



Electrolytic Capacitors

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Discontinued

Discontinued Series (not recommended for new design)

SP-Cap/ Conductive Polymer Aluminum Capacitors (Specialty Polymer Aluminum Capacitors)

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (μF)	Series	Endurance
CB	ECGC--B---R-	-40 °C to 105 °C	Low ESR	4 to 16	2.2 to 82	CD	-40 °C to 105 °C
SD	EEFSD-----	-40 °C to 105 °C	Low ESR	2 to 6.3	120 to 390	SX	-40 °C to 105 °C

Aluminum Electrolytic Capacitors (Surface Mount Type)

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (μF)	Series	Endurance
V-S	EEE---S---	+ 85 °C 1000 h	Dia 3 mm	4 to 50	0.1 to 22	Available upon request	
V-G	ECEV--G---R, P-	+105 °C 1000 h	Height 5.5 mm	6.3 to 50	0.1 to 470	V-HA	+105 °C 1000 h
V-A	ECEV--A---R, P	+ 85 °C 1000 h	Height 5.5 mm	4 to 50	0.1 to 1000	V-S	+ 85 °C 2000 h
	ECEV--A---NR, P	+ 85 °C 1000 h	Height 5.5 mm BP	6.3 to 50	0.22 to 47		
V-FE	EEVFE-----	+105 °C 1000 h	Low impedance	6.3 to 35	1 to 1000	V-FK	+105 °C 2000 to 5000 h
V-GG	ECEV--G---G	+105 °C 2000 h	Longlife	6.3 to 50	0.1 to 220	HB	+105 °C 2000 h
	ECEV--G---N	+105 °C 2000 h	Longlife Bi-polar	6.3 to 50	0.1 to 47	HB-BP	
V-TA	EEVTA-----	+125 °C 1000 h	For Automotive Application, Containing Pb	10 to 50	10 to 330	V-TG	+125 °C 1000 to 2000 h
V-TB	EEVTB-----	+125 °C 500 to 1000 h	Low temp. Characteristic stability type	10 to 50	10 to 330		
						V-TK	+125 °C 3000 h

Aluminum Electrolytic Capacitors (Radial Lead Type)

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (μF)	Series	Endurance
S SW S(High voltage)	ECEA--S-----	+ 85 °C 1000 h	Standard	10 to 50	1 to 100	M	+ 85 °C 2000 h
S Bi-polar	ECEA--N---S	+ 85 °C 2000 h	Bi-polar Standard	4 to 100	0.1 to 1000	SU-BP	+ 85 °C 2000 h
SU	ECEA--U-----	+ 85 °C 2000 h	Standard	6.3 to 450	0.1 to 15000	M	+ 85 °C 2000 h
K	ECEA--K-----	+ 85 °C 1000 h	Height 7 mm	6.3 to 50	0.1 to 100	KA	+ 85 °C 1000 h
KS(φ3)	ECEA--KK----	+ 85 °C 1000 h	Height 5 mm φ3×5	4 to 50	0.1 to 22	Available upon request	
KG	ECEA--KG-----	+105 °C 1000 h	Height 7 mm	6.3 to 50	0.1 to 220	GA	+105 °C 1000 h
SS	ECEA--SS---	+ 85 °C 2000 h	Low profile	6.3 to 50	3.3 to 4700	Available upon request	
Z	ECEA--Z----	+ 85 °C 2000 h	Low impedance	6.3 to 50	0.1 to 2200	FC	+105 °C 1000 to 5000 h
HF	ECEA--F----	+105 °C 2000 h	Low impedance	10 to 63	22 to 2200		
HFS	ECEA--FS---	+105 °C 1000 to 2000 h	Low impedance	6.3 to 63	0.47 to 4700		
HFE	ECEA--FE---	+105 °C 2000 h	Low impedance	6.3 to 100	3.3 to 15000		
HFG	ECA--FG----	+105 °C 2000 to 5000 h	Low impedance	6.3 to 63	0.1 to 15000		
HFQ	ECA--FQ----	+105 °C 1000 to 2000 h	Low impedance	6.3 to 63	6.8 to 15000		
HFZ	ECA--FZ----	+105 °C 5000 h	Low impedance	6.3 to 35	56 to 5600		
KF	ECA--KF----	+105 °C 1000 h	Height 7 mm, Low impedance	6.3 to 35	1 to 120		
ESM	ECEA--E---M	+ 85 °C 2000 h	Low impedance	10 to 50	0.1 to 220		
FA	EEUFA-----	+105 °C 2000 to 5000 h	Low impedance	6.3 to 63	68 to 15000		
FB	EEUFB-----	+105 °C 1000 to 2000 h	Low impedance	10 to 50	0.47 to 10000		
NHE	ECEA--GE---	+105 °C 2000 h	Longlife	6.3 to 450	0.1 to 15000	NHG	+105 °C 1000 to 2000 h
MH	ECA--MH---	+105 °C 1000 h	Longlife	6.3 to 100	0.1 to 22000		
NH	ECEA--G---S	+105 °C 2000 h	Longlife	6.3 to 100	0.47 to 4700		
NE	ECA--TE---	+105 °C 5000 to 7000 h	Longlife	10 to 63	0.47 to 3300	EB	+105 °C 5000 to 10000 h
NX	ECEA--NX---	+105 °C 5000 h	Longlife	6.3 to 50	0.047 to 2200		
3H	ECEA--T----	+125 °C 1000 h	High reliability	10 to 63	1 to 1000	TA	+125 °C 2000 h
MG	EEUMG----	+ 85 °C 2000 h	High ripple	160 to 450	2.2 to 470	Available upon request	
TH	ECEA--V---T	+105 °C 1000 h	Fixed time-interval circuit	10, 16, 25, 50	1 to 2200	NHG	+105 °C 1000 to 2000 h
MT	ECEA--M---T	+ 85 °C 1000 h	Time constant circuit	6.3 to 50	47 to 2200	M	+85 °C 2000 h
MS	ECEA--M---	+ 85 °C 2000 h	Low LC	10 to 50	0.1 to 100		
GA	EEUGA-----	+105 °C 2000 h	+105°C Standard	6.3 to 50	0.1 to 15000	NHG	+105 °C 1000 to 2000 h
EA	EEUEA-----	+105 °C 5000 h	Longlife	160 to 450	10 to 150	EE	+105 °C 8000 to 10000 h
Horizontal deflection current correction	ECEA--W----	+ 85 °C 2000 h	Horizontal deflection current correction for TV	25	3.5 to 10	Not available	

Discontinued Series (not recommended for new design)

Aluminum Electrolytic Capacitors (Snap-in Type)

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (μF)	Not available	
U	ECES--U---	+ 85 °C 2000 h	+ 85 °C Standard	16 to 450	0.1 to 1000		
UE	ECOS--U----	+ 85 °C 2000 h	+ 85 °C Standard	200 to 450	47 to 820		
NH	ECES--G----	+105 °C 2000 h	+ 85 °C Standard	16 to 250	100 to 22000		
NHE	ECOS--G----	+105 °C 2000 h	+ 105 °C Standard	10 to 450	33 to 39000		
NXA	ECOS--X---	+105 °C 2000 h	Longlife	160 to 400	39 to 1200		
EX	ECEC2EG--- ECOS2EG---	+105 °C 2000 h	For VDE-806 Standard	250	100 to 1200		
MC	ECEC--C--- ECES--C---	+105 °C 2000 h	For DC over voltage	200 to 450	39 to 1500		
UP	ECEC--P--- ECOS--P---	+ 85 °C 2000 h	+ 85 °C Standard	16 to 450	33 to 68000		
UQ	EETUQ-----	+ 85 °C 1000 h	+ 85 °C Standard	16 to 450	82 to 100000		
HA	ECEC--A--- ECOS--A---	+105 °C 2000 h	+ 105 °C Standard	10 to 400	100 to 22000		
HB	ECEC--B--- ECOS--B---	+105 °C 2000 h	+ 105 °C Standard	160 to 450	82 to 2200		
TU	ECET--U---	+ 85 °C 2000 h	Snap in Type Large Cap.	16 to 450	330 to 82000		
NH	ECET--G---	+105 °C 2000 h	+105 °C Standard	16 to 250	100 to 22000		
NHE	ECET--G---- ECOT--G----	+105 °C 2000 h	+105 °C Standard	16 to 450	47 to 22000		
MD	EETLD----- EETMD-----	+105 °C 2000 h	Over voltage resistant constrantion	200 to 400	56 to 1500		

Electric Double Layer Capacitors

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (F)	Series	Endurance
ST-S	EECS5RT----	+70 °C 1000 h	Taping	5.5	0.022 to 0.22	Not available	
EL	EECE0EL---	+70 °C 1000 h	Stacked Coin Type	2.5	0.47 to 2.0		
EM	EECEM---	+70 °C 500 h	S.M.T	2.5	0.2		
EN	EECEN---	+60 °C 500 h	S.M.T	3.3	0.2		
EP	EECEP---	+60 °C 250 h	S.M.T	3.3	0.033 to 0.03		
ER	EECER---	+60 °C 500 h	S.M.T	2.6	0.015		
AL	EECA0EL---	+70 °C 1000 h	Radial Lead Type	2.5	1.0 to 10	HZ	+70 °C 1000 h
HW	EECHW0D---	+70 °C 1000 h	Radial Lead Type	2.3	1.0 to 10		

(Production end schedule series)

Aluminum Electrolytic Capacitors (Snap-in Type)

Discontinued Product						Replacement	
Series	Part No.	Endurance	Features	Rated.W.V. (V)	Capacitance (F)	Series	Endurance
EE	EETEE-----	+105 °C 3000 h	High ripple	200 to 450	75 to 1800	Not available · Last shipment : 30/Jun/2015	
ED	EETED----	+105 °C 3000 h	High ripple	200 to 450	56 to 2200		
HC	EETHC-----	+105 °C 2000 h	+105 °C Standard	10 to 450	39 to 100000		
HD	EETHD-----	+105 °C 3000 h	Miniaturization High ripple	400 to 450	120 to 680		
XB	EETXB-----	+105 °C 7000 h	Longlife	160 to 450	39 to 2200		

Check Panasonic website for discontinued / revised product series specification.

<http://panasonic.net/id/>

■ ISO/QS Cer tified

(1) Quality Approval

Factory	Applicable Standard	Item	Organization Certificate Number	Acquisition Years
Capacitor Business Division Conductive Polymer Capacitor Division	ISO 9001	1.Aluminum Foil for Capacitors 2.Specialty Polymer Electrolytic Capacitors 3.Electric Double Layer Capacitors 4.Application units of Electric Double Layer Capacitors	JQA JQA-2524	Jul./ '98
Capacitor Business Division Aluminum Capacitor Division	ISO 9001	Aluminum Electrolytic Capacitors	JQA JQA-2524	Jul./ '98
	ISO/TS16949	Aluminum Electrolytic Capacitors	JQA JQA-AU0162-1	Feb./ '07
PIDMY Panasonic Industrial Devices Malaysia Sdn.Bhd	ISO 9001	Aluminum Electrolytic Capacitors	SIRIM AR0390	Jul./ '03
	ISO/TS16949	Aluminum Electrolytic Capacitors for Automotive Applications	SIRIM AR4429	Sep./ '07
PIDSG Panasonic Industrial Devices Singapore	ISO 9001	Specialty Polymer Electrolytic Capacitors	SGS SG94/04161	Feb./ '03

(2) Environment Approval

Factory	Applicable Standard	Item	Organization Certificate Number	Acquisition Years
Capacitor Business Division (Uji)	ISO 14001	1.Aluminum Electrolytic Capacitors (Including Polymer Aluminum Capacitors) 2.Electric Double Layer Capacitors 3.Aluminum Electrode Foils. The development, design, and manufacturing of the above-mentioned	JACO EC10J0027	Dec./ '96
Capacitor Business Division (Yamaguchi)	ISO 14001	The development, design, and manufacturing of Aluminum Electrolytic Capacitors	JACO EC10J0027	Dec./ '97
PIDMY Panasonic Industrial Devices Malaysia Sdn.Bhd	ISO 14001	The manufacturing of Aluminum Electrolytic Capacitors	SIRIM ER0127	Oct./ '98
PIDSG Panasonic Industrial Devices Singapore	ISO 14001	The design and manufacturing of Polymer Aluminum Capacitors	AJA AJA98/1151	Apr./ '98

SP-Cap/ Conductive Polymer Aluminum Capacitors

Standard

CD·CX (*UD·*UE)

CD

ESR : 18 mΩ (15 mΩ to 110 mΩ)
2 V to 16 V, 2.2 μF to 220 μF
1.8 mm Height

CX

ESR : 15 mΩ (12 mΩ to 15 mΩ)
2 V to 6.3 V, 100 μF to 560 μF
1.9 mm Height

*UD

ESR : 9 mΩ to 18 mΩ
2 V to 8 V, 68 μF to 470 μF
2.8 mm Height

*UE

ESR : 7 mΩ to 15 mΩ
4.2 mm Height

Low ESR

SL·SX·GX

SL

ESR : 9 mΩ
2 V to 6.3 V, 56 μF to 220 μF
1.8 mm Height

SX

ESR : 4.5 mΩ to 9 mΩ
2 V to 6.3 V, 82 μF to 560 μF
1.9 mm Height

GX

ESR : 3 mΩ
2 V to 2.5 V, 330 μF to 560 μF
1.9 mm Height

NEW High Voltage

NEW CS·CT·CX

CS

ESR : 40 mΩ
10 V to 25 V, 10 μF to 47 μF
1.1 mm Height

CT

ESR : 40 mΩ
10 V to 25 V, 22 μF to 68 μF
1.4 mm Height

CX

ESR : 40 mΩ
10 V to 25 V, 15 μF to 100 μF
1.9 mm Height

Miniaturized

MC

MC

ESR : 12 mΩ to 18 mΩ
2 V to 6.3 V, 47 μF to 120 μF
1.9 mm Height

Low ESL

LX

LX

ESR : 4.5 mΩ to 6 mΩ
2 V to 2.5 V, 330 μF to 470 μF
1.9 mm Height

(ESL : 50% less than current)

GX-L

GX-L

ESR : 3 mΩ
2 V to 2.5 V, 470 μF to 560 μF
1.9 mm Height

(ESL : 50% less than current)

Low Profile

Standard

NEW CS·CT (*FD)

CS

1.1 mm Height
ESR : 15 mΩ
4 V to 6.3 V, 68 μF to 120 μF

CT

1.4 mm Height
ESR : 15 mΩ
4 V to 6.3 V, 100 μF to 180 μF

*FD

1.1 mm Height
ESR : 28 mΩ to 40 mΩ
2 V to 12.5 V, 15 μF to 68 μF

Low ESR

NEW SS·ST

SS

1.1 mm Height
ESR : 6 mΩ
2 V to 2.5 V, 180 μF to 220 μF

ST

1.4 mm Height
ESR : 6 mΩ
2 V to 2.5 V, 270 μF to 330 μF

Low ESL

NEW LS·LT

LS

1.1 mm Height
ESR : 6 mΩ
2 V to 2.5 V, 180 μF to 220 μF

LT

1.4 mm Height
ESR : 6 mΩ
2 V to 2.5 V, 270 μF to 330 μF

(ESL : 50% less than current)

* Please contact us when the confirmation of details is necessary.

Surface Mount Type

SP-CapSeries: **CS, CT, CX**
(High Voltage Product)

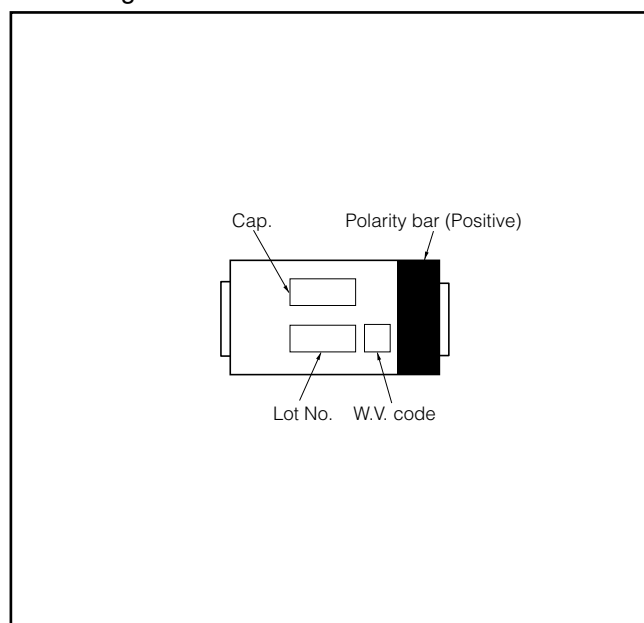
■ Features

- High voltage available using conductive specialty polymer.(10 V to 25V)
- Low profile 1.1 mm, 1.4 mm, 1.9 mm
- High temperature reflow soldering applicable.
- RoHS directive compliant

■ Specifications

Series & Size Code	CS	CT	CX
Category Temp. Range	−40 °C to +105 °C		
Rated W.V.Range	10 V.DC to 25 V.DC		
Nominal Cap.Range	10 μF to 47 μF	22 μF to 68 μF	15 μF to 100 μF
Capacitance Tolerance	±20 % (120 Hz / + 20 °C)		
DC Leakage Current	I ≤ 0.3 CV (μA) 2minutes		
tan δ	≤ 0.06 (120 Hz/+20 °C)		
Surge Voltage	Rated Working Voltage × 1.25 [10 V.DC to 16 V.DC], × 1.15 [20 V.DC to 25 V.DC](15 °C to 35 °C)		
Endurance	After applying rated working voltage for 2000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.		
	Capacitance change	±20% of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ Initial specified value	
Moisture resistance	After storing for 500 hours at 60 °C, 90 %		
	Capacitance change of initial measurd value	10 V.DC to 25 V.DC	
		+60, −20 %	
	tan δ	≤ 200 % of initial specified value	
DC leakage current	≤ Initial specified value		

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)

Series & Size Code	L ± 0.2	W1 ± 0.2	W2 ± 0.1	H	P ± 0.3
CS	7.3	4.3	2.4	1.1 ± 0.1	1.3
CT	7.3	4.3	2.4	1.4 ± 0.1	1.3
CX	7.3	4.3	2.4	1.9 ± 0.2	1.3
* Externals of figure are the reference.					

■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capaci- tance (±20 %) (μF)	Case Size			Specification		Part number	Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (mΩ max.)	*3 Reflow condition : 260 °C	
CS	10	47	7.3	4.3	1.1	3.2	40	EEFCS1A470R	3500
	16	15	7.3	4.3	1.1	3.2	40	EEFCS1C150R	3500
		22	7.3	4.3	1.1	3.2	40	EEFCS1C220R	3500
		33	7.3	4.3	1.1	3.2	40	EEFCS1C330R	3500
	20	10	7.3	4.3	1.1	3.2	40	EEFCS1D100R	3500
		15	7.3	4.3	1.1	3.2	40	EEFCS1D150R	3500
		22	7.3	4.3	1.1	3.2	40	EEFCS1D220R	3500
	25	10	7.3	4.3	1.1	3.2	40	EEFCS1E100R	3500
		15	7.3	4.3	1.1	3.2	40	EEFCS1E150R	3500
CT	10	68	7.3	4.3	1.4	3.2	40	EEFCT1A680R	3500
	16	47	7.3	4.3	1.4	3.2	40	EEFCT1C470R	3500
	20	33	7.3	4.3	1.4	3.2	40	EEFCT1D330R	3500
		47	7.3	4.3	1.4	3.2	40	EEFCT1D470R	3500
	25	22	7.3	4.3	1.4	3.2	40	EEFCT1E220R	3500
CX	10	47	7.3	4.3	1.9	3.2	40	EEFCX1A470R	3500
		68	7.3	4.3	1.9	3.2	40	EEFCX1A680R	3500
		100	7.3	4.3	1.9	3.2	40	EEFCX1A101R	3500
	16	15	7.3	4.3	1.9	3.2	40	EEFCX1C150R	3500
		22	7.3	4.3	1.9	3.2	40	EEFCX1C220R	3500
		33	7.3	4.3	1.9	3.2	40	EEFCX1C330R	3500
		47	7.3	4.3	1.9	3.2	40	EEFCX1C470R	3500
		68	7.3	4.3	1.9	3.2	40	EEFCX1C680R	3500
	20	22	7.3	4.3	1.9	3.2	40	EEFCX1D220R	3500
		33	7.3	4.3	1.9	3.2	40	EEFCX1D330R	3500
		47	7.3	4.3	1.9	3.2	40	EEFCX1D470R	3500
		56	7.3	4.3	1.9	3.2	40	EEFCX1D560R	3500
	25	15	7.3	4.3	1.9	3.2	40	EEFCX1E150R	3500
		22	7.3	4.3	1.9	3.2	40	EEFCX1E220R	3500
		33	7.3	4.3	1.9	3.2	40	EEFCX1E330R	3500

*1: Ripple current (100 kHz/ +45°C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

Temperature Compensation Multipliers for Ripple Current

≤ 45 °C	45 °C < T ≤ 85 °C	85 °C < T ≤ 105 °C
1.0	0.8	0.5

Surface Mount Type

SP-Cap

Series: **SR, LR, SS, LS, ST, LT, CS, CT** (Low profile)

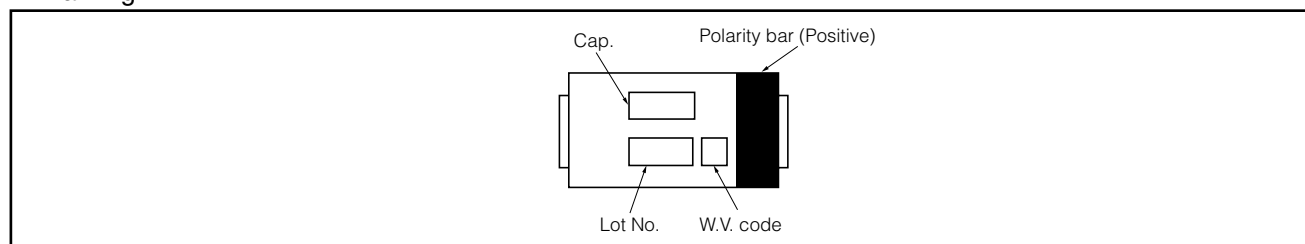
■ Features

- Low profile 1.0 mm(max.), 1.1 mm, 1.4 mm
- Large capacitance & Low ESR 4.5 mΩ (SR, LR series), 6 mΩ (SS, ST, LS, LT series)
- Low ESL by structure of SP-Cap 50% ESL of current products.
(LR, LS, LT series)
- High temperature reflow soldering applicable.
(Peak : 260 °C 10s, main heating : 230 °C 40s)
- RoHS directive compliant

■ Specifications

Series & Size Code	SR	LR	SS	LS	ST	LT	CS	CT
Category Temp. Range	-40 °C to +105 °C							
Rated W.V.Range	2 V.DC to 6.3 V.DC		2 V.DC to 2.5 V.DC				4 V.DC to 6.3 V.DC	
Nominal Cap.Range	68 μF to 220 μF		180 μF to 220 μF		270 μF to 330 μF		68 μF to 120 μF	100 μF to 180 μF
Capacitance Tolerance	±20 % (120 Hz / + 20 °C)							
DC Leakage Current	I ≤ 0.1 CV (μA) 2minutes							
tan δ	≤ 0.06 (120 Hz/+20 °C)							
Surge Voltage	Rated Working Voltage × 1.25 (15 °C to 35 °C)							
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.							
	Capacitance change		±10% of initial measured value					
	tan δ		≤ Initial specified value					
	DC leakage current		≤ Initial specified value					
Moisture resistance	After storing for 500 hours at 60 °C, 90 %							
	Capacitance change of initial measurd value		2, 2.5 V.DC	4 V.DC	6.3 V.DC			
			+70, -20 %	+60, -20 %	+50, -20 %			
	tan δ		≤ 200 % of initial specified value					
DC leakage current		≤ Initial specified value						

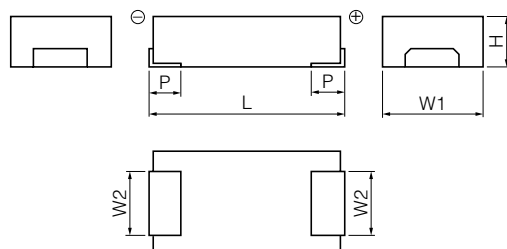
■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)

SR, SS, ST, CS, CT series



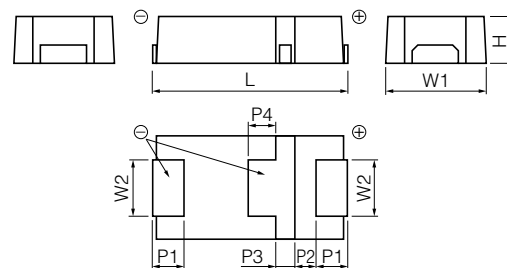
Series & Size Code	L±0.2	W1±0.2	W2±0.1	H±0.1	P±0.3
SR	7.3	4.3	2.4	1.0*1	1.3
SS, CS	7.3	4.3	2.4	1.1	1.3
ST, CT	7.3	4.3	2.4	1.4	1.3

* Externals of figure are the reference.

*1 : Maximum

(Unit : mm)

LR, LS, LT series



Series & Size Code	L±0.2	W1±0.2	W2±0.1	H±0.1	P1±0.3	P2±0.1	P3±0.2	P4±0.2
LR	7.3	4.3	2.4	1.0*1	1.3	1.1	0.7	1.4
LS	7.3	4.3	2.4	1.1	1.3	1.1	0.7	1.4
LT	7.3	4.3	2.4	1.4	1.3	1.1	0.7	1.4

* Externals of figure are the reference.

*1 : Maximum

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Jul. 2014

■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capaci- tance (±20 %) (μF)	Case Size			Specification		Part number Reflow condition : 260 °C ^{*3}	The number of terminals		Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	^{*1} Ripple current (Ar.m.s.)	^{*2} ESR (mΩ max.)		2	3	
SR	2	220	7.3	4.3	0.9	3.8	4.5	EEFSR0D221R4	○		3500
	2	220	7.3	4.3	0.9	3.5	6	EEFSR0D221R	○		3500
	2.5	180	7.3	4.3	0.9	3.8	4.5	EEFSR0E181R4	○		3500
	2.5	180	7.3	4.3	0.9	3.5	6	EEFSR0E181R	○		3500
	4	120	7.3	4.3	0.9	3.0	9	EEFSR0G121R	○		3500
	6.3	68	7.3	4.3	0.9	3.0	9	EEFSR0J680R	○		3500
LR	2	220	7.3	4.3	0.9	3.8	4.5	EEFLR0D221R4		○	3500
	2	220	7.3	4.3	0.9	3.5	6	EEFLR0D221R		○	3500
	2.5	180	7.3	4.3	0.9	3.8	4.5	EEFLR0E181R4		○	3500
	2.5	180	7.3	4.3	0.9	3.5	6	EEFLR0E181R		○	3500
	4	120	7.3	4.3	0.9	3.0	9	EEFLR0G121R		○	3500
	6.3	68	7.3	4.3	0.9	3.0	9	EEFLR0J680R		○	3500
SS	2	220	7.3	4.3	1.1	3.5	6	EEFSS0D221R	○		3500
	2.5	180	7.3	4.3	1.1	3.5	6	EEFSS0E181R	○		3500
LS	2	220	7.3	4.3	1.1	3.5	6	EEFLS0D221R		○	3500
	2.5	180	7.3	4.3	1.1	3.5	6	EEFLS0E181R		○	3500
ST	2	330	7.3	4.3	1.4	3.5	6	EEFST0D331R	○		3500
	2.5	270	7.3	4.3	1.4	3.5	6	EEFST0E271R	○		3500
LT	2	330	7.3	4.3	1.4	3.5	6	EEFLT0D331R		○	3500
	2.5	270	7.3	4.3	1.4	3.5	6	EEFLT0E271R		○	3500
CS	4	120	7.3	4.3	1.1	2.7	15	EEFCS0G121R	○		3500
	6.3	68	7.3	4.3	1.1	2.7	15	EEFCS0J680R	○		3500
CT	4	180	7.3	4.3	1.4	2.7	15	EEFCT0G181R	○		3500
	6.3	100	7.3	4.3	1.4	2.7	15	EEFCT0J101R	○		3500

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

Surface Mount Type **SP-Cap**

Series: **FD, CD, CX, UD, UE**



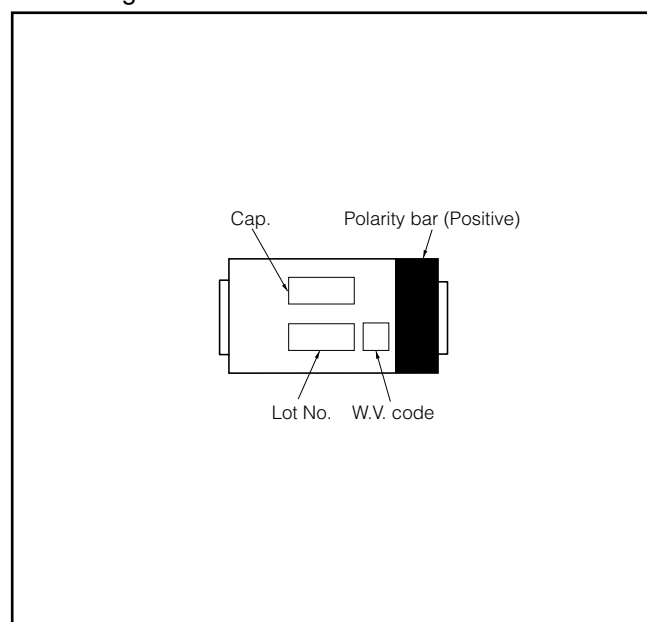
■ Features

- Low ESR
- Excellent Noise-absorbent Characteristics
- RoHS directive compliant

■ Specifications

Series & Size Code	FD	CD	CX	UD	UE
Category Temp. Range	-40 °C to +105 °C				
Rated W.V.Range	2 V.DC to 12.5 V.DC	2 V.DC to 16 V.DC	2 V.DC to 6.3 V.DC	2 V.DC to 8 V.DC	2 V.DC to 8 V.DC
Nominal Cap.Range	15 μF to 68 μF	2.2 μF to 220 μF	100 μF to 560 μF	68 μF to 470 μF	100 μF to 560 μF
Capacitance Tolerance	±20 %				
DC Leakage Current	Reflow 240 °C : I ≤ 0.06 CV (μA) 2minutes (2 V.DC to 4 V.DC) I ≤ 0.04 CV or 3 (μA) 2 minutes (6.3 V.DC to 16 V.DC) (Whichever is greater) Reflow 260 °C : I ≤ 0.1 CV (μA) 2 minutes				
tan δ	≤ 0.06 (120 Hz/+20 °C)			≤0.10 (120 Hz/+20 °C)	
Surge Voltage	Rated Working Voltage × 1.25 (15 °C to 35 °C)				
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.				
	Capacitance change	±10% of initial measured value			
	tan δ	≤ Initial specified value			
	DC leakage current	≤ Initial specified value			
Moisture resistance	After storing for 500 hours at 60 °C, 90 %				
	Capacitance change of initial measurd value	2, 2.5 V.DC	4 V.DC	6.3 V.DC	8 V.DC to 16 V.DC
		+70, -20 %	+60, -20 %	+50, -20 %	+40, -20 %
	tan δ	≤ 200 % of initial specified value			
	DC leakage current	≤ Initial specified value			

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)

Series & Size Code	L±0.2	W1±0.2	W2±0.1	H	P±0.3
FD	7.3	4.3	2.4	1.1±0.1	1.3
CD	7.3	4.3	2.4	1.8±0.1	1.3
CX	7.3	4.3	2.4	1.9±0.2	1.3
UD	7.3	4.3	2.4	2.8±0.2	1.3
UE	7.3	4.3	2.4	4.2±0.1	1.3
* Externals of figure are the reference.					

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Standard Products

○ : available, — : not available

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number	Reflow condition		Min. Packaging Q'ty (pcs)	
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (mΩ max.)		240 °C *3	260 °C *3		
FD	2	68	7.3	4.3	1.1	2.0	28	EEFFD0D680R *5	○	—	3500	
	2.5	56	7.3	4.3	1.1	2.0	28	EEFFD0E560R *5	○	—	3500	
	4	39	7.3	4.3	1.1	2.0	28	EEFFD0G390R *5	○	—	3500	
		47	7.3	4.3	1.1	2.0	28	EEFFD0G470R *5	○	—	3500	
	6.3	33	7.3	4.3	1.1	2.0	28	EEFFD0J330R *5	○	—	3500	
	8	22	7.3	4.3	1.1	2.0	28	EEFFD0K220R *5	○	—	3500	
	12.5	15	7.3	4.3	1.1	1.4	40	EEFFD1B150R *5	○	—	3500	
CD	2	100	7.3	4.3	1.8	2.5	18	EEFCD0D101ER	*4	○	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0D101XE	*4	○	3500	
		120	7.3	4.3	1.8	2.5	18	EEFCD0D121ER	*4	○	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0D121XE	*4	○	3500	
		150	7.3	4.3	1.8	2.5	18	EEFCD0D151ER	*4	○	3500	
		180	7.3	4.3	1.8	2.5	18	EEFCD0D181ER	*4	○	3500	
	2.5	220	7.3	4.3	1.8	2.5	18	EEFCD0D221ER	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0E820ER	*4	○	3500	
		82	7.3	4.3	1.8	2.5	18	EEFCD0E820XE	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0E101ER	*4	○	3500	
		100	7.3	4.3	1.8	2.7	15	EEFCD0E101XE	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0E121ER	*4	○	3500	
	4	150	7.3	4.3	1.8	2.5	18	EEFCD0E151ER	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0G560ER	*4	○	3500	
		56	7.3	4.3	1.8	2.7	15	EEFCD0G560XE	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0G680ER	*4	○	3500	
		68	7.3	4.3	1.8	2.7	15	EEFCD0G680XE	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0G820ER	*4	○	3500	
	6.3	82	7.3	4.3	1.8	2.7	15	EEFCD0G820XE	*4	○	3500	
			7.3	4.3	1.8	2.5	18	EEFCD0G101ER	*4	○	3500	
		10	7.3	4.3	1.8	1.4	55	EEFCD0J100ER	*4	○	3500	
		22	7.3	4.3	1.8	1.6	40	EEFCD0J220ER	*4	○	3500	
		33	7.3	4.3	1.8	2.0	28	EEFCD0J330ER	*4	○	3500	
		47	7.3	4.3	1.8	2.5	18	EEFCD0J470ER	*4	○	3500	
	7.3		4.3	1.8	2.7	15	EEFCD0J470XE	*4	○	3500		
	8	68	7.3	4.3	1.8	2.5	18	EEFCD0J680ER	*4	○	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0J680XE	*4	○	3500	
		8.2	7.3	4.3	1.8	1.4	55	EEFCD0K8R2ER	*4	○	3500	
		15	7.3	4.3	1.8	1.6	40	EEFCD0K150ER	*4	○	3500	
		22	7.3	4.3	1.8	2.0	28	EEFCD0K220ER	*4	○	3500	
		33	7.3	4.3	1.8	2.5	18	EEFCD0K330ER	*4	○	3500	
	10	47	7.3	4.3	1.8	1.8	25	EEFCD0K470ER	*4	○	3500	
		22	7.3	4.3	1.8	1.6	30	EEFCD1A220ER	—	○	3500	
		33	7.3	4.3	1.8	1.8	25	EEFCD1A330ER	—	○	3500	
		39	7.3	4.3	1.8	1.8	25	EEFCD1A390ER	—	○	3500	
		12.5	4.7	7.3	4.3	1.8	1.0	80	EEFCD1B4R7R *5	○	—	3500
			10	7.3	4.3	1.8	1.0	60	EEFCD1B100R *5	○	—	3500
	16	15	7.3	4.3	1.8	1.3	50	EEFCD1B150R *5	○	—	3500	
			22	7.3	4.3	1.8	1.6	30	EEFCD1B220R *5	○	—	3500
		2.2	7.3	4.3	1.8	1.0	110	EEFCD1C2R2R *5	○	—	3500	
		4.7	7.3	4.3	1.8	1.0	80	EEFCD1C4R7R *5	○	—	3500	
		6.8	7.3	4.3	1.8	1.0	70	EEFCD1C6R8R *5	○	—	3500	
		8.2	7.3	4.3	1.8	1.3	45	EEFCD1C8R2R *5	○	—	3500	
CX	2	220	7.3	4.3	1.9	2.7	15	EEFCX0D221R	—	○	3500	
		270	7.3	4.3	1.9	3.0	12	EEFCX0D271XR	—	○	3500	
		330	7.3	4.3	1.9	2.7	15	EEFCX0D331R	—	○	3500	
			7.3	4.3	1.9	3.0	12	EEFCX0D331XR	—	○	3500	
		390	7.3	4.3	1.9	2.7	15	EEFCX0D391R	—	○	3500	
		470	7.3	4.3	1.9	2.7	15	EEFCX0D471R	—	○	3500	
	2.5	560	7.3	4.3	1.9	2.7	15	EEFCX0D561R	—	○	3500	
		220	7.3	4.3	1.9	2.7	15	EEFCX0E221R	—	○	3500	
		330	7.3	4.3	1.9	2.7	15	EEFCX0E331R	—	○	3500	
		390	7.3	4.3	1.9	2.7	15	EEFCX0E391R	—	○	3500	
		470	7.3	4.3	1.9	2.7	15	EEFCX0E471R	—	○	3500	
		150	7.3	4.3	1.9	2.7	15	EEFCX0G151R	—	○	3500	
	4	180	7.3	4.3	1.9	2.7	15	EEFCX0G181R	—	○	3500	
			7.3	4.3	1.9	3.0	12	EEFCX0G181XR	—	○	3500	
		220	7.3	4.3	1.9	2.7	15	EEFCX0G221R	—	○	3500	
			7.3	4.3	1.9	3.0	12	EEFCX0G221XR	—	○	3500	
		270	7.3	4.3	1.9	2.7	15	EEFCX0G271R	—	○	3500	
		6.3	100	7.3	4.3	1.9	2.7	15	EEFCX0J101R	—	○	3500
	120		7.3	4.3	1.9	2.7	15	EEFCX0J121R	—	○	3500	
	150		7.3	4.3	1.9	2.7	15	EEFCX0J151R	—	○	3500	
			7.3	4.3	1.9	3.0	12	EEFCX0J151XR	—	○	3500	
	180	7.3	4.3	1.9	2.7	15	EEFCX0J181R	—	○	3500		

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

*4: Please use high temperature Lead-Free reflow (260 °C) for new design.

*5: In the case of new design please contact us.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Standard Products

○ : available, — : not available

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number	Reflow condition		Min. Packaging Q'ty (pcs)	
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (mΩ max.)		240 °C *3	260 °C *3		
UD	2	330	7.3	4.3	2.8	3.0	15	EEFUD0D331ER *5	*4	○	2000	
			7.3	4.3	2.8	3.3	12	EEFUD0D331XE *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0D331LE *5	*4	○	2000	
		390	7.3	4.3	2.8	3.0	15	EEFUD0D391ER *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0D391LE *5	*4	○	2000	
	2.5	470	7.3	4.3	2.8	3.4	9	EEFUD0D471LE *5	*4	○	2000	
			7.3	4.3	2.8	3.0	15	EEFUD0E221ER *5	*4	○	2000	
			7.3	4.3	2.8	3.3	12	EEFUD0E221XE *5	*4	○	2000	
		270	7.3	4.3	2.8	3.4	9	EEFUD0E221LE *5	*4	○	2000	
			7.3	4.3	2.8	3.0	15	EEFUD0E271ER *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0E271LE *5	*4	○	2000	
		4	120	7.3	4.3	2.8	3.0	15	EEFUD0G121ER *5	*4	○	2000
				7.3	4.3	2.8	3.4	12	EEFUD0G121XE *5	*4	○	2000
	150		7.3	4.3	2.8	3.0	15	EEFUD0G151ER *5	*4	○	2000	
			7.3	4.3	2.8	3.3	12	EEFUD0G151XE *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0G151LE *5	*4	○	2000	
	180		7.3	4.3	2.8	2.5	18	EEFUD0G181ER *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0G181LE *5	*4	○	2000	
	6.3	100	7.3	4.3	2.8	3.0	15	EEFUD0J101ER *5	*4	○	2000	
			7.3	4.3	2.8	3.3	12	EEFUD0J101XE *5	*4	○	2000	
		120	7.3	4.3	2.8	3.0	15	EEFUD0J121ER *5	*4	○	2000	
			7.3	4.3	2.8	3.3	12	EEFUD0J121XE *5	*4	○	2000	
			7.3	4.3	2.8	3.4	9	EEFUD0J121LR *5	○	—	2000	
			7.3	4.3	2.8	2.5	18	EEFUD0J151ER *5	*4	○	2000	
		150	7.3	4.3	2.8	3.4	9	EEFUD0J151LR *5	○	—	2000	
			68	7.3	4.3	2.8	3.0	15	EEFUD0K680ER	*4	○	2000
		8	100	7.3	4.3	2.8	2.5	18	EEFUD0K101ER	*4	○	2000
UE	2	270	7.3	4.3	4.2	3.3	12	EEFUE0D271ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0D271XE *5	*4	○	2000	
		330	7.3	4.3	4.2	3.3	12	EEFUE0D331ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0D331XE *5	*4	○	2000	
		390	7.3	4.3	4.2	3.3	12	EEFUE0D391ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0D391XE *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0D391LE *5	*4	○	2000	
			7.3	4.3	4.2	3.3	12	EEFUE0D471ER *5	*4	○	2000	
		470	7.3	4.3	4.2	3.5	10	EEFUE0D471XE *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0D471LE *5	*4	○	2000	
			7.3	4.3	4.2	3.3	12	EEFUE0D561ER *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0D561LE *5	*4	○	2000	
	2.5	220	7.3	4.3	4.2	3.3	12	EEFUE0E221ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0E221XE *5	*4	○	2000	
		270	7.3	4.3	4.2	3.3	12	EEFUE0E271ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0E271XE *5	*4	○	2000	
		330	7.3	4.3	4.2	3.3	12	EEFUE0E331ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0E331XE *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0E331LE *5	*4	○	2000	
			7.3	4.3	4.2	3.3	12	EEFUE0E391ER *5	*4	○	2000	
		390	7.3	4.3	4.2	3.7	7	EEFUE0E391LE *5	*4	○	2000	
			7.3	4.3	4.2	3.3	12	EEFUE0E471ER *5	*4	○	2000	
		470	7.3	4.3	4.2	3.7	7	EEFUE0E471LE *5	*4	○	2000	
	4	180	7.3	4.3	4.2	3.3	12	EEFUE0G181ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0G181XE *5	*4	○	2000	
		220	7.3	4.3	4.2	3.3	12	EEFUE0G221ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0G221XE *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0G221LE *5	*4	○	2000	
		270	7.3	4.3	4.2	3.3	12	EEFUE0G271ER *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0G271LE *5	*4	○	2000	
	330	7.3	4.3	4.2	3.3	12	EEFUE0G331ER	*4	○	2000		
	6.3	150	7.3	4.3	4.2	3.3	12	EEFUE0J151ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0J151XE *5	*4	○	2000	
		180	7.3	4.3	4.2	3.3	12	EEFUE0J181ER *5	*4	○	2000	
			7.3	4.3	4.2	3.5	10	EEFUE0J181XE *5	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0J181LR *5	○	—	2000	
		220	7.3	4.3	4.2	3.0	15	EEFUE0J221ER	*4	○	2000	
			7.3	4.3	4.2	3.7	7	EEFUE0J221LR *5	○	—	2000	
	8	100	7.3	4.3	4.2	3.3	12	EEFUE0K101ER *5	*4	○	2000	
		150	7.3	4.3	4.2	3.0	15	EEFUE0K151ER	*4	○	2000	

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

*4: Please use high temperature Lead-Free reflow (260 °C) for new design.

*5: In the case of new design please contact us.

Surface Mount Type

SP-Cap

Series: **S**



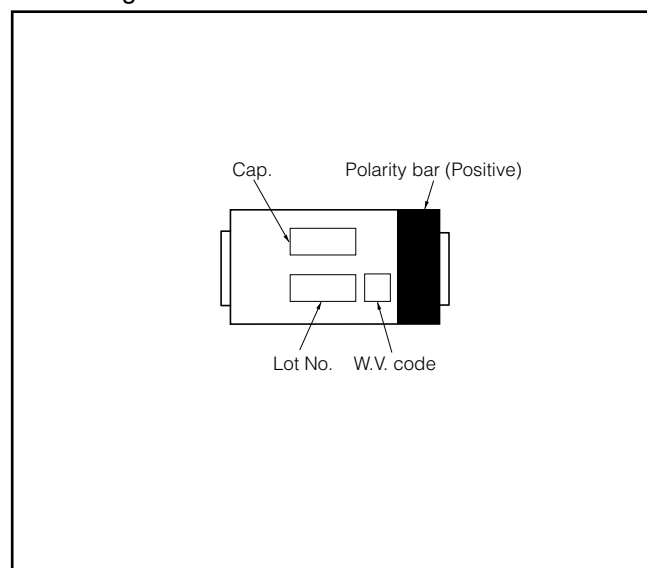
■ Features

- Super Low-ESR (4.5 mΩ to 9 mΩ)
- Lower ESR and Higher Capacitance at the same case size as conventional products.
- Excellent Noise-absorbent Characteristics
- High Ripple Current
- RoHS directive compliant

■ Specifications

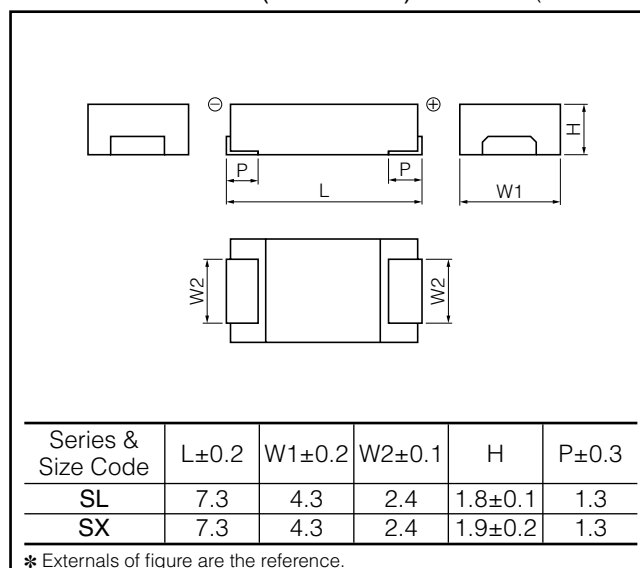
Series & Size Code	SL		SX	
Category Temp. Range	−40 °C to +105 °C			
Rated W.V.Range	2 V.DC to 6.3 V.DC			
Nominal Cap.Range	56 μF to 220 μF		82 μF to 560 μF	
Capacitance Tolerance	±20 %			
DC Leakage Current	Reflow 240 °C : I ≤ 0.06 CV (μA) 2 minutes (2 V.DC to 4 V.DC) I ≤ 0.04 CV (μA) 2 minutes (6.3 V.DC) Reflow 260 °C : I ≤ 0.1 CV (μA) 2 minutes			
tan δ	≤ 0.06 (120 Hz/+20 °C)			
Surge Voltage	Rated Working Voltage × 1.25 (15 °C to 35 °C)			
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.			
	Capacitance change	±10% of initial measured value		
	tan δ	≤ Initial specified value		
	DC leakage current	≤ Initial specified value		
Moisture resistance	After storing for 500 hours at 60 °C, 90 %			
	Capacitance change of initial measurd value	2, 2.5 V.DC	4 V.DC	6.3 V.DC
		+70, −20 %	+60, −20 %	+50, −20 %
	tan δ	≤ 200 % of initial specified value		
	DC leakage current	≤ Initial specified value		

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)



Low ESR Products

○ : available, — : not available

Series & Size Code	Rated W.V. (V.DC)	Capaci- tance (±20 %) (μF)	Case Size			Specification		Part number	Reflow condition		Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (mΩ max.)		240 °C *3	260 °C *3	
SL	2	100	7.3	4.3	1.8	3.0	9	EEFSL0D101ER	*4	○	3500
		120	7.3	4.3	1.8	3.0	9	EEFSL0D121ER	*4	○	3500
		150	7.3	4.3	1.8	3.0	9	EEFSL0D151ER	*4	○	3500
		180	7.3	4.3	1.8	3.0	9	EEFSL0D181ER	*4	○	3500
		220	7.3	4.3	1.8	3.0	9	EEFSL0D221ER	*4	○	3500
	2.5	100	7.3	4.3	1.8	3.0	9	EEFSL0E101ER	*4	○	3500
		120	7.3	4.3	1.8	3.0	9	EEFSL0E121ER	*4	○	3500
		150	7.3	4.3	1.8	3.0	9	EEFSL0E151ER	*4	○	3500
	4	82	7.3	4.3	1.8	3.0	9	EEFSL0G820ER	*4	○	3500
	6.3	56	7.3	4.3	1.8	3.0	9	EEFSL0J560R *5	○	—	3500
SX	2	180	7.3	4.3	1.9	3.0	9	EEFSX0D181ER	*4	○	3500
		220	7.3	4.3	1.9	3.0	9	EEFSX0D221ER	*4	○	3500
		270	7.3	4.3	1.9	3.0	9	EEFSX0D271ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0D271XE	*4	○	3500
			7.3	4.3	1.9	3.8	4.5	EEFSX0D271E4	—	○	3500
		330	7.3	4.3	1.9	3.0	9	EEFSX0D331ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0D331XE	*4	○	3500
			7.3	4.3	1.9	3.8	4.5	EEFSX0D331E4	—	○	3500
		390	7.3	4.3	1.9	3.0	9	EEFSX0D391ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0D391XE	*4	○	3500
			7.3	4.3	1.9	4.0	4.5	EEFSX0D391E4	—	○	3500
		470	7.3	4.3	1.9	3.0	9	EEFSX0D471ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0D471XE	*4	○	3500
			7.3	4.3	1.9	4.0	4.5	EEFSX0D471E4	—	○	3500
		560	7.3	4.3	1.9	3.8	4.5	EEFSX0D561E4	—	○	3500
	2.5	150	7.3	4.3	1.9	3.0	9	EEFSX0E151ER	*4	○	3500
		180	7.3	4.3	1.9	3.0	9	EEFSX0E181ER	*4	○	3500
		220	7.3	4.3	1.9	3.0	9	EEFSX0E221ER	*4	○	3500
			7.3	4.3	1.9	3.5	7	EEFSX0E221E7	—	○	3500
		270	7.3	4.3	1.9	3.5	7	EEFSX0E271E7	—	○	3500
		330	7.3	4.3	1.9	3.0	9	EEFSX0E331ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0E331XE	*4	○	3500
			7.3	4.3	1.9	4.0	4.5	EEFSX0E331E4	—	○	3500
		390	7.3	4.3	1.9	3.0	9	EEFSX0E391ER	*4	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0E391XE	*4	○	3500
			7.3	4.3	1.9	4.0	4.5	EEFSX0E391E4	—	○	3500
		470	7.3	4.3	1.9	3.0	9	EEFSX0E471ER	—	○	3500
			7.3	4.3	1.9	3.5	6	EEFSX0E471XE	—	○	3500
			7.3	4.3	1.9	3.8	4.5	EEFSX0E471E4	—	○	3500
	4	82	7.3	4.3	1.9	3.0	9	EEFSX0G820ER	*4	○	3500
		100	7.3	4.3	1.9	3.0	9	EEFSX0G101ER	*4	○	3500
		150	7.3	4.3	1.9	3.0	9	EEFSX0G151ER	—	○	3500
			7.3	4.3	1.9	3.5	7	EEFSX0G151E7	—	○	3500
		180	7.3	4.3	1.9	3.0	9	EEFSX0G181ER	—	○	3500
		220	7.3	4.3	1.9	3.0	9	EEFSX0G221ER	—	○	3500
	6.3	120	7.3	4.3	1.9	3.5	7	EEFSX0J121E7	—	○	3500
		150	7.3	4.3	1.9	3.0	9	EEFSX0J151ER	—	○	3500

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

*4: Please use high temperature Lead-Free reflow (260 °C) for new design.

*5: In the case of new design please contact us.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Surface Mount Type

SP-Cap

Series: **G**



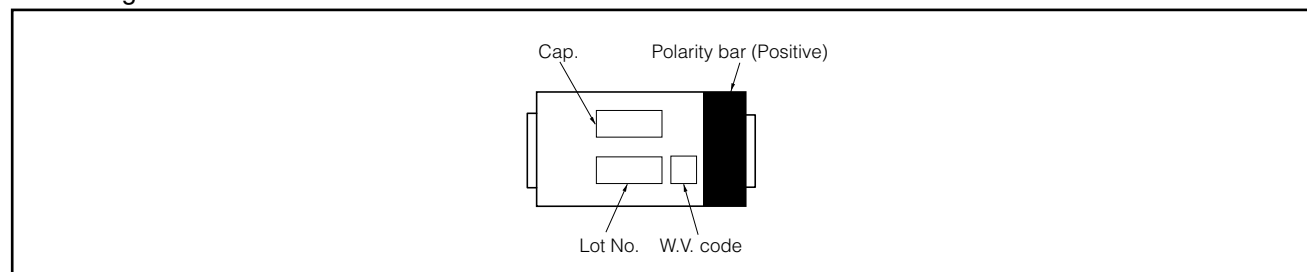
■ Features

- Super Low-ESR (3 mΩ)
- High temperature reflow soldering applicable
(Peak : 260 °C 10s, main heating : 230 °C 40s)
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C	
Rated W.V.Range	2 V.DC to 2.5 V.DC	
Nominal Cap.Range	330 μF to 560 μF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$I \leq 0.1 \text{ CV } (\mu\text{A})$ 2 minutes	
$\tan \delta$	≤ 0.06 (120 Hz/+20 °C)	
Surge Voltage	Rated Working Voltage $\times 1.25$ (15 °C to 35 °C)	
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.	
	Capacitance change	±10% of initial measured value
	$\tan \delta$	$\leq$ Initial specified value
	DC leakage current	$\leq$ Initial specified value
Moisture resistance	After storing for 500 hours at 60 °C, 90 %	
	Capacitance change of initial measured value	2 V.DC
		+70, -20 %
	$\tan \delta$	≤ 200 % of initial specified value
	DC leakage current	$\leq$ Initial specified value

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)

(Unit : mm)

2 terminals				
$L \pm 0.2$	$W1 \pm 0.2$	$W2 \pm 0.1$	$H \pm 0.2$	$P \pm 0.3$
7.3	4.3	2.4	1.9	1.3
* Externals of figure are the reference.				

3 terminals							
$L \pm 0.2$	$W1 \pm 0.2$	$W2 \pm 0.1$	$H \pm 0.2$	$P1 \pm 0.3$	$P2 \pm 0.1$	$P3 \pm 0.2$	$P4 \pm 0.2$
7.3	4.3	2.4	1.9	1.3	1.1	0.7	1.4
* Externals of figure are the reference.							

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Oct. 2013

■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number	The number of terminals		Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (Ω max.)	*3 Reflow condition : 260 °C [Proposal]			
						2	3				
GX	2	330	7.3	4.3	1.9	4.0	0.003	EEFGX0D331R	○		3500
		470	7.3	4.3	1.9	4.0	0.003	EEFGX0D471R	○		3500
		470	7.3	4.3	1.9	4.0	0.003	EEFGX0D471L		○	3500
		560	7.3	4.3	1.9	4.0	0.003	EEFGX0D561R	○		3500
		560	7.3	4.3	1.9	4.0	0.003	EEFGX0D561L		○	3500
	2.5	470	7.3	4.3	1.9	4.0	0.003	EEFGX0E471R	○		3500
		470	7.3	4.3	1.9	4.0	0.003	EEFGX0E471L		○	3500

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

Surface Mount Type

SP-Cap

Series: **L**



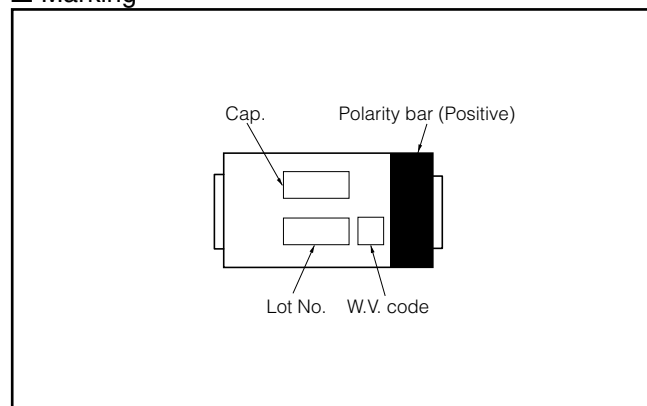
■ Features

- Low ESL by structure of SP-Cap 50% ESL of current products
- Super Low-ESR (4.5 mΩ)
- High temperature reflow soldering applicable
(Peak : 260 °C 10s, main heating : 230 °C 40s)
- RoHS directive compliant

■ Specifications

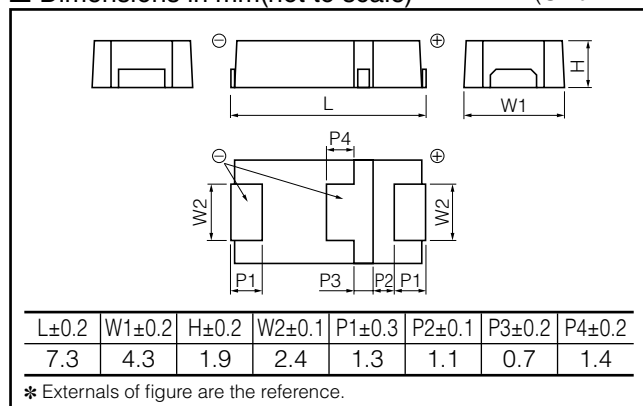
Category Temp. Range	-40 °C to +105 °C	
Rated W.V.Range	2 to 2.5 V.DC	
Nominal Cap.Range	330 μF to 560 μF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	I ≤ 0.1 CV (μA) 2 minutes	
tan δ	≤ 0.06 (120 Hz/+20 °C)	
Surge Voltage	Rated Working Voltage × 1.25 (15 °C to 35 °C)	
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.	
	Capacitance change	±10% of initial measured value
	tan δ	≤ Initial specified value
	DC leakage current	≤ Initial specified value
Moisture resistance	After storing for 500 hours at 60 °C, 90 %	
	Capacitance change of initial measurd value	2 to 2.5 V.DC +70, -20 %
	tan δ	≤ 200 % of initial specified value
	DC leakage current	≤ Initial specified value

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number	Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	Ripple current *1 (Ar.m.s.)	ESR *2 (mΩ max.)		
LX	2	330	7.3	4.3	1.9	3.5	6	EEFLX0D331R	3500
			7.3	4.3	1.9	3.8	4.5	EEFLX0D331R4	3500
		470	7.3	4.3	1.9	3.5	6	EEFLX0D471R	3500
			7.3	4.3	1.9	3.8	4.5	EEFLX0D471R4	3500
		560	7.3	4.3	1.9	3.5	6	EEFLX0D561R	3500
			7.3	4.3	1.9	3.8	4.5	EEFLX0D561R4	3500
	2.5	330	7.3	4.3	1.9	3.5	6	EEFLX0E331R	3500
			7.3	4.3	1.9	3.8	4.5	EEFLX0E331R4	3500
		470	7.3	4.3	1.9	3.5	6	EEFLX0E471R	3500
			7.3	4.3	1.9	3.8	4.5	EEFLX0E471R4	3500

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Oct. 2013

Surface Mount Type

SP-Cap

Series: **M**



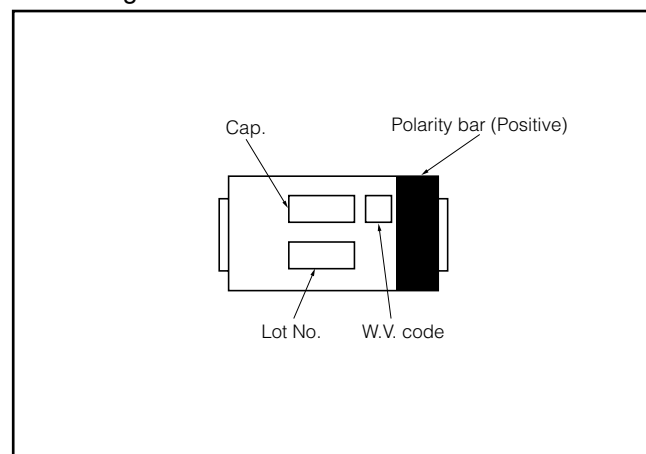
■ Features

- Achieved 40 % miniaturization on together with ultra low ESR of SP-Cap for further design flexibility.
- RoHS directive compliant
- High temperature reflow soldering applicable.
(Peak : 260 °C 10 s, main heating : 230 °C 40 s)

■ Specifications

Category Temp. Range	-40 °C to +105 °C			
Rated W.V.Range	2 V.DC to 6.3 V.DC			
Nominal Cap.Range	47 µF to 120 µF			
Capacitance Tolerance	±20 % (120 Hz/+20 °C)			
DC Leakage Current	I ≤ 0.1 CV (µA) 2 minutes			
tan δ	≤ 0.06 (120 Hz/+20 °C)			
Surge Voltage	Rated Working Voltage × 1.25 (15 °C to 35 °C)			
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C and then being atabilized at +20 °C, Capacitor shall			
	Capacitance change	±10% of initial measured value		
	tan δ	≤ Initial specified value		
	DC leakage current	≤ Initial specified value		
Moisture resistance	After storing for 500 hours at 60 °C, 90 %			
	Capacitance change of initial measurd value	2, 2.5 V.DC	4 V.DC	6.3 V.DC
		+70, -20 %	+60, -20 %	+50, -20 %
	tan δ	≤ 200 % of initial specified value		
	DC leakage current	≤ Initial specified value		

■ Marking



■ Dimensions in mm(not to scale)

(Unit : mm)

$L \pm 0.2$	$W1 \pm 0.2$	$W2 \pm 0.1$	$H \pm 0.2$	$P \pm 0.3$
6.0	3.2	1.8	1.9	1.3
* External of figure are the reference.				

■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number	Min. Packaging Q'ty (pcs)
			L (mm)	W (mm)	H (mm)	*1 Ripple current (Ar.m.s.)	*2 ESR (mΩ max.)		
MC	2	120	6.0	3.2	1.9	2.7	12	EEFMC0D121R	3000
	2.5	100	6.0	3.2	1.9	2.7	12	EEFMC0E101R	3000
	4	82	6.0	3.2	1.9	2.2	18	EEFMC0G820R	3000
	6.3	47	6.0	3.2	1.9	2.2	18	EEFMC0J470R	3000

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Notices

■ Applicable laws and regulations

- This product satisfies the requirements of the RoHS Directive (2011/65/UC) (related to the specified hazardous substances contained in electric al and electronic equipment).
- The ozone-depleting chemicals regulated by the Montreal Protocol are not intentionally used in the materials used in our manufacturing processes.
PBDEs (Poly-Brominated Biphenyls) / PBDEs (Poly-Brominated Diphenyl ethers)
The above specified brominated flame retardants are not intentionally used.
- When exporting this product, observe the export procedures specified in export control laws such as the Foreign Exchange and Foreign Trade Control Law.

■ Limited applications

- This product is intended to be used for general-purpose standard applications for general electronic equipment (such as AV equipment, household appliances, business or office equipment, information or communications equipment, etc.)
- If this product is being examined for possible use in applications where higher reliability or safety is required, in cases where a malfunction of this product may endanger life or property, then the delivery specifications meeting the application requirements must be agreed to and exchanged.

Items to be observed

- <1> The purpose of these specifications is to ensure the quality of components as individual components. Before use, check and evaluate their operation when mounted on your products.
- <2> Do not use our components outside of the corresponding specifications.

■ When using this capacitor in a product where safety is critical

We take great care in the quality of this product. However, performance may deteriorate and short-circuiting or open-circuiting may occur if it will be used in transportation equipment (e.g. trains, cars, traffic lights), medical equipment airborne equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, or other equipment where a defect in this component may cause the loss of human life or other significant damage. Ensure that the target equipment has a failsafe design and is provided with the following systems to guarantee adequate safety.

(1) * Ensure the safety of the whole system by installing a protection circuit and a protection device.

(2) Redundant circuits, etc. to maintain the safety of the entire system so that a single independent failure will not lead to unsafe conditions.

■ Conditions of use:

This product is intended to be used in electronic equipment for general-purpose standard applications and is not designed for use in any special environments.

When this capacitor is used in a special environment or under special conditions, its performance may be affected.

Before use, verify the performance and reliability of the capacitor

Application Guidelines

1. Circuit design

1-1 Prohibited circuits for use

Polymer Aluminum capacitors (SP-Cap) are expected to malfunction in the following circuits. Therefore, their use is prohibited.

- (1) Time constant circuits
- (2) Coupling circuits
- (3) Capacitors connected in series
- (4) Circuits significantly affected by leakage current
- (5) High-impedance voltage retention circuits

1.2 Polarity and voltage The SP-Cap has polarities.

Do not apply a reversed or alternating-current voltage.

If the polarity is reversed, then a leakage current may occur, leading to short-circuiting or capacitor breakdown.

Do not apply an excessive voltage (a voltage exceeding the rating).

"Applied voltage" refers to a voltage containing a peak transient instantaneous voltage and a peak ripple voltage. It does not only refer to a stationary line voltage. Design circuits so that peak voltages do not exceed the specified voltage.

1.3 Ripple current

Observe the allowable ripple current.

If an excessive ripple current passes through the SP-Cap, then self-generated heat may cause a current leak or a short-circuit. While observing the allowable ripple current, do not apply a ripple voltage as described in paragraph 1.2.

1.4 Leakage current

The leakage current may increase even if the following usage environment is within the specified requirements.

However, even if the leakage current increases, the capacitor's self-repairing function will reduce the leakage current in most cases when a voltage is applied.

- (1) After reflow soldering
- (2) Unloading conditions such as unloading at a high temperature, high temperature and humidity, rapid temperature change, etc.

1.5 Temperature

Use capacitors within the specified temperature range. If they are used outside the specified temperature range, then the electrical characteristics may vary or deteriorate significantly, leading to failure.

The temperature referred to here includes the ambient temperature including heat produced by heat generating devices (power transistors, resistors, etc.), self-heating due to ripple currents, etc.

Take these factors into consideration when checking the capacitor temperature.

1.6 Failure rate

Most failure modes are "short-circuits" and "leakage current increase". The main causes of failure include thermal stress due to reflow soldering, the temperature of the environment they are being used in, and/or electrical or mechanical stress. Using lower temperatures and voltages even within the specified range enables the defect rate to be reduced. Therefore, provide such allowances during design.

[Estimated defect rate] (Reference)

- (1) Data in our reliability tests/46 Fits or less
(Estimation with a rated voltage being applied at 105 °C)
- (2) Estimated defect rate in the market/0.13 Fits or less
(c=0, estimation with a reliability level of 60 %)

1.7 Mounting area consideration

Isolate the surface of PCB under the mounted capacitor.

2. Mounting

2.1 When mounting

- (1) Check the capacitor ratings (capacitance and voltage) before mounting.
- (2) Check the capacitor polarity before mounting.
- (3) Check the land size for the capacitor before mounting.
- (4) When using a mounter, if the pressure for mounting is too high, then the current leak may increase, short-circuiting may occur, or the capacitor may break down or come off.

2.2 Soldering (reflow soldering)

- (1) The SP-Cap is to be used exclusively for reflow soldering. When reflow soldering, use an ambient heat conduction system such as the simultaneous use of infrared and hot-air and not a steam heat conduction system (VPS).

* This capacitor cannot be used for flow or dip soldering.

- (2) Solder capacitors under these soldering conditions (pre-heating, main-heating temperatures and time) described in the specifications.
- (3) Reflow-solder up to twice.
- (4) Do not reuse the mounted SP-Cap.
- (5) When modifying or correcting by using a soldering iron, etc.:
Use a soldering iron of 30 W or less, whose iron tip temperature is 350 °C or less. Total soldering time should be no longer than 10 seconds. Do not apply excessive force to the capacitor.

2.3 Circuit board cleaning

Apply the following conditions for flux cleaning after soldering.

Temperature: 60 °C or less, duration: Five minutes or less

However, rinse sufficiently and dry the boards (at 100 °C for 20 minutes or less).

[Applicable solvents]

Pine Alpha ST-100S

Clean-thru 750H, 750L, or 710M

Aqua Cleaner 210SEP

Sunelec B-12, DK

Beclear CW-5790

Techno Cleaner 219

Cold Cleaner P3-375

Telpene Cleaner EC-7R

Technocare FRW-17, FRW-1, or FRV-1

AXREL 32

Remarks 1: If you wish to use solvents other than the above or Deionized water, please contact us.

2: Please do not use ozone-depleting chemicals in order to protect the environment.

3: In the case of using ultrasonic cleaning, the terminals may be broken. Therefore, please test before using in mass production.

2.4 Capacitor handling after soldering

(1) Do not apply an excessive force to the capacitor.

Deformed electrode terminals can affect mounting. Short-circuiting, wire breaking, leakage current increase, or damage to the exterior may be caused.

After mounting the capacitor, do not hold its body or apply a force to it.

3. Precautions for using equipment

3.1 Avoid using equipment to which capacitors are fitted in the following environments.

<1> Capacitors are directly exposed to water, salt water, or oil.

<2> Capacitors are exposed to direct sunlight.

<3> Capacitors are exposed to high temperature and humidity and the capacitor surface is condensed.

<4> Capacitors are exposed to various active gases.

<5> Acidic or alkaline environments

<6> Capacitors are subject to high-frequency induction.

<7> Capacitors are subject to excessive vibrations or shocks.

4. Emergency procedures

If the capacitors generate heat, smoke may come out of the exterior resin. If this is the case, then turn off the equipment immediately and stop using it.

Do not place your face or hands close to the capacitor. Otherwise, burns may be caused.

5. Storage

This product must be stored in an environment with controlled moisture protection.

This product must be stored as follows before and after moisture-protection packing is applied.

(If these requirements are not met, then thermal stress caused by moisture absorption of the package may damage the exterior or the internal elements.)

[Storage environment]

Temperature: 5 to 30 °C, humidity: 70 % or less

Storage period before opening the moisture protection seal: 2 years after manufacturing

Storage period after opening the moisture protection seal: 7 days*

* The capacitors for reflow 240 °C soldering except FD and CD (12.5 V and 16 V) products must be used within 14 days

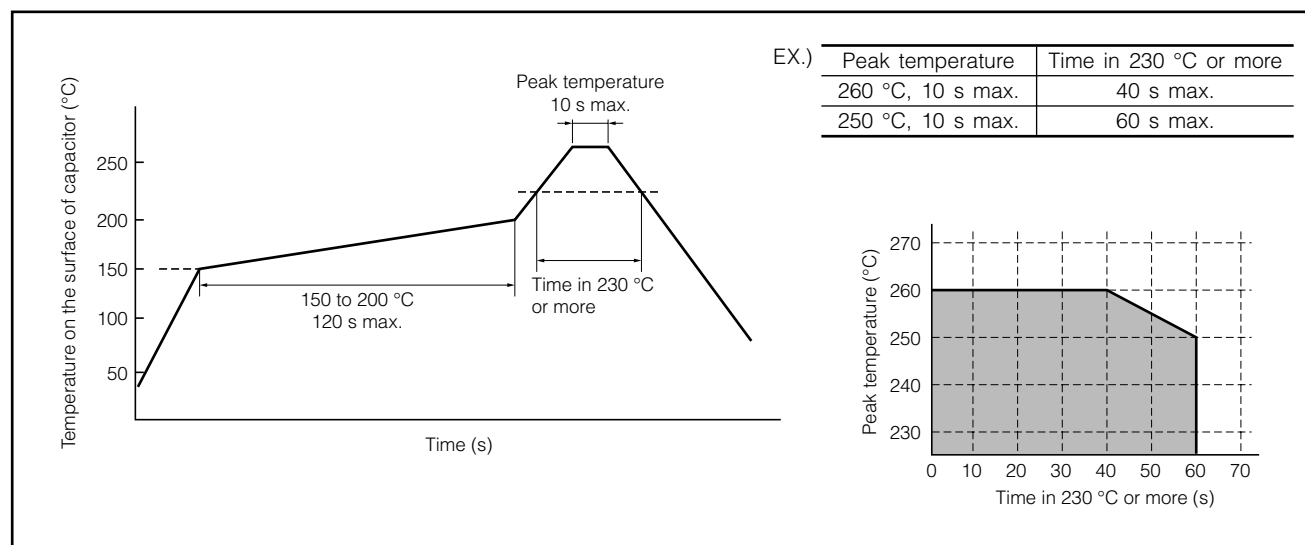
6. Discarding

Dispose of capacitors as industrial waste because they consist of various metals and resin.

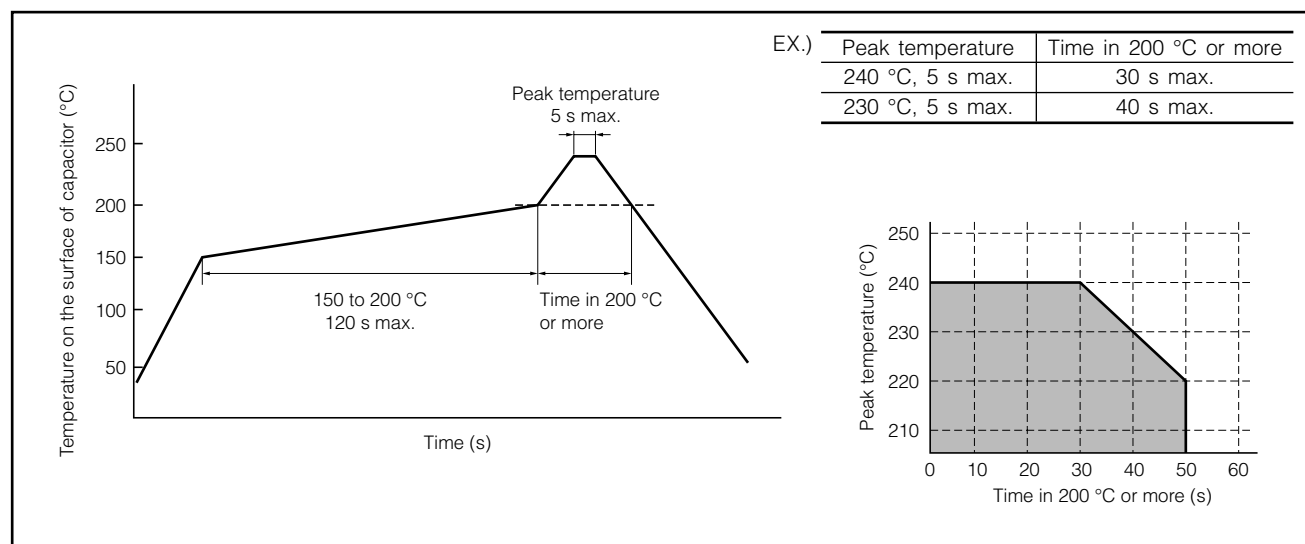
The precautions for the use of functional polymer aluminum electrolytic capacitors follow the "Precautionary guidelines for the use of fixed aluminum electrolytic capacitors for electronic equipment", RCR- 2367B issued by EIAJ in March 2002. Please refer to the above guidelines for details.

■ Mounting Specifications.

- Recommendable reflow soldering temperature 260 °C

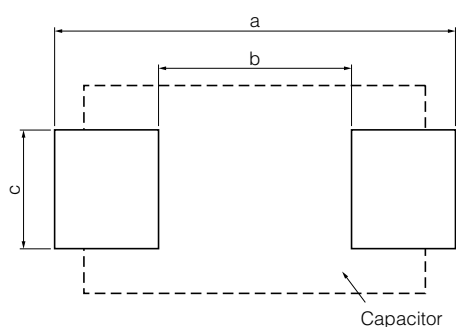


- Recommendable reflow soldering temperature 240 °C)



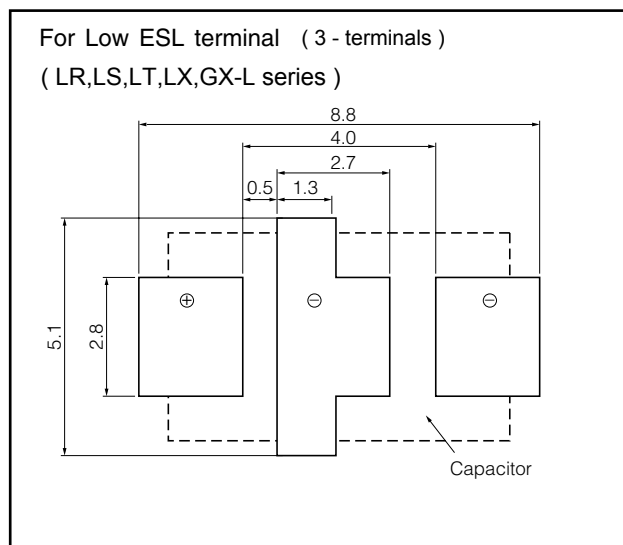
- Typical land pattern (mm)

For standard terminal (2 - terminals)

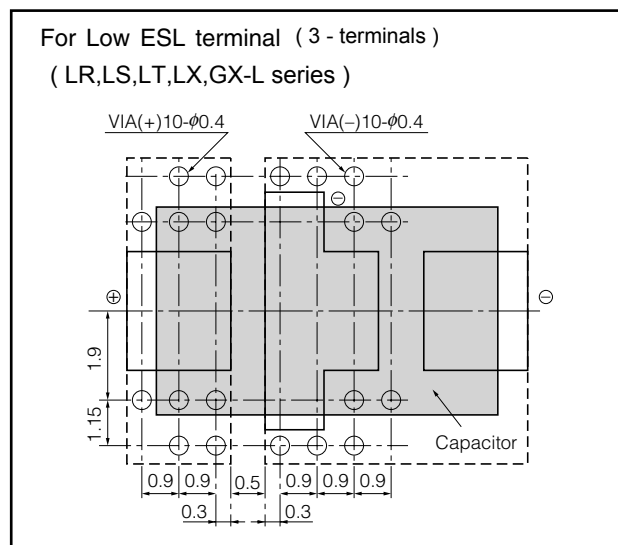


Series / Type	a	b	c
MC	7.2	2.6	2.2
Other	8.8	4.0	2.8

● Typical land pattern (mm)

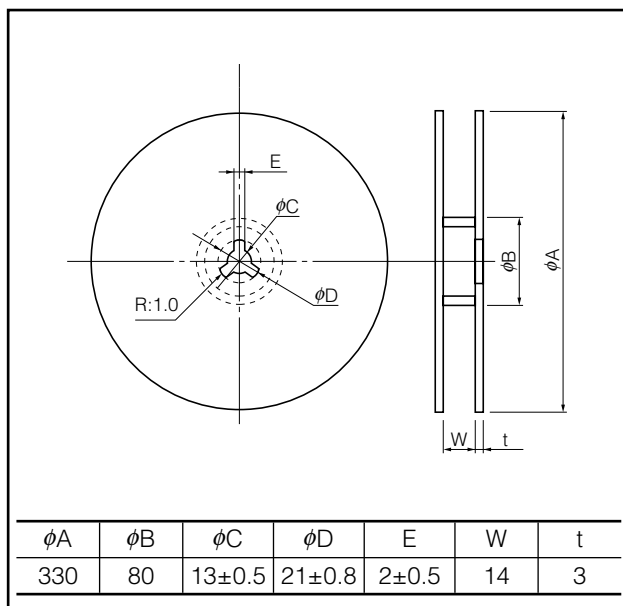


● VIA (mm)

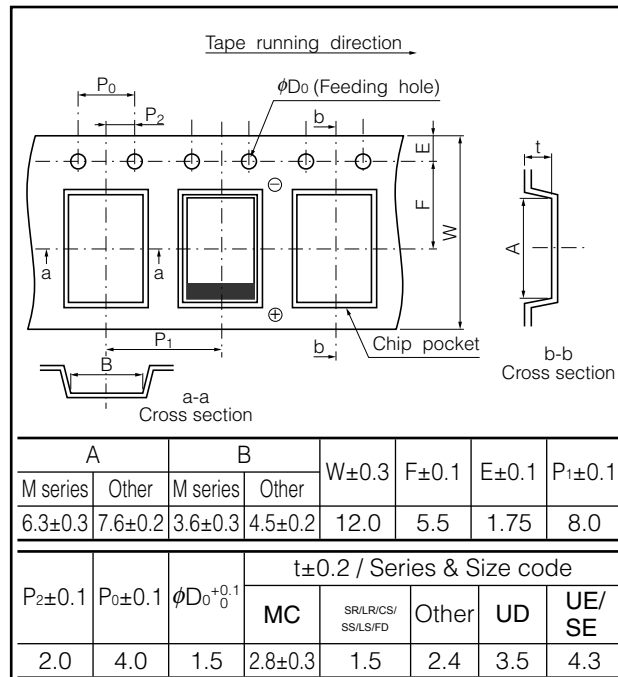


■ Packaging Specifications

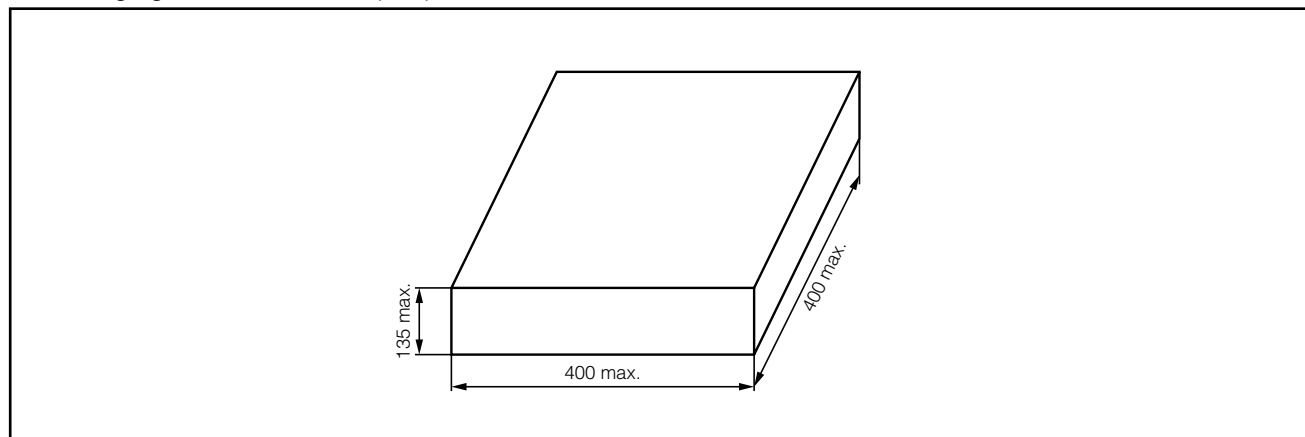
● Reel Dimensions (mm)



● Embossed Taping (mm)



■ Packaging Box Dimensions (mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Replacement Proposal Table of SP-Cap

■ Replacement from UD/UE Series to proposal series (SX, CX)

	2 V (OD)		2.5 V (OE)		4 V (OG)		6.3 V (OJ)		8 V (OK)	
	UD/UE Series	Proposal Series	UD/UE Series	Proposal Series	UD/UE Series	Proposal Series	UD/UE Series	Proposal Series	UD/UE Series	Proposal Series
68 μ F (680)									EEFUD0K680R UD(15 m Ω /3.0 A)	EEFCX1A100R CX(40 m Ω /3.0 A)
100 μ F (101)							EEFUD0J101R/ER UD(15 m Ω /3.0 A) EEFUD0J101XR/XE UD(12 m Ω /3.3 A)	EEFCX0J101R CX(15 m Ω /2.7 A)	EEFUD0K101R UD(18 m Ω /2.5 A) EEFUE0K101R UE(12 m Ω /3.3 A)	EEFCX1A100R CX(40 m Ω /3.0 A)
120 μ F (121)					EEFUD0G121R/ER UD(15 m Ω /3.0 A) EEFUD0G121XR/XE UD(12 m Ω /3.3 A)	EEFCX0G151R CX(15 m Ω /2.7 A) EEFSX0G151ER SX(9 m Ω /3.0 A) Please integrate into 150 μ F	EEFUD0J121R/ER UD(15 m Ω /3.0 A) EEFUD0J121XR/XE UD(12 m Ω /3.3 A) EEFUD0J121LR UD-L(9 m Ω /3.4 A)	EEFCX0J121R CX(15 m Ω /2.7 A) EEFSX0J121E7 SX(7 m Ω /3.5 A)		
150 μ F (151)			EEFUD0E151R/ER UD(15 m Ω /3.0 A) EEFUD0E151XR/XE UD(12 m Ω /3.3 A)	EEFCX0G151R CX(15 m Ω /2.7 A) EEFSX0E151ER SX(9 m Ω /3.0 A)	EEFUD0G151R/ER UD(15 m Ω /3.0 A) EEFUD0G151XR/XE UD(12 m Ω /3.3 A) EEFUD0G151LR/LE UD-L(9 m Ω /3.4 A)	EEFCX0G151R CX(15 m Ω /2.7 A) EEFSX0G151ER SX(9 m Ω /3.0 A)	EEFUD0J151R/ER UD(18 m Ω /2.5 A) EEFUD0J151LR UD-L(9 m Ω /3.4 A) EEFUE0J151R/ER UE(12 m Ω /3.3 A) EEFUE0J151XR/XE UE(10 m Ω /3.5 A)	EEFCX0J151R CX(15 m Ω /2.7 A) EEFSX0J151ER SX(9 m Ω /3.0 A)	EEFUE0K151R UE(15 m Ω /3.0 A)	EEFCX1A100R CX(40 m Ω /3.0 A)
180 μ F (181)	EEFUD0D181R/ER UD(15 m Ω /3.0 A) EEFUD0D181XR/XE UD(12 m Ω /3.3 A)	EEFSX0D181ER SL(9 m Ω /3.0 A)	EEFUD0E181R/ER UD(15 m Ω /3.0 A) EEFUD0E181XR/XE UD(12 m Ω /3.3 A)	EEFSX0E181ER SX(9 m Ω /3.0 A)	EEFUD0G181R/ER UD(18 m Ω /2.5 A) EEFUD0G181LR/LE UD-L(9 m Ω /3.4 A) EEFUE0G181R/ER UE(12 m Ω /3.3 A) EEFUE0G181XR/XE UE(10 m Ω /3.5 A)	EEFCX0G181R CX(15 m Ω /2.7 A) EEFSX0G181ER SX(9 m Ω /3.0 A)	EEFUE0J181R UE(12 m Ω /3.3 A) EEFUE0J181XR UE(10 m Ω /3.5 A)	EEFCX0J181R CX(15 m Ω /2.7 A)		
220 μ F (221)	EEFUD0D221R/ER UD(15 m Ω /3.0 A) EEFUD0D221XR/XE UD(12 m Ω /3.3 A)	EEFCX0D221R CX(15 m Ω /2.7 A) EEFSX0D221ER SX(9 m Ω /3.0 A)	EEFUD0E221R/ER UD(15 m Ω /3.0 A) EEFUD0E221XR/XE UD(12 m Ω /3.3 A) EEFUD0E221LR/LE UD-L(9 m Ω /3.4 A) EEFUE0E221R/ER UE(12 m Ω /3.3 A) EEFUE0E221XR/XE UE(10 m Ω /3.5 A)	EEFCX0E221R CX(15 m Ω /2.7 A) EEFSX0E221ER SX(9 m Ω /3.0 A)	EEFUE0G221R/ER UE(12 m Ω /3.3 A) EEFUE0G221XR/XE UE(10 m Ω /3.5 A) EEFUE0G221LR/LE UE-L(7 m Ω /3.7 A)	EEFCX0G221R CX(15 m Ω /2.7 A) EEFSX0G221ER SX(9 m Ω /3.0 A)	EEFUE0J221R UE(15 m Ω /3.0 A)	EEFCX0J181R CX(15 m Ω /2.7 A)		
270 μ F (271)	EEFUD0D271R/ER UD(15 m Ω /3.0 A) EEFUD0D271XR/XE UD(12 m Ω /3.3 A) EEFUD0D271LR/LE UD-L(9 m Ω /3.4 A) EEFUE0D271R/ER UE(12 m Ω /3.3 A) EEFUE0D271XR/XE UE(10 m Ω /3.5 A)	EEFSX0D271ER SX(9 m Ω /3.0 A) EEFCX0D331R CX(15 m Ω /2.7 A) EEFSX0D331ER SX(9 m Ω /3.0 A) Please integrate into 330 μ F	EEFUD0E271R/ER UD(15 m Ω /3.0 A) EEFUD0E271LR/LE UD-L(9 m Ω /3.4 A) EEFUE0E271R/ER UE(12 m Ω /3.3 A) EEFUE0E271XR/XE UE(10 m Ω /3.5 A)	EEFCX0E331R CX(15 m Ω /2.7 A) EEFSX0E331ER SX(9 m Ω /3.0 A) Please integrate into 330 μ F	EEFUE0G271R UE(12 m Ω /3.3 A) EEFUE0G271LR UE-L(7 m Ω /3.7 A)	EEFCX0G271R CX(15 m Ω /2.7 A)				
330 μ F (331)	EEFUD0D331R/ER UD(15 m Ω /3.0 A) EEFUD0D331XR/XE UD(12 m Ω /3.3 A) EEFUD0D331LR/LE UD-L(9 m Ω /3.4 A) EEFUE0D331R/ER UE(12 m Ω /3.3 A) EEFUE0D331XR/XE UE(10 m Ω /3.5 A)	EEFCX0D331R CX(15 m Ω /2.7 A) EEFSX0D331ER SX(9 m Ω /3.0 A) EEFSX0D331XE SX(6 m Ω /3.5 A)	EEFUE0E331R/ER UE(12 m Ω /3.3 A) EEFUE0E331XR/XE UE(10 m Ω /3.5 A) EEFUE0E331LR/LE UE-L(7 m Ω /3.7 A)	EEFCX0E331R CX(15 m Ω /2.7 A) EEFSX0E331ER SX(9 m Ω /3.0 A) EEFSX0E331XE SX(6 m Ω /3.5 A)	EEFUE0G331R UE(12 m Ω /3.3 A)	EEFCX0G271R CX(15 m Ω /2.7 A)				
390 μ F (391)	EEFUD0D391R/ER UD(15 m Ω /3.0 A) EEFUD0D391LR/LE UD-L(9 m Ω /3.4 A) EEFUE0D391R/ER UE(12 m Ω /3.3 A) EEFUE0D391XR/XE UE(10 m Ω /3.5 A) EEFUE0D391LR/LE UE-L(7 m Ω /3.7 A)	EEFCX0D391R CX(15 m Ω /2.7 A) EEFSX0D391ER SX(9 m Ω /3.0 A) EEFSX0D391XE SX(6 m Ω /3.5 A)	EEFUE0E391R/ER UE(12 m Ω /3.3 A) EEFUE0E391LR/LE UE-L(7 m Ω /3.7 A)	EEFCX0E391R CX(15 m Ω /2.7 A) EEFSX0E391ER SX(9 m Ω /3.0 A) EEFSX0E391XE SX(6 m Ω /3.5 A)						
470 μ F (471)	EEFUD0D471R/LE UD-L(9 m Ω /3.3 A) EEFUE0D471R/ER UE(12 m Ω /3.3 A) EEFUE0D471XR/XE UE(10 m Ω /3.5 A) EEFUE0D471LR/LE UE-L(7 m Ω /3.7 A)	EEFCX0D471R CX(15 m Ω /2.7 A) EEFSX0D471ER SX(9 m Ω /3.0 A) EEFSX0D471XE SX(6 m Ω /3.5 A)	EEFUE0E471R UE(12 m Ω /3.3 A) EEFUE0E471LR UE-L(7 m Ω /3.7 A)	EEFCX0E471R CX(15 m Ω /2.7 A) EEFSX0E471ER SX(9 m Ω /3.0 A) EEFSX0E471XE SX(6 m Ω /3.5 A)						
560 μ F (561)	EEFUE0D561R/ER UE(12 m Ω /3.3 A) EEFUE0D561LR/LE UE-L(7 m Ω /3.7 A)	EEFSX0D561E4 SX(4.5 m Ω /3.8 A)								

(ESR / Rated ripple current)

Small can type Aluminum Electrolytic Capacitors

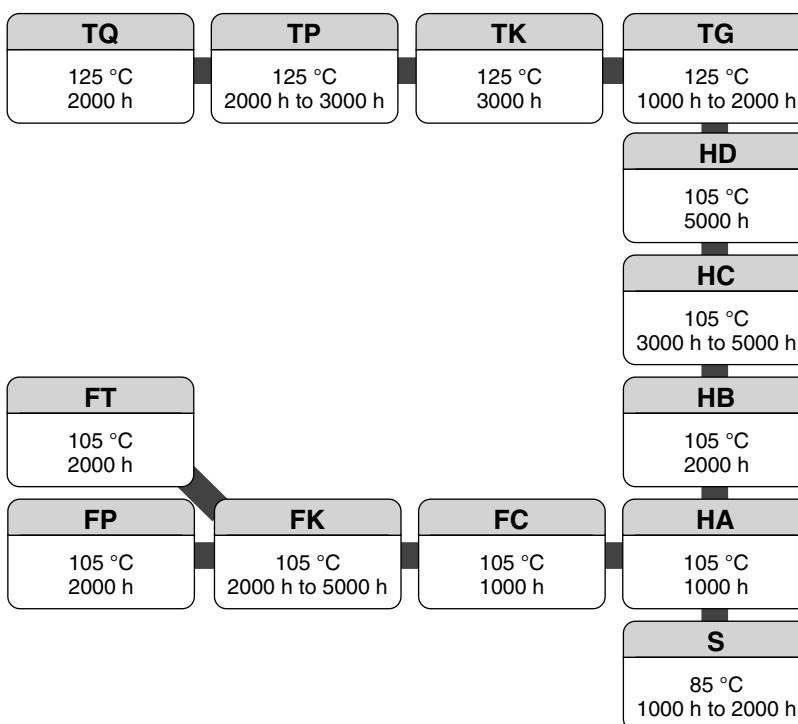
■ Surface Mount Type

High Temperature · Long Life

Conductive Polymer Hybrid

NEW ZC
125 °C 4000 h

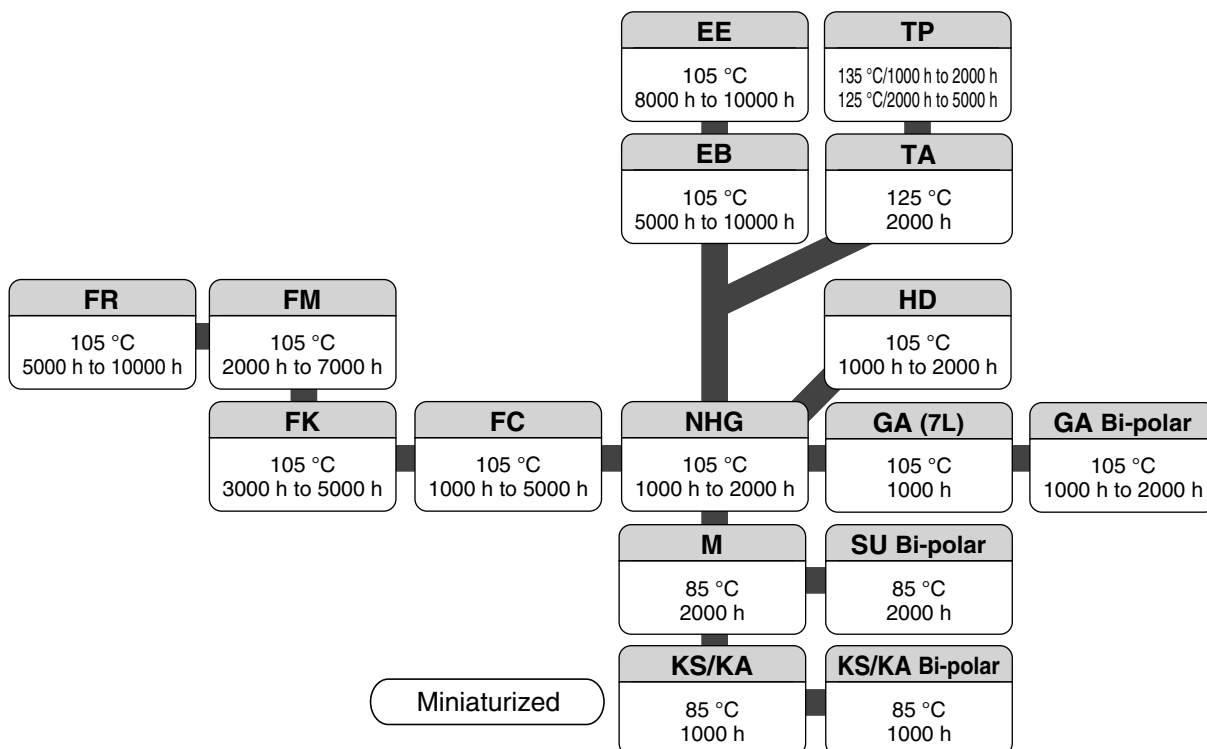
NEW ZA
105 °C 10000 h



Low Impedance

■ Radial Lead Type

Long Life · High Ripple



Low Impedance

Miniaturized

Surface Mount Type

Series: **ZA** Type: **V**
High temperature Lead-Free reflow



- Features

 - Endurance: 10000 h at 105 °C
 - Low ESR and High ripple current
(70 % over, Lower ESR than Current V-FP)
 - High voltage (to 80 V)
 - Equivalent to conductive polymer type Aluminum Electrolytic Capacitor
(There are little characteristics change by temperature and frequency)
 - AEC-Q200 qualified*
 - RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C						
Rated W.V.Range	25 V.DC to 80 V.DC						
Nominal Cap.Range	10 μF to 330 μF						
Capacitance Tolerance	±20 % (120 Hz/+20 °C)						
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (whichever is greater)						
tan δ	Please see the attached Standard Products list						
Endurance	The capacitor shall be subjected to application of the D.C. voltage with full rated ripple current at +105 °C for 10000 hours. After stabilizing at room temperature(+15 to 35 °C), the capacitor shall not exceed the specified limits. (The sum of DC voltage and ripple peak voltage shall not exceed the rated voltage.)						
	Capacitance change	±30 % of initial measured value					
	tan δ	≤ 200 % of initial specified value					
	E. S. R.	≤ 200 % of initial specified value					
	DC leakage current	≤ initial specified value					
	ESR after Endurance (Ω/100 kHz) (-40 °C)	Size Code					
		C	D	D8	F	G	
	2.0	1.4	0.8	0.4	0.3		
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)						
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.						
	Capacitance change	±10 % of initial measured value					
	tan δ	≤ initial specified value					
	DC leakage current	≤ initial specified value					

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.10	0.30	0.60	1.00

■ Marking

Example:25 V 33 μF Marking color : BLACK

Negative polarity marking (-)

Capacitance (μF)

Series identification

Rated Voltage Mark

Lot number

Rated Voltage Mark

E	25 V	J	63 V
V	35 V	K	80 V
H	50 V		

■ Dimensions in mm (not to scale) (Unit : mm)

Size code	D	L	A, B	H	I	W	P	K
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

■ Standard Products

Endurance : 105 °C 10000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	E.S.R. (100 kHz) (+20 °C) (mΩ)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
25	33	5	5.8	C	900	80	0.14	EEHZA1E330R	(5)	1000
	56	6.3	5.8	D	1300	50	0.14	EEHZA1E560P	(5)	1000
	100	6.3	7.7	D8	2000	30	0.14	EEHZA1E101XP	(5)	900
	220	8	10.2	F	2300	27	0.14	EEHZA1E221P	(6)	500
	330	10	10.2	G	2500	20	0.14	EEHZA1E331P	(6)	500
35	22	5	5.8	C	900	100	0.12	EEHZA1V220R	(5)	1000
	27	6.3	5.8	D	1300	60	0.12	EEHZA1V270P	(5)	1000
	47	6.3	5.8	D	1300	60	0.12	EEHZA1V470P	(5)	1000
	68	6.3	7.7	D8	2000	35	0.12	EEHZA1V680XP	(5)	900
	150	8	10.2	F	2300	27	0.12	EEHZA1V151P	(6)	500
	270	10	10.2	G	2500	20	0.12	EEHZA1V271P	(6)	500
50	10	5	5.8	C	750	120	0.10	EEHZA1H100R	(5)	1000
	22	6.3	5.8	D	1100	80	0.10	EEHZA1H220P	(5)	1000
	33	6.3	7.7	D8	1600	40	0.10	EEHZA1H330XP	(5)	900
	68	8	10.2	F	1800	30	0.10	EEHZA1H680P	(6)	500
	100	10	10.2	G	2000	28	0.10	EEHZA1H101P	(6)	500
63	10	6.3	5.8	D	1000	120	0.08	EEHZA1J100P	(5)	1000
	22	6.3	7.7	D8	1500	80	0.08	EEHZA1J220XP	(5)	900
	33	8	10.2	F	1700	40	0.08	EEHZA1J330P	(6)	500
	56	10	10.2	G	1800	30	0.08	EEHZA1J560P	(6)	500
80	22	8	10.2	F	1550	45	0.08	EEHZA1K220P	(6)	500
	33	10	10.2	G	1700	36	0.08	EEHZA1K330P	(6)	500

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

Surface Mount Type

Series: **ZC** Type: **V**

High temperature Lead-Free reflow



■ Features

- Endurance: 4000 h at 125 °C
(The longest endurance in the industry by each case size)
- Low ESR and High ripple current (85% over, Lower ESR than Current V-TP)
- High-withstand voltage (25 V to 63 V), Low LC (0.01 CV or 3 μA)
- Equivalent to conductive polymer type Aluminum Electrolytic Capacitor
(There are little characteristics change by temperature and frequency)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +125 °C						
Rated W.V.Range	25 V.DC to 63 V.DC						
Nominal Cap.Range	10 μF to 330 μF						
Capacitance Tolerance	±20 % (120 Hz/+20 °C)						
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (whichever is greater)						
tan δ	Please see the attached Standard Products list						
Endurance	The capacitor shall be subjected to application of the D.C. voltage with full rated ripple current at +125 °C for 4000 hours. After stabilizing at room temperature(+15 to 35 °C), the capacitor shall not exceed the specified limits. (The sum of DC voltage and ripple peak voltage shall not exceed the rated voltage.)						
	Capacitance change	±30 % of initial measured value					
	tan δ	≤200 % of initial specified value					
	E. S. R.	≤200 % of initial specified value					
	DC leakage current	≤ initial specified value					
	ESR after Endurance (Ω/100 kHz) (-40 °C)	Size Code					
		C	D	D8	F	G	
	2.0	1.4	0.8	0.4	0.3		
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)						
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.						
	Capacitance change	±10 % of initial measured value					
	tan δ	≤ initial specified value					
	DC leakage current	≤ initial specified value					

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.10	0.30	0.60	1.00

■ Marking

Example: 25 V 33 μF Marking color : BLACK

Negative polarity marking (-)
Capacitance (μF)
Series identification
Rated Voltage Mark
Lot number

E	25 V
V	35 V
H	50 V
J	63 V

■ Dimensions in mm (not to scale)

(Unit : mm)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 125 °C 4000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	E.S.R. (100 kHz) (+20 °C) (mΩ)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
25	33	5	5.8	C	550	80	0.14	EEHZA1E330R	(5)	1000
	56	6.3	5.8	D	900	50	0.14	EEHZA1E560P	(5)	1000
	100	6.3	7.7	D8	1400	30	0.14	EEHZA1E101XP	(5)	900
	220	8	10.2	F	1600	27	0.14	EEHZA1E221P	(6)	500
	330	10	10.2	G	2000	20	0.14	EEHZA1E331P	(6)	500
35	22	5	5.8	C	550	100	0.12	EEHZA1V220R	(5)	1000
	47	6.3	5.8	D	900	60	0.12	EEHZA1V470P	(5)	1000
	68	6.3	7.7	D8	1400	35	0.12	EEHZA1V680XP	(5)	900
	150	8	10.2	F	1600	27	0.12	EEHZA1V151P	(6)	500
	270	10	10.2	G	2000	20	0.12	EEHZA1V271P	(6)	500
50	10	5	5.8	C	500	120	0.10	EEHZA1H100R	(5)	1000
	22	6.3	5.8	D	750	80	0.10	EEHZA1H220P	(5)	1000
	33	6.3	7.7	D8	1100	40	0.10	EEHZA1H330XP	(5)	900
	68	8	10.2	F	1250	30	0.10	EEHZA1H680P	(6)	500
	100	10	10.2	G	1600	28	0.10	EEHZA1H101P	(6)	500
63	10	6.3	5.8	D	700	120	0.08	EEHZA1J100P	(5)	1000
	22	6.3	7.7	D8	900	80	0.08	EEHZA1J220XP	(5)	900
	33	8	10.2	F	1100	40	0.08	EEHZA1J330P	(6)	500
	56	10	10.2	G	1400	30	0.08	EEHZA1J560P	(6)	500

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

Surface Mount Type

Series: **S** Type: **V**

S High temperature Lead-Free reflow (suffix:A*)



■ Features

- Endurance: 85 °C 2000 h
- Vibration-proof product is available upon request.($\phi 8$ mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +85 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	1 μF to 1500 μF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)							
tan δ	Please see the attached High temperature lead-free reflow products list.							
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	8	6	4	4	3	3	
Endurance	After applying rated working voltage for 2000 hours (Miniaturization product type 1000 hours) at +85 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meer the following limits.							
	Capacitance change	±20 % of initial measured value						
		Size code				Cap. change		
		D8(φ6.3×7.7)				2000 hours ±25 %		
		≤D(φ6.3) Miniature				1000 hours ±30 %		
	tan δ	≤200 % of initial specified value						
DC leakage current	≤ initial specified value							
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example: 6.3 V 22 μ F (Polarized)
Marking color: BLACK

Negative polarity marking (-)

Capacitance (μ F)

Series identification (S) or (A)

Mark for Lead-Free Products Black Dot (Square)

Rated voltage Mark (V.DC) (6=6.3 V.DC)

Lot number

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.

$\phi D \pm 0.5$

A ± 0.2

B ± 0.2

H

L

I

W

P

K

Pressure Relief ($\phi 10$ and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 $^{+0.1}_{-0.1}$	4.3	5.5 max	1.8	0.65 ± 0.1	1.0	0.35 $^{+0.15}_{-0.20}$
C	5.0	5.4 $^{+0.1}_{-0.1}$	5.3	6.5 max	2.2	0.65 ± 0.1	1.5	0.35 $^{+0.15}_{-0.20}$
D	6.3	5.4 $^{+0.1}_{-0.1}$	6.6	7.8 max	2.6	0.65 ± 0.1	1.8	0.35 $^{+0.15}_{-0.20}$
D8	6.3	7.7 ± 0.3	6.6	7.8 max	2.6	0.65 ± 0.1	1.8	0.35 $^{+0.15}_{-0.20}$
E	8.0	6.2 ± 0.3	8.3	9.5 max	3.4	0.65 ± 0.1	2.2	0.35 $^{+0.15}_{-0.20}$
F	8.0	10.2 ± 0.3	8.3	10.0 max	3.4	0.90 ± 0.2	3.1	0.70 ± 0.20
G	10.0	10.2 ± 0.3	10.3	12.0 max	3.5	0.90 ± 0.2	4.6	0.70 ± 0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ High temperature Lead-Free reflow Products

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min.
		Dia.	Length	*Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance			Packaging Q'ty
(V)	(μF)	(mm)	(mm)				(hours)			Taping (pcs)
6.3	22	4	5.4	B	29	0.30	2000	EEE0JA220AR	(5)	2000
	33	4	5.4	(B)	22	0.35	1000	EEE0JA330WAR	(5)	2000
	47	5	5.4	C	46	0.30	2000	EEE0JA470AR	(5)	1000
	100	5	5.4	(C)	47	0.40	1000	EEE0JA101WAR	(5)	1000
		6.3	5.4	D	71	0.30	2000	EEE0JA101AP	(5)	1000
	330	6.3	7.7	D8	188	0.30	2000	EEE0JA331XAP	(5)	900
		8	6.2	E	300	0.35	2000	EEE0JA331AP	(7)	1000
	470	8	10.2	(F)	380	0.35	1000	EEE0JA471UAP	(7)	500
	1000	10	10.2	G	700	0.35	2000	EEE0JA102AP	(7)	500
1500	10	10.2	(G)	750	0.50	1000	EEE0JA152UAP	(7)	500	
10	22	4	5.4	(B)	28	0.30	1000	EEE1AA220WAR	(5)	2000
	33	4	5.4	(B)	29	0.30	1000	EEE1AA330WAR	(5)	2000
		5	5.4	C	43	0.22	2000	EEE1AA330AR	(5)	1000
	47	5	5.4	(C)	47	0.30	1000	EEE1AA470WAR	(5)	1000
	100	5	5.4	(C)	50	0.30	1000	EEE1AA101WAR	(5)	1000
		6.3	5.4	D	70	0.26	2000	EEE1AA101AP	(5)	1000
	220	6.3	7.7	D8	173	0.22	2000	EEE1AA221XAP	(5)	900
		8	6.2	E	250	0.26	2000	EEE1AA221AP	(7)	1000
	330	8	10.2	F	390	0.26	2000	EEE1AA331AP	(7)	500
	470	8	10.2	(F)	390	0.26	1000	EEE1AA471UAP	(7)	500
10		10.2	G	400	0.26	2000	EEE1AA471AP	(7)	500	
1000	10	10.2	(G)	580	0.35	1000	EEE1AA102UAP	(7)	500	
16	10	4	5.4	B	28	0.16	2000	EEE1CA100AR	(5)	2000
	22	4	5.4	(B)	28	0.26	1000	EEE1CA220WAR	(5)	2000
		5	5.4	C	39	0.16	2000	EEE1CA220AR	(5)	1000
	33	5	5.4	(C)	35	0.26	1000	EEE1CA330WAR	(5)	1000
	47	5	5.4	(C)	39	0.26	1000	EEE1CA470WAR	(5)	1000
		6.3	5.4	D	70	0.16	2000	EEE1CA470AP	(5)	1000
	100	6.3	5.4	(D)	70	0.26	1000	EEE1CA101WAP	(5)	1000
		8	6.2	E	200	0.20	2000	EEE1CA101AP	(7)	1000
	220	6.3	7.7	D8	162	0.20	2000	EEE1CA221XAP	(5)	900
		8	10.2	(F)	280	0.20	1000	EEE1CA221UAP	(7)	500
	330	8	10.2	(F)	320	0.20	1000	EEE1CA331UAP	(7)	500
		10	10.2	G	380	0.20	2000	EEE1CA331AP	(7)	500
	470	8	10.2	(F)	350	0.26	1000	EEE1CA471UAP	(7)	500
10		10.2	G	420	0.20	2000	EEE1CA471AP	(7)	500	
25	4.7	4	5.4	B	22	0.14	2000	EEE1EA4R7AR	(5)	2000
	10	4	5.4	(B)	22	0.20	1000	EEE1EA100WAR	(5)	2000
		5	5.4	C	28	0.14	2000	EEE1EA100AR	(5)	1000
	22	5	5.4	(C)	35	0.20	1000	EEE1EA220WAR	(5)	1000
		6.3	5.4	D	55	0.14	2000	EEE1EA220AP	(5)	1000
	33	5	5.4	(C)	42	0.20	1000	EEE1EA330WAR	(5)	1000
		6.3	5.4	D	65	0.14	2000	EEE1EA330AP	(5)	1000
	47	6.3	5.4	(D)	70	0.20	1000	EEE1EA470WAP	(5)	1000
	100	8	6.2	(E)	91	0.16	1000	EEE1EA101UAP	(7)	1000
		6.3	7.7	D8	143	0.16	2000	EEE1EA101XAP	(5)	900
		8	10.2	F	180	0.16	2000	EEE1EA101AP	(7)	500
	220	8	10.2	(F)	230	0.20	1000	EEE1EA221UAP	(7)	500
		10	10.2	G	310	0.16	2000	EEE1EA221AP	(7)	500
	330	8	10.2	(F)	270	0.20	1000	EEE1EA331UAP	(7)	500
		10	10.2	G	340	0.16	2000	EEE1EA331AP	(7)	500
470	10	10.2	(G)	380	0.25	1000	EEE1EA471UAP	(7)	500	

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
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02 Mar. 2014

■ High temperature Lead-Free reflow Products

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)			Taping (pcs)
35	4.7	4	5.4	B	22	0.12	2000	EEE1VA4R7AR	(5)	2000
	10	4	5.4	(B)	22	0.16	1000	EEE1VA100WAR	(5)	2000
		5	5.4	C	30	0.12	2000	EEE1VA100AR	(5)	1000
	22	5	5.4	(C)	36	0.16	1000	EEE1VA220WAR	(5)	1000
		6.3	5.4	D	60	0.12	2000	EEE1VA220AP	(5)	1000
	33	6.3	5.4	(D)	60	0.16	1000	EEE1VA330WAP	(5)	1000
		8	6.2	E	130	0.14	2000	EEE1VA330AP	(7)	1000
	47	6.3	5.4	(D)	70	0.16	1000	EEE1VA470WAP	(5)	1000
		8	6.2	E	165	0.14	2000	EEE1VA470AP	(7)	1000
	100	6.3	7.7	D8	132	0.14	2000	EEE1VA101XAP	(5)	900
		8	10.2	(F)	140	0.14	1000	EEE1VA101UAP	(7)	500
		10	10.2	G	210	0.14	2000	EEE1VA101AP	(7)	500
	220	8	10.2	(F)	200	0.14	1000	EEE1VA221UAP	(7)	500
		10	10.2	G	310	0.14	2000	EEE1VA221AP	(7)	500
	330	10	10.2	(G)	350	0.30	1000	EEE1VA331UAP	(7)	500
50	0.1	4	5.4	B	1	0.12	2000	EEE1HAR10AR ***	(5)	2000
	0.22	4	5.4	B	2	0.12	2000	EEE1HAR22AR ***	(5)	2000
	0.33	4	5.4	B	3	0.12	2000	EEE1HAR33AR ***	(5)	2000
	0.47	4	5.4	B	5	0.12	2000	EEE1HAR47AR ***	(5)	2000
	1	4	5.4	B	10	0.12	2000	EEE1HA1R0AR	(5)	2000
	2.2	4	5.4	B	16	0.12	2000	EEE1HA2R2AR	(5)	2000
	3.3	4	5.4	B	16	0.12	2000	EEE1HA3R3AR	(5)	2000
	4.7	4	5.4	(B)	18	0.14	1000	EEE1HA4R7WAR	(5)	2000
		5	5.4	C	23	0.12	2000	EEE1HA4R7AR	(5)	1000
	10	5	5.4	(C)	27	0.14	1000	EEE1HA100WAR	(5)	1000
		6.3	5.4	D	35	0.12	2000	EEE1HA100AP	(5)	1000
	22	6.3	5.4	(D)	40	0.14	1000	EEE1HA220WAP	(5)	1000
		8	6.2	E	120	0.12	2000	EEE1HA220AP	(7)	1000
	33	8	6.2	(E)	65	0.12	1000	EEE1HA330UAP	(7)	1000
		6.3	7.7	D8	65	0.14	2000	EEE1HA330XAP	(5)	900
		8	10.2	F	110	0.12	2000	EEE1HA330AP	(7)	500
	47	6.3	7.7	D8	105	0.14	2000	EEE1HA470XAP	(5)	900
		8	10.2	(F)	110	0.12	1000	EEE1HA470UAP	(7)	500
		10	10.2	G	130	0.12	2000	EEE1HA470AP	(7)	500
	100	8	10.2	(F)	200	0.18	1000	EEE1HA101UAP	(7)	500
		10	10.2	G	250	0.12	2000	EEE1HA101AP	(7)	500
	220	10	10.2	(G)	300	0.18	1000	EEE1HA221UAP	(7)	500

* Size code():Miniaturization product

*** Please kindly accept last shipment : 31/Mar/2015

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **S** Type: **V**



■ Features

- Endurance: 85 °C 2000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +85 °C										
Rated W.V. Range	4 V.DC to 100 V.DC										
Nominal Cap. Range	1 µF to 1500 µF										
Capacitance Tolerance	±20 % (120 Hz/+20 °C)										
DC Leakage Current	I ≤ 0.01 CV or 3 (µA) (Bi-Polar I ≤ 0.02 CV or 6 (µA) After 2 minutes (Whichever is greater)										
tan δ	Please see the attached standard products list										
Characteristics at Low Temperature	W.V. (V)	4	6.3	10	16	25	35	50	63	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	7	4	3	2	2	2	2	3	3	
	Z(-40 °C)/Z(+20 °C)	15	8	6	4	4	3	3	4	4	
Endurance	After applying rated working voltage for 2000 hours (Bi-polar:1000 hours for each polarity) at +85 °C ±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.										
	Capacitance change	±20 % of inisial measured value									
		Size code	Rated W.V.		Cap. change						
		B(φ4) to D, D8(φ6.3)	4 W.V		1000 hours ±30 %						
		≤ D(φ6.3) Miniature	6.3 W.V		1000 hours ±20 %						
	≥ 10 W.V										
tan δ	≤200 % initial specified value										
DC leakage current	≤ initial specified value										
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)										
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.										
	Capacitance change	±10 % of initial measured value									
	tan δ	≤ initial specified value									
	DC leakage current	≤ initial specified value									

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example:4V 33 μF (Polarized)
Marking color: BLACK

Negative polarity marking (-)
(No marking for the bi-polar)

Capacitance (μF)

Series identification (S) or (A)

Mark for Lead-Free Products
Black Dot (Square)

Rated voltage Mark (V.DC)
(6=6.3 V.DC)

Lot number

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.

A±0.2

B±0.2

W

P

K

Pressure Relief (φ10 and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ Standard Products

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance			Taping
(V)	(μF)	(mm)	(mm)				(hours)			(pcs)
4	33	4	5.4	B	26	0.35	1000	EEE0GA330SR	(1)	2000
	47	4	5.4	B	34	0.35	1000	EEE0GA470SR	(1)	2000
	100	5	5.4	C	61	0.35	1000	EEE0GA101SR	(1)	1000
	220	6.3	5.4	D	82	0.35	1000	EEE0GA221SP	(1)	1000
	330	6.3	5.4	(D)	80	0.50	1000	EEE0GA331WP	(1)	1000
	470	6.3	7.7	D8	200	0.35	1000	EEE0GA471XP	(1)	900
6.3	22	4	5.4	B	29	0.26	2000	EEE0JA220SR	(1)	2000
	33	4	5.4	(B)	22	0.35	1000	EEE0JA330WR	(1)	2000
	47	4	5.4	(B)	36	0.35	1000	EEE0JA470WR	(1)	2000
		5	5.4	C	46	0.26	2000	EEE0JA470SR	(1)	1000
	100	5	5.4	(C)	47	0.35	1000	EEE0JA101WR	(1)	1000
		6.3	5.4	D	71	0.26	2000	EEE0JA101SP	(1)	1000
	220	6.3	5.4	(D)	74	0.35	1000	EEE0JA221WP	(1)	1000
	330	6.3	7.7	D8	188	0.26	2000	EEE0JA331XP	(1)	900
		8	6.2	E	300	0.35	2000	EEE0JA331P	(2)	1000
	470	8	10.2	F	380	0.35	2000	EEE0JA471P	(2)	500
	1000	8	10.2	(F)	500	0.35	2000	EEE0JA102UP	(2)	500
		10	10.2	G	700	0.35	2000	EEE0JA102P	(2)	500
10	1500	10	10.2	G	750	0.35	2000	EEE0JA152P	(2)	500
	22	4	5.4	(B)	28	0.30	1000	EEE1AA220WR	(1)	2000
	33	4	5.4	(B)	29	0.30	1000	EEE1AA330WR	(1)	2000
		5	5.4	C	43	0.20	2000	EEE1AA330SR	(1)	1000
	47	5	5.4	(C)	43	0.30	1000	EEE1AA470WR	(1)	1000
	100	5	5.4	(C)	50	0.30	1000	EEE1AA101WR	(1)	1000
		6.3	5.4	D	70	0.26	2000	EEE1AA101SP	(1)	1000
	220	6.3	7.7	D8	173	0.20	2000	EEE1AA221XP	(1)	900
		8	6.2	E	250	0.26	2000	EEE1AA221P	(2)	1000
	330	8	10.2	F	390	0.26	2000	EEE1AA331P	(2)	500
	470	8	10.2	(F)	390	0.26	2000	EEE1AA471UP	(2)	500
		10	10.2	G	400	0.26	2000	EEE1AA471P	(2)	500
16	1000	10	10.2	G	580	0.26	2000	EEE1AA102P	(2)	500
	10	4	5.4	B	28	0.16	2000	EEE1CA100SR	(1)	2000
	22	4	5.4	(B)	28	0.26	1000	EEE1CA220WR	(1)	2000
		5	5.4	C	39	0.16	2000	EEE1CA220SR	(1)	1000
	33	5	5.4	(C)	35	0.26	1000	EEE1CA330WR	(1)	1000
	47	5	5.4	(C)	39	0.26	1000	EEE1CA470WR	(1)	1000
		6.3	5.4	D	70	0.16	2000	EEE1CA470SP	(1)	1000
	100	6.3	5.4	(D)	70	0.26	1000	EEE1CA101WP	(1)	1000
		8	6.2	E	200	0.20	2000	EEE1CA101P	(2)	1000
	220	6.3	7.7	D8	162	0.16	2000	EEE1CA221XP	(1)	900
		8	10.2	F	280	0.20	2000	EEE1CA221P	(2)	500
	330	8	10.2	(F)	320	0.20	2000	EEE1CA331UP	(2)	500
		10	10.2	G	380	0.20	2000	EEE1CA331P	(2)	500
	470	8	10.2	(F)	350	0.20	2000	EEE1CA471UP	(2)	500
		10	10.2	G	420	0.20	2000	EEE1CA471P	(2)	500

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)	Endurance (hours)			Taping (pcs)
25	4.7	4	5.4	B	22	0.14	2000	EEE1EA4R7SR	(1)	2000
	10	4	5.4	(B)	22	0.20	1000	EEE1EA100WR	(1)	2000
		5	5.4	C	28	0.14	2000	EEE1EA100SR	(1)	1000
	22	5	5.4	(C)	35	0.20	1000	EEE1EA220WR	(1)	1000
		6.3	5.4	D	55	0.14	2000	EEE1EA220SP	(1)	1000
	33	5	5.4	(C)	42	0.20	1000	EEE1EA330WR	(1)	1000
		6.3	5.4	D	65	0.14	2000	EEE1EA330SP	(1)	1000
	47	6.3	5.4	(D)	70	0.20	1000	EEE1EA470WP	(1)	1000
	100	6.3	7.7	D8	143	0.14	2000	EEE1EA101XP	(1)	900
		8	6.2	(E)	91	0.16	2000	EEE1EA101UP	(2)	1000
		8	10.2	F	180	0.16	2000	EEE1EA101P	(2)	500
	220	8	10.2	(F)	230	0.16	2000	EEE1EA221UP	(2)	500
		10.0	10.2	G	310	0.16	2000	EEE1EA221P	(2)	500
	330	8	10.2	(F)	270	0.16	2000	EEE1EA331UP	(2)	500
		10	10.2	G	340	0.16	2000	EEE1EA331P	(2)	500
35	470	10	10.2	G	380	0.16	2000	EEE1EA471P	(2)	500
	4.7	4	5.4	B	22	0.12	2000	EEE1VA4R7SR	(1)	2000
	10	4	5.4	(B)	22	0.16	1000	EEE1VA100WR	(1)	2000
		5	5.4	C	30	0.12	2000	EEE1VA100SR	(1)	1000
	22	5	5.4	(C)	36	0.16	1000	EEE1VA220WR	(1)	1000
		6.3	5.4	D	60	0.12	2000	EEE1VA220SP	(1)	1000
	33	6.3	5.4	(D)	60	0.16	1000	EEE1VA330WP	(1)	1000
		8	6.2	E	130	0.14	2000	EEE1VA330P	(2)	1000
	47	6.3	5.4	(D)	70	0.16	1000	EEE1VA470WP	(1)	1000
		8	6.2	E	165	0.14	2000	EEE1VA470P	(2)	1000
	100	6.3	7.7	D8	132	0.12	2000	EEE1VA101XP	(1)	900
		8	10.2	(F)	140	0.14	2000	EEE1VA101UP	(2)	500
		10	10.2	G	210	0.14	2000	EEE1VA101P	(2)	500
	220	8	10.2	(F)	200	0.14	2000	EEE1VA221UP	(2)	500
		10	10.2	G	310	0.14	2000	EEE1VA221P	(2)	500
	330	10	10.2	G	350	0.14	2000	EEE1VA331P	(2)	500

* Size code():Miniaturization product

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)	Endurance (hours)			Taping (pcs)
50	0.1	4	5.4	B	1	0.12	2000	EEE1HA0R1SR ***	(1)	2000
	0.22	4	5.4	B	2	0.12	2000	EEE1HAR22SR ***	(1)	2000
	0.33	4	5.4	B	3	0.12	2000	EEE1HAR33SR ***	(1)	2000
	0.47	4	5.4	B	5	0.12	2000	EEE1HAR47SR ***	(1)	2000
	1	4	5.4	B	10	0.12	2000	EEE1HA010SR	(1)	2000
	2.2	4	5.4	B	16	0.12	2000	EEE1HA2R2SR	(1)	2000
	3.3	4	5.4	B	16	0.12	2000	EEE1HA3R3SR	(1)	2000
	4.7	4	5.4	(B)	18	0.14	1000	EEE1HA4R7WR	(1)	2000
		5	5.4	C	23	0.12	2000	EEE1HA4R7SR	(1)	1000
	10	5	5.4	(C)	27	0.14	1000	EEE1HA100WR	(1)	1000
		6.3	5.4	D	35	0.12	2000	EEE1HA100SP	(1)	1000
	22	6.3	5.4	(D)	40	0.14	1000	EEE1HA220WP	(1)	1000
		8	6.2	E	120	0.12	2000	EEE1HA220P	(2)	1000
	33	6.3	7.7	D8	85	0.12	2000	EEE1HA330XP	(1)	900
		8	6.2	(E)	65	0.12	2000	EEE1HA330UP	(2)	1000
		8	10.2	F	110	0.12	2000	EEE1HA330P	(2)	500
	47	6.3	7.7	D8	105	0.12	2000	EEE1HA470XP	(1)	900
		8	10.2	(F)	110	0.12	2000	EEE1HA470UP	(2)	500
		10	10.2	G	130	0.12	2000	EEE1HA470P	(2)	500
	100	8	10.2	(F)	200	0.12	2000	EEE1HA101UP	(2)	500
		10	10.2	G	250	0.12	2000	EEE1HA101P	(2)	500
	220	10	10.2	G	300	0.12	2000	EEE1HA221P	(2)	500
63	22	8	6.2	(E)	40	0.18	2000	EEE1JA220UP	(2)	1000
		8	10.2	F	40	0.18	2000	EEE1JA220P	(2)	500
	33	8	10.2	F	45	0.18	2000	EEE1JA330P	(2)	500
		8	10.2	(F)	45	0.18	2000	EEE1JA470UP	(2)	500
	100	10	10.2	G	45	0.18	2000	EEE1JA470P	(2)	500
100	3.3	8	6.2	E	50	0.18	2000	EEE2AA3R3P	(2)	1000
	4.7	8	6.2	(E)	50	0.18	2000	EEE2AA4R7UP	(2)	1000
	10	8	6.2	(E)	50	0.18	2000	EEE2AA100UP	(2)	1000
		8	10.2	F	85	0.18	2000	EEE2AA100P	(2)	500
	22	8	10.2	(F)	55	0.18	2000	EEE2AA220UP	(2)	500
		10	10.2	G	85	0.18	2000	EEE2AA220P	(2)	500
	33	10	10.2	G	90	0.18	2000	EEE2AA330P	(2)	500

* Size code():Miniaturization product

*** Please kindly accept last shipment : 31/Mar/2015

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

■ Standard Products (Bi-polar)

Endurance : 85 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)	Endurance			Taping
(V)	(μF)	(mm)	(mm)				(hours)			(pcs)
6.3	22	5	5.4	C	29	0.52	2000	EEE0JA220NR	(1)	1000
	47	6.3	5.4	D	46	0.52	2000	EEE0JA470NP	(1)	1000
10	10	4	5.4	B	25	0.40	2000	EEE1AA100NR	(1)	2000
	33	6.3	5.4	D	43	0.40	2000	EEE1AA330NP	(1)	1000
16	4.7	4	5.4	B	20	0.32	2000	EEE1CA4R7NR	(1)	2000
	10	5	5.4	C	25	0.32	2000	EEE1CA100NR	(1)	1000
	22	6.3	5.4	D	39	0.32	2000	EEE1CA220NP	(1)	1000
25	3.3	4	5.4	B	12	0.28	2000	EEE1EA3R3NR	(1)	2000
	4.7	5	5.4	C	21	0.28	2000	EEE1EA4R7NR	(1)	1000
	10	6.3	5.4	D	28	0.28	2000	EEE1EA100NP	(1)	1000
35	2.2	4	5.4	B	12	0.24	2000	EEE1VA2R2NR	(1)	2000
	4.7	5	5.4	C	22	0.24	2000	EEE1VA4R7NR	(1)	1000
	10	6.3	5.4	D	30	0.24	2000	EEE1VA100NP	(1)	1000
50	0.22	4	5.4	B	2	0.24	2000	EEE1HAR22NR ***	(1)	2000
	0.33	4	5.4	B	3	0.24	2000	EEE1HAR33NR ***	(1)	2000
	0.47	4	5.4	B	5	0.24	2000	EEE1HAR47NR ***	(1)	2000
	1	4	5.4	B	10	0.24	2000	EEE1HA010NR	(1)	2000
	2.2	5	5.4	C	16	0.24	2000	EEE1HA2R2NR	(1)	1000
	3.3	5	5.4	C	21	0.24	2000	EEENZ1H3R3R	(1)	1000
	4.7	6.3	5.4	D	31	0.24	2000	EEE1HA4R7NP	(1)	1000

*** Please kindly accept last shipment : 31/Mar/2015

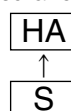
· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **HA** Type: **V**
HA High temperature Lead-Free reflow (suffix:A*)

High-temperature
assurance



Features

- Endurance: 105 °C 1000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

Specifications

Specifications								
Category Temp. Range	-40 °C to +105 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	1 μF to 1500 μF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)							
tan δ	Please see the attached High temperature lead-free reflow products list.							
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	8	6	4	4	3	3	
Endurance	After applying rated working voltage for 1000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±30 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

Marking

Example: 6.3 V 22 μF
Marking color: BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

Dimensions in mm(not to scale)

(Unit : mm)

Pressure Relief (φ10 and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ High temperature Lead-Free reflow products

Endurance : 105 °C 1000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
6.3	22	4	5.4	B	29	0.30	EEEHA0J220AR	(5)	2000
	33	4	5.4	(B)	29	0.35	EEEHAJ330WAR	(5)	2000
	47	5	5.4	C	46	0.30	EEEHA0J470AR	(5)	1000
	100	5	5.4	(C)	47	0.40	EEEHAJ101WAR	(5)	1000
		6.3	5.4	D	71	0.30	EEEHA0J101AP	(5)	1000
	330	6.3	7.7	D8	105	0.30	EEEHAJ331XAP	(5)	900
		8	6.2	(E)	180	0.35	EEEHAJ331UAP	(7)	500
		8	10.2	F	230	0.35	EEEHA0J331AP	(7)	500
	470	8	10.2	(F)	300	0.35	EEEHAJ471UAP	(7)	500
	1000	10	10.2	G	400	0.35	EEEHA0J102AP	(7)	500
	1500	10	10.2	(G)	480	0.50	EEEHAJ152UAP	(7)	500
10	22	4	5.4	(B)	28	0.30	EEEHAA220WAR	(5)	2000
	33	4	5.4	(B)	29	0.30	EEEHAA330WAR	(5)	2000
		5	5.4	C	43	0.22	EEEHAA1A330AR	(5)	1000
	47	5	5.4	(C)	43	0.30	EEEHAA470WAR	(5)	1000
	100	6.3	5.4	(D)	71	0.30	EEEHAA101WAP	(5)	1000
		8	6.2	E	110	0.26	EEEHAA1A101AP	(7)	1000
	220	6.3	7.7	D8	105	0.22	EEEHAA221XAP	(5)	900
		8	10.2	F	160	0.26	EEEHAA1A221AP	(7)	500
	470	8	10.2	(F)	200	0.26	EEEHAA471UAP	(7)	500
		10	10.2	G	270	0.26	EEEHAA1A471AP	(7)	500
16	1000	10	10.2	(G)	400	0.35	EEEHAA102UAP	(7)	500
	10	4	5.4	B	28	0.16	EEEHAC100AR	(5)	2000
	22	4	5.4	(B)	28	0.26	EEEHAC220WAR	(5)	2000
		5	5.4	C	39	0.16	EEEHAC1C220AR	(5)	1000
	33	5	5.4	(C)	35	0.26	EEEHAC330WAR	(5)	1000
	47	5	5.4	(C)	39	0.26	EEEHAC470WAR	(5)	1000
		6.3	5.4	D	70	0.16	EEEHAC1C470AP	(5)	1000
	100	6.3	5.4	(D)	70	0.26	EEEHAC101WAP	(5)	1000
	220	6.3	7.7	D8	105	0.20	EEEHAC221XAP	(5)	900
		8	10.2	(F)	150	0.20	EEEHAC221UAP	(7)	500
		10	10.2	G	210	0.20	EEEHAC1C221AP	(7)	500
	330	8	10.2	(F)	170	0.20	EEEHAC331UAP	(7)	500
		10	10.2	G	230	0.20	EEEHAC1C331AP	(7)	500
	470	8	10.2	(F)	340	0.26	EEEHAC471UAP	(7)	500
		10	10.2	G	340	0.20	EEEHAC1C471AP	(7)	500
	680	10	10.2	(G)	380	0.26	EEEHAC681UAP	(7)	500

* Size code():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V, 1H→H

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

■ High temperature Lead-Free reflow products

Endurance : 105 °C 1000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
25	4.7	4	5.4	B	22	0.14	EEEHA1E4R7AR	(5)	2000
	10	4	5.4	(B)	22	0.20	EEEHAE100WAR	(5)	2000
		5	5.4	C	28	0.14	EEEHA1E100AR	(5)	1000
	22	5	5.4	(C)	35	0.20	EEEHAE220WAR	(5)	1000
		6.3	5.4	D	55	0.14	EEEHA1E220AP	(5)	1000
	33	5	5.4	(C)	45	0.20	EEEHAE330WAR	(5)	1000
		6.3	5.4	D	65	0.14	EEEHA1E330AP	(5)	1000
	47	6.3	5.4	(D)	70	0.20	EEEHAE470WAP	(5)	1000
		8	6.2	E	91	0.16	EEEHA1E470AP	(7)	1000
	100	8	6.2	(E)	91	0.16	EEEHAE101UAP	(7)	1000
		6.3	7.7	D8	91	0.16	EEEHAE101XAP	(5)	900
		8	10.2	F	130	0.16	EEEHA1E101AP	(7)	500
		8	10.2	(F)	160	0.20	EEEHAE221UAP	(7)	500
	220	10	10.2	G	190	0.16	EEEHA1E221AP	(7)	500
		8	10.2	(F)	180	0.20	EEEHAE331UAP	(7)	500
	330	10	10.2	G	340	0.16	EEEHA1E331AP	(7)	500
		10	10.2	(G)	360	0.25	EEEHAE471UAP	(7)	500
35	4.7	4	5.4	B	22	0.12	EEEHA1V4R7AR	(5)	2000
	10	4	5.4	(B)	22	0.16	EEEHAV100WAR	(5)	2000
		5	5.4	C	30	0.12	EEEHA1V100AR	(5)	1000
	22	5	5.4	(C)	35	0.16	EEEHAV220WAR	(5)	1000
		6.3	5.4	D	60	0.12	EEEHA1V220AP	(5)	1000
	33	6.3	5.4	(D)	42	0.16	EEEHAV330WAP	(5)	1000
		8	6.2	E	84	0.14	EEEHA1V330AP	(7)	1000
	47	8	6.2	(E)	84	0.14	EEEHAV470UAP	(7)	1000
		8	10.2	F	98	0.14	EEEHA1V470AP	(7)	500
	100	6.3	7.7	D8	84	0.14	EEEHAV101XAP	(5)	900
		8	10.2	(F)	120	0.14	EEEHAV101UAP	(7)	500
		10	10.2	G	160	0.14	EEEHA1V101AP	(7)	500
		8	10.2	(F)	170	0.14	EEEHAV221UAP	(7)	500
	220	10	10.2	G	210	0.14	EEEHA1V221AP	(7)	500
		10	10.2	(G)	250	0.30	EEEHAV331UAP	(7)	500
50	0.1	4	5.4	B	1	0.12	EEEHA1HR10AR ***	(5)	2000
	0.22	4	5.4	B	2	0.12	EEEHA1HR22AR ***	(5)	2000
	0.33	4	5.4	B	3	0.12	EEEHA1HR33AR ***	(5)	2000
	0.47	4	5.4	B	5	0.12	EEEHA1HR47AR ***	(5)	2000
	1	4	5.4	B	10	0.12	EEEHA1H1R0AR	(5)	2000
	2.2	4	5.4	B	16	0.12	EEEHA1H2R2AR	(5)	2000
	3.3	4	5.4	B	16	0.12	EEEHA1H3R3AR	(5)	2000
	4.7	5	5.4	C	23	0.12	EEEHA1H4R7AR	(5)	1000
	10	6.3	5.4	D	35	0.12	EEEHA1H100AP	(5)	1000
	22	8	6.2	E	70	0.12	EEEHA1H220AP	(7)	1000
	33	6.3	7.7	D8	70	0.14	EEEHAH330XAP	(5)	900
		8	6.2	(E)	70	0.12	EEEHAH330UAP	(7)	1000
		8	10.2	F	91	0.12	EEEHA1H330AP	(7)	500
	47	6.3	7.7	D8	63	0.14	EEEHAH470XAP	(5)	900
		8	10.2	(F)	95	0.12	EEEHAH470UAP	(7)	500
		10	10.2	G	100	0.12	EEEHA1H470AP	(7)	500
	100	8	10.2	(F)	110	0.18	EEEHAH101UAP	(7)	500
		10	10.2	G	120	0.12	EEEHA1H101AP	(7)	500
	220	10	10.2	(G)	150	0.18	EEEHAH221UAP	(7)	500

* Size code(): Miniaturization product

*** Please kindly accept last shipment : 31/Mar/2015

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V, 1H→H

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

Surface Mount Type

Series: **HA** Type: **V**

■ Features

- Endurance: 105 °C 1000 h
- Vibration-proof product is available upon request.
(φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C									
Rated W.V. Range	6.3 V.DC to 100 V.DC									
Nominal Cap. Range	1 μF to 1500 μF									
Capacitance Tolerance	±20 % (120 Hz/+20 °C)									
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)									
tan δ	Please see the attached standard products list									
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	3	3	
	Z(-40 °C)/Z(+20 °C)	8	6	4	4	3	3	4	4	
Endurance	After applying rated working voltage for 1000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±20 % of initial measured value (6.3 W.V. of miniature : ±30 %)								
	tan δ	≤ 200 % of initial specified value								
	DC leakage current	≤ initial specified value								
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)									
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.									
	Capacitance change	±10 % of initial measured value								
	tan δ	≤ initial specified value								
	DC leakage current	≤ initial specified value								

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example: 6.3 V 22 μF (Polarized)
Marking color : BLACK

Negative polarity marking (-)

Capacitance (μF)

Series identification

Mark for Lead-Free Products Black Dot (Square)

Rated voltage Mark

Lot number

j	6.3 V	V	35 V
A	10 V	H	50 V
C	16 V	J	63 V
E	25 V	2A	100 V

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.

φD±0.5

L

H

A±0.2

B±0.2

I

W

P

K

Pressure Relief (φ10 and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ Standard Products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)						(pcs)
6.3	22	4	5.4	B	29	0.30	EEEHA0J220R	(1)	2000
	33	4	5.4	(B)	29	0.35	EEEHA0J330WR	(1)	2000
	47	4	5.4	(B)	36	0.35	EEEHA0J470WR	(1)	2000
		5	5.4	C	46	0.30	EEEHA0J470R	(1)	1000
	100	5	5.4	(C)	47	0.35	EEEHA0J101WR	(1)	1000
		6.3	5.4	D	71	0.30	EEEHA0J101P	(1)	1000
	220	6.3	5.4	(D)	74	0.35	EEEHA0J221WP	(1)	1000
	330	6.3	7.7	D8	105	0.30	EEEHA0J331XP	(1)	900
		8	10.2	F	230	0.35	EEEHA0J331P	(2)	500
	470	8	10.2	(F)	300	0.35	EEEHA0J471UP	(2)	500
	1000	8	10.2	(F)	300	0.35	EEEHA0J102UP	(2)	500
		10	10.2	G	400	0.35	EEEHA0J102P	(2)	500
	1500	10	10.2	G	480	0.35	EEEHA0J152P	(2)	500
10	22	4	5.4	(B)	28	0.30	EEEHA1A220WR	(1)	2000
	33	4	5.4	(B)	29	0.30	EEEHA1A330WR	(1)	2000
		5	5.4	C	43	0.22	EEEHA1A330R	(1)	1000
	47	5	5.4	(C)	43	0.30	EEEHA1A470WR	(1)	1000
		6.3	5.4	(D)	71	0.30	EEEHA1A101WP	(1)	1000
	100	8	6.2	E	110	0.26	EEEHA1A101P	(2)	1000
		6.3	7.7	D8	105	0.22	EEEHA1A221XP	(1)	900
	220	8	10.2	F	160	0.26	EEEHA1A221P	(2)	500
		8	10.2	(F)	200	0.26	EEEHA1A471UP	(2)	500
	470	10	10.2	G	270	0.26	EEEHA1A471P	(2)	500
		10	10.2	G	400	0.26	EEEHA1A102P	(2)	500
	1000	10	10.2	G	400	0.26	EEEHA1A102P	(2)	500
16	10	4	5.4	B	28	0.16	EEEHA1C100R	(1)	2000
	22	4	5.4	(B)	28	0.26	EEEHA1C220WR	(1)	2000
		5	5.4	C	39	0.16	EEEHA1C220R	(1)	1000
	33	5	5.4	(C)	35	0.26	EEEHA1C330WR	(1)	1000
	47	5	5.4	(C)	39	0.26	EEEHA1C470WR	(1)	1000
		6.3	5.4	D	70	0.16	EEEHA1C470P	(1)	1000
	100	6.3	5.4	(D)	70	0.26	EEEHA1C101WP	(1)	1000
	220	6.3	7.7	D8	105	0.16	EEEHA1C221XP	(1)	900
		8	10.2	(F)	150	0.20	EEEHA1C221UP	(2)	500
		10	10.2	G	210	0.20	EEEHA1C221P	(2)	500
	330	8	10.2	(F)	170	0.20	EEEHA1C331UP	(2)	500
		10	10.2	G	230	0.20	EEEHA1C331P	(2)	500
	470	8	10.2	(F)	340	0.20	EEEHA1C471UP	(2)	500
		10	10.2	G	340	0.20	EEEHA1C471P	(2)	500
	680	10	10.2	G	380	0.20	EEEHA1C681P	(2)	500

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

■ Standard Products

Endurance : 105 °C 1000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
25	4.7	4	5.4	B	22	0.14	EEEHA1E4R7R	(1)	2000
	10	4	5.4	(B)	22	0.20	EEEHA1E100WR	(1)	2000
		5	5.4	C	28	0.14	EEEHA1E100R	(1)	1000
	22	5	5.4	(C)	35	0.20	EEEHA1E220WR	(1)	1000
		6.3	5.4	D	55	0.14	EEEHA1E220P	(1)	1000
	33	5	5.4	(C)	45	0.20	EEEHA1E330WR	(1)	1000
		6.3	5.4	D	65	0.14	EEEHA1E330P	(1)	1000
	47	6.3	5.4	(D)	70	0.20	EEEHA1E470WP	(1)	1000
		8	6.2	E	91	0.16	EEEHA1E470P	(2)	1000
	100	6.3	7.7	D8	91	0.14	EEEHA1E101XP	(1)	900
		8	6.2	(E)	91	0.16	EEEHA1E101UP	(2)	1000
		8	10.2	F	130	0.16	EEEHA1E101P	(2)	500
	220	8	10.2	(F)	160	0.16	EEEHA1E221UP	(2)	500
		10	10.2	G	190	0.16	EEEHA1E221P	(2)	500
	330	8	10.2	(F)	180	0.16	EEEHA1E331UP	(2)	500
		10	10.2	G	340	0.16	EEEHA1E331P	(2)	500
	470	10	10.2	G	360	0.16	EEEHA1E471P	(2)	500
35	4.7	4	5.4	B	22	0.12	EEEHA1V4R7R	(1)	2000
	10	4	5.4	(B)	22	0.16	EEEHA1V100WR	(1)	2000
		5	5.4	C	30	0.12	EEEHA1V100R	(1)	1000
	22	5	5.4	(C)	35	0.16	EEEHA1V220WR	(1)	1000
		6.3	5.4	D	60	0.12	EEEHA1V220P	(1)	1000
	33	6.3	5.4	(D)	42	0.16	EEEHA1V330WP	(1)	1000
		8	6.2	E	84	0.14	EEEHA1V330P	(2)	1000
	47	8	6.2	(E)	84	0.14	EEEHA1V470UP	(2)	1000
		8	10.2	F	98	0.14	EEEHA1V470P	(2)	500
	100	6.3	7.7	D8	84	0.12	EEEHA1V101XP	(1)	900
		8	10.2	(F)	120	0.14	EEEHA1V101UP	(2)	500
		10	10.2	G	160	0.14	EEEHA1V101P	(2)	500
	220	8	10.2	(F)	170	0.14	EEEHA1V221UP	(2)	500
		10	10.2	G	210	0.14	EEEHA1V221P	(2)	500
	330	10	10.2	G	250	0.14	EEEHA1V331P	(2)	500
50	0.1	4	5.4	B	1	0.12	EEEHA1HR10R ***	(1)	2000
	0.22	4	5.4	B	2	0.12	EEEHA1HR22R ***	(1)	2000
	0.33	4	5.4	B	3	0.12	EEEHA1HR33R ***	(1)	2000
	0.47	4	5.4	B	5	0.12	EEEHA1HR47R ***	(1)	2000
	1	4	5.4	B	10	0.12	EEEHA1H1R0R	(1)	2000
	2.2	4	5.4	B	16	0.12	EEEHA1H2R2R	(1)	2000
	3.3	4	5.4	B	16	0.12	EEEHA1H3R3R	(1)	2000
	4.7	5	5.4	C	23	0.12	EEEHA1H4R7R	(1)	1000
	10	6.3	5.4	D	35	0.12	EEEHA1H100P	(1)	1000
	22	8	6.2	E	70	0.12	EEEHA1H220P	(2)	1000
	33	6.3	7.7	D8	70	0.12	EEEHA1H330XP	(1)	900
		8	6.2	(E)	70	0.12	EEEHA1H330UP	(2)	1000
		8	10.2	F	91	0.12	EEEHA1H330P	(2)	500
	47	6.3	7.7	D8	63	0.12	EEEHA1H470XP	(1)	900
		8	10.2	(F)	95	0.12	EEEHA1H470UP	(2)	500
		10	10.2	G	100	0.12	EEEHA1H470P	(2)	500
	100	8	10.2	(F)	110	0.12	EEEHA1H101UP	(2)	500
		10	10.2	G	120	0.12	EEEHA1H101P	(2)	500
	220	10	10.2	G	150	0.12	EEEHA1H221P	(2)	500

* Size code():Miniaturization product

*** Please kindly accept last shipment : 31/Mar/2015

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ Standard Products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μ F)	(mm)	(mm)						(pcs)
63	10	8	6.2	E	25	0.18	EEEHA1J100P	(2)	1000
	22	8	6.2	(E)	25	0.18	EEEHA1J220UP	(2)	1000
		8	10.2	F	30	0.18	EEEHA1J220P	(2)	500
	33	10	10.2	G	45	0.18	EEEHA1J330P	(2)	500
	47	8	10.2	(F)	45	0.18	EEEHA1J470UP	(2)	500
		10	10.2	G	50	0.18	EEEHA1J470P	(2)	500
100	3.3	8	6.2	E	30	0.18	EEEHA2A3R3P	(2)	1000
	4.7	8	6.2	(E)	30	0.18	EEEHA2A4R7UP	(2)	1000
	10	8	10.2	F	55	0.18	EEEHA2A100P	(2)	500
	22	8	10.2	(F)	55	0.18	EEEHA2A220UP	(2)	500
		10	10.2	G	60	0.18	EEEHA2A220P	(2)	500
	33	10	10.2	G	65	0.18	EEEHA2A330P	(2)	500
	47	10	10.2	(G)	65	0.18	EEEHA2A470UP	(2)	500

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **HB** Type: **V**

HB High temperature Lead-Free reflow (suffix:A*)



■ Features

- Endurance: 105 °C 2000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C								
Rated W.V. Range	6.3 V.DC to 50 V.DC								
Nominal Cap. Range	1 μF to 1500 μF								
Capacitance Tolerance	±20 % (120 Hz/ +20 °C)								
DC Leakage Current	I≤0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)								
tan δ	Please see the attached High temperature lead-free reflow products list.								
Characteristics at Low Temperature	Standard	W.V.(V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
		Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	
		Z(-40 °C)/Z(+20 °C)	8	6	4	4	3	3	
	Miniaturization product	Z(-25 °C)/Z(+20 °C)	4	3	2	2	2	2	
		Z(-40 °C)/Z(+20 °C)	10	8	6	6	4	4	
Endurance	After applying rated working voltage for 2000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.								
	Capacitance change	±20 % of initial measured value (16 V.DC or less : Within ±25 %, Miniaturization product : Within ±35 %)							
	tan δ	≤ 200 % of initial specified value							
	DC leakage current	≤ initial specified value							
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)								
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.								
	Capacitance change	±10 % of initial measured value							
	tan δ	≤ initial specified value							
	DC leakage current	≤ initial specified value							

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example : 6.3 V 22 μF (Polarized)
Marking color : BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

■ Dimensions in mm (not to scale)

(Unit : mm)

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ High temperate Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
6.3	22	4	5.8	B	26	0.30	EEEHB0J220AR	(5)	2000
	33	4	5.8	B	29	0.30	EEEHB0J330AR	(5)	2000
	47	4	5.8	(B)	26	0.50	EEEHBJ470UAR	(5)	2000
		5	5.8	C	46	0.30	EEEHB0J470AR	(5)	1000
	100	5	5.8	(C)	42	0.50	EEEHBJ101UAR	(5)	1000
		6.3	5.8	D	71	0.30	EEEHB0J101AP	(5)	1000
	220	6.3	5.8	(D)	80	0.50	EEEHBJ221UAP	(5)	1000
		8	10.2	F	150	0.35	EEEHB0J221AP	(7)	500
	330	8	6.2	(E)	180	0.50	EEEHBJ331UAP	(7)	1000
		8	10.2	F	230	0.35	EEEHB0J331AP	(7)	500
10	33	4	5.8	(B)	23	0.30	EEEHBA330UAR	(5)	2000
		5	5.8	C	43	0.26	EEEHB1A330AR	(5)	1000
	68	6.3	5.8	D	70	0.22	EEEHB1A680AP	(5)	1000
	100	6.3	5.8	(D)	71	0.30	EEEHBA101UAR	(5)	1000
		8	6.2	E	110	0.26	EEEHB1A101AP	(7)	1000
	150	6.3	5.8	(D)	64	0.50	EEEHBA151UAP	(5)	1000
	220	8	6.2	(E)	110	0.30	EEEHBA221UAP	(7)	1000
		8	10.2	F	160	0.26	EEEHB1A221AP	(7)	500
	470	8	10.2	(F)	220	0.35	EEEHBA471UAP	(7)	500
		10	10.2	G	270	0.26	EEEHB1A471AP	(7)	500
16	10	4	5.8	B	28	0.16	EEEHB1C100AR	(5)	2000
	22	4	5.8	(B)	29.5	0.26	EEEHBC220UAR	(5)	2000
		5	5.8	C	39	0.16	EEEHB1C220AR	(5)	1000
	33	6.3	5.8	D	65	0.16	EEEHB1C330AP	(5)	1000
	47	5	5.8	(C)	39	0.26	EEEHBC470UAR	(5)	1000
		6.3	5.8	D	70	0.16	EEEHB1C470AP	(5)	1000
		6.3	7.7	D8	84	0.16	EEEHBC470XAP	(5)	900
	100	6.3	5.8	(D)	70	0.26	EEEHBC101UAR	(5)	1000
		8	10.2	F	120	0.20	EEEHB1C101AP	(7)	500
	220	8	10.2	(F)	150	0.20	EEEHBC221UAP	(7)	500
		10	10.2	G	210	0.20	EEEHB1C221AP	(7)	500
	330	10	10.2	G	230	0.20	EEEHB1C331AP	(7)	500
25	470	8	10.2	(F)	240	0.40	EEEHBC471UAP	(7)	500
		10	10.2	G	340	0.20	EEEHB1C471AP	(7)	500
	4.7	4	5.8	B	22	0.14	EEEHB1E4R7AR	(5)	2000
	6.8	4	5.8	B	25	0.14	EEEHB1E6R8AR	(5)	2000
	10	4	5.8	(B)	28	0.16	EEEHBE100UAR	(5)	2000
		5	5.8	C	28	0.14	EEEHB1E100AR	(5)	1000
	22	6.3	5.8	D	55	0.14	EEEHB1E220AP	(5)	1000
	33	5	5.8	(C)	50	0.20	EEEHBE330UAR	(5)	1000
		6.3	5.8	D	65	0.14	EEEHB1E330AP	(5)	1000
	47	6.3	5.8	(D)	65	0.20	EEEHBE470UAP	(5)	1000
		8	6.2	E	91	0.16	EEEHB1E470AP	(7)	1000
	100	8	6.2	(E)	100	0.16	EEEHBE101UAP	(7)	1000
		8	10.2	F	130	0.16	EEEHB1E101AP	(7)	500
25	220	8	10.2	(F)	130	0.30	EEEHBE221UAP	(7)	500
		10	10.2	G	190	0.16	EEEHB1E221AP	(7)	500
	330	8	10.2	(F)	130	0.30	EEEHBE331UAP	(7)	500
		10	10.2	G	220	0.16	EEEHB1E331AP	(7)	500
	470	8	10.2	(F)	230	0.30	EEEHBE471UAP	(7)	500
		10	10.2	(G)	230	0.30	EEEHBE471UAP	(7)	500

*Size code ():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ High temperate Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
35	4.7	4	5.8	B	21	0.12	EEH1B1V4R7AR	(5)	2000
	6.8	4	5.8	(B)	25	0.12	EEH1BV6R8UAR	(5)	2000
	10	5	5.8	C	28	0.12	EEH1B1V100AR	(5)	1000
	22	6.3	5.8	D	55	0.12	EEH1B1V220AP	(5)	1000
	33	8	6.2	E	84	0.14	EEH1B1V330AP	(7)	1000
	47	6.3	7.7	D8	98	0.20	EEH1BV470YAP	(5)	900
		8	6.2	(E)	91	0.18	EEH1BV470UAP	(7)	1000
		8	10.2	F	98	0.14	EEH1B1V470AP	(7)	500
	100	8	10.2	(F)	98	0.20	EEH1BV101UAP	(7)	500
		10	10.2	G	160	0.14	EEH1B1V101AP	(7)	500
50	220	10	10.2	(G)	180	0.14	EEH1BV221UAP	(7)	500
	0.1	4	5.8	B	1	0.12	EEH1B1HR10AR ***	(5)	2000
	0.22	4	5.8	B	2	0.12	EEH1B1HR22AR ***	(5)	2000
	0.33	4	5.8	B	3	0.12	EEH1B1HR33AR ***	(5)	2000
	0.47	4	5.8	B	5	0.12	EEH1B1HR47AR ***	(5)	2000
	0.68	4	5.8	B	7	0.12	EEH1B1HR68AR ***	(5)	2000
	1	4	5.8	B	10	0.12	EEH1B1H1R0AR	(5)	2000
	2.2	4	5.8	B	16	0.12	EEH1B1H2R2AR	(5)	2000
	3.3	4	5.8	B	16	0.12	EEH1B1H3R3AR	(5)	2000
	4.7	5	5.8	C	23	0.12	EEH1B1H4R7AR	(5)	1000
	6.8	5	5.8	C	23	0.12	EEH1B1H6R8AR	(5)	1000
	10	6.3	5.8	D	35	0.12	EEH1B1H100AP	(5)	1000
	22	6.3	5.8	(D)	35	0.14	EEH1BH220UAP	(5)	1000
		8	6.2	E	70	0.12	EEH1B1H220AP	(7)	1000
	33	8	10.2	F	91	0.12	EEH1B1H330AP	(7)	500
	47	6.3	7.7	D8	63	0.12	EEH1BH470YAP	(5)	900
		8	10.2	(F)	95	0.12	EEH1BH470UAP	(7)	500
		10	10.2	G	100	0.12	EEH1B1H470AP	(7)	500
	100	10	10.2	(G)	250	0.12	EEH1BH101UAP	(7)	500
	220	10	10.2	(G)	270	0.18	EEH1BH221UAP	(7)	500

*Size code ():Miniaturization product

*** Please kindly accept last shipment : 31/Mar/2015

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

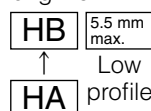
· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **HB** Type: **V**

Long life



■ Features

- Endurance: 105 °C 2000 h
- 5.8 mm height (≤ ϕ6.3), 5.5 mm height max.
- Vibration-proof product is available upon request. (ϕ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Specifications									
Category Temp. Range	-40 °C to +105 °C								
Rated W.V. Range	4 V.DC to 50 V.DC								
Nominal Cap. Range	1 μF to 470 μF								
Capacitance Tolerance	±20 % (120 Hz/+20 °C)								
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Bi-polar I ≤ 0.02 CV or 6 (μA) after 2 minutes) (Whichever is greater)								
tan δ	Please see the attached standard products list								
Characteristics at Low Temperature	W.V. (V)	4	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	7	4	3	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	15	8	6	4	4	3	3	
Endurance	After applying rated working voltage for 2000 hours (Bi-polar : 1000 hours for each polarity) at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.								
	Capacitance change	±20 % of inisial measured value (4 W.V. : ±35 % 6.3 W.V. : ±25 % ϕ4 to ϕ6.3), 5.5 mm max. : ±25 %							
	tan δ	≤ 200 % of initial specified value							
	DC leakage current	≤ initial specified value							
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)								
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20°C, capacitors shall meet the following limits.								
	Capacitance change	±10 % of initial measured value							
	tan δ	≤ initial specified value							
	DC leakage current	≤ initial specified value							

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example: 4 V 47 μF
Marking color: BLACK

Rated Voltage Mark

g	4 V	E	25 V
j	6.3 V	V	35 V
A	10 V	H	50 V
C	16 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

● 5.5 mm height max.

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)						(pcs)
4	47	4	5.8	B	34	0.50	EEH0470R	(1)	2000
	100	5	5.8	C	61	0.50	EEH0101R	(1)	1000
	150	6.3	5.8	D	82	0.50	EEH0151P	(1)	1000
	220	6.3	5.8	D	82	0.50	EEH0221P	(1)	1000
6.3	22	4	5.8	B	26	0.30	EEH0220R	(1)	2000
	33	4	5.8	B	29	0.30	EEH0330R	(1)	2000
	47	5	5.8	C	46	0.30	EEH0470R	(1)	1000
	100	6.3	5.8	D	71	0.30	EEH0101P	(1)	1000
	220	8	10.2	F	150	0.35	EEH0221P	(2)	500
	330	8	10.2	F	230	0.35	EEH0331P	(2)	500
10	33	5	5.8	C	43	0.22	EEH10330R	(1)	1000
	100	8	6.2	E	110	0.26	EEH10101P	(2)	1000
	220	8	10.2	F	160	0.26	EEH10221P	(2)	500
	470	10	10.2	G	270	0.26	EEH10471P	(2)	500
16	10	4	5.8	B	28	0.16	EEH10100R	(1)	2000
	22	5	5.8	C	39	0.16	EEH10220R	(1)	1000
	47	6.3	5.8	D	70	0.16	EEH10470P	(1)	1000
	100	8	10.2	F	120	0.20	EEH10101P	(2)	500
	220	10	10.2	G	210	0.20	EEH10221P	(2)	500
	330	10	10.2	G	230	0.20	EEH10331P	(2)	500
25	4.7	4	5.8	B	22	0.14	EEH1047R	(1)	2000
	6.8	4	5.8	B	25	0.14	EEH1068R	(1)	2000
	33	6.3	5.8	D	65	0.14	EEH10330P	(1)	1000
	47	8	6.2	E	91	0.16	EEH10470P	(2)	1000
	100	8	10.2	F	130	0.16	EEH10101P	(2)	500
	220	10	10.2	G	190	0.16	EEH10221P	(2)	500
35	10	5	5.8	C	28	0.12	EEH10100R	(1)	1000
	22	6.3	5.8	D	55	0.12	EEH10220P	(1)	1000
	33	8	6.2	E	84	0.14	EEH10330P	(2)	1000
	47	8	10.2	F	98	0.14	EEH10470P	(2)	500
	100	10	10.2	G	160	0.14	EEH10101P	(2)	500
50	0.1	4	5.8	B	1	0.12	EEH101HR10R ***	(1)	2000
	0.22	4	5.8	B	2	0.12	EEH102HR22R ***	(1)	2000
	0.33	4	5.8	B	3	0.12	EEH103HR33R ***	(1)	2000
	0.47	4	5.8	B	5	0.12	EEH104HR47R ***	(1)	2000
	1	4	5.8	B	10	0.12	EEH101H1R0R	(1)	2000
	2.2	4	5.8	B	16	0.12	EEH102H2R2R	(1)	2000
	3.3	4	5.8	B	16	0.12	EEH103H3R3R	(1)	2000
	4.7	5	5.8	C	23	0.12	EEH104H4R7R	(1)	1000
	6.8	5	5.8	C	23	0.12	EEH106H6R8R	(1)	1000
	10	6.3	5.8	D	35	0.12	EEH101H100P	(1)	1000
	22	8	6.2	E	70	0.12	EEH102H220P	(2)	1000
	33	8	10.2	F	91	0.12	EEH103H330P	(2)	500
	47	10	10.2	G	100	0.12	EEH104H470P	(2)	500

*** Please kindly accept last shipment : 31/Mar/2015

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products (Bi-polar)

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)						(pcs)
6.3	47	6.3	5.8	D	35	0.60	EEEHP0J470P	(1)	1000
10	10	4	5.8	B	20	0.44	EEEHP1A100R	(1)	2000
	33	6.3	5.8	D	26	0.44	EEEHP1A330P	(1)	1000
16	10	5	5.8	C	25	0.32	EEEHP1C100R	(1)	1000
25	3.3	4	5.8	B	12	0.28	EEEHP1E3R3R	(1)	2000
	4.7	4	5.8	B	12	0.28	EEEHP1E4R7R	(1)	2000
	10	6.3	5.8	D	28	0.28	EEEHP1E100P	(1)	1000
	22	6.3	5.8	D	55	0.28	EEEHP1E220P	(1)	1000
35	2.2	4	5.8	B	10	0.24	EEEHP1V2R2R	(1)	2000
50	0.22	4	5.8	B	2	0.24	EEEHP1HR22R ***	(1)	2000
	0.33	4	5.8	B	3	0.24	EEEHP1HR33R ***	(1)	2000
	0.47	4	5.8	B	5	0.24	EEEHP1HR47R ***	(1)	2000
	1	4	5.8	B	10	0.24	EEEHP1H1R0R	(1)	2000
	3.3	6.3	5.8	D	16	0.24	EEEHP1H3R3P	(1)	1000
	4.7	6.3	5.8	D	23	0.24	EEEHP1H4R7P	(1)	1000

■ Standard Products (5.5 mm max.)

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)						(pcs)
6.3	22	4	5.4	B	26	0.30	EEEHB0J220SR	(1)	2000
	47	5	5.4	C	46	0.30	EEEHB0J470SR	(1)	1000
	100	6.3	5.4	D	71	0.30	EEEHB0J101SP	(1)	1000
10	33	5	5.4	C	43	0.22	EEEHB1A330SR	(1)	1000
16	10	4	5.4	B	28	0.16	EEEHB1C100SR	(1)	2000
	22	5	5.4	C	39	0.16	EEEHB1C220SR	(1)	1000
	47	6.3	5.4	D	70	0.16	EEEHB1C470SP	(1)	1000
25	4.7	4	5.4	B	22	0.14	EEEHB1E4R7SR	(1)	2000
	6.8	4	5.4	B	25	0.14	EEEHB1E6R8SR	(1)	2000
	33	6.3	5.4	D	65	0.14	EEEHB1E330SP	(1)	1000
35	10	5	5.4	C	28	0.12	EEEHB1V100SR	(1)	1000
	22	6.3	5.4	D	55	0.12	EEEHB1V220SP	(1)	1000
50	0.1	4	5.4	B	1	0.12	EEEHB1HR10SR ***	(1)	2000
	0.22	4	5.4	B	2	0.12	EEEHB1HR22SR ***	(1)	2000
	0.33	4	5.4	B	3	0.12	EEEHB1HR33SR ***	(1)	2000
	0.47	4	5.4	B	5	0.12	EEEHB1HR47SR ***	(1)	2000
	1	4	5.4	B	10	0.12	EEEHB1H1R0SR	(1)	2000
	2.2	4	5.4	B	16	0.12	EEEHB1H2R2SR	(1)	2000
	3.3	4	5.4	B	16	0.12	EEEHB1H3R3SR	(1)	2000
	4.7	5	5.4	C	23	0.12	EEEHB1H4R7SR	(1)	1000
	6.8	5	5.4	C	23	0.12	EEEHB1H6R8SR	(1)	1000
	10	6.3	5.4	D	35	0.12	EEEHB1H100SP	(1)	1000

*** Please kindly accept last shipment : 31/Mar/2015

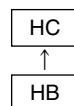
- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Surface Mount Type

Series: **HC** Type: **V**

Long life



■ Features

- Life time: 3000 h to 5000 h at 105 °C
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

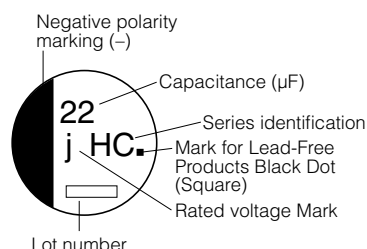
Category Temp. Range	-40 °C to +105 °C	
Rated W.V. Range	6.3 V.DC to 50 V.DC	
Nominal Cap. Range	1 µF to 1000 µF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	I ≤ 0.01 CV or 3 (µA) After 2 minutes (Whichever is greater)	
tan δ	Please see the attached standard products list	
Endurance	After applying rated working voltage for +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits. φ4 to φ6.3 (3000 hours After applying rated working voltage) φ8 to φ10 (5000 hours After applying rated working voltage)	
	Capacitance change	±30 % of initially measured value
	tan δ	≤ 300 % of initially specified values
	DC leakage current	≤ initially specified values
Shelf life	After storage for 1000 hours at +105 °C ±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	
Resistance to Soldering Heat	Capacitance change	±10 % of initially measured values
	tan δ	≤ initially specified values
	DC leakage current	≤ initially specified values

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example: 6.3 V 22 μF
Marking color : BLACK

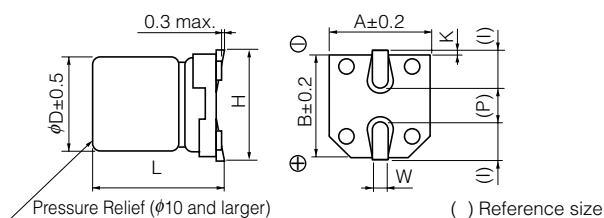


Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

■ Dimensions in mm (not to scale)

(Unit : mm)



Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ Standard Products

Endurance : 105 °C 3000 h (φ8, φ10 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)						(pcs)
6.3	22	4	5.8	B	26	0.30	EEEHC0J220R	(1)	2000
	47	5	5.8	C	46	0.30	EEEHC0J470R	(1)	1000
	100	6.3	5.8	D	71	0.30	EEEHC0J101P	(1)	1000
	220	6.3	7.7	D8	101	0.30	EEEHC0J221XP	(1)	900
	330	8	10.2	F	230	0.30	EEEHC0J331P	(2)	500
	1000	10	10.2	G	313	0.50	EEEHC0J102P	(2)	500
10	33	5	5.8	C	43	0.26	EEEHC1A330R	(1)	1000
	220	8	10.2	F	160	0.26	EEEHC1A221P	(2)	500
16	10	4	5.8	B	28	0.20	EEEHC1C100R	(1)	2000
	22	5	5.8	C	39	0.20	EEEHC1C220R	(1)	1000
	47	6.3	5.8	D	70	0.20	EEEHC1C470P	(1)	1000
	100	6.3	7.7	D8	81	0.20	EEEHC1C101XP	(1)	900
	470	10	10.2	G	340	0.20	EEEHC1C471P	(2)	500
25	33	6.3	5.8	D	65	0.16	EEEHC1E330P	(1)	1000
	47	6.3	7.7	D8	65	0.16	EEEHC1E470XP	(1)	900
	100	8	10.2	F	130	0.16	EEEHC1E101P	(2)	500
	330	10	10.2	G	238	0.16	EEEHC1E331P	(2)	500
35	4.7	4	5.8	B	15	0.14	EEEHC1V4R7R	(1)	2000
	10	5	5.8	C	28	0.14	EEEHC1V100R	(1)	1000
	22	6.3	5.8	D	55	0.14	EEEHC1V220P	(1)	1000
	33	6.3	7.7	D8	57	0.14	EEEHC1V330XP	(1)	900
	220	10	10.2	G	220	0.14	EEEHC1V221P	(2)	500
50	0.1	4	5.8	B	1	0.12	EEEHC1HR10R ***	(1)	2000
	0.22	4	5.8	B	2.6	0.12	EEEHC1HR22R ***	(1)	2000
	0.33	4	5.8	B	3.2	0.12	EEEHC1HR33R ***	(1)	2000
	0.47	4	5.8	B	5	0.12	EEEHC1HR47R ***	(1)	2000
	1	4	5.8	B	10	0.12	EEEHC1H1R0R	(1)	2000
	2.2	4	5.8	B	16	0.12	EEEHC1H2R2R	(1)	2000
	3.3	4	5.8	B	16	0.12	EEEHC1H3R3R	(1)	2000
	4.7	5	5.8	C	23	0.12	EEEHC1H4R7R	(1)	1000
	10	6.3	5.8	D	35	0.12	EEEHC1H100P	(1)	1000
	22	6.3	7.7	D8	49	0.12	EEEHC1H220XP	(1)	900
	33	8	10.2	F	91	0.12	EEEHC1H330P	(2)	500
	47	8	10.2	F	100	0.12	EEEHC1H470P	(2)	500
	100	10	10.2	G	160	0.12	EEEHC1H101P	(2)	500

*** Please kindly accept last shipment : 31/Mar/2015

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **HD** Type: **V**

※6.3V to 35V : High temperature Lead-Free reflow (suffix:A*)

50V to 100V : Standard Lead-Free reflow



■ Features

- Endurance: 105 °C 5000 h
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C									
Rated W.V. Range	6.3 V.DC to 100 V.DC									
Nominal Cap. Range	1 µF to 1000 µF									
Capacitance Tolerance	±20 % (120 Hz/+20 °C)									
DC Leakage Current	I ≤ 0.01 CV or 3 (µA) After 2 minutes (Whichever is greater)									
tan δ	Please see the attached High temperature lead-free reflow products list.									
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	3	3	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	4	4	3	3	3	3	3	3	
Endurance	After applying rated working voltage for 5000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±30 % of initial measured value								
	tan δ	≤ 300 % of initial specified value								
	DC leakage current	≤ initial specified value								
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)									
	Capacitance change	±20 % of initial measured value								
	tan δ	≤ 200 % of initial specified value								
	DC leakage current	≤ initial specified value								
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±10 % of initial measured value								
	tan δ	≤ initial specified value								
	DC leakage current	≤ initial specified value								

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Marking

Example: 6.3 V 330 μF
Marking color: BLACK

Capacitance (μF)
Series identification
Mark for Lead-Free Products Black Dot (Square)
Rated voltage Mark
Lot number

Rated Voltage Mark

j	6.3 V	H	50 V
A	10 V	J	63 V
C	16 V	2A	100 V
E	25 V		
V	35 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.
φD±0.5
L
A±0.2
B±0.2
W
P
K
() Reference size
Pressure Relief (φ10 and larger)

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

■ High temperature Lead-Free reflow Products(6.3V to 35V)

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
6.3	330	8.0	10.2	F	230	1.5	0.30	EEEHD0J331AP	(7)	500
	1000	10.0	10.2	G	313	0.8	0.50	EEEHD0J102AP	(7)	500
10	100	8.0	6.2	E	62	2.0	0.30	EEEHD1A101AP	(7)	1000
	220	8.0	10.2	F	160	1.5	0.30	EEEHD1A221AP	(7)	500
	330	8.0	10.2	F	160	1.5	0.30	EEEHD1A331AP	(7)	500
16	10	4.0	5.8	B	28	12.0	0.20	EEEHD1C100AR	(5)	2000
	22	5.0	5.8	C	39	7.2	0.20	EEEHD1C220AR	(5)	1000
	47	6.3	5.8	D	70	4.0	0.20	EEEHD1C470AP	(5)	1000
	100	8.0	10.2	F	130	1.5	0.20	EEEHD1C101AP	(7)	500
	220	10.0	10.2	G	220	0.8	0.20	EEEHD1C221AP	(7)	500
	470	10.0	10.2	G	340	0.8	0.20	EEEHD1C471AP	(7)	500
25	4.7	4.0	5.8	B	17	12.0	0.16	EEEHD1E4R7AR	(5)	2000
	10	5.0	5.8	C	28	7.2	0.16	EEEHD1E100AR	(5)	1000
	22	6.3	5.8	D	55	4.0	0.16	EEEHD1E220AP	(5)	1000
	33	6.3	5.8	D	55	4.0	0.16	EEEHD1E330AP	(5)	1000
	47	8.0	6.2	E	56	2.0	0.18	EEEHD1E470AP	(7)	1000
	100	8.0	10.2	F	130	1.5	0.16	EEEHD1E101AP	(7)	500
	330	10.0	10.2	G	238	0.8	0.16	EEEHD1E331AP	(7)	500
35	4.7	4.0	5.8	B	17	12.0	0.13	EEEHD1V4R7AR	(5)	2000
	10	5.0	5.8	C	28	7.2	0.13	EEEHD1V100AR	(5)	1000
	22	6.3	5.8	D	55	4.0	0.13	EEEHD1V220AP	(5)	1000
	33	8.0	6.2	E	53	2.0	0.16	EEEHD1V330AP	(7)	1000
		6.3	7.7	D8	57	2.0	0.13	EEEHDV330XAP	(5)	900
	47	6.3	7.7	D8	57	2.0	0.14	EEEHDV470XAP	(5)	900
		8.0	10.2	F	79	1.5	0.14	EEEHD1V470AP	(7)	500
	100	10.0	10.2	G	101	0.8	0.14	EEEHD1V101AP	(7)	500
	220	10.0	10.2	G	220	0.8	0.14	EEEHD1V221AP	(7)	500

■ Standard Lead-Free reflow Products(50V to 100V)

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (120 Hz) (+105°C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
50	0.47	4.0	5.8	B	5	12.0	0.12	EEEHD1HR47R ***	(1)	2000
	1	4.0	5.8	B	7	12.0	0.12	EEEHD1H1R0R	(1)	2000
	2.2	4.0	5.8	B	12	12.0	0.12	EEEHD1H2R2R	(1)	2000
	3.3	4.0	5.8	B	16	12.0	0.12	EEEHD1H3R3R	(1)	2000
	4.7	5.0	5.8	C	21	7.2	0.12	EEEHD1H4R7R	(1)	1000
	10	6.3	5.8	D	33	4.0	0.12	EEEHD1H100P	(1)	1000
	22	8.0	6.2	E	50	2.0	0.14	EEEHD1H220P	(2)	1000
	33	8.0	10.2	F	74	1.5	0.14	EEEHD1H330P	(2)	500
	47	10.0	10.2	G	94	0.8	0.14	EEEHD1H470P	(2)	500
	100	10.0	10.2	G	94	0.8	0.14	EEEHD1H101P	(2)	500
63	10	8.0	6.2	E	45	2.0	0.18	EEEHD1J100P	(2)	1000
	22	8.0	10.2	F	65	1.5	0.18	EEEHD1J220P	(2)	500
	33	10.0	10.2	G	80	0.8	0.18	EEEHD1J330P	(2)	500
100	3.3	8.0	6.2	E	30	2.0	0.18	EEEHD2A3R3P	(2)	1000
	10	8.0	10.2	F	55	1.5	0.18	EEEHD2A100P	(2)	500
	22	10.0	10.2	G	70	0.8	0.18	EEEHD2A220P	(2)	500

*** Please kindly accept last shipment : 31/Mar/2015

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **Medium-size HD** Type: **V**
HD High temperature Lead-Free reflow(suffix:A*)



■ Features

- Endurance: 5000 h at 105 °C
- Vibration-proof product is available upon request.
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C	
Rated W.V.Range	6.3 V.DC to 35 V.DC	
Nominal Cap.Range	680 µF to 7500 µF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	I ≤ 0.01 CV (µA) After 2 minutes	
tan δ	Please see the attached High temperature lead-free reflow products list.	
Endurance	After applying rated working voltage for 5000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	≤ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)	
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.	
	Capacitance change	±10 % of initial measured value
	tan δ	≤ initial specified value
	DC leakage current	≤ initial specified value

■ Frequency correction factor for ripple current

Cap (µF)			Frequency (Hz)				
			60	120	1 k	10 k	100 k to
680	to	1000	0.93	1.00	1.20	1.27	1.33
1200	to	2200	0.94	1.00	1.13	1.19	1.25
2700	to	7500	0.94	1.00	1.12	1.18	1.18

■ Marking

Example: 6.3 V 3300 µF Marking color : BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

Size code	D	L	A,B	H	I	W	P	K
H13	12.5	13.5±0.5	13.5	15.0 max.	4.7	0.90±0.3	4.4	0.70±0.3
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.20±0.3	6.7	0.70±0.3
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.20±0.3	6.7	0.70±0.3

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 5000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification		Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	Size Code	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)			Taping (pcs)
6.3	3300	12.5	13.5	H13	680	0.32	EEEHD0J332AQ	(9)	200
	6800	16	16.5	J16	1280	0.38	EEEHD0J682AM	(9)	125
	7500	18	16.5	K16	1540	0.40	EEEHD0J752AM	(9)	125
10	2200	12.5	13.5	H13	620	0.24	EEEHD1A222AQ	(9)	200
	4700	16	16.5	J16	1280	0.28	EEEHD1A472AM	(9)	125
	6800	18	16.5	K16	1540	0.32	EEEHD1A682AM	(9)	125
16	1500	12.5	13.5	H13	620	0.18	EEEHD1C152AQ	(9)	200
	3300	16	16.5	J16	1280	0.22	EEEHD1C332AM	(9)	125
	4700	18	16.5	K16	1540	0.24	EEEHD1C472AM	(9)	125
25	1000	12.5	13.5	H13	580	0.16	EEEHD1E102AQ	(9)	200
	2200	16	16.5	J16	1200	0.18	EEEHD1E222AM	(9)	125
	3300	18	16.5	K16	1540	0.20	EEEHD1E332AM	(9)	125
35	680	12.5	13.5	H13	580	0.14	EEEHD1V681AQ	(9)	200
	1500	16	16.5	J16	1200	0.16	EEEHD1V152AM	(9)	125
	1800	18	16.5	K16	1450	0.16	EEEHD1V182AM	(9)	125

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "Q or M"

Surface Mount Type

Series: **FC** Type: **V**

FC High temperature Lead-Free reflow(suffix:A*)

Low impedance



■ Features

- Endurance : 105 °C 1000 h
- Low impedance (1/2 for HA series)
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C						
Rated W.V. Range	6.3 V.DC to 35 V.DC						
Nominal Cap. Range	1 μF to 1500 μF						
Capacitance Tolerance	±20 % (120 Hz/+20 °C)						
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)						
tan δ	Please see the attached High temperature lead-free reflow products list.						
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	(Impedance ratio at 120 Hz)
	Z(-25 °C) / Z(+20 °C)	2	2	2	2	2	
	Z(-40 °C) / Z(+20 °C)	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.						
	Capacitance change	±20 % of initial measured value					
	tan δ	≤ 200 % of initial specified value					
	DC leakage current	≤ initial specified value					
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)						
	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.						
Resistance to Soldering Heat	Capacitance change	±10 % of initial measured value					
	tan δ	≤ initial specified value					
	DC leakage current	≤ initial specified value					

■ Frequency correction factor for ripple current

	Frequency (Hz)				
	50, 60	120	1 k	10 k	100 k to
Correction factor	0.70	0.75	0.90	0.95	1.00

■ Marking

Example: 6.3 V 22 μF
Marking color : BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105°C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)	Impedance (100 kHz) (+20 °C) (Ω)			Taping
(V)	(μ F)	(mm)	(mm)							(pcs)
6.3	22	4	5.4	B	60	0.26	3.00	EEEF0J220AR	(5)	2000
	47	5	5.4	C	95	0.26	1.80	EEEF0J470AR	(5)	1000
	68	6.3	5.4	D	140	0.26	1.00	EEEF0J680AP	(5)	1000
	100	6.3	5.4	D	140	0.26	1.00	EEEF0J101AP	(5)	1000
	220	8	6.2	E	230	0.26	0.40	EEEF0J221AP	(6)	1000
	330	8	10.2	F	450	0.26	0.30	EEEF0J331AP	(6)	500
	1000	10	10.2	G	670	0.26	0.15	EEEF0J102AP	(6)	500
	1500	10	10.2	G	670	0.26	0.15	EEEF0J152AP	(6)	500
10	33	5	5.4	C	95	0.19	1.80	EEEF1A330AR	(5)	1000
	100	8	6.2	E	230	0.19	0.40	EEEF1A101AP	(6)	1000
	150	8	6.2	E	230	0.19	0.40	EEEF1A151AP	(6)	1000
	220	8	10.2	F	450	0.19	0.30	EEEF1A221AP	(6)	500
	470	10	10.2	G	670	0.19	0.15	EEEF1A471AP	(6)	500
	1000	10	10.2	G	670	0.19	0.15	EEEF1A102AP	(6)	500
16	10	4	5.4	B	60	0.16	3.00	EEEF1C100AR	(5)	2000
	22	5	5.4	C	95	0.16	1.80	EEEF1C220AR	(5)	1000
	47	6.3	5.4	D	140	0.16	1.00	EEEF1C470AP	(5)	1000
	68	8	6.2	E	230	0.16	0.40	EEEF1C680AP	(6)	1000
	100	8	6.2	E	230	0.16	0.40	EEEF1C101AP	(6)	1000
	220	10	10.2	G	670	0.16	0.15	EEEF1C221AP	(6)	500
	330	10	10.2	G	670	0.16	0.15	EEEF1C331AP	(6)	500
	470	10	10.2	G	670	0.16	0.15	EEEF1C471AP	(6)	500
	680	10	10.2	G	670	0.16	0.15	EEEF1C681AP	(6)	500
25	6.8	4	5.4	B	60	0.14	3.00	EEEF1E6R8AR	(5)	2000
	22	6.3	5.4	D	140	0.14	1.00	EEEF1E220AP	(5)	1000
	33	6.3	5.4	D	140	0.14	1.00	EEEF1E330AP	(5)	1000
	47	8	6.2	E	230	0.14	0.40	EEEF1E470AP	(6)	1000
	68	8	10.2	F	450	0.14	0.30	EEEF1E680AP	(6)	500
	100	8	10.2	F	450	0.14	0.30	EEEF1E101AP	(6)	500
	220	10	10.2	G	670	0.14	0.15	EEEF1E221AP	(6)	500
	330	10	10.2	G	670	0.14	0.15	EEEF1E331AP	(6)	500
	470	10	10.2	G	670	0.14	0.15	EEEF1E471AP	(6)	500
35	1	4	5.4	B	60	0.12	3.00	EEEF1V1R0AR	(5)	2000
	2.2	4	5.4	B	60	0.12	3.00	EEEF1V2R2AR	(5)	2000
	3.3	4	5.4	B	60	0.12	3.00	EEEF1V3R3AR	(5)	2000
	4.7	4	5.4	B	60	0.12	3.00	EEEF1V4R7AR	(5)	2000
	6.8	5	5.4	C	95	0.12	1.80	EEEF1V6R8AR	(5)	1000
	10	5	5.4	C	95	0.12	1.80	EEEF1V100AR	(5)	1000
	22	6.3	5.4	D	140	0.12	1.00	EEEF1V220AP	(5)	1000
	33	8	6.2	E	230	0.12	0.40	EEEF1V330AP	(6)	1000
	47	8	6.2	E	230	0.12	0.40	EEEF1V470AP	(6)	1000
	100	10	10.2	G	670	0.12	0.15	EEEF1V101AP	(6)	500
	220	10	10.2	G	670	0.12	0.15	EEEF1V221AP	(6)	500
	330	10	10.2	G	670	0.12	0.15	EEEF1V331AP	(6)	500

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

Surface Mount Type

Series: **FC** Type: **V**

Low impedance



■ Features

- Endurance : 105 °C 1000 h
- Low impedance (1/2 for HA series)
- Vibration-proof product is available upon request. (ø8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

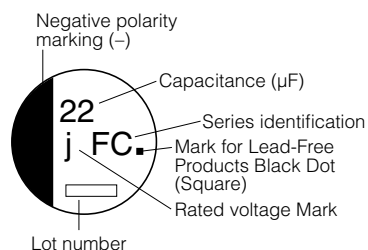
Category Temp. Range	-40 °C to +105 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	1 µF to 1500 µF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV or 3 (µA) After 2 minutes (Whichever is greater)							
tan δ	Please see the attached standard products list							
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C) / Z(+20 °C)	2	2	2	2	2	2	
	Z(-40 °C) / Z(+20 °C)	3	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.							
	Capacitance change	±20 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

■ Frequency correction factor for ripple current

	Frequency (Hz)				
	50, 60	120	1 k	10 k	100 k to
Correction factor	0.70	0.75	0.90	0.95	1.00

■ Marking

Example: 6.3 V 22 µF
Marking color : BLACK

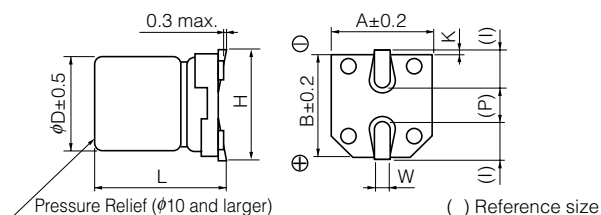


Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

■ Dimensions in mm (not to scale)

(Unit : mm)



Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.4 ^{+0.1} _{-0.2}	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.4 ^{+0.1} _{-0.2}	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.4 ^{+0.1} _{-0.2}	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105°C) (mA r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C)	Impedance (100 kHz) (+20 °C) (Ω)			Taping
(V)	(μ F)	(mm)	(mm)							(pcs)
6.3	22	4	5.4	B	60	0.26	3.00	EEEF0J220R	(1)	2000
	47	5	5.4	C	95	0.26	1.80	EEEF0J470R	(1)	1000
	68	6.3	5.4	D	140	0.26	1.00	EEEF0J680P	(1)	1000
	100	6.3	5.4	D	140	0.26	1.00	EEEF0J101P	(1)	1000
	220	8	6.2	E	230	0.26	0.40	EEEF0J221P	(2)	1000
	330	8	10.2	F	450	0.26	0.30	EEEF0J331P	(2)	500
	1000	10	10.2	G	670	0.26	0.15	EEEF0J102P	(2)	500
	1500	10	10.2	G	670	0.26	0.15	EEEF0J152P	(2)	500
10	33	5	5.4	C	95	0.19	1.80	EEEF1A330R	(1)	1000
	100	8	6.2	E	230	0.19	0.40	EEEF1A101P	(2)	1000
	150	8	6.2	E	230	0.19	0.40	EEEF1A151P	(2)	1000
	220	8	10.2	F	450	0.19	0.30	EEEF1A221P	(2)	500
	470	10	10.2	G	670	0.19	0.15	EEEF1A471P	(2)	500
	1000	10	10.2	G	670	0.19	0.15	EEEF1A102P	(2)	500
16	10	4	5.4	B	60	0.16	3.00	EEEF1C100R	(1)	2000
	22	5	5.4	C	95	0.16	1.80	EEEF1C220R	(1)	1000
	47	6.3	5.4	D	140	0.16	1.00	EEEF1C470P	(1)	1000
	68	8	6.2	E	230	0.16	0.40	EEEF1C680P	(2)	1000
	100	8	6.2	E	230	0.16	0.40	EEEF1C101P	(2)	1000
	220	10	10.2	G	670	0.16	0.15	EEEF1C221P	(2)	500
	330	10	10.2	G	670	0.16	0.15	EEEF1C331P	(2)	500
	470	10	10.2	G	670	0.16	0.15	EEEF1C471P	(2)	500
	680	10	10.2	G	670	0.16	0.15	EEEF1C681P	(2)	500
25	6.8	4	5.4	B	60	0.14	3.00	EEEF1E6R8R	(1)	2000
	22	6.3	5.4	D	140	0.14	1.00	EEEF1E220P	(1)	1000
	33	6.3	5.4	D	140	0.14	1.00	EEEF1E330P	(1)	1000
	47	8	6.2	E	230	0.14	0.40	EEEF1E470P	(2)	1000
	68	8	10.2	F	450	0.14	0.30	EEEF1E680P	(2)	500
	100	8	10.2	F	450	0.14	0.30	EEEF1E101P	(2)	500
	220	10	10.2	G	670	0.14	0.15	EEEF1E221P	(2)	500
	330	10	10.2	G	670	0.14	0.15	EEEF1E331P	(2)	500
	470	10	10.2	G	670	0.14	0.15	EEEF1E471P	(2)	500
35	1	4	5.4	B	60	0.12	3.00	EEEF1V1R0R	(1)	2000
	2.2	4	5.4	B	60	0.12	3.00	EEEF1V2R2R	(1)	2000
	3.3	4	5.4	B	60	0.12	3.00	EEEF1V3R3R	(1)	2000
	4.7	4	5.4	B	60	0.12	3.00	EEEF1V4R7R	(1)	2000
	6.8	5	5.4	C	95	0.12	1.80	EEEF1V6R8R	(1)	1000
	10	5	5.4	C	95	0.12	1.80	EEEF1V100R	(1)	1000
	22	6.3	5.4	D	140	0.12	1.00	EEEF1V220P	(1)	1000
	33	8	6.2	E	230	0.12	0.40	EEEF1V330P	(2)	1000
	47	8	6.2	E	230	0.12	0.40	EEEF1V470P	(2)	1000
	100	10	10.2	G	670	0.12	0.15	EEEF1V101P	(2)	500
	220	10	10.2	G	670	0.12	0.15	EEEF1V221P	(2)	500
	330	10	10.2	G	670	0.12	0.15	EEEF1V331P	(2)	500
50	1	4	5.4	B	30	0.12	5.00	EEEF1H1R0R	(1)	2000
	2.2	4	5.4	B	30	0.12	5.00	EEEF1H2R2R	(1)	2000
	3.3	4	5.4	B	30	0.12	5.00	EEEF1H3R3R	(1)	2000
	4.7	5	5.4	C	50	0.12	3.00	EEEF1H4R7R	(1)	1000
	10	6.3	5.4	D	70	0.12	2.00	EEEF1H100P	(1)	1000
	22	8	6.2	E	120	0.12	0.70	EEEF1H220P	(2)	1000
	33	8	10.2	F	300	0.12	0.60	EEEF1H330P	(2)	500
	47	10	10.2	G	500	0.12	0.30	EEEF1H470P	(2)	500
	100	10	10.2	G	500	0.12	0.30	EEEF1H101P	(2)	500
	220	10	10.2	G	500	0.12	0.30	EEEF1H221P	(2)	500

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

Surface Mount Type

Series: **FK** Type: **V**

FK High temperature Lead-Free reflow(suffix:A*)



■ Features

- Endurance: 2000 h at 105 °C
- Low impedance (40 % to 60 % less than FC series)
Miniaturized (30 % to 50 % less than FC series)
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C						
Rated W.V.Range	6.3 V.DC to 35 V.DC						
Nominal Cap.Range	4.7 μF to 1500 μF						
Capacitance Tolerance	±20 % (120 Hz/+20 °C)						
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)						
tan δ	Please see the attached High temperature lead-free reflow products list.						
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	3	3	3	3	3	
	Z(-55 °C)/Z(+20 °C)	4	4	4	3	3	
Endurance	After applying rated working voltage for 2000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.						
	Capacitance change	±30 % of initial measured value					
	tan δ	≤ 200 % of initial specified value					
	DC leakage current	≤ initial specified value					
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)						
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.						
	Capacitance change	±10 % of initial measured value					
	tan δ	≤ initial specified value					
	DC leakage current	≤ initial specified value					

■ Frequency correction factor for ripple current

Cap (μF)	Frequency (Hz)			
	120	1 k	10 k	100 k to
4.7 to 470	0.65	0.85	0.95	1.00
680 to 1500	0.70	0.90	0.95	1.00

■ Marking

Example: 6.3 V 22 μF
Marking color : BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
6.3	22	4	5.8	B	90	1.35	0.26	EEEFK0J220AR	(5)	2000
	47	4	5.8	(B)	90	1.35	0.26	EEEFKJ470UAR	(5)	2000
		5	5.8	C	160	0.70	0.26	EEEFK0J470AR	(5)	1000
	100	5	5.8	(C)	160	0.70	0.26	EEEFKJ101UAR	(5)	1000
		6.3	5.8	D	240	0.36	0.26	EEEFK0J101AP	(5)	1000
	220	6.3	5.8	D	240	0.36	0.26	EEEFK0J221AP	(5)	1000
	330	6.3	7.7	D8	280	0.34	0.26	EEEFKJ331XAP	(5)	900
		8	6.2	E	300	0.26	0.26	EEEFK0J331AP	(6)	1000
	470	8	10.2	F	600	0.16	0.26	EEEFK0J471AP	(6)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102AP	(6)	500
1500	10	10.2	G	850	0.08	0.26	EEEFK0J152AP	(6)	500	
10	22	4	5.8	B	90	1.35	0.19	EEEFK1A220AR	(5)	2000
	33	4	5.8	(B)	90	1.35	0.19	EEEFKA330UAR	(5)	2000
		5	5.8	C	160	0.70	0.19	EEEFK1A330AR	(5)	1000
	150	6.3	5.8	D	240	0.36	0.19	EEEFK1A151AP	(5)	1000
	220	6.3	7.7	D8	280	0.34	0.19	EEEFKA221XAP	(5)	900
		8	6.2	E	300	0.26	0.19	EEEFK1A221AP	(6)	1000
	330	8	10.2	F	600	0.16	0.19	EEEFK1A331AP	(6)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471AP	(6)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681AP	(6)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102AP	(6)	500
16	10	4	5.8	B	90	1.35	0.16	EEEFK1C100AR	(5)	2000
	22	4	5.8	(B)	90	1.35	0.16	EEEFKC220UAR	(5)	2000
		5	5.8	C	160	0.70	0.16	EEEFK1C220AR	(5)	1000
	47	5	5.8	(C)	160	0.70	0.16	EEEFKC470UAR	(5)	1000
		6.3	5.8	D	240	0.36	0.16	EEEFK1C470AP	(5)	1000
	68	6.3	5.8	D	240	0.36	0.16	EEEFK1C680AP	(5)	1000
	100	6.3	5.8	D	240	0.36	0.16	EEEFK1C101AP	(5)	1000
	150	6.3	7.7	D8	280	0.34	0.16	EEEFKC151XAP	(5)	900
	220	6.3	7.7	D8	280	0.34	0.16	EEEFKC221XAP	(5)	900
		8	6.2	E	300	0.26	0.16	EEEFK1C221AP	(6)	1000
330	8	10.2	F	600	0.16	0.16	EEEFK1C331AP	(6)	500	
470	8	10.2	F	600	0.16	0.16	EEEFK1C471AP	(6)	500	
680	10	10.2	G	850	0.08	0.16	EEEFK1C681AP	(6)	500	
25	10	4	5.8	B	90	1.35	0.14	EEEFK1E100AR	(5)	2000
	22	5	5.8	C	160	0.70	0.14	EEEFK1E220AR	(5)	1000
		5	5.8	(C)	160	0.70	0.14	EEEFKE330UAR	(5)	1000
	33	6.3	5.8	D	240	0.36	0.14	EEEFK1E330AP	(5)	1000
		6.3	5.8	D	240	0.36	0.14	EEEFK1E470AP	(5)	1000
	68	6.3	5.8	D	240	0.36	0.14	EEEFK1E680AP	(5)	1000
	100	6.3	7.7	D8	280	0.34	0.14	EEEFKE101XAP	(5)	900
		8	6.2	E	300	0.26	0.14	EEEFK1E101AP	(6)	1000
	150	8	10.2	F	600	0.16	0.14	EEEFK1E151AP	(6)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221AP	(6)	500
330	8	10.2	F	600	0.16	0.14	EEEFK1E331AP	(6)	500	
470	10	10.2	G	850	0.08	0.14	EEEFK1E471AP	(6)	500	
35	4.7	4	5.8	B	90	1.35	0.12	EEEFK1V4R7AR	(5)	2000
	10	4	5.8	(B)	90	1.35	0.12	EEEFKV100UAR	(5)	2000
		5	5.8	C	160	0.70	0.12	EEEFK1V100AR	(5)	1000
	22	5	5.8	C	160	0.70	0.12	EEEFK1V220AR	(5)	1000
	33	6.3	5.8	D	240	0.36	0.12	EEEFK1V330AP	(5)	1000
	47	6.3	5.8	D	240	0.36	0.12	EEEFK1V470AP	(5)	1000
	68	6.3	7.7	D8	280	0.34	0.12	EEEFKV680XAP	(5)	900
	100	6.3	7.7	D8	280	0.34	0.12	EEEFKV101XAP	(5)	900
		8	10.2	F	600	0.16	0.12	EEEFK1V101AP	(6)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151AP	(6)	500
220	8	10.2	F	600	0.16	0.12	EEEFK1V221AP	(6)	500	
330	10	10.2	G	850	0.08	0.12	EEEFK1V331AP	(6)	500	

*Size code (): Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

Surface Mount Type

Series: **Medium-size FK** Type: **V**
FK High temperature Lead-Free reflow(suffix:A*)



■ Features

- Endurance: 5000 h at 105 °C
- Vibration-proof product is available upon request.
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C										
Rated W.V.Range	6.3 V.DC to 100 V.DC										
Nominal Cap.Range	47 μF to 6800 μF										
Capacitance Tolerance	±20 % (120 Hz/+20 °C)										
DC Leakage Current	I ≤ 0.01 CV (μA) After 2 minutes										
tan δ	Please see the attached High temperature lead-free reflow products list.										
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	2	2	2	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	3	3	3	3	3	3	3	3	3	
	Z(-55 °C)/Z(+20 °C)	4	4	4	3	3	3	3	3	3	
Endurance	After applying rated working voltage for 5000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.										
	Capacitance change	±30 % of initial measured value									
	tan δ	≤ 200 % of initial specified value									
	DC leakage current	≤ initial specified value									
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)										
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.										
	Capacitance change	±10 % of initial measured value									
	tan δ	≤ initial specified value									
	DC leakage current	≤ initial specified value									

■ Frequency correction factor for ripple current

Cap (μF)	Frequency (Hz)			
	120	1 k	10 k	100 k to
47 to 6800	0.75	0.90	0.95	1.00

■ Marking

Example: 6.3 V 3300 μF Marking color : BLACK

Rated Voltage Mark

j	6.3 V	H	50 V
A	10 V	J	63 V
C	16 V	K	80 V
E	25 V	2A	100 V
V	35 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

Pressure Relief

() Reference

Size code	D	L	A, B	H	I	W	P	K
H13	12.5	13.5±0.5	13.5	15.0 max.	4.7	0.90±0.3	4.4	0.70±0.30
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.20±0.3	6.7	0.70±0.30
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.20±0.3	6.7	0.70±0.30

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Mar. 2014

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
(V)	(μ F)	(mm)	(mm)							
6.3	3300	12.5	13.5	H13	1100	0.06	0.30	EEEFK0J332AQ	(9)	200
	6800	16	16.5	J16	1800	0.035	0.36	EEEFK0J682AM	(9)	125
10	2200	12.5	13.5	H13	1100	0.06	0.21	EEEFK1A222AQ	(9)	200
	4700	16	16.5	J16	1800	0.035	0.25	EEEFK1A472AM	(9)	125
	6800	18	16.5	K16	2060	0.033	0.29	EEEFK1A682AM	(9)	125
16	1500	12.5	13.5	H13	1100	0.06	0.16	EEEFK1C152AQ	(9)	200
	3300	16	16.5	J16	1800	0.035	0.20	EEEFK1C332AM	(9)	125
	4700	18	16.5	K16	2060	0.033	0.22	EEEFK1C472AM	(9)	125
25	1000	12.5	13.5	H13	1100	0.06	0.14	EEEFK1E102AQ	(9)	200
	1500	16	16.5	J16	1800	0.035	0.16	EEEFK1E152AM	(9)	125
	2200	16	16.5	J16	1800	0.035	0.16	EEEFK1E222AM	(9)	125
	3300	18	16.5	K16	2060	0.033	0.18	EEEFK1E332AM	(9)	125
35	470	12.5	13.5	H13	1100	0.06	0.12	EEEFK1V471AQ	(9)	200
	680	12.5	13.5	H13	1100	0.06	0.12	EEEFK1V681AQ	(9)	200
	1000	16	16.5	J16	1800	0.035	0.12	EEEFK1V102AM	(9)	125
	1500	16	16.5	J16	1800	0.035	0.12	EEEFK1V152AM	(9)	125
50	330	12.5	13.5	H13	900	0.12	0.12	EEEFK1H331AQ	(10)	200
	390	12.5	13.5	H13	900	0.12	0.12	EEEFK1H391AQ	(10)	200
	470	16	16.5	J16	1610	0.073	0.12	EEEFK1H471AM	(10)	125
	560	16	16.5	J16	1610	0.073	0.12	EEEFK1H561AM	(10)	125
	680	16	16.5	J16	1610	0.073	0.12	EEEFK1H681AM	(10)	125
	1000	16	16.5	J16	1610	0.073	0.12	EEEFK1H102AM	(10)	125
63	150	12.5	13.5	H13	800	0.16	0.10	EEEFK1J151AQ	(10)	200
	220	12.5	13.5	H13	800	0.16	0.10	EEEFK1J221AQ	(10)	200
	470	16	16.5	J16	1410	0.082	0.10	EEEFK1J471AM	(10)	125
	680	18	16.5	K16	1690	0.08	0.10	EEEFK1J681AM	(10)	125
80	68	12.5	13.5	H13	500	0.32	0.08	EEEFK1K680AQ	(11)	200
	100	12.5	13.5	H13	500	0.32	0.08	EEEFK1K101AQ	(11)	200
	150	12.5	13.5	H13	500	0.32	0.08	EEEFK1K151AQ	(11)	200
	330	16	16.5	J16	793	0.17	0.08	EEEFK1K331AM	(11)	125
	470	18	16.5	K16	917	0.153	0.08	EEEFK1K471AM	(11)	125
100	47	12.5	13.5	H13	500	0.32	0.07	EEEFK2A470AQ	(11)	200
	68	12.5	13.5	H13	500	0.32	0.07	EEEFK2A680AQ	(11)	200
	100	16	16.5	J16	793	0.17	0.07	EEEFK2A101AM	(11)	125
	150	16	16.5	J16	793	0.17	0.07	EEEFK2A151AM	(11)	125
	220	18	16.5	K16	917	0.153	0.07	EEEFK2A221AM	(11)	125
	330	18	16.5	K16	917	0.153	0.07	EEEFK2A331AM	(11)	125

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "Q or M"

Surface Mount Type

Series: **FK** Type: **V**



■ Features

- Endurance: 2000 h to 5000 h at 105 °C
- Low impedance (40 % to 60 % less than FC series)
Miniaturized (30 % to 50 % less than FC series)
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C										
Rated W.V.Range	6.3 V.DC to 100 V.DC										
Nominal Cap.Range	3.3 μF to 6800 μF										
Capacitance Tolerance	±20 % (120 Hz/+20 °C)										
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)										
tan δ	Please see the attached standard products list										
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	2	2	2	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	3	3	3	3	3	3	3	3	3	
	Z(-55 °C)/Z(+20 °C)	4	4	4	3	3	3	3	3	3	
Endurance	After applying rated working voltage for 2000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits. (≥ ϕ12.5 and suffix “G” in ϕ8×10.2, ϕ10×10.2 are 5000 hours)										
	Capacitance change	±30 % of initial measured value (Suffix “G” is 35 %)									
	tan δ	≤ 200 % of initial specified value (Suffix “G” is 300 %)									
	DC leakage current	≤ initial specified value									
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)										
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.										
	Capacitance change	±10 % of initial measured value									
	tan δ	≤ initial specified value									
	DC leakage current	≤ initial specified value									

■ Frequency correction factor for ripple current

	Frequency (Hz)				
	50, 60	120	1 k	10 k	100 k to
Correction factor	0.70	0.75	0.90	0.95	1.00

■ Marking

Example: 6.3 V 22 μF, 6.3 V 3300 μF
Marking color : BLACK

≤ φ10

Negative polarity marking (-)

Capacitance (μF)

Series identification

Mark for Lead-Free Products Black Dot (Square)

Lot number

Rated Voltage Mark

≥ φ12.5

Negative polarity marking (-)

Capacitance (μF)

Series identification

Lot number

Rated Voltage Mark

Rated Voltage Mark

j	6.3 V	H	50 V
A	10 V	J	63 V
C	16 V	K	80 V
E	25 V	2A	100 V
V	35 V		

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.

φD±0.5

L

H

A±0.2

B±0.2

W

P

K

Pressure Relief (φ10 and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+1.5} _{-0.2}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+1.5} _{-0.2}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+1.5} _{-0.2}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+1.5} _{-0.2}
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+1.5} _{-0.2}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2
H13	12.5	13.5±0.5	13.5	15.0 max.	4.7	0.90±0.3	4.4	0.70±0.3
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.20±0.3	6.7	0.70±0.3
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.20±0.3	6.7	0.70±0.3

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 105 °C 2000 h (≥ φ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
6.3	22	4	5.8	B	90	1.35	0.26	EEEFK0J220R	(1)	2000
	47	4	5.8	(B)	90	1.35	0.26	EEEFK0J470UR	(1)	2000
		5	5.8	C	160	0.70	0.26	EEEFK0J470R	(1)	1000
	100	5	5.8	(C)	160	0.70	0.26	EEEFK0J101UR	(1)	1000
		6.3	5.8	D	240	0.36	0.26	EEEFK0J101P	(1)	1000
	220	6.3	5.8	D	240	0.36	0.26	EEEFK0J221P	(1)	1000
	330	6.3	7.7	D8	280	0.34	0.26	EEEFK0J331XP	(1)	900
		8	6.2	E	300	0.26	0.26	EEEFK0J331P	(2)	1000
	470	8	10.2	F	600	0.16	0.26	EEEFK0J471P	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102P	(2)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152P	(2)	500
	3300	12.5	13.5	H13	1100	0.06	0.30	EEVFK0J332Q	(3)	200
	6800	16	16.5	J16	1800	0.035	0.36	EEVFK0J682M	(3)	125
10	22	4	5.8	B	90	1.35	0.19	EEEFK1A220R	(1)	2000
	33	4	5.8	(B)	90	1.35	0.19	EEEFK1A330UR	(1)	2000
		5	5.8	C	160	0.70	0.19	EEEFK1A330R	(1)	1000
	150	6.3	5.8	D	240	0.36	0.19	EEEFK1A151P	(1)	1000
	220	6.3	7.7	D8	280	0.34	0.19	EEEFK1A221XP	(1)	900
		8	6.2	E	300	0.26	0.19	EEEFK1A221P	(2)	1000
	330	8	10.2	F	600	0.16	0.19	EEEFK1A331P	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471P	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681P	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102P	(2)	500
	2200	12.5	13.5	H13	1100	0.06	0.21	EEVFK1A222Q	(3)	200
	4700	16	16.5	J16	1800	0.035	0.25	EEVFK1A472M	(3)	125
	6800	18	16.5	K16	2060	0.033	0.29	EEVFK1A682M	(3)	125
16	10	4	5.8	B	90	1.35	0.16	EEEFK1C100R	(1)	2000
	22	4	5.8	(B)	90	1.35	0.16	EEEFK1C220UR	(1)	2000
		5	5.8	C	160	0.70	0.16	EEEFK1C220R	(1)	1000
	47	5	5.8	(C)	160	0.70	0.16	EEEFK1C470UR	(1)	1000
		6.3	5.8	D	240	0.36	0.16	EEEFK1C470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.16	EEEFK1C680P	(1)	1000
	100	6.3	5.8	D	240	0.36	0.16	EEEFK1C101P	(1)	1000
	150	6.3	7.7	D8	280	0.34	0.16	EEEFK1C151XP	(1)	900
	220	6.3	7.7	D8	280	0.34	0.16	EEEFK1C221XP	(1)	900
		8	6.2	E	300	0.26	0.16	EEEFK1C221P	(2)	1000
	330	8	10.2	F	600	0.16	0.16	EEEFK1C331P	(2)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1C471P	(2)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681P	(2)	500
	1500	12.5	13.5	H13	1100	0.06	0.16	EEVFK1C152Q	(3)	200
	3300	16	16.5	J16	1800	0.035	0.20	EEVFK1C332M	(3)	125
	4700	18	16.5	K16	2060	0.033	0.22	EEVFK1C472M	(3)	125
25	10	4	5.8	B	90	1.35	0.14	EEEFK1E100R	(1)	2000
	22	5	5.8	C	160	0.70	0.14	EEEFK1E220R	(1)	1000
		5	5.8	(C)	160	0.70	0.14	EEEFK1E330UR	(1)	1000
	33	6.3	5.8	D	240	0.36	0.14	EEEFK1E330P	(1)	1000
		6.3	5.8	D	240	0.36	0.14	EEEFK1E470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.14	EEEFK1E680P	(1)	1000
	100	6.3	7.7	D8	280	0.34	0.14	EEEFK1E101XP	(1)	900
		8	6.2	E	300	0.26	0.14	EEEFK1E101P	(2)	1000
	150	8	10.2	F	600	0.16	0.14	EEEFK1E151P	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221P	(2)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331P	(2)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471P	(2)	500
	1000	12.5	13.5	H13	1100	0.06	0.14	EEVFK1E102Q	(3)	200
	1500	16	16.5	J16	1800	0.035	0.14	EEVFK1E152M	(3)	125
	2200	16	16.5	J16	1800	0.035	0.16	EEVFK1E222M	(3)	125
	3300	18	16.5	K16	2060	0.033	0.18	EEVFK1E332M	(3)	125

* Size code(): Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

Standard Products

Endurance : 105 °C 2000 h (≥ ϕ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
35	4.7	4	5.8	B	90	1.35	0.12	EEEFK1V4R7R	(1)	2000
	10	4	5.8	(B)	90	1.35	0.12	EEEFK1V100UR	(1)	2000
		5	5.8	C	160	0.70	0.12	EEEFK1V100R	(1)	1000
	22	5	5.8	C	160	0.70	0.12	EEEFK1V220R	(1)	1000
	33	6.3	5.8	D	240	0.36	0.12	EEEFK1V330P	(1)	1000
	47	6.3	5.8	D	240	0.36	0.12	EEEFK1V470P	(1)	1000
	68	6.3	7.7	D8	280	0.34	0.12	EEEFK1V680XP	(1)	900
	100	6.3	7.7	D8	280	0.34	0.12	EEEFK1V101XP	(1)	900
		8	10.2	F	600	0.16	0.12	EEEFK1V101P	(2)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151P	(2)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221P	(2)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331P	(2)	500
	470	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V471Q	(3)	200
	680	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V681Q	(3)	200
50	1000	16	16.5	J16	1800	0.035	0.12	EEVFK1V102M	(3)	125
	1500	16	16.5	J16	1800	0.035	0.12	EEVFK1V152M	(3)	125
	4.7	4	5.8	B	60	2.90	0.10	EEEFK1H4R7R	(1)	2000
	10	5	5.8	(C)	85	1.52	0.10	EEEFK1H100UR	(1)	1000
		6.3	5.8	D	165	0.88	0.10	EEEFK1H100P	(1)	1000
	22	6.3	5.8	D	165	0.88	0.10	EEEFK1H220P	(1)	1000
	33	6.3	7.7	D8	195	0.68	0.10	EEEFK1H330XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H330P	(2)	1000
	47	6.3	7.7	D8	195	0.68	0.10	EEEFK1H470XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H470P	(2)	1000
	100	8	10.2	F	350	0.34	0.10	EEEFK1H101P	(2)	500
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151P	(2)	500
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221P	(2)	500
	330	12.5	13.5	H13	900	0.12	0.10	EEVFK1H331Q	(3)	200
63	390	12.5	13.5	H13	900	0.12	0.10	EEVFK1H391Q	(3)	200
	470	16	16.5	J16	1610	0.073	0.10	EEVFK1H471M	(3)	125
	560	16	16.5	J16	1610	0.073	0.10	EEVFK1H561M	(3)	125
	680	16	16.5	J16	1610	0.073	0.10	EEVFK1H681M	(3)	125
	1000	16	16.5	J16	1610	0.073	0.10	EEVFK1H102M	(3)	125
	4.7	5	5.8	C	50	3.00	0.08	EEEFK1J4R7R	(1)	1000
	10	6.3	5.8	D	80	1.50	0.08	EEEFK1J100P	(1)	1000
	22	6.3	7.7	D8	120	1.20	0.08	EEEFK1J220XP	(1)	900
		8	6.2	E	120	1.20	0.08	EEEFK1J220P	(2)	1000
	33	8	10.2	F	250	0.65	0.08	EEEFK1J330P	(2)	500
	47	8	10.2	F	250	0.65	0.08	EEEFK1J470P	(2)	500
	68	8	10.2	(F)	250	0.65	0.08	EEEFK1J680UP	(2)	500
	100	10	10.2	G	400	0.35	0.08	EEEFK1J101P	(2)	500
	150	12.5	13.5	H13	800	0.16	0.08	EEVFK1J151Q	(3)	200
	220	12.5	13.5	H13	800	0.16	0.08	EEVFK1J221Q	(3)	200
80	470	16	16.5	J16	1410	0.082	0.08	EEVFK1J471M	(3)	125
	680	18	16.5	K16	1690	0.08	0.08	EEVFK1J681M	(3)	125
	3.3	5	5.8	C	25	5.00	0.08	EEEFK1K3R3R	(1)	1000
	4.7	6.3	5.8	D	40	3.00	0.08	EEEFK1K4R7P	(1)	1000
	10	6.3	7.7	D8	60	2.40	0.08	EEEFK1K100XP	(1)	900
		8	6.2	E	60	2.40	0.08	EEEFK1K100P	(2)	1000
	22	8	10.2	F	130	1.30	0.08	EEEFK1K220P	(2)	500
	33	8	10.2	F	130	1.30	0.08	EEEFK1K330P	(2)	500
	47	10	10.2	G	200	0.70	0.08	EEEFK1K470P	(2)	500
	68	12.5	13.5	H13	500	0.32	0.08	EEVFK1K680Q	(3)	200
	100	12.5	13.5	H13	500	0.32	0.08	EEVFK1K101Q	(3)	200
	150	12.5	13.5	H13	500	0.32	0.08	EEVFK1K151Q	(3)	200
	330	16	16.5	J16	793	0.17	0.08	EEVFK1K331M	(3)	125
	470	18	16.5	K16	917	0.153	0.08	EEVFK1K471M	(3)	125

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 105 °C 2000 h (≥ ϕ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
100	22	8	10.2	F	130	1.30	0.07	EEEFK2A220P	(2)	500
	33	10	10.2	G	200	0.70	0.07	EEEFK2A330P	(2)	500
	47	12.5	13.5	H13	500	0.32	0.07	EEVFK2A470Q	(3)	200
	68	12.5	13.5	H13	500	0.32	0.07	EEVFK2A680Q	(3)	200
	100	16	16.5	J16	793	0.17	0.07	EEVFK2A101M	(3)	125
	150	16	16.5	J16	793	0.17	0.07	EEVFK2A151M	(3)	125
	220	18	16.5	K16	917	0.153	0.07	EEVFK2A221M	(3)	125
	330	18	16.5	K16	917	0.153	0.07	EEVFK2A331M	(3)	125

* Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

■ Endurance 5000 h Products

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
6.3	470	8	10.2	F	600	0.16	0.26	EEEFK0J471GP	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102GP	(2)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152GP	(2)	500
10	330	8	10.2	F	600	0.16	0.19	EEEFK1A331GP	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471GP	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681GP	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102GP	(2)	500
16	330	8	10.2	F	600	0.16	0.16	EEEFK1C331GP	(2)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1C471GP	(2)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681GP	(2)	500
25	150	8	10.2	F	600	0.16	0.14	EEEFK1E151GP	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221GP	(2)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331GP	(2)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471GP	(2)	500
35	100	8	10.2	F	600	0.16	0.12	EEEFK1V101GP	(2)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151GP	(2)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221GP	(2)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331GP	(2)	500
50	100	8	10.2	F	350	0.34	0.10	EEEFK1H101GP	(2)	500
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151GP	(2)	500
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221GP	(2)	500

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **FT** Type: **V**

High temperature Lead-Free reflow(suffix:A*)



■ Features

- Endurance: 2000 h at 105 °C
- Miniaturized, Low ESR (1 size smaller than series FK)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C	
Rated W.V.Range	6.3 V.DC to 50 V.DC	
Nominal Cap.Range	10 μF to 2200 μF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	I ≤ 0.01 CV After 2 minutes	
tan δ	Please see the attached High temperature lead-free reflow products list.	
Endurance	After applying rated working voltage for 2000 hours at +105 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	≤ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.	
	Capacitance change	±10 % of initial measured value
	tan δ	≤ initial specified value
	DC leakage current	≤ initial specified value

■ Frequency correction factor for ripple current

Cap (μF)			Frequency (Hz)			
			120	1 k	10 k	100 k to
10	to	470	0.65	0.85	0.95	1.00
560	to	2200	0.70	0.90	0.95	1.00

■ Marking

Example: 25 V 22 μF
Marking color : BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

■ Dimensions in mm (not to scale)

(Unit : mm)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.3	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.3	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	ESR (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
6.3	100	4	5.8	B	160	0.85	0.26	EEEFT0J101AR	(5)	2000
	220	5	5.8	C	240	0.36	0.26	EEEFT0J221AR	(5)	1000
	330	6.3	5.8	D	300	0.26	0.26	EEEFT0J331AP	(5)	1000
	470	6.3	7.7	D8	600	0.16	0.26	EEEFTJ471XAP	(5)	900
	680	6.3	7.7	D8	600	0.16	0.26	EEEFTJ681XAP	(5)	900
	1500	8	10.2	F	850	0.08	0.26	EEEFT0J152AP	(6)	500
	2200	10	10.2	G	1190	0.06	0.28	EEEFT0J222AP	(6)	500
10	68	4	5.8	B	160	0.85	0.19	EEEFT1A680AR	(5)	2000
	150	5	5.8	C	240	0.36	0.19	EEEFT1A151AR	(5)	1000
	220	6.3	5.8	D	300	0.26	0.19	EEEFT1A221AP	(5)	1000
	330	6.3	7.7	D8	600	0.16	0.19	EEEFTA331XAP	(5)	900
	470	6.3	7.7	D8	600	0.16	0.19	EEEFTA471XAP	(5)	900
	1000	8	10.2	F	850	0.08	0.19	EEEFT1A102AP	(6)	500
	1500	10	10.2	G	1190	0.06	0.19	EEEFT1A152AP	(6)	500
16	47	4	5.8	B	160	0.85	0.16	EEEFT1C470AR	(5)	2000
	68	5	5.8	C	240	0.36	0.16	EEEFT1C680AR	(5)	1000
	100	5	5.8	C	240	0.36	0.16	EEEFT1C101AR	(5)	1000
	150	6.3	5.8	D	300	0.26	0.16	EEEFT1C151AP	(5)	1000
	220	6.3	5.8	D	300	0.26	0.16	EEEFT1C221AP	(5)	1000
	330	6.3	7.7	D8	600	0.16	0.16	EEEFTC331XAP	(5)	900
	680	8	10.2	F	850	0.08	0.16	EEEFT1C681AP	(6)	500
	1000	10	10.2	G	1190	0.06	0.16	EEEFT1C102AP	(6)	500
25	22	4	5.8	B	160	0.85	0.14	EEEFT1E220AR	(5)	2000
	33	4	5.8	B	160	0.85	0.14	EEEFT1E330AR	(5)	2000
	47	5	5.8	C	240	0.36	0.14	EEEFT1E470AR	(5)	1000
	68	5	5.8	C	240	0.36	0.14	EEEFT1E680AR	(5)	1000
	100	6.3	5.8	D	300	0.26	0.14	EEEFT1E101AP	(5)	1000
	150	6.3	7.7	D8	600	0.16	0.14	EEEFTE151XAP	(5)	900
	220	6.3	7.7	D8	600	0.16	0.14	EEEFTE221XAP	(5)	900
	470	8	10.2	F	850	0.08	0.14	EEEFT1E471AP	(6)	500
	820	10	10.2	G	1190	0.06	0.14	EEEFT1E821AP	(6)	500
35	22	4	5.8	B	160	0.85	0.12	EEEFT1V220AR	(5)	2000
	33	5	5.8	C	240	0.36	0.12	EEEFT1V330AR	(5)	1000
	47	5	5.8	C	240	0.36	0.12	EEEFT1V470AR	(5)	1000
	68	6.3	5.8	D	300	0.26	0.12	EEEFT1V680AP	(5)	1000
	100	6.3	5.8	D	300	0.26	0.12	EEEFT1V101AP	(5)	1000
	150	6.3	7.7	D8	600	0.16	0.12	EEEFTV151XAP	(5)	900
	330	8	10.2	F	850	0.08	0.12	EEEFT1V331AP	(6)	500
	560	10	10.2	G	1190	0.06	0.12	EEEFT1V561AP	(6)	500
50	10	4	5.8	(B)	85	2.30	0.10	EEEFTH100UAR	(5)	2000
		5	5.8	C	165	0.88	0.10	EEEFTH100AR	(5)	1000
	22	5	5.8	C	165	0.88	0.10	EEEFTH1H220AR	(5)	1000
	47	6.3	5.8	D	195	0.68	0.10	EEEFTH1H470AP	(5)	1000
	100	6.3	7.7	D8	350	0.34	0.10	EEEFTH101XAP	(5)	900
	220	8	10.2	F	670	0.18	0.10	EEEFTH1H221AP	(6)	500
	330	10	10.2	G	900	0.12	0.10	EEEFTH1H331AP	(6)	500

* Size code():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V, 1H→H

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

Surface Mount Type

Series: **FP** Type: **V**

FP High temperature Lead-Free reflow (suffix:A*)



■ Features

- Low ESR (30 % to 50 % less than FK series)
- Endurance: 2000 h at 105 °C
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	10 μF to 1800 μF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (whichever is greater)							
tan δ	Please see the attached standard products list							
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	2	2	2	2	2	2	
	Z(-40°C)/Z(+20 °C)	3	3	3	3	3	3	
	Z(-55°C)/Z(+20 °C)	4	4	4	3	3	3	
Endurance	After applying rated working voltage at +105 °C ±2 °C for 2000 hours the capacitors shall meet the limits specified below. Post-test requirement at +20 °C							
	Capacitance change	±30 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

■ Frequency correction factor for ripple current

Cap (μF)		Frequency (Hz)			
		120	1 k	10 k	100 k to
10	to 470	0.65	0.85	0.95	1.00
560	to 1800	0.75	0.90	0.95	1.00

■ Marking

Example: 6.3 V 22 μF
Marking color: BLACK

Rated Voltage Mark

j	6.3 V	E	25 V
A	10 V	V	35 V
C	16 V	H	50 V

■ Dimensions in mm(not to scale)

(Unit : mm)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8±0.30	4.3	5.5 max.	1.8	0.65±0.1	1.0	0.35 ^{+0.15} _{-0.20}
C	5.0	5.8±0.30	5.3	6.5 max.	2.2	0.65±0.1	1.5	0.35 ^{+0.15} _{-0.20}
D	6.3	5.8±0.30	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
D8	6.3	7.7±0.30	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
E	8.0	6.2±0.30	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.30	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.30	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	E.S.R. (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
6.3	22	4	5.8	B	160	0.85	0.26	EEEF0J220AR	(5)	2000
	47	4	5.8	(B)	160	0.85	0.26	EEEF0J470UAR	(5)	2000
		5	5.8	C	240	0.36	0.26	EEEF0J470AR	(5)	1000
	100	5	5.8	(C)	240	0.36	0.26	EEEF0J101UAR	(5)	1000
		6.3	5.8	D	300	0.26	0.26	EEEF0J101AP	(5)	1000
	220	6.3	5.8	D	300	0.26	0.26	EEEF0J221AP	(5)	1000
	330	6.3	7.7	D8	600	0.16	0.26	EEEF0J331XAP	(5)	900
		8	6.2	E	500	0.18	0.26	EEEF0J331AP	(6)	1000
	470	8	10.2	F	850	0.08	0.26	EEEF0J471AP	(6)	500
	1000	8	10.2	F	850	0.08	0.26	EEEF0J102AP	(6)	500
1500	10	10.2	G	1190	0.06	0.26	EEEF0J152AP	(6)	500	
1800	10	10.2	(G)	850	0.08	0.26	EEEF0J182UAP	(6)	500	
10	22	4	5.8	B	160	0.85	0.19	EEEF1A220AR	(5)	2000
	33	4	5.8	(B)	160	0.85	0.19	EEEF1A330UAR	(5)	2000
		5	5.8	C	240	0.36	0.19	EEEF1A330AR	(5)	1000
	150	6.3	5.8	D	300	0.26	0.19	EEEF1A151AP	(5)	1000
	220	6.3	7.7	D8	600	0.16	0.19	EEEF1A221XAP	(5)	900
		8	6.2	E	500	0.18	0.19	EEEF1A221AP	(6)	1000
	330	8	10.2	F	850	0.08	0.19	EEEF1A331AP	(6)	500
	470	8	10.2	F	850	0.08	0.19	EEEF1A471AP	(6)	500
	680	8	10.2	F	850	0.08	0.19	EEEF1A681AP	(6)	500
	1000	10	10.2	G	1190	0.06	0.19	EEEF1A102AP	(6)	500
1200	10	10.2	(G)	850	0.08	0.19	EEEF1A122UAP	(6)	500	
16	10	4	5.8	B	160	0.85	0.16	EEEF1C100AR	(5)	2000
	22	4	5.8	(B)	160	0.85	0.16	EEEF1C220UAR	(5)	2000
		5	5.8	C	240	0.36	0.16	EEEF1C220AR	(5)	1000
	47	5	5.8	(C)	240	0.36	0.16	EEEF1C470UAR	(5)	1000
		6.3	5.8	D	300	0.26	0.16	EEEF1C470AP	(5)	1000
	68	6.3	5.8	D	300	0.26	0.16	EEEF1C680AP	(5)	1000
	100	6.3	5.8	D	300	0.26	0.16	EEEF1C101AP	(5)	1000
		6.3	7.7	D8	600	0.16	0.16	EEEF1C101XAP	(5)	900
	150	6.3	7.7	D8	600	0.16	0.16	EEEF1C151XAP	(5)	900
	220	6.3	7.7	D8	600	0.16	0.16	EEEF1C221XAP	(5)	900
		8	6.2	E	500	0.18	0.16	EEEF1C221AP	(6)	1000
	330	8	10.2	F	850	0.08	0.16	EEEF1C331AP	(6)	500
	470	8	10.2	F	850	0.08	0.16	EEEF1C471AP	(6)	500
	680	10	10.2	G	1190	0.06	0.16	EEEF1C681AP	(6)	500
820	10	10.2	(G)	850	0.08	0.16	EEEF1C821UAP	(6)	500	
25	10	4	5.8	B	160	0.85	0.14	EEEF1E100AR	(5)	2000
	22	5	5.8	C	240	0.36	0.14	EEEF1E220AR	(5)	1000
	33	5	5.8	(C)	240	0.36	0.14	EEEF1E330UAR	(5)	1000
		6.3	5.8	D	300	0.26	0.14	EEEF1E330AP	(5)	1000
	47	6.3	5.8	D	300	0.26	0.14	EEEF1E470AP	(5)	1000
	68	6.3	5.8	D	300	0.26	0.14	EEEF1E680AP	(5)	1000
	100	6.3	7.7	D8	600	0.16	0.14	EEEF1E101XAP	(5)	900
		8	6.2	E	500	0.18	0.14	EEEF1E101AP	(6)	1000
	150	8	10.2	F	850	0.08	0.14	EEEF1E151AP	(6)	500
	220	8	10.2	F	850	0.08	0.14	EEEF1E221AP	(6)	500
	330	8	10.2	F	850	0.08	0.14	EEEF1E331AP	(6)	500
	470	10	10.2	G	1190	0.06	0.14	EEEF1E471AP	(6)	500
560	10	10.2	(G)	850	0.08	0.14	EEEF1E561UAP	(6)	500	

* Size code (): Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 105 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	E.S.R. (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
(V)	(μF)	(mm)	(mm)							
35	10	4	5.8	(B)	160	0.85	0.12	EEEFV100UAR	(5)	2000
	22	5	5.8	C	240	0.36	0.12	EEEFV1V220AR	(5)	1000
	33	6.3	5.8	D	300	0.26	0.12	EEEFV1V330AP	(5)	1000
	47	6.3	5.8	D	300	0.26	0.12	EEEFV1V470AP	(5)	1000
	68	6.3	7.7	D8	600	0.16	0.12	EEEFV680XAP	(5)	900
	100	6.3	7.7	D8	600	0.16	0.12	EEEFV101XAP	(5)	900
		8	10.2	F	850	0.08	0.12	EEEFV1V101AP	(6)	500
	150	8	10.2	F	850	0.08	0.12	EEEFV1V151AP	(6)	500
	220	8	10.2	F	850	0.08	0.12	EEEFV1V221AP	(6)	500
	330	10	10.2	G	1190	0.06	0.12	EEEFV1V331AP	(6)	500
50	390	10	10.2	(G)	850	0.08	0.12	EEEFV391UAP	(6)	500
	100	8	10.2	F	670	0.18	0.10	EEEFV1H101AP	(6)	500
	220	10	10.2	G	900	0.12	0.10	EEEFV1H221AP	(6)	500

* Size code():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **TG** Type: **V**

■ Features

- Endurance: 125 °C 1000 h to 2000 h
- Miniaturization (40 % less than TA Series)
- Low ESR (Low temp)
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant (Parts No φ8 to φ10 : **EEE***, φ12.5 to φ18 : **EEV***)



■ Specifications

Category Temp. Range	-40 °C to +125 °C									
Rated W.V. Range	10 V.DC to 100 V.DC									
Nominal Cap. Range	10 μF to 4700 μF									
Capacitance Tolerance	±20 % (120 Hz/+20 °C)									
DC Leakage Current	I ≤ 0.01 CV After 2 minutes									
tan δ	Please see the attached standard products list									
Characteristics at Low Temperature	W.V. (V)	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	3	2	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	6	4	4	3	3	3	3	3	
Endurance	After applying rated working voltage for 1000 hours (ø8×6.2), 2000 hours (ø8×10.2≤) at +125 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±30 % of initial measured value (code U : ±35 %)								
	tan δ	≤ 300 % of initial specified value (code U : ±350 %)								
	DC leakage current	≤ initial specified value								
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)									
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±10 % of initial measured value								
	tan δ	≤ initial specified value								
	DC leakage current	≤ initial specified value								

■ Frequency correction factor for ripple current

Correction factor	Frequency (Hz)			
	120	1 k	10 k	100 k to
	0.65	0.85	0.95	1.00

■ Marking

Example : 10 V 100 µF, 10 V 1000 µF
Marking coloc : BLACK
Lead-Free products (≤ φ10)

Capacitance (µF)
Series identification
Mark for Lead-Free Products Black Dot (Square)
Rated Voltage Mark
Lot number

Lead-Free products (≥ φ12.5)

Capacitance (µF)
Series identification
Rated Voltage Mark
Lot number

Rated Voltage Mark

A	10 V	H	50 V
C	16 V	J	63 V
E	25 V	K	80 V
V	35 V	2A	100 V

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.
φD±0.5
L
H
I
A±0.2
B±0.2
W
P
() Reference size
Pressure Relief (φ10 and larger)

Size code	D	L	A, B	H	I	W	P	K
E	8.0	6.2±0.3	8.3	9.5 max.	3.4	0.65±0.1	2.2	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.20
H13	12.5	13.5±0.5	13.5	15.0 max.	4.7	0.90±0.3	4.4	0.70±0.30
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.20±0.3	6.7	0.70±0.30
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.20±0.3	6.7	0.70±0.30

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 125 °C 1000 h ($\phi 8 \times 10.2 \leq$: 2000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (+20 °C) (Ω)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μF)	(mm)	(mm)							(pcs)
10	100	8	6.2	E	100	1.00	0.30	EEETG1A101P	(2)	1000
	220	8	6.2	(E)	100	1.00	0.30	EEETG1A221UP	(2)	1000
		8	10.2	F	197	0.50	0.30	EEETG1A221P	(2)	500
	330	8	10.2	(F)	197	0.50	0.30	EEETG1A331UP	(2)	500
		10	10.2	G	270	0.30	0.30	EEETG1A331P	(2)	500
	470	10	10.2	(G)	270	0.30	0.30	EEETG1A471UP	(2)	500
	1000	12.5	13.5	H13	800	0.12	0.30	EEVTG1A102Q	(3)	200
	1500	12.5	13.5	(H13)	800	0.12	0.30	EEVTG1A152UQ	(3)	200
	2200	16	16.5	J16	1100	0.08	0.32	EEVTG1A222M	(3)	125
	3300	16	16.5	(J16)	1100	0.08	0.34	EEVTG1A332UM	(3)	125
18		16.5	K16	1300	0.075	0.34	EEVTG1A332M	(3)	125	
4700	18	16.5	K16	1300	0.075	0.36	EEVTG1A472M	(3)	125	
16	100	8	10.2	F	197	0.50	0.23	EEETG1C101P	(2)	500
	220	8	10.2	(F)	197	0.50	0.23	EEETG1C221UP	(2)	500
		10	10.2	G	270	0.30	0.23	EEETG1C221P	(2)	500
	330	10	10.2	(G)	270	0.30	0.23	EEETG1C331UP	(2)	500
		12.5	13.5	H13	800	0.12	0.23	EEVTG1C331Q	(3)	200
	470	12.5	13.5	H13	800	0.12	0.23	EEVTG1C471Q	(3)	200
	680	12.5	13.5	H13	800	0.12	0.23	EEVTG1C681Q	(3)	200
	1000	12.5	13.5	(H13)	800	0.12	0.23	EEVTG1C102UQ	(3)	200
		16	16.5	J16	1100	0.08	0.23	EEVTG1C102M	(3)	125
	2200	16	16.5	(J16)	1100	0.08	0.25	EEVTG1C222UM	(3)	125
18		16.5	K16	1300	0.075	0.25	EEVTG1C222M	(3)	125	
3300	18	16.5	K16	1300	0.075	0.27	EEVTG1C332M	(3)	125	
25	47	8	6.2	E	100	1.00	0.18	EEETG1E470P	(2)	1000
	100	8	6.2	(E)	100	1.00	0.18	EEETG1E101UP	(2)	1000
		8	10.2	F	197	0.50	0.18	EEETG1E101P	(2)	500
	220	8	10.2	(F)	197	0.50	0.18	EEETG1E221UP	(2)	500
		10	10.2	G	270	0.30	0.18	EEETG1E221P	(2)	500
	330	10	10.2	(G)	270	0.30	0.18	EEETG1E331UP	(2)	500
		12.5	13.5	H13	800	0.12	0.18	EEVTG1E331Q	(3)	200
	470	12.5	13.5	H13	800	0.12	0.18	EEVTG1E471Q	(3)	200
	680	12.5	13.5	(H13)	800	0.12	0.18	EEVTG1E681UQ	(3)	200
		16	16.5	J16	1100	0.08	0.18	EEVTG1E681M	(3)	125
1000	16	16.5	(J16)	1100	0.08	0.18	EEVTG1E102UM	(3)	125	
	18	16.5	K16	1300	0.075	0.18	EEVTG1E102M	(3)	125	
2200	18	16.5	K16	1300	0.075	0.20	EEVTG1E222M	(3)	125	
35	33	8	6.2	E	100	1.00	0.16	EEETG1V330P	(2)	1000
	47	8	6.2	(E)	100	1.00	0.16	EEETG1V470UP	(2)	1000
		8	10.2	F	197	0.50	0.16	EEETG1V470P	(2)	500
	100	8	10.2	(F)	197	0.50	0.16	EEETG1V101UP	(2)	500
		10	10.2	G	270	0.30	0.16	EEETG1V101P	(2)	500
	220	10	10.2	(G)	270	0.30	0.16	EEETG1V221UP	(2)	500
330	12.5	13.5	H13	800	0.12	0.16	EEVTG1V331Q	(3)	200	
35	470	12.5	13.5	(H13)	800	0.12	0.16	EEVTG1V471UQ	(3)	200
		16	16.5	J16	1100	0.08	0.16	EEVTG1V471M	(3)	125
	680	16	16.5	(J16)	1100	0.08	0.16	EEVTG1V681UM	(3)	125
		18	16.5	K16	1300	0.075	0.16	EEVTG1V681M	(3)	125
	1000	18	16.5	K16	1300	0.075	0.16	EEVTG1V102M	(3)	125

*Size code (): Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P, Q, or M"

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

Standard Products

Endurance : 125 °C 1000 h ($\phi 8 \times 10.2 \leq$: 2000 h)

W.V.	Cap. ($\pm 20\%$)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (+20 °C) (Ω)	$\tan \delta$ (120 Hz) (+20 °C)			Taping
(V)	(μ F)	(mm)	(mm)							(pcs)
50	10	8	6.2	E	80	1.60	0.14	EEETG1H100P	(2)	1000
	22	8	6.2	E	80	1.60	0.14	EEETG1H220P	(2)	1000
	33	8	6.2	(E)	80	1.60	0.14	EEETG1H330UP	(2)	1000
		8	10.2	F	133	0.75	0.14	EEETG1H330P	(2)	500
	47	8	10.2	(F)	133	0.75	0.14	EEETG1H470UP	(2)	500
		10	10.2	G	221	0.50	0.14	EEETG1H470P	(2)	500
	100	10	10.2	(G)	221	0.50	0.14	EEETG1H101UP	(2)	500
	220	12.5	13.5	H13	600	0.23	0.14	EEVTG1H221Q	(3)	200
	330	12.5	13.5	H13	600	0.23	0.14	EEVTG1H331Q	(3)	200
	470	16	16.5	J16	900	0.15	0.14	EEVTG1H471M	(3)	125
	680	16	16.5	(J16)	900	0.15	0.14	EEVTG1H681UM	(3)	125
		18	16.5	K16	950	0.14	0.14	EEVTG1H681M	(3)	125
	1000	18	16.5	K16	950	0.14	0.14	EEVTG1H102M	(3)	125
63	10	8	6.2	E	55	2.20	0.12	EEETG1J100P	(2)	1000
	22	8	10.2	F	100	1.00	0.12	EEETG1J220P	(2)	500
	33	8	10.2	(F)	100	1.00	0.12	EEETG1J330UP	(2)	500
		10	10.2	G	150	0.80	0.12	EEETG1J330P	(2)	500
	47	8	10.2	(F)	100	1.00	0.12	EEETG1J470UP	(2)	500
		10	10.2	G	150	0.80	0.12	EEETG1J470P	(2)	500
	100	10	10.2	(G)	150	0.80	0.12	EEETG1J101UP	(2)	500
		12.5	13.5	H13	350	0.26	0.12	EEVTG1J101Q	(3)	200
	220	12.5	13.5	H13	350	0.26	0.12	EEVTG1J221Q	(3)	200
	330	16	16.5	J16	500	0.18	0.12	EEVTG1J331M	(3)	125
	470	16	16.5	J16	500	0.18	0.12	EEVTG1J471M	(3)	125
80	10	8	10.2	F	70	1.30	0.12	EEETG1K100P	(2)	500
	22	8	10.2	(F)	70	1.30	0.12	EEETG1K220UP	(2)	500
		10	10.2	G	90	1.00	0.12	EEETG1K220P	(2)	500
	33	8	10.2	(F)	70	1.30	0.12	EEETG1K330UP	(2)	500
		10	10.2	G	90	1.00	0.12	EEETG1K330P	(2)	500
	47	10	10.2	(G)	90	1.00	0.12	EEETG1K470UP	(2)	500
		12.5	13.5	H13	250	0.42	0.12	EEVTG1K470Q	(3)	200
	100	12.5	13.5	(H13)	250	0.42	0.12	EEVTG1K101UQ	(3)	200
		16	16.5	J16	350	0.30	0.12	EEVTG1K101M	(3)	125
	220	16	16.5	(J16)	350	0.30	0.12	EEVTG1K221UM	(3)	125
		18	16.5	K16	400	0.28	0.12	EEVTG1K221M	(3)	125
	330	16	16.5	(J16)	350	0.30	0.12	EEVTG1K331UM	(3)	125
		18	16.5	K16	400	0.28	0.12	EEVTG1K331M	(3)	125
	470	18	16.5	K16	400	0.28	0.12	EEVTG1K471M	(3)	125
	10	8	10.2	F	70	1.30	0.10	EEETG2A100P	(2)	500
	22	8	10.2	(F)	70	1.30	0.10	EEETG2A220UP	(2)	500
		10	10.2	G	90	1.00	0.10	EEETG2A220P	(2)	500
	33	10	10.2	G	90	1.00	0.10	EEETG2A330P	(2)	500
100	47	12.5	13.5	H13	250	0.42	0.10	EEVTG2A470Q	(3)	200
	100	16	16.5	J16	350	0.30	0.10	EEVTG2A101M	(3)	125
	220	18	16.5	K16	400	0.28	0.10	EEVTG2A221M	(3)	125
	330	18	16.5	K16	400	0.28	0.10	EEVTG2A331M	(3)	125

*Size code():Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead of "P, Q, or M"

Surface Mount Type

Series: **Medium-size TK** Type: **V**
TK High temperature Lead-Free reflow(suffix:A*)



■ Features

- Endurance: 2000 h at 125 °C
- Vibration-proof product is available upon request.
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

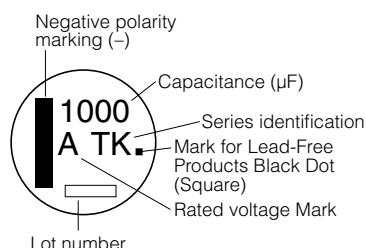
Category Temp. Range	-40 °C to +125 °C									
Rated W.V. Range	10 V.DC to 100 V.DC									
Nominal Cap. Range	47 μF to 4700 μF									
Capacitance Tolerance	±20 % (120 Hz/+20 °C)									
DC Leakage Current	I ≤ 0.01 CV After 2 minutes									
tan δ	Please see the attached High temperature lead-free reflow products list.									
Characteristics at Low Temperature	W.V. (V)	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	3	2	2	2	2	2	2	2	
	Z(-40 °C)/Z(+20 °C)	6	4	4	3	3	3	3	3	
Endurance	After applying rated working voltage for 2000 hours at +125 °C±2 °C and then being stabilized at +20 °C, Capacitors shall meet the following limits.									
	Capacitance change	±30 % of initial measured value (Miniaturization product : Within ±35 %)								
	tan δ	≤ 300 % of initial specified value (Miniaturization product : Within 350 %)								
	DC leakage current	≤ initial specified value								
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)									
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	±10 % of initial measured value								
	tan δ	≤ initial specified value								
	DC leakage current	≤ initial specified value								

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.75	0.90	0.95	1.00

■ Marking

Example:10 V 1000 μF
Marking color: BLACK

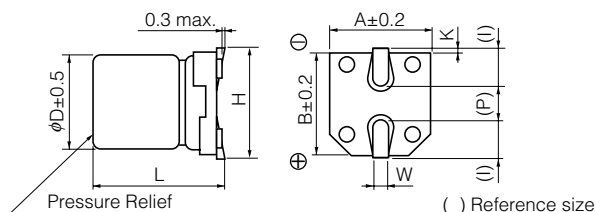


Rated Voltage Mark

A	10 V	H	50 V
C	16 V	J	63 V
E	25 V	K	80 V
V	35 V	2A	100 V

■ Dimensions in mm (not to scale)

(Unit : mm)



Size code	D	L	A, B	H	I	W	P	K
H13	12.5	13.5±0.5	13.5	15.0 max.	4.7	0.90±0.3	4.4	0.70±0.3
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.20±0.3	6.7	0.70±0.3
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.20±0.3	6.7	0.70±0.3

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

■ High temperature Lead-Free reflow Products

Endurance : 125 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification				Part No. (RoHS:compliant)	Reflow	Min.
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (Ω)		tan δ (120 Hz) (+20 °C)			Packaging Q'ty
						Taping					
(V)	(μF)	(mm)	(mm)			+20 °C	-40 °C				(pcs)
10	1000	12.5	13.5	H13	800	0.120	1.80	0.30	EEETK1A102AQ	(9)	200
	1500	12.5	13.5	(H13)	800	0.120	1.80	0.30	EEETKA152UAQ	(9)	200
	2200	16	16.5	J16	1100	0.080	1.20	0.32	EEETK1A222AM	(9)	125
	3300	16	16.5	(J16)	1100	0.080	1.20	0.34	EEETKA332UAM	(9)	125
		18	16.5	K16	1300	0.075	1.10	0.36	EEETK1A332AM	(9)	125
	4700	18	16.5	K16	1300	0.075	1.10	0.38	EEETK1A472AM	(9)	125
16	330	12.5	13.5	H13	800	0.120	1.80	0.23	EEETK1C331AQ	(9)	200
	470	12.5	13.5	H13	800	0.120	1.80	0.23	EEETK1C471AQ	(9)	200
	680	12.5	13.5	H13	800	0.120	1.80	0.23	EEETK1C681AQ	(9)	200
	1000	12.5	13.5	(H13)	800	0.120	1.80	0.23	EEETKC102UAQ	(9)	200
		16	16.5	J16	1100	0.080	1.20	0.25	EEETK1C102AM	(9)	125
	2200	16	16.5	(J16)	1100	0.080	1.20	0.27	EEETKC222UAM	(9)	125
		18	16.5	K16	1300	0.075	1.10	0.27	EEETK1C222AM	(9)	125
	3300	18	16.5	K16	1300	0.075	1.10	0.29	EEETK1C332AM	(9)	125
25	330	12.5	13.5	H13	800	0.120	1.80	0.18	EEETK1E331AQ	(9)	200
	470	12.5	13.5	H13	800	0.120	1.80	0.18	EEETK1E471AQ	(9)	200
	680	12.5	13.5	(H13)	800	0.120	1.80	0.18	EEETKE681UAQ	(9)	200
		16	16.5	J16	1100	0.080	1.20	0.18	EEETK1E681AM	(9)	125
	1000	16	16.5	(J16)	1100	0.080	1.20	0.18	EEETKE102UAM	(9)	125
		18	16.5	K16	1300	0.075	1.10	0.18	EEETK1E102AM	(9)	125
	2200	18	16.5	K16	1300	0.075	1.10	0.20	EEETK1E222AM	(9)	125
35	330	12.5	13.5	H13	800	0.120	1.80	0.16	EEETK1V331AQ	(9)	200
	470	12.5	13.5	(H13)	800	0.120	1.80	0.16	EEETKV471UAQ	(9)	200
		16	16.5	J16	1100	0.080	1.20	0.16	EEETK1V471AM	(9)	125
	680	16	16.5	(J16)	1100	0.080	1.20	0.16	EEETKV681UAM	(9)	125
		18	16.5	K16	1300	0.075	1.10	0.16	EEETK1V681AM	(9)	125
	1000	18	16.5	K16	1300	0.075	1.10	0.16	EEETK1V102AM	(9)	125
50	220	12.5	13.5	H13	600	0.230	3.40	0.14	EEETK1H221AQ	(10)	200
	330	12.5	13.5	H13	600	0.230	3.40	0.14	EEETK1H331AQ	(10)	200
	470	16	16.5	J16	900	0.150	2.20	0.14	EEETK1H471AM	(10)	125
	680	16	16.5	(J16)	900	0.150	2.20	0.14	EEETKH681UAM	(10)	125
		18	16.5	K16	950	0.140	2.10	0.14	EEETK1H681AM	(10)	125
	1000	18	16.5	K16	950	0.140	2.10	0.14	EEETK1H102AM	(10)	125
63	100	12.5	13.5	H13	350	0.260	5.20	0.12	EEETK1J101AQ	(11)	200
	220	12.5	13.5	H13	350	0.260	5.20	0.12	EEETK1J221AQ	(11)	200
	330	16	16.5	J16	500	0.180	3.60	0.12	EEETK1J331AM	(11)	125
	470	16	16.5	J16	500	0.180	3.60	0.12	EEETK1J471AM	(11)	125
80	47	12.5	13.5	H13	250	0.420	8.40	0.12	EEETK1K470AQ	(11)	200
	100	12.5	13.5	(H13)	250	0.420	8.40	0.12	EEETKK101UAQ	(11)	200
		16	16.5	J16	350	0.300	6.00	0.12	EEETK1K101AM	(11)	125
	220	16	16.5	(J16)	350	0.300	6.00	0.12	EEETKK221UAM	(11)	125
		18	16.5	K16	400	0.280	5.60	0.12	EEETK1K221AM	(11)	125
	330	16	16.5	(J16)	350	0.300	6.00	0.12	EEETKK331UAM	(11)	125
		18	16.5	K16	400	0.280	5.60	0.12	EEETK1K331AM	(11)	125
470	18	16.5	K16	400	0.280	5.60	0.12	EEETK1K471AM	(11)	125	
100	47	12.5	13.5	H13	250	0.420	8.40	0.10	EEETK2A470AQ	(11)	200
	100	16	16.5	J16	350	0.300	6.00	0.10	EEETK2A101AM	(11)	125
	220	18	16.5	K16	400	0.280	5.60	0.10	EEETK2A221AM	(11)	125
	330	18	16.5	K16	400	0.280	5.60	0.10	EEETK2A331AM	(11)	125

* Size code(): Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "Q or M"

Surface Mount Type

Series: **TK** Type: **V**



■ Features

- Endurance : 125 °C 3000 h
- Low ESR at -40 °C (50 % lower than TG series)
- Added ESR specification after the endurance test
- Vibration-proof product is available upon request.
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +125 °C					
Rated W.V. Range	10 V.DC to 35 V.DC					
Nominal Cap. Range	47 µF to 470 µF					
Capacitance Tolerance	±20 % (120 Hz/+20 °C)					
DC Leakage Current	I ≤ 0.01 CV After 2 minutes					
tan δ	Please see the attached standard products list					
Characteristics at Low Temperature	W.V. (V)	10	16	25	35	(Impedance ratio at 120 Hz)
	Z(-25 °C)/Z(+20 °C)	3	2	2	2	
	Z(-40 °C)/Z(+20 °C)	4	3	3	3	
Endurance	After the life test with DC rated woking voltage at +125 °C ±2 °C for 3000 hours, the capacitors shall meet the limits specified below.					
	Capacitance change	±30 % of initially measured values (code U : ±35 %)				
	tan δ	≤ 300 % of initially specified values (code U : ±350 %)				
	DC leakage current	≤ initially specified values				
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)					
ESR after the Life test	After the life test with DC rated working voltage at +125 °C±2 °C for 3000 hours, ESR value shall meet the specified below.					
	After 1000 hours	20 °C	≤ 150 % of the initially measured specified value.			
		-40 °C	≤ 200 % of the initially measured specified value.			
	After 2000 hours	20 °C	≤ 300 % of the initially measured specified value.			
		-40 °C	≤ 400 % of the initially measured specified value.			
	After 3000 hours	20 °C	≤ 1000 % of the initially measured specified value.			
-40 °C		≤ 1500 % of the initially measured specified value.				

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.65	0.85	0.95	1.00

■ Marking

Example: 10 V 220 µF (polarized)
Marking color: BLACK

Rated Voltage Mark

A	10 V
C	16 V
E	25 V
V	35 V

■ Dimensions in mm (not to scale)

(Unit : mm)

Pressure Relief (φ10 and larger)

() Reference size

Size code	D	L	A, B	H	I	W	P	K
F	8.0	10.2±0.3	8.3	10.0 max.	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2±0.3	10.3	12.0 max.	3.5	0.90±0.2	4.6	0.70±0.2

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Mar. 2014

■ Standard Products

Endurance : 125 °C 3000 h

W.V.	Cap. (±20 %)	Case size			Specification				Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+125 °C)	ESR (100 kHz)		tan δ (120 Hz) (+20 °C)			Taping
						(Ω)					
(V)	(μF)	(mm)	(mm)		(mA r.m.s.)	+20 °C	-40 °C				(pcs)
10	220	8	10.2	F	197	0.3	5	0.30	EEETK1A221P	(8)	500
	330	8	10.2	(F)	197	0.3	5	0.30	EEETK1A331UP	(8)	500
		10	10.2	G	270	0.2	3	0.30	EEETK1A331P	(8)	500
	470	10	10.2	(G)	270	0.2	3	0.30	EEETK1A471UP	(8)	500
16	100	8	10.2	F	197	0.3	5	0.23	EEETK1C101P	(8)	500
	220	8	10.2	(F)	197	0.3	5	0.23	EEETK1C221UP	(8)	500
		10	10.2	G	270	0.2	3	0.23	EEETK1C221P	(8)	500
	330	10	10.2	(G)	270	0.2	3	0.23	EEETK1C331UP	(8)	500
25	100	8	10.2	F	197	0.3	5	0.18	EEETK1E101P	(8)	500
	220	8	10.2	(F)	197	0.3	5	0.18	EEETK1E221UP	(8)	500
		10	10.2	G	270	0.2	3	0.18	EEETK1E221P	(8)	500
	330	10	10.2	(G)	270	0.2	3	0.18	EEETK1E331UP	(8)	500
35	47	8	10.2	F	197	0.3	5	0.16	EEETK1V470P	(8)	500
	100	8	10.2	(F)	197	0.3	5	0.16	EEETK1V101UP	(8)	500
		10	10.2	G	270	0.2	3	0.16	EEETK1V101P	(8)	500
	220	10	10.2	(G)	270	0.2	3	0.16	EEETK1V221UP	(8)	500

* Size code() : Miniaturization product

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **TP** Type: **V**

TP High temperature Lead-Free reflow(suffix:A*)



■ Features

- Lower ESR at Low temperature after endurance
- Endurance: 3000 h at 125 °C(D8 size : 2000 h)
- Automotive
- Vibration-proof product is available upon request. (φ8 mm and larger)
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +125 °C					
Rated W.V.Range	10 V.DC to 35 V.DC					
Nominal Cap.Range	47 μF to 470 μF					
Capacitance Tolerance	±20 % (120 Hz/+20 °C)					
DC Leakage Current	I ≤ 0.01 CV (μA) After 2 minutes					
tan δ	Please see the attached standard products list					
Endurance	After the life test with DC rated working voltage at +125 °C±2 °C for 3000 hours(D8 size : 2000 h). the capacitors shall meet the limits specified below.					
	Capacitance change	±30 % of initial measured value				
	tan δ	≤ 300 % of initial specified value				
	DC leakage current	≤ initial specified value				
	ESR after Endurance (Ω/100kHz)		Size Code			
			D8	F	G	
		Initial(+20 °C)	0.45	0.2	0.15	
	After 2000 h(-40 °C)	40	4.5	3.5		
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)					
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.					
	Capacitance change	±10 % of initial measured value				
	tan δ	≤ initial specified value				
	DC leakage current	≤ initial specified value				

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.65	0.85	0.95	1.00

■ Marking

Example:10 V 220 μF Marking color : BLACK

Rated Voltage Mark

A	10 V
C	16 V
E	25 V
V	35 V

■ Dimensions in mm (not to scale)

(Unit : mm)

Size code	D	L	A, B	H	I	W	P	K
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}
F	8.0	10.2±0.3	8.3	10.0max.	3.4	0.90±0.2	3.1	0.70±0.20
G	10.0	10.2±0.3	10.3	12.0max.	3.5	0.90±0.2	4.6	0.70±0.20

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 125 °C 3000 h ($\phi 6.3 \times 7.7 \leq$: 2000 h)

W.V.	Cap. (±20 %)	Case size			Specification				Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	ESR (100 kHz) (Ω)		tan δ (120 Hz) (+20 °C)			Taping
						+20 °C	-40 °C				
(V)	(μF)	(mm)	(mm)								
10	220	8	10.2	F	270	0.20	3	0.30	EEETP1A221AP	(8)	500
	330	8	10.2	(F)	270	0.20	3	0.30	EEETPA331UAP	(8)	500
		10	10.2	G	500	0.15	2	0.30	EEETP1A331AP	(8)	500
	470	10	10.2	G	500	0.15	2	0.30	EEETP1A471AP	(8)	500
16	100	6.3	7.7	D8	197	0.45	5	0.23	EEETPC101XAP	(8)	900
		8	10.2	F	270	0.20	3	0.23	EEETP1C101AP	(8)	500
	220	8	10.2	F	270	0.20	3	0.23	EEETP1C221AP	(8)	500
	330	10	10.2	G	500	0.15	2	0.23	EEETP1C331AP	(8)	500
	470	10	10.2	G	500	0.15	2	0.23	EEETP1C471AP	(8)	500
	25	100	8	10.2	F	270	0.20	3	0.18	EEETP1E101AP	(8)
220		10	10.2	G	500	0.15	2	0.18	EEETP1E221AP	(8)	500
330		10	10.2	G	500	0.15	2	0.18	EEETP1E331AP	(8)	500
35	47	6.3	7.7	D8	197	0.45	5	0.16	EEETPV470XAP	(8)	900
		8	10.2	F	270	0.20	3	0.16	EEETP1V470AP	(8)	500
	100	8	10.2	F	270	0.20	3	0.16	EEETP1V101AP	(8)	500
	220	10	10.2	G	500	0.15	2	0.16	EEETP1V221AP	(8)	500

* Size code():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 1A→A, 1C→C, 1E→E, 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

· When requesting vibration-proof product, please put the last "V" instead to "P"

Surface Mount Type

Series: **TQ** Type: **V**

TQ High temperature Lead-Free reflow(suffix:A*)



■ Features

- 1 size smaller and same performance compare with V-TK series
- Low ESR
(85% low ESR in low temperature after endurance compare with V-TP series)
- Endurance: 2000 h at 125 °C
- AEC-Q200 qualified*
- RoHS directive compliant

■ Recommended Applications

- Automotive

■ Specifications

Category Temp. Range	-40 °C to +125 °C			
Rated W.V.Range	35 V.DC			
Nominal Cap.Range	47 µF to 100 µF			
Capacitance Tolerance	±20 % (120 Hz/+20 °C)			
DC Leakage Current	I ≤ 0.01 CV (µA) After 2 minutes			
tan δ	Please see the attached standard products list			
Endurance	After the life test with DC rated working voltage at +125 °C±2 °C for 2000 hours, the capacitors shall meet the limits specified below.			
	Capacitance change	±30 % of initial measured value		
	tan δ	≤ 300 % of initial specified value		
	DC leakage current	≤ initial specified value		
	ESR after Endurance (Ω/100kHz)		Size Code	
			D8	
		Initial(+20 °C)	0.30	
	After 2000 h(-40 °C)	6		
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)			
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.			
	Capacitance change	±10 % of initial measured value		
	tan δ	≤ initial specified value		
	DC leakage current	≤ initial specified value		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	120	1 k	10 k	100 k to
Correction factor	0.65	0.85	0.95	1.00

■ Marking

Example:35 V 47 µF Marking color : BLACK

Rated Voltage Mark

V	35 V
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■ Dimensions in mm (not to scale)

(Unit : mm)

Size code	D	L	A, B	H	I	W	P	K
D8	6.3	7.7±0.3	6.6	7.8 max.	2.6	0.65±0.1	1.8	0.35 ^{+0.15} _{-0.20}

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Mar. 2014

■ Standard Products

Endurance : 125 °C 2000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	E.S.R. (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping (pcs)
(V)	(μF)	(mm)	(mm)							
35	47	6.3	7.7	D8	197	0.30	0.16	EEETQV470XAP	(5)	900
	100	6.3	7.7	D8	197	0.30	0.16	EEETQV101XAP	(5)	900

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 1V→V

· Please refer to the page of "Reflow Profile" and "The Taping Dimensions".

Surface Mount Type

Series: **EB(Large Can Size)** Type: **V**



■ Features

- Endurance : 105 °C 3000 h to 5000 h
- RoHS directive compliant

■ Specifications

Category Temp. Range	-25 °C to +105 °C							
Rated W.V. Range	160 V.DC to 450 V.DC							
Nominal Cap. Range	2.2 µF to 100 µF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.06 CV +10 (µA) After 2 minutes							
tan δ	Please see the attached standard products list							
Characteristics at Low Temperature	W.V. (V)	160	200	250	350	400	450	(Impedance ratio at 120 Hz)
	Z(-25 °C) / Z(+20 °C)	2	2	3	5	6	6	
Endurance	After the life test with DC rated working voltage at +105 °C±2 °C for 5000 hours, the capacitors shall meet the limits specified below. (Size code G13 : 3000 hours, G17 : 4000 hours)							
	Capacitance change	±20 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.							
	Capacitance change	±10 % of initial measured value						
	tan δ	≤ initial specified value						
	DC leakage current	≤ initial specified value						

■ Frequency correction factor for ripple current

Rated Voltage (V.DC)			Frequency (Hz)			
			120	1 k	$10 k \leq f < 30 k$	$30 k \leq f \leq 100 k$
160	to	250	0.55	0.85	0.90	1.00
350	to	450	0.50	0.80	0.90	1.00

■ Marking

Example : 160 V 10 μF

Negative polarity marking (-)
 Capacitance (μF)
 Series identification
 Rated voltage Mark
 Lot number

Rated Voltage Mark

2C	160 V	2V	350 V
2D	200 V	2G	400 V
2E	250 V	2W	450 V

■ Dimensions in mm (not to scale)

(Unit : mm)

0.3 max.
 $\phi D \pm 0.5$
 L
 H
 Pressure Relief
 $A \pm 0.2$
 $B \pm 0.2$
 I
 W
 P
 K
 () Reference size

Size code	D	L	A,B	H	I	W	P	K
G13	10.0	13.5±0.5	10.3	12.0 max.	3.5	0.9±0.2	4.6	0.70±0.20
G17	10.0	16.5±0.5	10.3	12.0 max.	3.5	0.9±0.2	4.6	0.70±0.20
H16	12.5	16.5±0.5	13.5	15.0 max.	4.7	0.9±0.2	4.4	0.70±0.30
J16	16.0	16.5±0.5	17.0	19.0 max.	5.5	1.2±0.3	6.7	0.70±0.30
J21	16.0	21.5±0.5	17.0	19.0 max.	5.5	1.2±0.3	6.7	0.70±0.30
K16	18.0	16.5±0.5	19.0	21.0 max.	6.7	1.2±0.3	6.7	0.70±0.30
K21	18.0	21.5±0.5	19.0	21.0 max.	6.7	1.2±0.3	6.7	0.70±0.30

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Endurance : 105 °C 5000 h (G13 : 3000 h, G17 : 4000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105 °C)	$\tan \delta$ (120 Hz) (+20 °C)	Endurance			Taping
(V)	(μF)	(mm)	(mm)		(mA)		(hours)			(pcs)
160	10	10	13.5	G13	70	0.15	3000	EEVEB2C100Q	(4)	250
	33	12.5	16.5	H16	470	0.15	5000	EEVEB2C330SQ	(4)	150
	47	16	16.5	J16	600	0.15	5000	EEVEB2C470SM	(4)	125
	68	16	21.5	J21	750	0.15	5000	EEVEB2C680M	(4)	75
		18	16.5	K16	750	0.15	5000	EEVEB2C680SM	(4)	125
	100	18	21.5	K21	1060	0.15	5000	EEVEB2C101M	(4)	75
200	10	10	16.5	G17	80	0.15	4000	EEVEB2D100Q	(4)	200
	22	12.5	16.5	H16	470	0.15	5000	EEVEB2D220SQ	(4)	150
	33	16	16.5	J16	600	0.15	5000	EEVEB2D330SM	(4)	125
	47	18	16.5	K16	600	0.15	5000	EEVEB2D470SM	(4)	125
	68	16	21.5	J21	750	0.15	5000	EEVEB2D680M	(4)	75
	100	18	21.5	K21	1060	0.15	5000	EEVEB2D101M	(4)	75
250	10	10	16.5	G17	88	0.15	4000	EEVEB2E100Q	(4)	200
	22	16	16.5	J16	560	0.15	5000	EEVEB2E220SM	(4)	125
	33	18	16.5	K16	560	0.15	5000	EEVEB2E330SM	(4)	125
	47	16	21.5	J21	710	0.15	5000	EEVEB2E470M	(4)	75
	68	18	21.5	K21	990	0.15	5000	EEVEB2E680M	(4)	75
350	3.3	10	13.5	G13	38	0.20	3000	EEVEB2V3R3Q	(4)	250
	4.7	10	16.5	G17	50	0.20	4000	EEVEB2V4R7Q	(4)	200
	10	16	16.5	J16	270	0.20	5000	EEVEB2V100SM	(4)	125
	22	18	16.5	K16	350	0.20	5000	EEVEB2V220SM	(4)	125
	33	16	21.5	J21	480	0.20	5000	EEVEB2V330M	(4)	75
	47	18	21.5	K21	670	0.20	5000	EEVEB2V470M	(4)	75
400	3.3	10	13.5	G13	40	0.24	3000	EEVEB2G3R3Q	(4)	250
	4.7	10	16.5	G17	50	0.24	4000	EEVEB2G4R7Q	(4)	200
	10	16	16.5	J16	250	0.24	5000	EEVEB2G100SM	(4)	125
	22	16	21.5	J21	410	0.24	5000	EEVEB2G220M	(4)	75
	33	18	21.5	K21	600	0.24	5000	EEVEB2G330M	(4)	75
450	2.2	10	13.5	G13	29	0.24	3000	EEVEB2W2R2Q	(4)	250
	3.3	10	16.5	G17	41	0.24	4000	EEVEB2W3R3Q	(4)	200
	4.7	12.5	16.5	H16	49	0.24	5000	EEVEB2W4R7SQ	(4)	150
	10	18	16.5	K16	310	0.24	5000	EEVEB2W100SM	(4)	125
	22	18	21.5	K21	560	0.24	5000	EEVEB2W220M	(4)	75

- Please refer to the page of "Reflow Profile" and "The Taping Dimensions".
- When requesting vibration-proof product, please put the last "V" instead to "Q or M"

Radial Lead Type

Series: **FC** Type: **A**



■ Features

- Endurance : 105 °C 1000 h to 5000 h
- Low impedance
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-55 °C to +105 °C									
Rated W.V. Range	6.3 V.DC to 100 V.DC									
Nominal Cap. Range	2.2 μF to 15000 μF									
Capacitance Tolerance	±20 % (120 Hz/+20 °C)									
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)									
tan δ	W.V. (V)	6.3	10	16	25	35	50	63	100	(120 Hz/+20 °C)
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07	
	For capacitance value ≥ 1000 μF, add 0.02 per every 1000 μF.									
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified bellow. Duration : ϕ4 to ϕ6.3: 1000 hours, ϕ8: 2000 hours , ϕ10: 3000 hours , ϕ12.5 to ϕ18: 5000 hours									
	Capacitance change	±20 % of initial measured value								
	tan δ	≤ 200 % of initial specified value								
	DC leakage current	≤ initial specified value								
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)									

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 100	2.2 to 330	0.55	0.65	0.85	0.90	1.00
	390 to 1000	0.70	0.75	0.90	0.95	1.00
	1200 to 2200	0.75	0.80	0.90	0.95	1.00
	2700 to 15000	0.80	0.85	0.95	1.00	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

*L≤16 : L±1.0 (*φ8×15, φ16×15, φ18×15 : L±1.5) L≥20 : L±2.0												
	L≥11								L=7			
Body Dia. φD	4	5	6.3	8	10	12.5	16	18	4	5	6.3	
Body Length L						15 to 25	30 to 40					
Lead Dia. φd	0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5	3.5	5.0	5.0	5.0	7.5	7.5	1.5	2.0	2.5

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

05 Jul. 2014

■ Case size/ Impedance/ Ripple Current

W.V(V.DC) Case size (ϕ D×L)	6.3 V to 35 V			50 V			63 V			100 V		
	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s) /(100 kHz)	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s) /(100 kHz)	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s) /(100 kHz)	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s) /(100 kHz)
	20 °C	−10 °C		20 °C	−10 °C		20 °C	−10 °C		20 °C	−10 °C	
4 × 7	2.00	5.00	65									
5 × 7	0.950	2.40	120									
6.3 × 7	0.450	1.20	200									
4 × 11	1.30	2.60	120	2.50	5.00	90	3.50	7.00	80			
5 × 11	0.800	1.60	175	*	*	*	2.00	4.00	145	4.10	8.20	80
5 × 15	0.500	1.00	235	0.900	1.80	215	1.30	2.60	200	2.80	5.60	90
6.3 × 11.2	0.350	0.700	290	0.600	1.20	260	1.00	2.00	240	1.80	3.60	114
6.3 × 15	0.250	0.500	400	0.400	0.800	360	0.700	1.40	330	1.10	2.20	155
8 × 11.5	0.117	0.234	555	0.234	0.468	485	0.342	0.684	405	0.680	1.36	260
8 × 15	0.085	0.170	730	0.155	0.310	635	0.230	0.460	535	0.450	0.900	340
8 × 20	0.065	0.130	995	0.120	0.240	860	0.178	0.356	690	0.330	0.660	455
10 × 12.5	0.090	0.180	755	0.162	0.324	615	0.256	0.512	535	0.530	1.06	306
10 × 16	0.068	0.136	1050	0.119	0.238	850	0.194	0.388	600	0.360	0.720	400
10 × 20	0.052	0.104	1220	0.090	0.180	1030	0.147	0.294	885	0.240	0.480	463
10 × 25	0.045	0.090	1440	0.082	0.164	1200	0.130	0.260	1050	0.210	0.420	599
10 × 30	0.035	0.070	1815	0.060	0.120	1610	0.090	0.180	1300	0.150	0.300	698
12.5 × 15	0.065	0.130	1205	0.110	0.220	1150	0.150	0.300	1020	0.230	0.460	511
12.5 × 20	0.038	0.076	1655	0.063	0.126	1480	0.085	0.170	1285	0.180	0.360	671
12.5 × 25	0.030	0.060	1945	0.050	0.100	1832	0.070	0.140	1720	0.110	0.220	807
12.5 × 30	0.025	0.050	2310	0.040	0.080	2215	0.055	0.110	2090	0.098	0.196	937
12.5 × 35	0.022	0.044	2510	0.034	0.068	2285	0.047	0.094	2265	0.087	0.174	1040
12.5 × 40	0.018	0.036	2655	0.030	0.060	2590	0.042	0.084	2560	0.072	0.144	1130
16 × 15	0.043	0.086	1690	0.080	0.160	1610	0.090	0.180	1410	0.140	0.280	793
16 × 20	0.029	0.058	2205	0.048	0.096	1835	0.059	0.118	1765	0.110	0.220	995
16 × 25	0.022	0.044	2555	0.034	0.068	2235	0.050	0.100	2160	0.089	0.178	1170
16 × 31.5	0.018	0.036	3010	0.028	0.056	2700	0.043	0.086	2670	0.062	0.124	1520
16 × 35.5	0.016	0.032	3150	0.025	0.050	2790	0.036	0.072	2770	0.053	0.106	1730
16 × 40	0.015	0.030	3360	0.023	0.046	2845	0.030	0.060	2825	0.047	0.094	1920
18 × 15	0.038	0.076	2000	0.068	0.136	1900	0.086	0.172	1690	0.120	0.240	917
18 × 20	0.028	0.056	2490	0.042	0.084	2420	0.055	0.110	2290	0.080	0.160	1230
18 × 25	0.020	0.040	2740	0.029	0.058	2610	0.043	0.086	2585	0.070	0.140	1420
18 × 31.5	0.016	0.032	3635	0.025	0.050	3000	0.032	0.064	2950	0.062	0.124	1600
18 × 35.5	0.015	0.030	3680	0.023	0.046	3100	0.030	0.060	3095	0.041	0.082	1770
18 × 40	0.014	0.028	3735	—	—	—	0.025	0.050	3205	0.036	0.072	2300

*

Case size (ϕ D×L)	Capacitance (μ F)	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s)/(100 kHz)
		20 °C	−10 °C	
5 × 11	1.0	2.40	4.80	20
	2.2	1.80	3.60	45
	3.3	1.30	2.60	65
	4.7	1.30	2.60	95
	10	1.30	2.60	125
	12	1.30	2.60	135
	15	1.30	2.60	145
	18	1.30	2.60	155
	22	1.30	2.60	155

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	27	4	7	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC0J270()	200	2000
	56	5	7	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC0J560()	200	2000
	68	4	11	120	1.300	1000	0.45	1.5	5.0	2.5	EEUFC0J680()***	200	2000
	100	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC0J101()	200	2000
	120	6.3	7	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC0J121()	200	2000
	150	5	15	235	0.500	1000	0.50	2.0	5.0	2.5	EEUFC0J151()***	200	2000
	220	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J221()	200	2000
	270	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J271()	200	2000
	330	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC0J331S()	200	2000
		6.3	15	400	0.250	1000	0.50	2.5	5.0	2.5	EEUFC0J331()***	200	2000
	390	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC0J391()	200	1000
	470	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC0J471()	200	1000
	560	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC0J561()	200	1000
	820	8	15	730	0.085	2000	0.60	3.5	5.0		EEUFC0J821L()	200	1000
		10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC0J821()	200	500
	1000	10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC0J102()	200	500
	1200	8	20	995	0.065	2000	0.60	3.5	5.0		EEUFC0J122L()	200	1000
		10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC0J122()	200	500
	1500	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC0J152()	200	500
		12.5	15	1205	0.065	5000	0.60	5.0	5.0		EEUFC0J152S()	200	500
	1800	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC0J182()	200	500
	2200	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC0J222()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC0J222S()	100	250
	2700	10	30	1815	0.035	3000	0.60	5.0			EEUFC0J272L	100	
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC0J272()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC0J272S()	100	250
	3300	12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC0J332()	200	500
		18	15	2000	0.038	5000	0.80	7.5	7.5		EEUFC0J332S()	100	250
	3900	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC0J392()	200	500
	4700	12.5	30	2310	0.025	5000	0.80	5.0			EEUFC0J472	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC0J472S()	100	250
	5600	12.5	35	2510	0.022	5000	0.80	5.0			EEUFC0J562L	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC0J562()	100	250
	6800	12.5	40	2655	0.018	5000	0.80	5.0			EEUFC0J682L	100	
		16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC0J682()	100	250
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC0J682S()	100	250
	8200	16	31.5	3010	0.018	5000	0.80	7.5			EEUFC0J822	100	
	10000	16	35.5	3150	0.016	5000	0.80	7.5			EEUFC0J103	100	
		18	25	2740	0.020	5000	0.80	7.5	7.5		EEUFC0J103S()	100	250
	12000	16	40	3360	0.015	5000	0.80	7.5			EEUFC0J123L	100	
		18	31.5	3635	0.016	5000	0.80	7.5			EEUFC0J123	50	
	15000	18	35.5	3680	0.015	5000	0.80	7.5			EEUFC0J153	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 30/Jun/2015

■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
10	22	4	7	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1A220()	200	2000
	39	5	7	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1A390()	200	2000
	47	4	11	120	1.300	1000	0.45	1.5	5.0	2.5	EEUFC1A470()***	200	2000
	82	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1A820()	200	2000
		6.3	7	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1A820()	200	2000
	100	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1A101S()	200	2000
		5	15	235	0.500	1000	0.50	2.0	5.0	2.5	EEUFC1A101()***	200	2000
	150	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A151()	200	2000
	180	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A181()	200	2000
	220	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1A221S()	200	2000
		6.3	15	400	0.250	1000	0.50	2.5	5.0	2.5	EEUFC1A221()***	200	2000
	330	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1A331()	200	1000
	390	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1A391()	200	1000
	470	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1A471()	200	1000
	560	10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1A561()	200	500
	680	8	15	730	0.085	2000	0.60	3.5	5.0		EEUFC1A681L()	200	1000
		10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1A681()	200	500
	820	10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1A821()	200	500
	1000	8	20	995	0.065	2000	0.60	3.5	5.0		EEUFC1A102L()	200	1000
		10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1A102()	200	500
	1200	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1A122()	200	500
		12.5	15	1205	0.065	5000	0.60	5.0	5.0		EEUFC1A122S()	200	500
	1500	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC1A152()	200	500
	1800	12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1A182()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC1A182S()	100	250
	2200	10	30	1815	0.035	3000	0.60	5.0			EEUFC1A222L	100	
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1A222()	200	500
	2700	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1A272()	200	500
		18	15	2000	0.038	5000	0.80	7.5	7.5		EEUFC1A272S()	100	250
	3300	12.5	30	2310	0.025	5000	0.80	5.0			EEUFC1A332	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1A332S()	100	250
	3900	12.5	35	2510	0.022	5000	0.80	5.0			EEUFC1A392L	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1A392()	100	250
	4700	12.5	40	2655	0.018	5000	0.80	5.0			EEUFC1A472L	100	
		16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1A472()	100	250
	5600	16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1A562()	100	250
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1A562S()	100	250
	6800	16	31.5	3010	0.018	5000	0.80	7.5			EEUFC1A682	100	
		18	25	2740	0.020	5000	0.80	7.5	7.5		EEUFC1A682S()	100	250
	8200	16	35.5	3150	0.016	5000	0.80	7.5			EEUFC1A822L	100	
		18	31.5	3635	0.016	5000	0.80	7.5			EEUFC1A822	50	
	10000	18	35.5	3680	0.015	5000	0.80	7.5			EEUFC1A103	50	
	12000	18	40	3735	0.014	5000	0.80	7.5			EEUFC1A123	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
 · Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 30/Jun/2015

■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
16	15	4	7	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1C150()	200	2000
	27	5	7	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1C270()	200	2000
	39	4	11	120	1.30	1000	0.45	1.5	5.0	2.5	EEUFC1C390()***	200	2000
	47	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C470()	200	2000
	56	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C560()	200	2000
		6.3	7	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1C560()	200	2000
	68	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1C680()	200	2000
	82	5	15	235	0.500	1000	0.50	2.0	5.0	2.5	EEUFC1C820()***	200	2000
	100	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1C101()	200	2000
	120	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1C121()	200	2000
	180	6.3	15	400	0.250	1000	0.50	2.5	5.0	2.5	EEUFC1C181()***	200	2000
	220	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1C221()	200	1000
	270	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1C271()	200	1000
	330	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1C331()	200	1000
	390	10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1C391()	200	500
	470	8	15	730	0.085	2000	0.60	3.5	5.0		EEUFC1C471L()	200	1000
		10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1C471()	200	500
	560	10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1C561()	200	500
	680	8	20	995	0.065	2000	0.60	3.5	5.0		EEUFC1C681L()	200	1000
		10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1C681()	200	500
	820	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1C821()	200	500
		12.5	15	1205	0.065	5000	0.60	5.0	5.0		EEUFC1C821S()	200	500
	1000	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1C102S()	200	500
		10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC1C102()	200	500
	1200	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC1C122()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC1C122S()	100	250
	1500	10	30	1815	0.035	3000	0.60	5.0			EEUFC1C152L	100	
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1C152()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC1C152S()	100	250
	1800	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1C182()	200	500
		18	15	2000	0.038	5000	0.80	7.5	7.5		EEUFC1C182S()	100	250
	2200	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1C222()	200	500
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1C222S()	100	250
	2700	12.5	30	2310	0.025	5000	0.80	5.0			EEUFC1C272L	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1C272()	100	250
	3300	12.5	35	2510	0.022	5000	0.80	5.0			EEUFC1C332	100	
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1C332S()	100	250
	3900	16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1C392()	100	250
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1C392S()	100	250
	4700	16	31.5	3010	0.018	5000	0.80	7.5			EEUFC1C472	100	
		18	25	2740	0.020	5000	0.80	7.5	7.5		EEUFC1C472S()	100	250
	5600	16	35.5	3150	0.016	5000	0.80	7.5			EEUFC1C562L	100	
		18	31.5	3635	0.016	5000	0.80	7.5			EEUFC1C562	50	
	6800	16	40	3360	0.015	5000	0.80	7.5			EEUFC1C682	100	
	8200	18	35.5	3680	0.015	5000	0.80	7.5			EEUFC1C822	50	

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· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 30/Jun/2015

Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
25	10	4	7	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1E100()	200	2000
	22	5	7	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1E220()	200	2000
	27	4	11	120	1.30	1000	0.45	1.5	5.0	2.5	EEUFC1E270()***	200	2000
	39	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1E390()	200	2000
		6.3	7	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1E390()	200	2000
	47	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1E470()	200	2000
	56	5	15	235	0.500	1000	0.50	2.0	5.0	2.5	EEUFC1E560()***	200	2000
	82	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1E820()	200	2000
	100	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1E101S()	200	2000
	120	6.3	15	400	0.250	1000	0.50	2.5	5.0	2.5	EEUFC1E121()***	200	2000
	180	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1E181()	200	1000
	220	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1E221()	200	1000
	270	10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1E271()	200	500
	330	8	15	730	0.085	2000	0.60	3.5	5.0		EEUFC1E331L()	200	1000
		10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1E331()	200	500
	390	10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1E391()	200	500
	470	8	20	995	0.065	2000	0.60	3.5	5.0		EEUFC1E471L()	200	1000
		10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1E471()	200	500
	560	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1E561()	200	500
		12.5	15	1205	0.065	5000	0.60	5.0	5.0		EEUFC1E561S()	200	500
	680	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1E681()	200	500
	820	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC1E821()	200	500
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1E821S()	200	500
	1000	10	30	1815	0.035	3000	0.60	5.0			EEUFC1E102L	100	
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1E102()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC1E102S()	100	250
	1200	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1E122()	200	500
		18	15	2000	0.038	5000	0.80	7.5	7.5		EEUFC1E122S()	100	250
	1500	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1E152()	200	500
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1E152S()	100	250
	1800	12.5	30	2310	0.025	5000	0.80	5.0			EEUFC1E182L	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1E182()	100	250
	2200	12.5	35	2510	0.022	5000	0.80	5.0			EEUFC1E222	100	
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1E222S()	100	250
	2700	16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1E272()	100	250
	3300	16	31.5	3010	0.018	5000	0.80	7.5			EEUFC1E332	100	
		18	25	2740	0.020	5000	0.80	7.5	7.5		EEUFC1E332S()	100	250
	3900	16	35.5	3150	0.016	5000	0.80	7.5			EEUFC1E392L	100	
		18	31.5	3635	0.016	5000	0.80	7.5			EEUFC1E392	50	
	4700	18	35.5	3680	0.015	5000	0.80	7.5			EEUFC1E472	50	
	5600	18	40	3735	0.014	5000	0.80	7.5			EEUFC1E562	50	

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■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
35	6.8	4	7	65	2.000	1000	0.45	1.5	5.0	2.5	EEAFC1V6R8()	200	2000
	12	5	7	120	0.950	1000	0.45	2.0	5.0	2.5	EEAFC1V120()	200	2000
	18	4	11	120	1.300	1000	0.45	1.5	5.0	2.5	EEUFC1V180()***	200	2000
	22	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1V220()	200	2000
	27	5	11	175	0.800	1000	0.50	2.0	5.0	2.5	EEUFC1V270()	200	2000
		6.3	7	200	0.450	1000	0.45	2.5	5.0	2.5	EEAFC1V270()	200	2000
	33	5	11	175	0.080	1000	0.50	2.0	5.0	2.5	EEUFC1V330()	200	2000
	39	5	15	235	0.500	1000	0.50	2.0	5.0	2.5	EEUFC1V390()***	200	2000
	47	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V470()	200	2000
	56	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V560()	200	2000
	68	6.3	11.2	290	0.350	1000	0.50	2.5	5.0	2.5	EEUFC1V680()	200	2000
	82	6.3	15	400	0.250	1000	0.50	2.5	5.0	2.5	EEUFC1V820()***	200	2000
	100	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1V101()	200	1000
	120	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1V121()	200	1000
	150	8	11.5	555	0.117	2000	0.60	3.5	5.0		EEUFC1V151()	200	1000
	180	10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1V181()	200	500
	220	8	15	730	0.085	2000	0.60	3.5	5.0		EEUFC1V221L()	200	1000
		10	12.5	755	0.090	3000	0.60	5.0	5.0		EEUFC1V221()	200	500
	270	10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1V271()	200	500
	330	8	20	995	0.065	2000	0.60	3.5	5.0		EEUFC1V331L()	200	1000
		10	16	1050	0.068	3000	0.60	5.0	5.0		EEUFC1V331()	200	500
	390	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1V391()	200	500
		12.5	15	1205	0.065	5000	0.60	5.0	5.0		EEUFC1V391S()	200	500
	470	10	20	1220	0.052	3000	0.60	5.0	5.0		EEUFC1V471()	200	500
	560	10	25	1440	0.045	3000	0.60	5.0	5.0		EEUFC1V561()	200	500
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1V561S()	200	500
	680	10	30	1815	0.035	3000	0.60	5.0			EEUFC1V681L	100	
		12.5	20	1655	0.038	5000	0.60	5.0	5.0		EEUFC1V681()	200	500
		16	15	1690	0.043	5000	0.80	7.5	7.5		EEUFC1V681S()	100	250
	820	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1V821L()	200	500
		18	15	2000	0.038	5000	0.80	7.5	7.5		EEUFC1V821()	100	250
	1000	12.5	25	1945	0.030	5000	0.60	5.0	5.0		EEUFC1V102()	200	500
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1V102S()	100	250
	1200	12.5	30	2310	0.025	5000	0.80	5.0			EEUFC1V122L	100	
		16	20	2205	0.029	5000	0.80	7.5	7.5		EEUFC1V122()	100	250
	1500	12.5	35	2510	0.022	5000	0.80	5.0			EEUFC1V152L	100	
		16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1V152()	100	250
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1V152S()	100	250
	1800	12.5	40	2655	0.018	5000	0.80	5.0			EEUFC1V182L	100	
		16	25	2555	0.022	5000	0.80	7.5	7.5		EEUFC1V182()	100	250
		18	20	2490	0.028	5000	0.80	7.5	7.5		EEUFC1V182S()	100	250
	2200	16	31.5	3010	0.018	5000	0.80	7.5			EEUFC1V222	100	
		18	25	2740	0.020	5000	0.80	7.5	7.5		EEUFC1V222S()	100	250
	2700	16	35.5	3150	0.016	5000	0.80	7.5			EEUFC1V272L	100	
		18	31.5	3635	0.016	5000	0.80	7.5			EEUFC1V272	50	
	3300	18	35.5	3680	0.015	5000	0.80	7.5			EEUFC1V332	50	
	3900	18	40	3735	0.014	5000	0.80	7.5			EEUFC1V392	50	

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■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
50	1.0	5	11	20	2.400	1000	0.50	2.0	5.0	2.5	EEUFC1H1R0()**	200	2000
	2.2	5	11	45	1.800	1000	0.50	2.0	5.0	2.5	EEUFC1H2R2()	200	2000
	3.3	5	11	65	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H3R3()	200	2000
	4.7	5	11	95	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H4R7()	200	2000
	10	4	11	90	2.500	1000	0.45	1.5	5.0	2.5	EEUFC1H100()***	200	2000
		5	11	125	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H100L()	200	2000
	12	5	11	135	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H120()	200	2000
	15	5	11	145	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H150()	200	2000
	18	5	11	155	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H180()	200	2000
	22	5	11	155	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1H220()	200	2000
	27	5	15	215	0.900	1000	0.50	2.0	5.0	2.5	EEUFC1H270()***	200	2000
	33	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H330()	200	2000
	39	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H390()	200	2000
	47	6.3	11.2	260	0.600	1000	0.50	2.5	5.0	2.5	EEUFC1H470()	200	2000
	56	6.3	15	360	0.400	1000	0.50	2.5	5.0	2.5	EEUFC1H560()***	200	2000
	68	8	11.5	485	0.234	2000	0.60	3.5	5.0		EEUFC1H680()	200	1000
	82	8	11.5	485	0.234	2000	0.60	3.5	5.0		EEUFC1H820()	200	1000
	100	10	12.5	615	0.162	3000	0.60	5.0	5.0		EEUFC1H101()	200	500
	120	8	15	635	0.155	2000	0.60	3.5	5.0		EEUFC1H121L()	200	1000
		10	12.5	615	0.162	3000	0.60	5.0	5.0		EEUFC1H121()	200	500
	150	10	16	850	0.119	3000	0.60	5.0	5.0		EEUFC1H151()	200	500
	180	8	20	860	0.120	2000	0.60	3.5	5.0		EEUFC1H181L()	200	1000
		10	16	850	0.119	3000	0.60	5.0	5.0		EEUFC1H181()	200	500
	220	10	20	1030	0.090	3000	0.60	5.0	5.0		EEUFC1H221()	200	500
		12.5	15	1150	0.110	5000	0.60	5.0	5.0		EEUFC1H221S()	200	500
	270	10	25	1200	0.082	3000	0.60	5.0	5.0		EEUFC1H271()	200	500
	330	10	30	1610	0.060	3000	0.60	5.0			EEUFC1H331L	100	
		12.5	20	1480	0.063	5000	0.60	5.0	5.0		EEUFC1H331()	200	500
	390	12.5	20	1480	0.063	5000	0.60	5.0	5.0		EEUFC1H391()	200	500
		16	15	1610	0.080	5000	0.80	7.5	7.5		EEUFC1H391S()	100	250
	470	10	30	1610	0.060	3000	0.60	5.0			EEUFC1H471L	100	
		12.5	25	1832	0.050	5000	0.60	5.0	5.0		EEUFC1H471()	200	500
	560	12.5	25	1832	0.050	5000	0.60	5.0	5.0		EEUFC1H561()	200	500
		18	15	1900	0.068	5000	0.80	7.5	7.5		EEUFC1H561S()	100	250
	680	12.5	30	2215	0.040	5000	0.80	5.0			EEUFC1H681L	100	
		16	20	1835	0.048	5000	0.80	7.5	7.5		EEUFC1H681()	100	250
	820	12.5	35	2285	0.034	5000	0.80	5.0			EEUFC1H821L	100	
		18	20	2420	0.042	5000	0.80	7.5	7.5		EEUFC1H821()	100	250
	1000	12.5	40	2590	0.030	5000	0.80	5.0			EEUFC1H102L	100	
		16	25	2235	0.034	5000	0.80	7.5	7.5		EEUFC1H102()	100	250
	1200	16	31.5	2700	0.028	5000	0.80	7.5			EEUFC1H122	100	
		18	25	2610	0.029	5000	0.80	7.5	7.5		EEUFC1H122S()	100	250
	1500	16	35.5	2790	0.025	5000	0.80	7.5			EEUFC1H152L	100	
	1800	16	40	2845	0.023	5000	0.80	7.5			EEUFC1H182L	100	
		18	31.5	3000	0.025	5000	0.80	7.5			EEUFC1H182	50	
	2200	18	35.5	3100	0.023	5000	0.80	7.5			EEUFC1H222	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
 · Please refer to the page of "Taping Dimensions".

** Please kindly accept last shipment : 31/Mar/2015

*** Please kindly accept last shipment : 30/Jun/2015

■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Dia.	Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)		Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
63	6.8	4	11	80	3.500	1000	0.45	1.5	5.0	2.5	EEUFC1J6R8()***	200	2000
	12	5	11	145	2.000	1000	0.50	2.0	5.0	2.5	EEUFC1J120()	200	2000
	18	5	15	200	1.300	1000	0.50	2.0	5.0	2.5	EEUFC1J180()***	200	2000
	22	6.3	11.2	240	1.000	1000	0.50	2.5	5.0	2.5	EEUFC1J220()	200	2000
	33	6.3	11.2	240	1.000	1000	0.50	2.5	5.0	2.5	EEUFC1J330()	200	2000
	39	6.3	15	330	0.700	1000	0.50	2.5	5.0	2.5	EEUFC1J390()***	200	2000
	47	8	11.5	405	0.342	2000	0.60	3.5	5.0		EEUFC1J470()	200	1000
	56	8	11.5	405	0.342	2000	0.60	3.5	5.0		EEUFC1J560()	200	1000
	68	8	11.5	405	0.342	2000	0.60	3.5	5.0		EEUFC1J680()	200	1000
	82	10	12.5	535	0.256	3000	0.60	5.0	5.0		EEUFC1J820()	200	500
	100	8	15	535	0.230	2000	0.60	3.5	5.0		EEUFC1J101L()	200	1000
		10	12.5	535	0.256	3000	0.60	5.0	5.0		EEUFC1J101()	200	500
	120	10	16	600	0.194	3000	0.60	5.0	5.0		EEUFC1J121()	200	500
	150	8	20	690	0.178	2000	0.60	3.5	5.0		EEUFC1J151()	200	1000
	180	10	20	885	0.147	3000	0.60	5.0	5.0		EEUFC1J181()	200	500
		12.5	15	1020	0.150	5000	0.60	5.0	5.0		EEUFC1J181S()	200	500
	220	10	20	885	0.147	3000	0.60	5.0	5.0		EEUFC1J221X()	200	500
		10	25	1050	0.130	3000	0.60	5.0	5.0		EEUFC1J221()	200	500
		12.5	20	1285	0.085	5000	0.60	5.0	5.0		EEUFC1J221S()	200	500
	270	16	15	1410	0.090	5000	0.80	7.5	7.5		EEUFC1J271()	100	250
	330	10	30	1300	0.090	3000	0.60	5.0			EEUFC1J331L	100	
		12.5	20	1285	0.085	5000	0.60	5.0	5.0		EEUFC1J331()	200	500
	390	12.5	25	1720	0.070	5000	0.60	5.0	5.0		EEUFC1J391()	200	500
		18	15	1690	0.086	5000	0.80	7.5	7.5		EEUFC1J391S()	100	250
	470	12.5	30	2090	0.055	5000	0.80	5.0			EEUFC1J471L	100	
		16	20	1765	0.059	5000	0.80	7.5	7.5		EEUFC1J471()	100	250
	560	16	25	2160	0.050	5000	0.80	7.5	7.5		EEUFC1J561()	100	250
	680	12.5	35	2265	0.047	5000	0.80	5.0			EEUFC1J681L	100	
		16	25	2160	0.050	5000	0.80	7.5	7.5		EEUFC1J681()	100	250
		18	20	2290	0.055	5000	0.80	7.5	7.5		EEUFC1J681S()	100	250
	820	12.5	40	2560	0.042	5000	0.80	5.0			EEUFC1J821L	100	
		16	31.5	2670	0.043	5000	0.80	7.5			EEUFC1J821	100	
		18	25	2585	0.043	5000	0.80	7.5	7.5		EEUFC1J821S()	100	250
	1000	16	31.5	2670	0.043	5000	0.80	7.5			EEUFC1J102U	100	
		16	35.5	2770	0.036	5000	0.80	7.5			EEUFC1J102	100	
	1200	16	40	2825	0.030	5000	0.80	7.5			EEUFC1J122L	100	
		18	31.5	2950	0.032	5000	0.80	7.5			EEUFC1J122	50	
	1500	18	35.5	3095	0.030	5000	0.80	7.5			EEUFC1J152	50	
	1800	18	40	3205	0.025	5000	0.80	7.5			EEUFC1J182	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 30/Jun/2015

■ Standard Products

Endurance : 105 °C $\phi 4$ to $\phi 6.3$ =1000 h, $\phi 8$ =2000 h, $\phi 10$ =3000 h, $\phi 12.5$ to $\phi 18$ =5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B (mm)	Taping *H (mm)			
(V)	(μF)	(mm)	(mm)										
100	5.6	5	11	80	4.10	1000	0.5	2.0	5.0	2.5	EEUFC2A5R6()	200	2000
	8.2	5	15	90	2.80	1000	0.5	2.0	5.0	2.5	EEUFC2A8R2()***	200	2000
	12	6.3	11.2	114	1.80	1000	0.5	2.5	5.0	2.5	EEUFC2A120()	200	2000
	18	6.3	15	155	1.10	1000	0.5	2.5	5.0	2.5	EEUFC2A180()***	200	2000
	22	8	11.5	260	0.680	2000	0.6	3.5	5.0		EEUFC2A220()	200	1000
	33	8	15	340	0.450	2000	0.6	3.5	5.0		EEUFC2A330L()	200	1000
		10	12.5	306	0.530	3000	0.6	5.0	5.0		EEUFC2A330()	200	500
	39	8	20	455	0.330	2000	0.6	5.0	5.0		EEUFC2A390L()	200	1000
		10	16	400	0.360	3000	0.6	5.0	5.0		EEUFC2A390()	200	500
	56	10	20	463	0.240	3000	0.6	5.0	5.0		EEUFC2A560()	200	500
	68	10	25	599	0.210	3000	0.6	5.0	5.0		EEUFC2A680L()	200	500
		12.5	15	511	0.230	5000	0.6	5.0	5.0		EEUFC2A680()	200	500
	100	10	30	698	0.150	3000	0.6	5.0			EEUFC2A101L	100	
		12.5	20	671	0.180	5000	0.6	5.0	5.0		EEUFC2A101()	200	500
	120	16	15	793	0.140	5000	0.8	7.5	7.5		EEUFC2A121S()	100	250
	150	12.5	25	807	0.110	5000	0.6	5.0	5.0		EEUFC2A151()	200	500
		18	15	917	0.120	5000	0.8	7.5	7.5		EEUFC2A151S()	100	250
	180	12.5	30	937	0.098	5000	0.8	5.0			EEUFC2A181L	100	
		16	20	995	0.110	5000	0.8	7.5	7.5		EEUFC2A181()	100	250
	220	12.5	35	1040	0.087	5000	0.8	5.0			EEUFC2A221L	100	
		16	25	1170	0.089	5000	0.8	7.5	7.5		EEUFC2A221()	100	250
	270	12.5	40	1130	0.072	5000	0.8	5.0			EEUFC2A271L	100	
		18	20	1230	0.080	5000	0.8	7.5	7.5		EEUFC2A271S()	100	250
	330	16	31.5	1520	0.062	5000	0.8	7.5			EEUFC2A331	100	
		18	25	1420	0.070	5000	0.8	7.5	7.5		EEUFC2A331S()	100	250
	390	16	35.5	1730	0.053	5000	0.8	7.5			EEUFC2A391L	100	
		18	31.5	1600	0.062	5000	0.8	7.5			EEUFC2A391	50	
	470	16	40	1920	0.047	5000	0.8	7.5			EEUFC2A471	100	
	560	18	35.5	1770	0.041	5000	0.8	7.5			EEUFC2A561	50	
	680	18	40	2300	0.036	5000	0.8	7.5			EEUFC2A681	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

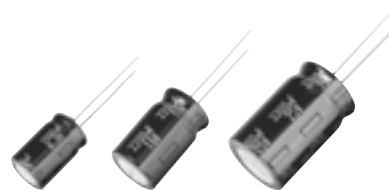
*** Please kindly accept last shipment : 30/Jun/2015

Radial Lead Type

Series: **FK** Type: **A**

■ Features

- Low impedance (10 % to 30 % less than FC Series)
- Miniaturization (30 % to 40 % less than FC Series)
- Endurance : 3000 h to 5000 h at +105 °C
- AEC-Q200 qualified*
- RoHS directive compliant



■ Specifications

Category Temp. Range	-55 °C to +105 °C						
Rated W.V. Range	6.3 V.DC to 35 V.DC						
Nominal Cap. Range	180 μF to 12000 μF						
Capacitance Tolerance	±20 % (120 Hz/+20 °C)						
DC Leakage Current	I ≤ 0.01 CV (μA) After 2 minutes						
tan δ	W.V.	6.3	10	16	25	35	(120 Hz/+20 °C)
	tan δ	0.22	0.19	0.16	0.14	0.12	
	Add 0.02 per 1000 μF for products of 1000 μF or more.						
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified bellow. Duration : ϕ8: 3000 hours , ϕ10: 4000 hours , ϕ12.5 to ϕ18: 5000 hours						
	Capacitance change	±20 % of initial measured value					
	tan δ	≤ 200 % of initial specified value					
	DC leakage current	≤ initial specified value					
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)						

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 35	180 to 330	0.60	0.70	0.85	0.95	1.00
	390 to 1000	0.65	0.75	0.90	0.98	1.00
	1200 to 12000	0.75	0.80	0.95	1.00	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. ϕD	8	10	12.5		16	18
Body Length L	—	—	12.5 to 25	30 to 40	—	—
Lead Dia. ϕd	0.6	0.6	0.6	0.8	0.8	0.8
Lead space F	3.5	5.0	5.0	5.0	7.5	7.5

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 May. 2014

■ Case size/Impedance/Ripple current

Case size (ϕ D×L)	Impedance (Ω)/(100 kHz)		Ripple Current (mA r.m.s.)/(100 kHz)
	+20 °C	−10 °C	+105 °C
8 × 11.5	0.090	0.180	630
8 × 15	0.062	0.124	860
8 × 20	0.044	0.088	1220
10 × 12.5	0.063	0.126	900
10 × 16	0.049	0.098	1240
10 × 20	0.035	0.070	1490
10 × 25	0.033	0.066	1680
10 × 30	0.025	0.050	2140
12.5 × 15	0.048	0.096	1400
12.5 × 20	0.029	0.058	1890
12.5 × 25	0.022	0.044	2280
12.5 × 30	0.018	0.036	2720
12.5 × 35	0.016	0.032	2940
12.5 × 40	0.014	0.028	3010
16 × 15	0.038	0.076	1800
16 × 20	0.026	0.052	2330
16 × 25	0.019	0.038	2760
18 × 15	0.036	0.072	2060
18 × 20	0.025	0.050	2640
18 × 25	0.018	0.036	2850

■ Standard Products

Endurance : 105 °C ϕ 8=3000 h, ϕ 10=4000 h, ϕ 12.5 to ϕ 18=5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space			Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	680	8	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK0J681()	200	1000
	1000	8	15	860	0.062	3000	0.6	3.5	5.0	EEUFK0J102L()	200	1000
		10	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK0J102()	200	500
	1500	8	20	1220	0.044	3000	0.6	3.5	5.0	EEUFK0J152L()	200	1000
		10	16	1240	0.049	4000	0.6	5.0	5.0	EEUFK0J152()	200	500
	1800	12.5	15	1400	0.048	5000	0.6	5.0	5.0	EEUFK0J182S()	200	500
	2200	10	20	1490	0.035	4000	0.6	5.0	5.0	EEUFK0J222()	200	500
		10	25	1680	0.033	4000	0.6	5.0	5.0	EEUFK0J222L()	200	500
	3300	10	30	2140	0.025	4000	0.6	5.0		EEUFK0J332L	100	
		12.5	20	1890	0.029	5000	0.6	5.0	5.0	EEUFK0J332()	200	500
		16	15	1800	0.038	5000	0.8	7.5	7.5	EEUFK0J332S()	100	250
	4700	12.5	25	2280	0.022	5000	0.6	5.0	5.0	EEUFK0J472()	200	500
		18	15	2060	0.036	5000	0.8	7.5	7.5	EEUFK0J472S()	100	250
	5600	12.5	30	2720	0.018	5000	0.8	5.0		EEUFK0J562L	100	
		16	20	2330	0.026	5000	0.8	7.5	7.5	EEUFK0J562S()	100	250
	6800	12.5	35	2940	0.016	5000	0.8	5.0		EEUFK0J682L	100	
	8200	12.5	40	3010	0.014	5000	0.8	5.0		EEUFK0J822L	100	
		16	25	2760	0.019	5000	0.8	7.5	7.5	EEUFK0J822()	100	250
		18	20	2640	0.025	5000	0.8	7.5	7.5	EEUFK0J822S()	100	250
	12000	18	25	2850	0.018	5000	0.8	7.5	7.5	EEUFK0J123S()	100	250
10	560	8	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1A561()	200	1000
	820	8	15	860	0.062	3000	0.6	3.5	5.0	EEUFK1A821L()	200	1000
		10	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1A821()	200	500
	1200	8	20	1220	0.044	3000	0.6	3.5	5.0	EEUFK1A122L()	200	1000
		10	16	1240	0.049	4000	0.6	5.0	5.0	EEUFK1A122()	200	500
	1500	12.5	15	1400	0.048	5000	0.6	5.0	5.0	EEUFK1A152S()	200	500
	1800	10	20	1490	0.035	4000	0.6	5.0	5.0	EEUFK1A182()	200	500
		10	25	1680	0.033	4000	0.6	5.0	5.0	EEUFK1A182L()	200	500
	2700	10	30	2140	0.025	4000	0.6	5.0		EEUFK1A272L	100	
		12.5	20	1890	0.029	5000	0.6	5.0	5.0	EEUFK1A272()	200	500
		16	15	1800	0.038	5000	0.8	7.5	7.5	EEUFK1A272S()	100	250
	3900	12.5	25	2280	0.022	5000	0.6	5.0	5.0	EEUFK1A392()	200	500
		18	15	2060	0.036	5000	0.8	7.5	7.5	EEUFK1A392S()	100	250
	4700	12.5	30	2720	0.018	5000	0.8	5.0		EEUFK1A472L	100	
		16	20	2330	0.026	5000	0.8	7.5	7.5	EEUFK1A472S()	100	250
	5600	12.5	35	2940	0.016	5000	0.8	5.0		EEUFK1A562L	100	
	6800	12.5	40	3010	0.014	5000	0.8	5.0		EEUFK1A682L	100	
		16	25	2760	0.019	5000	0.8	7.5	7.5	EEUFK1A682()	100	250
		18	20	2640	0.025	5000	0.8	7.5	7.5	EEUFK1A682S()	100	250
	8200	18	25	2850	0.018	5000	0.8	7.5	7.5	EEUFK1A822S()	100	250

- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

■ Standard Products

Endurance : 105 °C $\phi 8=3000$ h, $\phi 10=4000$ h, $\phi 12.5$ to $\phi 18=5000$ h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia.	Lead Space			Straight Leads	Taping
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)		(pcs)	(pcs)
16	390	8	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1C391()	200	1000
	680	8	15	860	0.062	3000	0.6	3.5	5.0	EEUFK1C681L()	200	1000
		10	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1C681()	200	500
	820	8	20	1220	0.044	3000	0.6	3.5	5.0	EEUFK1C821L()	200	1000
	1000	10	16	1240	0.049	4000	0.6	5.0	5.0	EEUFK1C102()	200	500
	1200	10	20	1490	0.035	4000	0.6	5.0	5.0	EEUFK1C122()	200	500
		12.5	15	1400	0.048	5000	0.6	5.0	5.0	EEUFK1C122S()	200	500
	1500	10	25	1680	0.033	4000	0.6	5.0	5.0	EEUFK1C152L()	200	500
	2200	10	30	2140	0.025	4000	0.6	5.0		EEUFK1C222L	100	
		12.5	20	1890	0.029	5000	0.6	5.0	5.0	EEUFK1C222()	200	500
		16	15	1800	0.038	5000	0.8	7.5	7.5	EEUFK1C222S()	100	250
	2700	12.5	25	2280	0.022	5000	0.6	5.0	5.0	EEUFK1C272()	200	500
		18	15	2060	0.036	5000	0.8	7.5	7.5	EEUFK1C272S()	100	250
	3300	12.5	30	2720	0.018	5000	0.8	5.0		EEUFK1C332L	100	
	3900	12.5	35	2940	0.016	5000	0.8	5.0		EEUFK1C392L	100	
		16	20	2330	0.026	5000	0.8	7.5	7.5	EEUFK1C392S()	100	250
	4700	12.5	40	3010	0.014	5000	0.8	5.0		EEUFK1C472L	100	
		18	20	2640	0.025	5000	0.8	7.5	7.5	EEUFK1C472S()	100	250
	5600	16	25	2760	0.019	5000	0.8	7.5	7.5	EEUFK1C562()	100	250
	6800	18	25	2850	0.018	5000	0.8	7.5	7.5	EEUFK1C682S()	100	250
25	270	8	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1E271()	200	1000
	390	8	15	860	0.062	3000	0.6	3.5	5.0	EEUFK1E391L()	200	1000
	470	10	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1E471()	200	500
	560	8	20	1220	0.044	3000	0.6	3.5	5.0	EEUFK1E561L()	200	1000
		10	16	1240	0.049	4000	0.6	5.0	5.0	EEUFK1E561()	200	500
	820	10	20	1490	0.035	4000	0.6	5.0	5.0	EEUFK1E821()	200	500
		12.5	15	1400	0.048	5000	0.6	5.0	5.0	EEUFK1E821S()	200	500
	1000	10	25	1680	0.033	4000	0.6	5.0	5.0	EEUFK1E102L()	200	500
	1200	12.5	20	1890	0.029	5000	0.6	5.0	5.0	EEUFK1E122()	200	500
	1500	10	30	2140	0.025	4000	0.6	5.0		EEUFK1E152L	100	
		16	15	1800	0.038	5000	0.8	7.5	7.5	EEUFK1E152S()	100	250
	1800	12.5	25	2280	0.022	5000	0.6	5.0	5.0	EEUFK1E182()	200	500
		18	15	2060	0.036	5000	0.8	7.5	7.5	EEUFK1E182S()	100	250
	2200	12.5	30	2720	0.018	5000	0.8	5.0		EEUFK1E222L	100	
		16	20	2330	0.026	5000	0.8	7.5	7.5	EEUFK1E222S()	100	250
	2700	12.5	35	2940	0.016	5000	0.8	5.0		EEUFK1E272L	100	
	3300	12.5	40	3010	0.014	5000	0.8	5.0		EEUFK1E332L	100	
		16	25	2760	0.019	5000	0.8	7.5	7.5	EEUFK1E332()	100	250
		18	20	2640	0.025	5000	0.8	7.5	7.5	EEUFK1E332S()	100	250
	4700	18	25	2850	0.018	5000	0.8	7.5	7.5	EEUFK1E472S()	100	250

- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

■ Standard Products

Endurance : 105 °C ϕ 8=3000 h, ϕ 10=4000 h, ϕ 12.5 to ϕ 18=5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space			Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)			
35	180	8	11.5	630	0.090	3000	0.6	3.5	5.0	EEUFK1V181()	200	1000
	270	8	15	860	0.062	3000	0.6	3.5	5.0	EEUFK1V271L()	200	1000
		10	12.5	900	0.063	4000	0.6	5.0	5.0	EEUFK1V271()	200	500
	390	8	20	1220	0.044	3000	0.6	3.5	5.0	EEUFK1V391L()	200	1000
		10	16	1240	0.049	4000	0.6	5.0	5.0	EEUFK1V391()	200	500
	560	10	20	1490	0.035	4000	0.6	5.0	5.0	EEUFK1V561()	200	500
		12.5	15	1400	0.048	5000	0.6	5.0	5.0	EEUFK1V561S()	200	500
	680	10	25	1680	0.033	4000	0.6	5.0	5.0	EEUFK1V681L()	200	500
	820	12.5	20	1890	0.029	5000	0.6	5.0	5.0	EEUFK1V821()	200	500
	1000	10	30	2140	0.025	4000	0.6	5.0		EEUFK1V102L	100	
		16	15	1800	0.038	5000	0.8	7.5	7.5	EEUFK1V102S()	100	250
	1200	12.5	25	2280	0.022	5000	0.6	5.0	5.0	EEUFK1V122()	200	500
		18	15	2060	0.036	5000	0.8	7.5	7.5	EEUFK1V122S()	100	250
	1500	12.5	30	2720	0.018	5000	0.8	5.0		EEUFK1V152L	100	
	1800	12.5	35	2940	0.016	5000	0.8	5.0		EEUFK1V182L	100	
		16	20	2330	0.026	5000	0.8	7.5	7.5	EEUFK1V182S()	100	250
	2200	12.5	40	3010	0.014	5000	0.8	5.0		EEUFK1V222L	100	
		16	25	2760	0.019	5000	0.8	7.5	7.5	EEUFK1V222()	100	250
		18	20	2640	0.025	5000	0.8	7.5	7.5	EEUFK1V222S()	100	250
	3300	18	25	2850	0.018	5000	0.8	7.5	7.5	EEUFK1V332S()	100	250

- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

Radial Lead Type

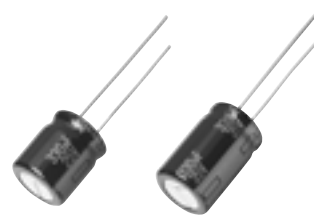
Series: **FM** Type: **A**

■ Features

- Low impedance (40 % to 70 % less than FC Series)
- Endurance : 2000 h to 7000 h at +105 °C
- RoHS directive compliant

■ Attention

Not applicable for automotive



■ Specifications

Category Temp. Range	-40 °C to +105 °C								
Rated W.V. Range	6.3 V.DC to 50 V.DC								
Nominal Cap. Range	22 µF to 6800 µF								
Capacitance Tolerance	±20 % (120 Hz/+20 °C)								
DC Leakage Current	I ≤ 0.01 CV (µA) After 2 minutes								
tan δ	W.V.	6.3	10	16	25	35	50	(max.) (120 Hz/+20 °C)	
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10		
	Add 0.02 per 1000 µF for products of 1000 µF or more.								
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.								
	Duration								
	φ5 to φ6.3 : 2000 hours, φ8×11.5 to φ8×15: 3000 hours								
	φ8×20 to φ10×16 : 4000 hours, φ10×20 to φ12.5×20/ φ16×20: 5000 hours								
	φ12.5×25 to φ12.5×35/ φ16×25 : 7000 hours								
	Capacitance change ±25 % of initial measured value (6.3 V to 10 V : ±30 %)								
	tan δ		≤ 200 % of initial specified value						
	DC leakage current		≤ initial specified value						
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)								

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (µF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 50	22 to 33	0.45	0.55	0.75	0.90	1.00
	47 to 330	0.60	0.70	0.85	0.95	1.00
	390 to 1000	0.65	0.75	0.90	0.98	1.00
	1200 to 6800	0.75	0.80	0.95	1.00	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

Pressure relief $\phi 6.3 \leq$ Sleeve $\phi d \pm 0.05$ 14 min. 3 min. $\phi 8$ $\phi 10 \leq$ $\phi D \pm 0.5$ $F \pm 0.5$ $\phi D \pm 0.5$ * $L \leq 16$: $L \pm 1.5$ $L \geq 20$: $L \pm 2.0$							
Body Dia. ϕD	5	6.3	8	10	12.5	16	
Body Length L	—	—	—	—	12.5 to 25	30 to 40	—
Lead Dia. ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	

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01 May. 2014

■ Case size/Impedance/Ripple current

W.V.(V.DC) Case size (ϕ D×L)	6.3 V to 35 V			50 V		
	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)
	+20 °C	−10 °C	+105 °C	+20 °C	−10 °C	+105 °C
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	0.140	0.460	405
8 × 11.5	0.056	0.168	950	0.061	0.183	870
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.038	0.114	1290	0.042	0.126	1170
10 × 16	0.026	0.078	1790	0.030	0.090	1650
10 × 20	0.019	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	0.022	0.055	2260
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	0.019	0.048	2870
16 × 25	0.014	0.035	3820	0.016	0.040	3320

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia.	Lead Space				Long Lead	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	150	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM0J151()	200	2000
	330	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM0J331()	200	2000
	560	8	11.5	950	0.056	3000	0.6	3.5	5.0		EEUFM0J561()	200	1000
	820	8	15	1240	0.041	3000	0.6	3.5	5.0		EEUFM0J821L()	200	1000
	1000	10	12.5	1290	0.038	4000	0.6	5.0	5.0		EEUFM0J102()	200	500
	1200	8	20	1560	0.030	4000	0.6	3.5	5.0		EEUFM0J122L()	200	1000
		10	16	1790	0.026	4000	0.6	5.0	5.0		EEUFM0J122()	200	500
	1500	10	20	2180	0.019	5000	0.6	5.0	5.0		EEUFM0J152()	200	500
	2200	10	25	2470	0.018	5000	0.6	5.0	5.0		EEUFM0J222L()	200	500
	3300	12.5	20	2600	0.018	5000	0.6	5.0	5.0		EEUFM0J332()	200	500
	3900	12.5	25	3190	0.015	7000	0.6	5.0	5.0		EEUFM0J392()	200	500
	4700	12.5	30	3630	0.013	7000	0.8	5.0			EEUFM0J472L	100	
	5600	12.5	35	3750	0.012	7000	0.8	5.0			EEUFM0J562L	100	
		16	20	3300	0.017	5000	0.8	7.5	7.5		EEUFM0J562S()	100	250
6800	16	25	3820	0.014	7000	0.8	7.5	7.5		EEUFM0J682()	100	250	
10	100	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1A101()	200	2000
	220	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1A221()	200	2000
	470	8	11.5	950	0.056	3000	0.6	3.5	5.0		EEUFM1A471()	200	1000
	680	8	15	1240	0.041	3000	0.6	3.5	5.0		EEUFM1A681L()	200	1000
		10	12.5	1290	0.038	4000	0.6	5.0	5.0		EEUFM1A681()	200	500
	1000	8	20	1560	0.030	4000	0.6	3.5	5.0		EEUFM1A102L()	200	1000
		10	16	1790	0.026	4000	0.6	5.0	5.0		EEUFM1A102()	200	500
	1200	10	20	2180	0.019	5000	0.6	5.0	5.0		EEUFM1A122()	200	500
	1500	10	25	2470	0.018	5000	0.6	5.0	5.0		EEUFM1A152L()	200	500
	2200	12.5	20	2600	0.018	5000	0.6	5.0	5.0		EEUFM1A222()	200	500
	3300	12.5	25	3190	0.015	7000	0.6	5.0	5.0		EEUFM1A332()	200	500
	3900	12.5	30	3630	0.013	7000	0.8	5.0			EEUFM1A392L	100	
		16	20	3300	0.017	5000	0.8	7.5	7.5		EEUFM1A392S()	100	250
	4700	12.5	35	3750	0.012	7000	0.8	5.0			EEUFM1A472L	100	
5600	16	25	3820	0.014	7000	0.8	7.5	7.5		EEUFM1A562()	100	250	
16	68	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1C680()	200	2000
	120	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1C121()	200	2000
	330	8	11.5	950	0.056	3000	0.6	3.5	5.0		EEUFM1C331()	200	1000
	470	8	15	1240	0.041	3000	0.6	3.5	5.0		EEUFM1C471L()	200	1000
		10	12.5	1290	0.038	4000	0.6	5.0	5.0		EEUFM1C471()	200	500
	680	8	20	1560	0.030	4000	0.6	3.5	5.0		EEUFM1C681L()	200	1000
		10	16	1790	0.026	4000	0.6	5.0	5.0		EEUFM1C681()	200	500
	1000	10	20	2180	0.019	5000	0.6	5.0	5.0		EEUFM1C102()	200	500
	1200	10	25	2470	0.018	5000	0.6	5.0	5.0		EEUFM1C122L()	200	500
	1500	12.5	20	2600	0.018	5000	0.6	5.0	5.0		EEUFM1C152()	200	500
	2200	12.5	25	3190	0.015	7000	0.6	5.0	5.0		EEUFM1C222()	200	500
	2700	12.5	30	3630	0.013	7000	0.8	5.0			EEUFM1C272L	100	
		16	20	3300	0.017	5000	0.8	7.5	7.5		EEUFM1C272S()	100	250
	3300	12.5	35	3750	0.012	7000	0.8	5.0			EEUFM1C332L	100	
3900	16	25	3820	0.014	7000	0.8	7.5	7.5		EEUFM1C392()	100	250	

· When requesting taped product, please put the letter "B" of "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
· Please refer to the page of "Taping Dimensions".

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01 May. 2014

Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia.	Lead Space				Long Lead	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
25	47	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1E470()	200	2000
	100	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1E101()	200	2000
	220	8	11.5	950	0.056	3000	0.6	3.5	5.0		EEUFM1E221()	200	1000
	330	8	15	1240	0.041	3000	0.6	3.5	5.0		EEUFM1E331L()	200	1000
		10	12.5	1290	0.038	4000	0.6	5.0	5.0		EEUFM1E331()	200	500
	470	8	20	1560	0.030	4000	0.6	3.5	5.0		EEUFM1E471L()	200	1000
		10	16	1790	0.026	4000	0.6	5.0	5.0		EEUFM1E471()	200	500
	680	10	20	2180	0.019	5000	0.6	5.0	5.0		EEUFM1E681()	200	500
	820	10	25	2470	0.018	5000	0.6	5.0	5.0		EEUFM1E821L()	200	500
	1000	12.5	20	2600	0.018	5000	0.6	5.0	5.0		EEUFM1E102()	200	500
	1500	12.5	25	3190	0.015	7000	0.6	5.0	5.0		EEUFM1E152()	200	500
	1800	12.5	30	3630	0.013	7000	0.8	5.0			EEUFM1E182L	100	
		16	20	3300	0.017	5000	0.8	7.5	7.5		EEUFM1E182S()	100	250
	2200	12.5	35	3750	0.012	7000	0.8	5.0			EEUFM1E222L	100	
	2700	16	25	3820	0.014	7000	0.8	7.5	7.5		EEUFM1E272()	100	250
35	33	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFM1V330()	200	2000
	68	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFM1V680()	200	2000
	150	8	11.5	950	0.056	3000	0.6	3.5	5.0		EEUFM1V151()	200	1000
	220	8	15	1240	0.041	3000	0.6	3.5	5.0		EEUFM1V221L()	200	1000
		10	12.5	1290	0.038	4000	0.6	5.0	5.0		EEUFM1V221()	200	500
	330	8	20	1560	0.030	4000	0.6	3.5	5.0		EEUFM1V331L()	200	1000
		10	16	1790	0.026	4000	0.6	5.0	5.0		EEUFM1V331()	200	500
	470	10	20	2180	0.019	5000	0.6	5.0	5.0		EEUFM1V471()	200	500
	560	10	25	2470	0.018	5000	0.6	5.0	5.0		EEUFM1V561L()	200	500
	680	12.5	20	2600	0.018	5000	0.6	5.0	5.0		EEUFM1V681()	200	500
	1000	12.5	25	3190	0.015	7000	0.6	5.0	5.0		EEUFM1V102()	200	500
	1200	12.5	30	3630	0.013	7000	0.8	5.0			EEUFM1V122L	100	
		16	20	3300	0.017	5000	0.8	7.5	7.5		EEUFM1V122S()	100	250
	1500	12.5	35	3750	0.012	7000	0.8	5.0			EEUFM1V152L	100	
	1800	16	25	3820	0.014	7000	0.8	7.5	7.5		EEUFM1V182()	100	250
50	22	5	11	250	0.340	2000	0.5	2.0	5.0	2.5	EEUFM1H220()	200	2000
	56	6.3	11.2	405	0.140	2000	0.5	2.5	5.0	2.5	EEUFM1H560()	200	2000
	100	8	11.5	870	0.061	3000	0.6	3.5	5.0		EEUFM1H101()	200	1000
	120	8	15	1140	0.045	3000	0.6	3.5	5.0		EEUFM1H121L()	200	1000
	150	10	12.5	1170	0.042	4000	0.6	5.0	5.0		EEUFM1H151()	200	500
	180	8	20	1430	0.033	4000	0.6	3.5	5.0		EEUFM1H181L()	200	1000
	220	10	16	1650	0.030	4000	0.6	5.0	5.0		EEUFM1H221()	200	500
	270	10	20	1890	0.023	5000	0.6	5.0	5.0		EEUFM1H271()	200	500
	330	10	25	2150	0.022	5000	0.6	5.0	5.0		EEUFM1H331L()	200	500
	470	12.5	20	2260	0.022	5000	0.6	5.0	5.0		EEUFM1H471()	200	500
	560	12.5	25	2660	0.018	7000	0.6	5.0	5.0		EEUFM1H561()	200	500
	680	12.5	30	3160	0.016	7000	0.8	5.0			EEUFM1H681L	100	
	820	12.5	35	3270	0.014	7000	0.8	5.0			EEUFM1H821L	100	
		16	20	2870	0.019	5000	0.8	7.5	7.5		EEUFM1H821S()	100	250
	1000	16	25	3320	0.016	7000	0.8	7.5	7.5		EEUFM1H102()	100	250

· When requesting taped product, please put the letter "B" of "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
· Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 May. 2014

Radial Lead Type

Series: **FR** Type: **A**

■ Features

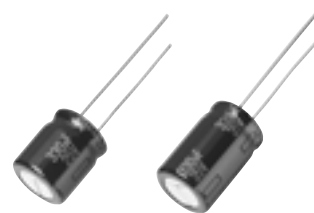
- Low ESR (Same as FM Series)
- Endurance : 5000 h to 10000 h at +105 °C
- RoHS directive compliant

■ Attention

Not applicable for automotive

■ Country of origin

Malaysia



■ Specifications

Specifications									
Category Temp. Range	-40 °C to +105 °C								
Rated W.V. Range	6.3 V.DC to 63 V.DC								
Nominal Cap. Range	4.7 μF to 8200 μF								
Capacitance Tolerance	±20 % (120 Hz/+20 °C)								
DC Leakage Current	I ≤ 0.01 CV (μA) After 2 minutes								
tan δ	W.V.	6.3	10	16	25	35	50	63	(120 Hz/+20 °C)
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	
	Add 0.02 per 1000 μF for products of 1000 μF or more.								
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration φ5×11/ φ6.3×11.2 : 5000 hours φ8×11.5/ φ10×12.5 : 6000 hours (* Only EEUF1V331U (φ10×12.5) 5000 hours) φ8×15/ φ10×16 : 8000 hours, φ8×20 : 9000 hours φ10×20 to φ10×25/ φ12.5×20 to φ12.5×35/ φ16×20 to φ16×25 : 10000 hours								
	Capacitance change	±25 % of initial measured value (6.3 V to 10 V : ±30 %)							
	tan δ	≤ 200 % of initial specified value							
	DC leakage current	≤ initial specified value							
	Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 63	4.7 to 33	0.45	0.55	0.75	0.90	1.00
	47 to 330	0.60	0.70	0.85	0.95	1.00
	390 to 1000	0.65	0.75	0.90	0.98	1.00
	1200 to 8200	0.75	0.80	0.95	1.00	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

* $L \leq 16$: $L \pm 1.5$ $L \geq 20$: $L \pm 2.0$							
Body Dia. ϕD	5	6.3	8	10	12.5	16	
Body Length L	—	—	—	—	12.5 to 25	30 to 35	—
Lead Dia. ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

05 May. 2014

■ Case size/Impedance/Ripple current

W.V.(V.DC) Case size (ϕ D×L)	6.3 V to 35 V			50 V		
	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)
	+20 °C	−10 °C	+105 °C	+20 °C	−10 °C	+105 °C
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	0.140	0.460	405
8 × 11.5	0.056	0.168	950	0.061	0.183	870
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.043	0.114	1290	0.042	0.126	1170
10 × 16	0.028	0.078	1790	0.030	0.090	1650
10 × 20	0.020	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	0.022	0.055	2260
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	0.019	0.048	2870
16 × 25	0.014	0.035	3820	0.016	0.040	3320

W.V.(V.DC) Case size (ϕ D×L)	63 V		
	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)
	+20 °C	−10 °C	+105 °C
5 × 11	0.510	2.040	175
6.3 × 11.2	0.210	0.840	284
8 × 11.5	0.092	0.368	566
8 × 15	0.068	0.272	741
8 × 20	0.050	0.200	930
10 × 12.5	0.063	0.252	761
10 × 16	0.045	0.180	1073
10 × 20	0.035	0.140	1229
10 × 25	0.033	0.132	1500
12.5 × 20	0.033	0.125	1582
12.5 × 25	0.027	0.092	1995
12.5 × 30	0.024	0.082	2528
12.5 × 35	0.021	0.071	2780
16 × 20	0.029	0.093	2153
16 × 25	0.024	0.074	2988

■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight (mm)	Taping *B (mm)	Taping *H (mm)			
6.3	150	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR0J151()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J221()	200	2000
	330	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J331()	200	2000
	470	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J471()	200	2000
	820	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR0J821()	200	1000
	1000	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR0J102()	200	1000
	1200	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR0J122L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR0J122()	200	500
	1500	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR0J152L()	200	1000
	1800	10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR0J182()	200	500
	2200	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR0J222()	200	500
	2700	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR0J272L()	200	500
	3300	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR0J332L()	200	500
	3900	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR0J392()	200	500
	4700	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR0J472()	200	500
	5600	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR0J562L	100	
	6800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR0J682L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR0J682S()	100	250
	8200	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR0J822()	100	250
10	100	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A101()	200	2000
	150	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A151()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A221()	200	2000
	270	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A271()	200	2000
	470	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1A471()	200	1000
	680	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1A681()	200	1000
	820	10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1A821()	200	500
	1000	10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1A102()	200	500
		8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1A102L()	200	1000
	1500	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1A152L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1A152()	200	500
	1800	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1A182()	200	500
	2200	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1A222L()	200	500
	3300	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1A332()	200	500
	3900	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1A392()	200	500
	4700	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1A472L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1A472S()	100	250
	5600	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1A562L	100	
	6800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1A682L	100	
16		25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1A682()	100	250	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
· Please refer to the page of "Taping Dimensions".

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)			
16	68	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C680()	200	2000
	100	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C101()	200	2000
	120	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C121()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C221()	200	2000
	470	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1C471()	200	1000
	680	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1C681L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1C681()	200	500
	1000	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1C102L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1C102()	200	500
	1500	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1C152()	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1C152L()	200	500
	1800	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1C182L()	200	500
	2200	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1C222()	200	500
	2700	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1C272()	200	500
	3300	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1C332L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1C332S()	100	250
	3900	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1C392L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1C392S()	100	250
	4700	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1C472L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1C472()	100	250
	5600	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1C562()	100	250
25	47	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E470()	200	2000
	68	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E680()	200	2000
	100	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E101()	200	2000
	150	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E151()	200	2000
	220	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1E221()	200	1000
	330	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1E331()	200	1000
	390	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1E391L()	200	1000
	470	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1E471Y()	200	1000
		8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E471L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1E471()	200	500
	560	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E561L()	200	1000
	680	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E681L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1E681()	200	500
	820	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1E821()	200	500
	1000	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1E102()	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1E102L()	200	500
	1200	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1E122L()	200	500
	1500	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1E152()	200	500
	1800	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1E182()	200	500
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E182S()	100	250
	2200	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1E222L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E222S()	100	250
	2700	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1E272L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E272S()	100	250
	3300	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1E332()	100	250

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
· Please refer to the page of "Taping Dimensions".

■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight (mm)	Taping *B (mm)	Taping *H (mm)			
35	33	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1V330()	200	2000
	68	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1V680()	200	2000
	100	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V101()	200	1000
	180	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V181()	200	1000
	220	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V221()	200	1000
	270	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1V271L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1V271()	200	500
	330	10	12.5	1330	0.043	5000	0.6	5.0	5.0		EEUFR1V331U()	200	500
	390	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1V391L()	200	1000
	470	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1V471L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1V471()	200	500
	560	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1V561()	200	500
	680	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1V681()	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1V681L()	200	500
	820	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1V821L()	200	500
	1000	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1V102()	200	500
	1200	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1V122()	200	500
	1500	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1V152L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1V152S()	100	250
	1800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1V182L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1V182()	100	250
	2200	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1V222L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1V222()	100	250
50	4.7	5	11	185	0.620	5000	0.5	2.0	5.0	2.5	EEUFR1H4R7()	200	2000
	10	5	11	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H100()	200	2000
	22	5	11	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H220()	200	2000
	47	6.3	11.2	405	0.140	5000	0.5	2.5	5.0		EEUFR1H470()	200	2000
	56	6.3	11.2	405	0.140	5000	0.5	2.5	5.0	2.5	EEUFR1H560()	200	2000
	100	8	11.5	870	0.061	6000	0.6	3.5	5.0		EEUFR1H101()	200	1000
	120	8	15	1140	0.045	8000	0.6	3.5	5.0		EEUFR1H121L()	200	1000
	150	10	12.5	1170	0.042	6000	0.6	5.0	5.0		EEUFR1H151()	200	500
	180	8	20	1430	0.033	9000	0.6	3.5	5.0		EEUFR1H181L()	200	1000
	220	10	16	1650	0.030	8000	0.6	5.0	5.0		EEUFR1H221()	200	500
	270	10	20	1890	0.023	10000	0.6	5.0	5.0		EEUFR1H271()	200	500
	330	10	25	2150	0.022	10000	0.6	5.0	5.0		EEUFR1H331L()	200	500
	470	12.5	20	2260	0.022	10000	0.6	5.0	5.0		EEUFR1H471()	200	500
	560	12.5	25	2660	0.018	10000	0.6	5.0	5.0		EEUFR1H561()	200	500
	680	12.5	30	3160	0.016	10000	0.8	5.0			EEUFR1H681L	100	
	820	12.5	35	3270	0.014	10000	0.8	5.0			EEUFR1H821L	100	
		16	20	2870	0.019	10000	0.8	7.5	7.5		EEUFR1H821S()	100	250
	1000	16	25	3320	0.016	10000	0.8	7.5	7.5		EEUFR1H102()	100	250
63	18	5	11	175	0.510	5000	0.5	2.0	5.0	2.5	EEUFR1J180()	200	2000
	47	6.3	11.2	284	0.210	5000	0.5	2.5	5.0	2.5	EEUFR1J470()	200	2000
	82	8	11.5	566	0.092	6000	0.6	3.5	5.0		EEUFR1J820()	200	1000
	100	8	15	741	0.068	8000	0.6	3.5	5.0		EEUFR1J101L()	200	1000
		10	12.5	761	0.063	6000	0.6	5.0	5.0		EEUFR1J101()	200	500
	120	8	20	930	0.050	9000	0.6	3.5	5.0		EEUFR1J121L()	200	1000
		10	16	1073	0.045	8000	0.6	5.0	5.0		EEUFR1J121()	200	500
	150	8	20	930	0.050	9000	0.6	3.5	5.0		EEUFR1J151L()	200	1000
		10	16	1073	0.045	8000	0.6	5.0	5.0		EEUFR1J151()	200	500
	180	10	20	1229	0.035	10000	0.6	5.0	5.0		EEUFR1J181()	200	500
	220	10	25	1500	0.033	10000	0.6	5.0	5.0		EEUFR1J221L()	200	500
		10	20	1229	0.035	10000	0.6	5.0	5.0		EEUFR1J271U()	200	500
	270	10	25	1500	0.033	10000	0.6	5.0	5.0		EEUFR1J271L()	200	500
		12.5	20	1582	0.033	10000	0.6	5.0	5.0		EEUFR1J271()	200	500
	330	12.5	20	1582	0.033	10000	0.6	5.0	5.0		EEUFR1J331()	200	500
	390	12.5	25	1995	0.027	10000	0.6	5.0	5.0		EEUFR1J391()	200	500
	470	12.5	25	1995	0.027	10000	0.6	5.0	5.0		EEUFR1J471()	200	500
	560	12.5	30	2528	0.024	10000	0.8	5.0			EEUFR1J561L	100	
		16	20	2153	0.029	10000	0.8	7.5	7.5		EEUFR1J561S()	100	250
	680	12.5	35	2780	0.021	10000	0.8	5.0			EEUFR1J681L	100	
	820	16	25	2988	0.024	10000	0.8	7.5	7.5		EEUFR1J821()	100	250

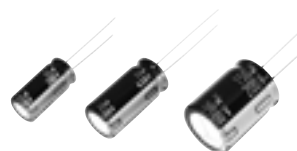
· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
· Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

05 May. 2014

Radial Lead Type

Series: **EB** Type: **A**



■ Features

- Endurance : +105 °C 5000 h to 10000 h
- Hight ripple high frequency (Hight Voltage)
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to +105 °C	-25 °C to +105 °C
Rated W.V. Range	10 V.DC to 63 V.DC	160 V.DC to 450 V.DC
Nominal Cap. Range	2.2 μF to 3300 μF	10 μF to 330 μF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes application of rated working voltage at +20 °C (Whichever is greater)	
tan δ	Please see the attached standard products list	
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restord to 20 °C, the capacitors shall meet the limits specified below.	
	(10 to 63 V.DC) Duration : ϕ5×11 to ϕ8×11.5 : 5000 hours ϕ8×15 to ϕ12.5×25 : 10000 hours	
	Capacitance change	±30 % of initial measured value
	tan δ	≤ 300 % of initial specified value
	DC leakage current	≤ initial specified value
	(160 to 450 V.DC) Duration : 5000 hours	
	Capacitance change	±20 % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	≤ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

■ Frequency correction factor for ripple current (10 ~ 63 V.DC)

Capacitance (μF)	Frequency (Hz)				
	60	120	1 k	10 k	100 k
2.2 to 10	0.75	1.00	1.40	1.55	1.65
22 to 470	0.85	1.00	1.20	1.25	1.30
1000 to 3300	0.95	1.00	1.05	1.10	1.15

W. V. (V. DC)	Frequency (Hz)			
	120	1 k	10 k to 30k	30 k to 100k
160 to 250	0.55	0.85	0.90	1.00
350 to 450	0.50	0.80	0.90	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. ϕD	5	6.3	8	10	12.5	16	18
Lead Dia. ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

03 Jun. 2014

■ Standard Products

Endurance : 105 °C $\phi 5 \times 11$ to $\phi 8 \times 11.5 = 5000$ h, $\phi 5 \times 15$ to $\phi 6.3 \times 15 = 7000$ h, $\phi 8 \times 15$ to $\phi 12.5 \times 25 = 10000$ h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)			(mm)	(mm)	(mm)	(mm)			
10	100	5	15	105	0.30	7000	0.5	2.0	5.0	2.5	EEUEB1A101()***	200	2000
		5	11	66	0.30	5000	0.5	2.0	5.0	2.5	EEUEB1A101S()	200	2000
	220	6.3	15	152	0.30	7000	0.5	2.5	5.0	2.5	EEUEB1A221()***	200	2000
		6.3	11.2	100	0.30	5000	0.5	2.5	5.0	2.5	EEUEB1A221S()	200	2000
	470	8	15	278	0.30	10000	0.6	3.5	5.0		EEUEB1A471()	200	1000
		8	11.5	180	0.30	5000	0.6	3.5	5.0		EEUEB1A471S()	200	1000
	2200	12.5	20	540	0.32	10000	0.6	5.0	5.0		EEUEB1A222()	200	500
	3300	12.5	25	802	0.34	10000	0.6	5.0	5.0		EEUEB1A332()	200	500
16	1000	10	20	430	0.25	10000	0.6	5.0	5.0		EEUEB1C102()	200	500
	2200	12.5	25	706	0.27	10000	0.6	5.0	5.0		EEUEB1C222()	200	500
25	47	5	15	78	0.22	7000	0.5	2.0	5.0	2.5	EEUEB1E470()***	200	2000
		5	11	55	0.22	5000	0.5	2.0	5.0	2.5	EEUEB1E470S()	200	2000
	100	6.3	15	135	0.22	7000	0.5	2.5	5.0	2.5	EEUEB1E101()***	200	2000
		6.3	11.2	95	0.22	5000	0.5	2.5	5.0	2.5	EEUEB1E101S()	200	2000
	220	8	11.5	125	0.22	5000	0.6	3.5	5.0		EEUEB1E221S()	200	1000
	330	8	15	255	0.22	10000	0.6	3.5	5.0		EEUEB1E331()	200	1000
	470	10	16	321	0.22	10000	0.6	5.0	5.0		EEUEB1E471()	200	500
	1000	12.5	20	498	0.22	10000	0.6	5.0	5.0		EEUEB1E102()	200	500
35	33	5	15	66	0.18	7000	0.5	2.0	5.0	2.5	EEUEB1V330()***	200	2000
		5	11	46	0.18	5000	0.5	2.0	5.0	2.5	EEUEB1V330S()	200	2000
	220	8	15	197	0.18	10000	0.6	3.5	5.0		EEUEB1V221()	200	1000
	330	10	16	278	0.18	10000	0.6	5.0	5.0		EEUEB1V331()	200	500
	470	10	20	349	0.18	10000	0.6	5.0	5.0		EEUEB1V471()	200	500
	1000	12.5	25	586	0.18	10000	0.6	5.0	5.0		EEUEB1V102()	200	500
50	0.47	5	11	4	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1HR47S()**	200	2000
	1	5	11	8	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H1R0S()**	200	2000
	2.2	5	11	15	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H2R2S()	200	2000
	3.3	5	11	18	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H3R3S()	200	2000
	4.7	5	11	18	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H4R7S()	200	2000
	10	5	11	27	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H100S()	200	2000
	22	5	15	55	0.15	7000	0.5	2.0	5.0	2.5	EEUEB1H220()***	200	2000
		5	11	39	0.15	5000	0.5	2.0	5.0	2.5	EEUEB1H220S()	200	2000
	47	6.3	15	87	0.15	7000	0.5	2.5	5.0	2.5	EEUEB1H470()***	200	2000
		6.3	11.2	61	0.15	5000	0.5	2.5	5.0	2.5	EEUEB1H470S()	200	2000
	100	8	11.5	99	0.15	5000	0.6	3.5	5.0		EEUEB1H101S()	200	1000
	220	10	16	234	0.15	10000	0.6	5.0	5.0		EEUEB1H221()	200	500
	330	10	20	293	0.15	10000	0.6	5.0	5.0		EEUEB1H331()	200	500
	470	12.5	20	370	0.15	10000	0.6	5.0	5.0		EEUEB1H471()	200	500
63	0.47	5	15	6	0.12	7000	0.5	2.0	5.0	2.5	EEUEB1JR47()**	200	2000
		5	11	4.5	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1JR47S()**	200	2000
	1	5	15	12	0.12	7000	0.5	2.0	5.0	2.5	EEUEB1J1R0()**	200	2000
		5	11	9	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J1R0S()**	200	2000
	2.2	5	11	16.5	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J2R2S()	200	2000
	3.3	5	15	30	0.12	7000	0.5	2.0	5.0	2.5	EEUEB1J3R3()***	200	2000
		5	11	20	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J3R3S()	200	2000
	4.7	5	15	30	0.12	7000	0.5	2.0	5.0	2.5	EEUEB1J4R7()***	200	2000
		5	11	23	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J4R7S()	200	2000
	10	5	15	46	0.12	7000	0.5	2.0	5.0	2.5	EEUEB1J100()***	200	2000
		5	11	30	0.12	5000	0.5	2.0	5.0	2.5	EEUEB1J100S()	200	2000
	22	6.3	15	55	0.12	7000	0.5	2.5	5.0	2.5	EEUEB1J220()***	200	2000
		6.3	11.2	40	0.12	5000	0.5	2.5	5.0	2.5	EEUEB1J220S()	200	2000
	33	6.3	15	71	0.12	7000	0.5	2.5	5.0	2.5	EEUEB1J330()***	200	2000
		6.3	11.2	50	0.12	5000	0.5	2.5	5.0	2.5	EEUEB1J330S()	200	2000
	47	8	15	94	0.12	10000	0.6	3.5	5.0		EEUEB1J470()	200	1000
		8	11.5	80	0.12	5000	0.6	3.5	5.0		EEUEB1J470S()	200	1000
	100	8	15	180	0.12	10000	0.6	3.5	5.0		EEUEB1J101()	200	1000
	220	10	20	292	0.12	10000	0.6	5.0	5.0		EEUEB1J221()	200	500
	330	12.5	20	381	0.12	10000	0.6	5.0	5.0		EEUEB1J331()	200	500
	470	12.5	25	454	0.12	10000	0.6	5.0	5.0		EEUEB1J471()	200	500

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

** Please kindly accept last shipment : 31/Mar/2015

*** Please kindly accept last shipment : 30/Jun/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Standard Products

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia.	Lead Space			Straight Leads	Taping
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(120 Hz) (+20 °C)	(hours)	(mm)	(mm)	(mm)		(pcs)	(pcs)
160	22	10	20	470	0.15	5000	0.6	5.0	5.0	EEUEB2C220()	200	500
	33	10	20	470	0.15	5000	0.6	5.0	5.0	EEUEB2C330()	200	500
	47	12.5	20	600	0.15	5000	0.6	5.0	5.0	EEUEB2C470()	200	500
	68	12.5	25	750	0.15	5000	0.6	5.0	5.0	EEUEB2C680()	200	500
		16	20	750	0.15	5000	0.8	7.5	7.5	EEUEB2C680S()	100	250
	100	16	25	1060	0.15	5000	0.8	7.5	7.5	EEUEB2C101()	100	250
		18	20	1060	0.15	5000	0.8	7.5	7.5	EEUEB2C101S()	100	250
	150	16	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2C151	100	—
		18	25	1280	0.15	5000	0.8	7.5	7.5	EEUEB2C151S()	100	250
	220	16	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2C221	100	—
		18	25	1280	0.15	5000	0.8	7.5	7.5	EEUEB2C221S()	100	250
330	18	31.5	1690	0.15	5000	0.8	7.5	—	EEUEB2C331	50	—	
200	22	10	20	470	0.15	5000	0.6	5.0	5.0	EEUEB2D220()	200	500
	33	12.5	20	600	0.15	5000	0.6	5.0	5.0	EEUEB2D330()	200	500
	47	12.5	20	600	0.15	5000	0.6	5.0	5.0	EEUEB2D470()	200	500
	68	12.5	25	750	0.15	5000	0.6	5.0	5.0	EEUEB2D680()	200	500
		16	20	750	0.15	5000	0.8	7.5	7.5	EEUEB2D680S()	100	250
	100	16	25	1060	0.15	5000	0.8	7.5	7.5	EEUEB2D101()	100	250
		18	20	1060	0.15	5000	0.8	7.5	7.5	EEUEB2D101S()	100	250
	150	16	31.5	1280	0.15	5000	0.8	7.5	—	EEUEB2D151	100	—
		18	25	1280	0.15	5000	0.8	7.5	7.5	EEUEB2D151S()	100	250
	220	18	31.5	1690	0.15	5000	0.8	7.5	—	EEUEB2D221	50	—
250	22	12.5	20	560	0.15	5000	0.6	5.0	5.0	EEUEB2E220()	200	500
	33	12.5	20	560	0.15	5000	0.6	5.0	5.0	EEUEB2E330()	200	500
	47	12.5	25	710	0.15	5000	0.6	5.0	5.0	EEUEB2E470()	200	500
		16	20	710	0.15	5000	0.8	7.5	7.5	EEUEB2E470S()	100	250
	68	16	25	990	0.15	5000	0.8	7.5	7.5	EEUEB2E680()	100	250
		18	20	990	0.15	5000	0.8	7.5	7.5	EEUEB2E680S()	100	250
	100	16	31.5	1200	0.15	5000	0.8	7.5	—	EEUEB2E101	100	—
		18	25	1200	0.15	5000	0.8	7.5	7.5	EEUEB2E101S()	100	250
	150	18	31.5	1470	0.15	5000	0.8	7.5	—	EEUEB2E151	50	—
350	10	10	20	270	0.20	5000	0.6	5.0	5.0	EEUEB2V100()	200	500
	22	12.5	20	350	0.20	5000	0.6	5.0	5.0	EEUEB2V220()	200	500
	33	16	20	480	0.20	5000	0.8	7.5	7.5	EEUEB2V330S()	100	250
	47	16	25	640	0.20	5000	0.8	7.5	7.5	EEUEB2V470()	100	250
		18	20	640	0.20	5000	0.8	7.5	7.5	EEUEB2V470S()	100	250
	68	16	31.5	780	0.20	5000	0.8	7.5	—	EEUEB2V680	100	—
		18	25	780	0.20	5000	0.8	7.5	7.5	EEUEB2V680S()	100	250
	100	18	31.5	970	0.20	5000	0.8	7.5	—	EEUEB2V101	50	—
400	10	10	20	250	0.24	5000	0.6	5.0	5.0	EEUEB2G100()	200	500
	22	12.5	25	410	0.24	5000	0.6	5.0	5.0	EEUEB2G220()	200	500
		16	20	410	0.24	5000	0.8	7.5	7.5	EEUEB2G220S()	100	250
	33	16	25	600	0.24	5000	0.8	7.5	7.5	EEUEB2G330()	100	250
		18	20	600	0.24	5000	0.8	7.5	7.5	EEUEB2G330S()	100	250
	47	16	31.5	730	0.24	5000	0.8	7.5	—	EEUEB2G470	100	—
		18	25	730	0.24	5000	0.8	7.5	7.5	EEUEB2G470S()	100	250
450	10	12.5	20	310	0.24	5000	0.6	5.0	5.0	EEUEB2W100()	200	500
	22	16	25	560	0.24	5000	0.8	7.5	7.5	EEUEB2W220()	100	250
		18	20	560	0.24	5000	0.8	7.5	7.5	EEUEB2W220S()	100	250
	33	16	31.5	680	0.24	5000	0.8	7.5	—	EEUEB2W330()	100	—
		18	25	680	0.24	5000	0.8	7.5	7.5	EEUEB2W330S()	100	250
	47	18	31.5	850	0.24	5000	0.8	7.5	—	EEUEB2W470	50	—

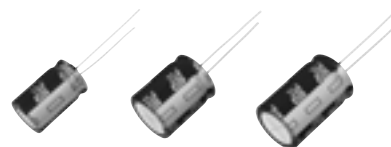
- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

Radial Lead Type

Series: **EE** Type: **A**

■ Features

- High ripple current (at high frequency):
40 % higher than ED Series
- Endurance: 105 °C 8000 h to 10000 h
- RoHS directive compliant



■ Specifications

Category Temp. Range	-25 °C to + 105 °C							
Rated W.V. Range	160 V .DC to 450 V .DC							
Nominal Cap. Range	10 µF to 330 µF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.06 CV +10 (µA) After 2 minutes							
tan δ	W.V.	160	200	250	350	400	450	(120 Hz/+20 °C)
	tan δ	0.15	0.15	0.15	0.20	0.24	0.24	
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration ϕ10 : 8000 hours ϕ12.5 to ϕ18 : 10000 hours							
	Capacitance change	±20 % of initial measured value						
	tan δ	≤ 200 % of initial specified value						
	DC leakage current	≤ initial specified value						
	Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)						

■ Frequency correction factor for ripple current

W. V. (V. DC)	Cap. (µF)	Frequency (Hz)					
		60 ≤	120 ≤	300 ≤	1 k ≤	10 k ≤	100 k ≤
160 to 450	10 to 82	0.25	0.35	0.50	0.65	0.90	1.00
	100 to 330	0.30	0.40	0.55	0.70	0.90	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. ϕD	10	12.5	16	18
Lead Dia. ϕd	0.6	0.6	0.8	0.8
Lead space F	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Case size/Ripple current

Cap. (μ F)	160 V			200 V		
	Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C		Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C	
		120 Hz	100 kHz		120 Hz	100 kHz
22	10 × 20	245	700	10 × 20	300	850
33	10 × 20	280	810	10 × 20	320	920
47	10 × 20	370	1065	12.5 × 20	385	1100
68	12.5 × 20	470	1350	12.5 × 25 16 × 20S	465 465	1330 1330
82	12.5 × 25	520	1480	16 × 20S	510	1460
100	12.5 × 25 16 × 20S	660 680	1660 1700	16 × 25 18 × 20S	690 670	1730 1665
150	16 × 25 18 × 20S	755 730	1890 1820	16 × 25	740	1860
220	16 × 31.5 18 × 25S	910 780	2280 1950	18 × 31.5	1175	2600
330	18 × 31.5	1040	2600	18 × 40	1250	3120

Cap. (μ F)	250 V			350 V		
	Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C		Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C	
		120 Hz	100 kHz		120 Hz	100 kHz
15				10 × 20	170	480
22	10 × 20	275	785	12.5 × 20	230	660
33	12.5 × 20	350	995	12.5 × 25 16 × 20S	275 315	790 900
47	12.5 × 25 16 × 20S	450 490	1290 1400	16 × 25 18 × 20S	375 375	1070 1070
68	16 × 20S	490	1400	16 × 31.5 18 × 25S	535 465	1530 1330
82	16 × 25 18 × 20S	590 590	1680 1680	18 × 25S	535	1530
100	16 × 31.5 18 × 25S	840 840	2100 2100	18 × 31.5	640	1600
150	18 × 31.5	1010	2520			
220	18 × 40	1175	2940			

Cap. (μ F)	400 V			450 V		
	Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C		Case size (ϕ D×L)	Ripple current (mA r.m.s.) 105 °C	
		120 Hz	100 kHz		120 Hz	100 kHz
10	10 × 20	150	430	10 × 20U 12.5 × 20	115 170	330 490
15	12.5 × 20	205	590	12.5 × 25	270	780
22	12.5 × 25 16 × 20S	265 300	760 860	16 × 20S	330	945
33	16 × 20S	355	1020	16 × 25 18 × 20S	350 350	1000 1000
47	16 × 25 18 × 20S	410 410	1180 1180	16 × 31.5 18 × 25S	420 420	1200 1200
56				18 × 31.5	480	1380
68	18 × 25	515	1470	18 × 40	630	1800
82	18 × 31.5	575	1645			
100	18 × 40	825	2060			

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

Endurance : 105 °C ϕ 10=8000 h, ϕ 12.5 to ϕ 18=10000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space			Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)					(mm)	(mm)			
160	22	10	20	700	0.15	8000	0.6	5.0	5.0	EEUEE2C220()	200	500
	33	10	20	810	0.15	8000	0.6	5.0	5.0	EEUEE2C330()	200	500
	47	10	20	1065	0.15	8000	0.6	5.0	5.0	EEUEE2C470()	200	500
	68	12.5	20	1350	0.15	10000	0.6	5.0	5.0	EEUEE2C680()	200	500
	82	12.5	25	1480	0.15	10000	0.6	5.0	5.0	EEUEE2C820()	200	500
	100	12.5	25	1660	0.15	10000	0.6	5.0	5.0	EEUEE2C101()	200	500
		16	20	1700	0.15	10000	0.8	7.5	7.5	EEUEE2C101S()	100	250
	150	16	25	1890	0.15	10000	0.8	7.5	7.5	EEUEE2C151()	100	250
		18	20	1820	0.15	10000	0.8	7.5	7.5	EEUEE2C151S()	100	250
	220	16	31.5	2280	0.15	10000	0.8	7.5		EEUEE2C221	100	
		18	25	1950	0.15	10000	0.8	7.5	7.5	EEUEE2C221S()	100	250
	330	18	31.5	2600	0.15	10000	0.8	7.5		EEUEE2C331	50	
200	22	10	20	850	0.15	8000	0.6	5.0	5.0	EEUEE2D220()	200	500
	33	10	20	920	0.15	8000	0.6	5.0	5.0	EEUEE2D330()	200	500
	47	12.5	20	1100	0.15	10000	0.6	5.0	5.0	EEUEE2D470()	200	500
	68	12.5	25	1330	0.15	10000	0.6	5.0	5.0	EEUEE2D680()	200	500
		16	20	1330	0.15	10000	0.8	7.5	7.5	EEUEE2D680S()	100	250
	82	16	20	1460	0.15	10000	0.8	7.5	7.5	EEUEE2D820S()	100	250
	100	16	25	1730	0.15	10000	0.8	7.5	7.5	EEUEE2D101()	100	250
		18	20	1665	0.15	10000	0.8	7.5	7.5	EEUEE2D101S()	100	250
	150	16	25	1860	0.15	10000	0.8	7.5	7.5	EEUEE2D151()	100	250
	220	18	31.5	2600	0.15	10000	0.8	7.5		EEUEE2D221	50	
	330	18	40	3120	0.15	10000	0.8	7.5		EEUEE2D331	50	
	250	22	10	20	785	0.15	8000	0.6	5.0	5.0	EEUEE2E220()	200
33		12.5	20	995	0.15	10000	0.6	5.0	5.0	EEUEE2E330()	200	500
47		12.5	25	1290	0.15	10000	0.6	5.0	5.0	EEUEE2E470()	200	500
		16	20	1400	0.15	10000	0.8	7.5	7.5	EEUEE2E470S()	100	250
68		16	20	1400	0.15	10000	0.8	7.5	7.5	EEUEE2E680S()	100	250
82		16	25	1680	0.15	10000	0.8	7.5	7.5	EEUEE2E820()	100	250
		18	20	1680	0.15	10000	0.8	7.5	7.5	EEUEE2E820S()	100	250
100		16	31.5	2100	0.15	10000	0.8	7.5		EEUEE2E101	100	
		18	25	2100	0.15	10000	0.8	7.5	7.5	EEUEE2E101S()	100	250
150		18	31.5	2520	0.15	10000	0.8	7.5		EEUEE2E151	50	
220		18	40	2940	0.15	10000	0.8	7.5		EEUEE2E221	50	
350		15	10	20	480	0.20	8000	0.6	5.0	5.0	EEUEE2V150()	200
	22	12.5	20	660	0.20	10000	0.6	5.0	5.0	EEUEE2V220()	200	500
	33	12.5	25	790	0.20	10000	0.6	5.0	5.0	EEUEE2V330()	200	500
		16	20	900	0.20	10000	0.8	7.5	7.5	EEUEE2V330S()	100	250
	47	16	25	1070	0.20	10000	0.8	7.5	7.5	EEUEE2V470()	100	250
		18	20	1070	0.20	10000	0.8	7.5	7.5	EEUEE2V470S()	100	250
	68	16	31.5	1530	0.20	10000	0.8	7.5		EEUEE2V680	100	
		18	25	1330	0.20	10000	0.8	7.5	7.5	EEUEE2V680S()	100	250
	82	18	25	1530	0.20	10000	0.8	7.5	7.5	EEUEE2V820S()	100	250
	100	18	31.5	1600	0.20	10000	0.8	7.5		EEUEE2V101	50	

· When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.

· Please refer to the page of "Taping Dimensions".

■ Standard Products

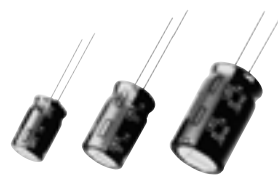
Endurance : 105 °C ϕ 10=8000 h, ϕ 12.5 to ϕ 18=10000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia.	Lead Space			Straight Leads	Taping
								Straight	Taping *B			
(V)	(μF)	(mm)	(mm)				(mm)	(mm)	(mm)		(pcs)	(pcs)
400	10	10	20	430	0.24	8000	0.6	5.0	5.0	EEUEE2G100()	200	500
	15	12.5	20	590	0.24	10000	0.6	5.0	5.0	EEUEE2G150()	200	500
	22	12.5	25	760	0.24	10000	0.6	5.0	5.0	EEUEE2G220()	200	500
		16	20	860	0.24	10000	0.8	7.5	7.5	EEUEE2G220S()	100	250
	33	16	20	1020	0.24	10000	0.8	7.5	7.5	EEUEE2G330S()	100	250
	47	16	25	1180	0.24	10000	0.8	7.5	7.5	EEUEE2G470()	100	250
		18	20	1180	0.24	10000	0.8	7.5	7.5	EEUEE2G470S()	100	250
	68	18	25	1470	0.24	10000	0.8	7.5	7.5	EEUEE2G680()	100	250
	82	18	31.5	1645	0.24	10000	0.8	7.5		EEUEE2G820	50	
100	18	40	2060	0.24	10000	0.8	7.5		EEUEE2G101	50		
450	10	10	20	330	0.24	8000	0.6	5.0	5.0	EEUEE2W100U()	200	500
		12.5	20	490	0.24	10000	0.6	5.0	5.0	EEUEE2W100()	200	500
	15	12.5	25	780	0.24	10000	0.6	5.0	5.0	EEUEE2W150()	200	500
	22	16	20	945	0.24	10000	0.8	7.5	7.5	EEUEE2W220S()	100	250
	33	16	25	1000	0.24	10000	0.8	7.5	7.5	EEUEE2W330()	100	250
		18	20	1000	0.24	10000	0.8	7.5	7.5	EEUEE2W330S()	100	250
	47	16	31.5	1200	0.24	10000	0.8	7.5		EEUEE2W470	100	
		18	25	1200	0.24	10000	0.8	7.5	7.5	EEUEE2W470S()	100	250
	56	18	31.5	1380	0.24	10000	0.8	7.5		EEUEE2W560	50	
	68	18	40	1800	0.24	10000	0.8	7.5		EEUEE2W680	50	

- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

Radial Lead Type

Series: **TA** Type: **A**



■ Features

- Endurance: 125 °C 2000 h
- Heat cycle: 1000 cycle -40 °C to +125 °C
- AEC-Q200 qualified*
- RoHS directive compliant

■ Specifications

Category Temp. Range	-40 °C to + 125 °C								
Rated W.V. Range	10 V .DC to 63 V .DC								
Nominal Cap. Range	2.2 μF to 4700 μF								
Capacitance Tolerance	±20 % (120 Hz/+20 °C)								
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)								
tan δ	W.V.(V)	10	16	25	35	50	63	(120Hz / +20 °C)	
	tan δ	0.20	0.16	0.14	0.12	0.10	0.09		
	For capacitance value ≥ 1000 μF , add 0.02 per every 1000 μF.								
Endurance	After following life test with DC voltage and +125 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), for 2000 hours, when the capacitors are restored to 20 °C, the capacitors, shall meet the limits specified below.								
	Capacitance change	±30% of initial measured value							
	tan δ	≤ 300 % of initial specified value							
	DC leakage current	≤ initial specified value							
Shelf Life	After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)								

■ Frequency correction factor for ripple current

W.V. (V.DC)	Cap. (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
10 to 63	1 to 330	0.55	0.65	0.85	0.90	1.00
	470 to 1000	0.70	0.75	0.90	0.95	1.00
	2200 to 4700	0.75	0.80	0.90	0.95	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

* L≤16 : L±1.0 (φ16×15, φ18×15 : L±1.5) L≥20 : L±2.0					
Body Dia. φD	8	10	12.5	16	18
Lead Dia. φd	0.6	0.6	0.6	0.8	0.8
Lead space F	3.5	5.0	5.0	7.5	7.5

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

Endurance : 125 °C 2000 h

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Lead Dia.	Lead Space			Straight Leads	Taping
							Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(mm)	(mm)	(mm)		(pcs)	(pcs)
10	330	8	11.5	500	0.130	0.6	3.5	5.0	EEUTA1A331()	200	1000
	470	10	12.5	680	0.100	0.6	5.0	5.0	EEUTA1A471()	200	500
	1000	10	20	1100	0.057	0.6	5.0	5.0	EEUTA1A102()	200	500
		12.5	15	1085	0.070	0.6	5.0	5.0	EEUTA1A102S()	200	500
	2200	12.5	25	1750	0.033	0.6	5.0	5.0	EEUTA1A222L()	200	500
		16	20	1985	0.032	0.8	7.5	7.5	EEUTA1A222()	100	250
		18	15	1800	0.042	0.8	7.5	7.5	EEUTA1A222S()	100	250
	3300	16	25	2300	0.024	0.8	7.5	7.5	EEUTA1A332()	100	250
		18	20	2250	0.031	0.8	7.5	7.5	EEUTA1A332S()	100	250
	4700	16	31.5	2710	0.020	0.8	7.5		EEUTA1A472	100	
		18	25	2470	0.022	0.8	7.5	7.5	EEUTA1A472S()	100	250
16	220	8	11.5	500	0.130	0.6	3.5	5.0	EEUTA1C221()	200	1000
	330	10	12.5	680	0.100	0.6	5.0	5.0	EEUTA1C331()	200	500
	470	10	16	945	0.075	0.6	5.0	5.0	EEUTA1C471()	200	500
	1000	12.5	20	1490	0.042	0.6	5.0	5.0	EEUTA1C102()	200	500
		16	15	1520	0.047	0.8	7.5	7.5	EEUTA1C102S()	100	250
	2200	16	25	2300	0.024	0.8	7.5	7.5	EEUTA1C222()	100	250
		18	20	2250	0.031	0.8	7.5	7.5	EEUTA1C222S()	100	250
	3300	16	31.5	2710	0.020	0.8	7.5		EEUTA1C332	100	
		18	25	2470	0.022	0.8	7.5	7.5	EEUTA1C332S()	100	250
	4700	18	31.5	3270	0.018	0.8	7.5		EEUTA1C472	50	
25	100	8	11.5	500	0.130	0.6	3.5	5.0	EEUTA1E101()	200	1000
	220	10	12.5	680	0.100	0.6	5.0	5.0	EEUTA1E221()	200	500
	330	10	16	945	0.075	0.6	5.0	5.0	EEUTA1E331()	200	500
	470	10	20	1100	0.057	0.6	5.0	5.0	EEUTA1E471()	200	500
		12.5	15	1085	0.070	0.6	5.0	5.0	EEUTA1E471S()	200	500
	1000	12.5	25	1750	0.033	0.6	5.0	5.0	EEUTA1E102L()	200	500
		16	20	1985	0.032	0.8	7.5	7.5	EEUTA1E102()	100	250
		18	15	1800	0.042	0.8	7.5	7.5	EEUTA1E102S()	100	250
	2200	16	31.5	2710	0.020	0.8	7.5		EEUTA1E222	100	
		18	25	2470	0.022	0.8	7.5	7.5	EEUTA1E222S()	100	250
	3300	18	35.5	3310	0.017	0.8	7.5		EEUTA1E332	50	
35	100	10	12.5	555	0.180	0.6	5.0	5.0	EEUTA1V101()	200	500
	220	10	16	765	0.130	0.6	5.0	5.0	EEUTA1V221()	200	500
	330	10	20	930	0.100	0.6	5.0	5.0	EEUTA1V331()	200	500
	470	12.5	20	1330	0.070	0.6	5.0	5.0	EEUTA1V471()	200	500
		16	15	1450	0.088	0.8	7.5	7.5	EEUTA1V471S()	100	250
	1000	16	25	2010	0.037	0.8	7.5	7.5	EEUTA1V102()	100	250
		18	20	2180	0.046	0.8	7.5	7.5	EEUTA1V102S()	100	250
	2200	18	35.5	2790	0.025	0.8	7.5		EEUTA1V222	50	

- When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.
- Please refer to the page of "Taping Dimensions".

■ Standard Products

Endurance : 125 °C 2000 h

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length			Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	Imped- ance (100 kHz) (+20 °C) (Ω)	Lead Dia.	Lead Space			Straight Leads	Taping
							Straight	Taping *B			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(mm)	(mm)	(mm)		(pcs)	(pcs)
50	1	8	11.5	35	2.00	0.6	3.5	5.0	EEUTA1H1R0()***	200	1000
	10	8	11.5	180	0.950	0.6	3.5	5.0	EEUTA1H100()	200	1000
	22	8	11.5	250	0.650	0.6	3.5	5.0	EEUTA1H220()	200	1000
	33	8	11.5	300	0.450	0.6	3.5	5.0	EEUTA1H330()	200	1000
	47	8	11.5	440	0.350	0.6	3.5	5.0	EEUTA1H470S()	200	1000
	100	10	12.5	555	0.180	0.6	5.0	5.0	EEUTA1H101()	200	500
	220	10	20	930	0.100	0.6	5.0	5.0	EEUTA1H221()	200	500
	330	12.5	20	1330	0.070	0.6	5.0	5.0	EEUTA1H331()	200	500
		16	15	1450	0.088	0.8	7.5	7.5	EEUTA1H331S()	100	250
	470	12.5	25	1650	0.055	0.6	5.0	5.0	EEUTA1H471L()	200	500
		16	20	1650	0.053	0.8	7.5	7.5	EEUTA1H471()	100	250
		18	15	1710	0.075	0.8	7.5	7.5	EEUTA1H471S()	100	250
	1000	16	31.5	2430	0.031	0.8	7.5		EEUTA1H102	100	
		18	25	2350	0.032	0.8	7.5	7.5	EEUTA1H102S()	100	250
63	22	8	11.5	310	0.470	0.6	3.5	5.0	EEUTA1J220()	200	1000
	33	10	12.5	410	0.360	0.6	5.0	5.0	EEUTA1J330()	200	500
	47	10	16	460	0.270	0.6	5.0	5.0	EEUTA1J470()	200	500
	100	10	20	680	0.205	0.6	5.0	5.0	EEUTA1J101()	200	500
	220	12.5	25	1325	0.100	0.6	5.0	5.0	EEUTA1J221L()	200	500
		16	20	1360	0.085	0.8	7.5	7.5	EEUTA1J221()	100	250
		18	15	1300	0.120	0.8	7.5	7.5	EEUTA1J221S()	100	250
	330	16	25	1660	0.070	0.8	7.5	7.5	EEUTA1J331()	100	250
		18	20	1760	0.077	0.8	7.5	7.5	EEUTA1J331S()	100	250
	470	16	31.5	2055	0.060	0.8	7.5		EEUTA1J471	100	
		18	25	1990	0.060	0.8	7.5	7.5	EEUTA1J471S()	100	250

· When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.

· Please refer to the page of "Taping Dimensions".

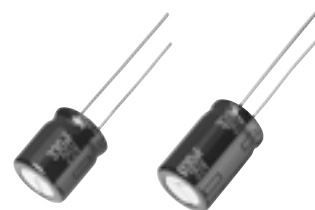
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Radial Lead Type

Series: **TP** Type: **A**

■ Features

- Endurance: 125 °C 2000 h to 5000 h or 135 °C 1000 h to 2000 h
- Smaller than series TA
- High ripple current (at high frequency) : 20 to 40% higher than TA series
- AEC-Q200 qualified*
- RoHS directive compliant



■ Specifications

Category Temp. Range	-40 °C to + 135 °C			
Rated W.V. Range	25 V .DC to 35 V .DC			
Nominal Cap. Range	100 μF to 5100 μF			
Capacitance Tolerance	±20 % (120 Hz/+20 °C)			
DC Leakage Current	I ≤ 0.01 CV After 2 minutes			
tan δ	W.V.(V)	25	35	(120Hz / +20 °C)
	tan δ	0.14	0.12	
	For capacitance value ≥ 1000 μF , add 0.02 per every 1000 μF.			
Endurance 1	After following life test with DC voltage and +125 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration φ8 : 2000 hours, φ10 : 3000 hours, φ12.5 : 4000 hours, φ16 to φ18 : 5000 hours			
	Capacitance change	±30% of initial measured value		
	tan δ	≤ 300 % of initial specified value		
	DC leakage current	≤ initial specified value		
	Endurance 2	After following life test with DC voltage and +135 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration φ8 : 1000 hours, φ10 to φ18 : 2000 hours		
Capacitance change		±30% of initial measured value		
tan δ		≤ 300 % of initial specified value		
DC leakage current		≤ initial specified value		
Shelf Life 1		After storage for 1000 hours at +125 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)		
Shelf Life 2	After storage for 1000 hours at +135 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)			

■ Frequency correction factor for ripple current

W.V. (V.DC)	Cap. (µF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
25 to 35	to 330	0.55	0.65	0.85	0.90	1.00
	390 to 1000	0.70	0.75	0.90	0.95	1.00
	1200 to	0.75	0.80	0.90	0.95	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. øD	8	10	12.5	16	18
Lead Dia. ød	0.6	0.6	0.6	0.8	0.8
Lead space F	3.5	5.0	5.0	7.5	7.5

* This product qualify for AEC-Q200, but it has some deviations.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification						Lead Length			Part No. *: Substandard (E24series numbers)	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (100 kHz) (+125 °C) (mA r.m.s.)	Ripple Current (100 kHz) (+135 °C) (mA r.m.s.)	E.S.R (100 kHz) (+20 °C) (Ω)	tan δ (120 kHz) (+20 °C)	125 °C Endurance (hours)	135 °C Endurance (hours)	Lead Dia. (mm)	Lead Space			Straight Leads (pcs)	Taping (pcs)
											Straight	Taping *B			
(V)	(μF)	(mm)	(mm)								(mm)	(mm)			
25	220	10	12.5	580	500	0.190	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E221()	200	500
	330	10	16	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E331()	200	500
	470	8	20	1060	760	0.067	0.14	2000	1000	0.6	3.5	5.0	EEUTP1E471L()	200	1000
		10	16	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E471()	200	500
	510	10	16	1100	945	0.130	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E511()*	200	500
	820	10	20	1540	1100	0.052	0.14	3000	2000	0.6	5.0	5.0	EEUTP1E821()	200	500
	1000	12.5	20	1860	1490	0.038	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E102()	200	500
	1200	12.5	20	1860	1490	0.038	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E122()	200	500
	1800	12.5	25	2180	1750	0.030	0.14	4000	2000	0.6	5.0	5.0	EEUTP1E182()	200	500
		16	20	2380	1985	0.029	0.14	5000	2000	0.8	7.5	7.5	EEUTP1E182S()	100	250
	2000	16	20	2380	1985	0.029	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E202S()*	100	250
	2200	16	25	2760	2300	0.022	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E222()	100	250
		18	20	2700	2250	0.028	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E222S()	100	250
	2700	16	25	2760	2300	0.022	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E272()	100	250
		18	20	2700	2250	0.028	0.16	5000	2000	0.8	7.5	7.5	EEUTP1E272S()	100	250
	3300	16	31.5	3250	2710	0.018	0.18	5000	2000	0.8	7.5		EEUTP1E332	100	
		18	25	2960	2470	0.020	0.18	5000	2000	0.8	7.5	7.5	EEUTP1E332S()	100	250
	3900	16	31.5	3250	2710	0.018	0.18	5000	2000	0.8	7.5		EEUTP1E392	100	
		18	25	2960	2470	0.020	0.18	5000	2000	0.8	7.5	7.5	EEUTP1E392S()	100	250
	4700	18	31.5	3480	2900	0.016	0.20	5000	2000	0.8	7.5		EEUTP1E472	50	
	5100	18	31.5	3480	2900	0.016	0.22	5000	2000	0.8	7.5		EEUTP1E512*	50	
35	100	10	12.5	580	500	0.190	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V101()	200	500
	120	10	12.5	580	500	0.190	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V121()	200	500
	220	8	20	1060	760	0.067	0.12	2000	1000	0.6	3.5	5.0	EEUTP1V221L()	200	1000
		10	16	1100	945	0.130	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V221()	200	500
	270	8	20	1060	760	0.067	0.12	2000	1000	0.6	3.5	5.0	EEUTP1V271L()	200	1000
		10	16	1100	945	0.130	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V271()	200	500
	330	10	20	1540	1100	0.052	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V331()	200	500
	390	10	20	1540	1100	0.052	0.12	3000	2000	0.6	5.0	5.0	EEUTP1V391()	200	500
	470	12.5	20	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V471()	200	500
	560	12.5	20	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V561()	200	500
	620	12.5	20	1860	1490	0.038	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V621()*	200	500
	820	12.5	25	2180	1750	0.030	0.12	4000	2000	0.6	5.0	5.0	EEUTP1V821()	200	500
	1000	16	20	2380	1985	0.029	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V102()	100	250
	1200	16	20	2380	1985	0.029	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V122()	100	250
	1500	16	25	2760	2300	0.022	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V152()	100	250
		18	20	2700	2250	0.028	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V152S()	100	250
	1600	16	25	2760	2300	0.022	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V162()*	100	250
	1800	16	31.5	3250	2710	0.018	0.12	5000	2000	0.8	7.5		EEUTP1V182	100	
		18	25	2960	2470	0.020	0.12	5000	2000	0.8	7.5	7.5	EEUTP1V182S()	100	250
	2000	16	31.5	3250	2710	0.018	0.14	5000	2000	0.8	7.5		EEUTP1V202*	100	
		18	25	2960	2470	0.020	0.14	5000	2000	0.8	7.5	7.5	EEUTP1V202S()*	100	250
	2200	18	31.5	3480	2900	0.016	0.14	5000	2000	0.8	7.5		EEUTP1V222	50	
	2700	18	31.5	3480	2900	0.016	0.14	5000	2000	0.8	7.5		EEUTP1V272	50	

· When requesting taped product, please put the letter "B" between the "()". Lead wire pitch *B=5 mm, 7.5 mm.

· Please refer to the page of "Taping Dimensions".

Radial Lead Type

Series: **NHG** Type: **A**

■ Features

- Endurance : 105 °C 1000 h to 2000 h
- RoHS directive compliant



■ Specifications

Category Temp. Range	-55 °C to +105 °C	-25 °C to +105 °C
Rated W.V. Range	6.3 V.DC to 100 V.DC	160 V.DC to 450 V.DC
Nominal Cap. Range	2.2 μF to 22000 μF	1 μF to 330 μF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Which is greater)	$I \leq 0.06 CV + 10$ (μA) After 2 minutes
tan δ	Please see the attached standard products list	
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), When the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.	
	Duration : 6.3 V.DC to 100 V.DC : (φ5 to φ8)=1000 hours, (φ10 to φ18)=2000 hours 160 V.DC to 450 V.DC : 2000 hours	
	Capacitance change	±20 % of initial measured value
	tan δ	≤ 200 % of initial specified value
Shelf Life	DC leakage current	≤ initial specified value
	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap. (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 100	2.2 to 33	0.75	1.00	1.55	1.80	2.00
	47 to 470	0.80	1.00	1.35	1.50	1.50
	1000 to 22000	0.85	1.00	1.10	1.15	1.15
160 to 450	1 to 330	0.80	1.00	1.35	1.50	1.50

■ Dimensions in mm (not to scale)

(Unit : mm)

* L≤16 : L±1.0 L≥20 : L±2.0							
Body Dia. φD	5	6.3	8	10	12.5	16	18
Lead Dia. φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	220	5	11	140	0.28	1000	0.5	2.0	5.0	2.5	ECA0JHG221()	200	2000
	470	6.3	11.2	230	0.28	1000	0.5	2.5	5.0	2.5	ECA0JHG471()	200	2000
	1000	8	11.5	380	0.28	1000	0.6	3.5	5.0		ECA0JHG102()	200	1000
	2200	10	16	710	0.30	2000	0.6	5.0	5.0		ECA0JHG222()	200	500
	3300	10	20	840	0.32	2000	0.6	5.0	5.0		ECA0JHG332()	200	500
	4700	12.5	20	1090	0.34	2000	0.6	5.0	5.0		ECA0JHG472()	200	500
	6800	12.5	25	1350	0.38	2000	0.6	5.0	5.0		ECA0JHG682()	200	500
	10000	16	25	1650	0.46	2000	0.8	7.5	7.5		ECA0JHG103()	100	250
	15000	16	31.5	2010	0.56	2000	0.8	7.5			ECA0JHG153	100	
22000	18	35.5	2350	0.70	2000	0.8	7.5			ECA0JHG223	50		
10	330	6.3	11.2	200	0.24	1000	0.5	2.5	5.0	2.5	ECA1AHG331()	200	2000
	470	8	11.5	250	0.24	1000	0.6	3.5	5.0		ECA1AHG471()	200	1000
	1000	10	12.5	460	0.24	2000	0.6	5.0	5.0		ECA1AHG102()	200	500
	2200	10	20	760	0.26	2000	0.6	5.0	5.0		ECA1AHG222()	200	500
	3300	12.5	20	1000	0.28	2000	0.6	5.0	5.0		ECA1AHG332()	200	500
	4700	12.5	25	1260	0.30	2000	0.6	5.0	5.0		ECA1AHG472()	200	500
	6800	16	25	1570	0.34	2000	0.8	7.5	7.5		ECA1AHG682()	100	250
	10000	16	31.5	1890	0.42	2000	0.8	7.5			ECA1AHG103	100	
	15000	18	35.5	2180	0.52	2000	0.8	7.5			ECA1AHG153	50	
16	100	5	11	110	0.20	1000	0.5	2.0	5.0	2.5	ECA1CHG101()	200	2000
	220	6.3	11.2	180	0.20	1000	0.5	2.5	5.0	2.5	ECA1CHG221()	200	2000
	330	8	11.5	260	0.20	1000	0.6	3.5	5.0		ECA1CHG331()	200	1000
	470	8	11.5	310	0.20	1000	0.6	3.5	5.0		ECA1CHG471()	200	1000
	1000	10	16	560	0.20	2000	0.6	5.0	5.0		ECA1CHG102()	200	500
	2200	12.5	20	920	0.22	2000	0.6	5.0	5.0		ECA1CHG222()	200	500
	3300	12.5	25	1170	0.24	2000	0.6	5.0	5.0		ECA1CHG332()	200	500
	4700	16	25	1480	0.26	2000	0.8	7.5	7.5		ECA1CHG472()	100	250
	6800	16	31.5	1780	0.30	2000	0.8	7.5			ECA1CHG682	100	
10000	18	35.5	2060	0.38	2000	0.8	7.5			ECA1CHG103	50		
25	47	5	11	91	0.16	1000	0.5	2.0	5.0	2.5	ECA1EHG470()	200	2000
	100	6.3	11.2	130	0.16	1000	0.5	2.5	5.0	2.5	ECA1EHG101()	200	2000
	220	8	11.5	230	0.16	1000	0.6	3.5	5.0		ECA1EHG221()	200	1000
	330	8	11.5	310	0.16	1000	0.6	3.5	5.0		ECA1EHG331()	200	1000
	470	10	12.5	380	0.16	2000	0.6	5.0	5.0		ECA1EHG471()	200	500
	1000	10	20	680	0.16	2000	0.6	5.0	5.0		ECA1EHG102()	200	500
	2200	12.5	25	1090	0.18	2000	0.6	5.0	5.0		ECA1EHG222()	200	500
	3300	16	25	1400	0.20	2000	0.8	7.5	7.5		ECA1EHG332()	100	250
	4700	16	31.5	1750	0.22	2000	0.8	7.5			ECA1EHG472	100	
6800	18	35.5	2040	0.26	2000	0.8	7.5			ECA1EHG682	50		
35	47	5	11	90	0.14	1000	0.5	2.0	5.0	2.5	ECA1VHG470()	200	2000
	100	6.3	11.2	150	0.14	1000	0.5	2.5	5.0	2.5	ECA1VHG101()	200	2000
	220	8	11.5	270	0.14	1000	0.6	3.5	5.0		ECA1VHG221()	200	1000
	330	10	12.5	350	0.14	2000	0.6	5.0	5.0		ECA1VHG331()	200	500
	470	10	16	460	0.14	2000	0.6	5.0	5.0		ECA1VHG471()	200	500
	1000	12.5	20	810	0.14	2000	0.6	5.0	5.0		ECA1VHG102()	200	500
	2200	16	25	1260	0.16	2000	0.8	7.5	7.5		ECA1VHG222()	100	250
	3300	16	31.5	1610	0.18	2000	0.8	7.5			ECA1VHG332	100	
	4700	18	35.5	1910	0.20	2000	0.8	7.5			ECA1VHG472	50	

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
 · Please refer to the page of "Taping Dimensions".

Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *i			
		(mm)	(mm)				(mm)	(mm)	(mm)	(mm)			
50	0.1	5	11	1.1	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG0R1()***	200	2000
	0.22	5	11	2.3	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHGR22()***	200	2000
	0.33	5	11	3.5	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHGR33()***	200	2000
	0.47	5	11	5	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHGR47()***	200	2000
	1	5	11	10	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG010()***	200	2000
	2.2	5	11	18	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG2R2()	200	2000
	3.3	5	11	22	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG3R3()	200	2000
	4.7	5	11	26	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG4R7()	200	2000
	10	5	11	39	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG100()	200	2000
	22	5	11	65	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG220()	200	2000
	33	5	11	90	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG330()	200	2000
	47	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	ECA1HHG470()	200	2000
	100	8	11.5	180	0.12	1000	0.6	3.5	5.0		ECA1HHG101()	200	1000
	220	10	12.5	300	0.12	2000	0.6	5.0	5.0		ECA1HHG221()	200	500
	330	10	16	410	0.12	2000	0.6	5.0	5.0		ECA1HHG331()	200	500
	470	10	20	530	0.12	2000	0.6	5.0	5.0		ECA1HHG471()	200	500
	1000	12.5	25	950	0.12	2000	0.6	5.0	5.0		ECA1HHG102()	200	500
	2200	16	31.5	1470	0.14	2000	0.8	7.5			ECA1HHG222	100	
	3300	18	35.5	1770	0.16	2000	0.8	7.5			ECA1HHG332	50	
63	10	5	11	46	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG100()	200	2000
	22	5	11	71	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG220()	200	2000
	33	6.3	11.2	100	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG330()	200	2000
	47	6.3	11.2	120	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG470()	200	2000
	100	10	12.5	215	0.10	2000	0.6	5.0	5.0		ECA1JHG101()	200	500
	220	10	16	335	0.10	2000	0.6	5.0	5.0		ECA1JHG221()	200	500
	330	10	20	510	0.10	2000	0.6	5.0	5.0		ECA1JHG331()	200	500
	470	12.5	20	640	0.10	2000	0.6	5.0	5.0		ECA1JHG471()	200	500
	1000	16	25	930	0.10	2000	0.8	7.5	7.5		ECA1JHG102()	100	250
	2200	18	35.5	1610	0.12	2000	0.8	7.5			ECA1JHG222	50	
100	0.47	5	11	9	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHGR47()***	200	2000
	1	5	11	14	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG010()***	200	2000
	2.2	5	11	21	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG2R2()	200	2000
	3.3	5	11	31	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG3R3()	200	2000
	4.7	5	11	38	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG4R7()	200	2000
	10	6.3	11.2	54	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG100()	200	2000
	22	6.3	11.2	93	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG220()	200	2000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
100	33	8	11.5	130	0.08	1000	0.6	3.5	5.0		ECA2AHG330()	200	1000
	47	10	12.5	165	0.08	2000	0.6	5.0	5.0		ECA2AHG470()	200	500
	100	10	20	265	0.08	2000	0.6	5.0	5.0		ECA2AHG101()	200	500
	220	12.5	25	440	0.08	2000	0.6	5.0	5.0		ECA2AHG221()	200	500
	330	16	25	540	0.08	2000	0.8	7.5	7.5		ECA2AHG331()	100	250
	470	16	25	715	0.08	2000	0.8	7.5	7.5		ECA2AHG471()	100	250
	1000	18	35.5	985	0.08	2000	0.8	7.5			ECA2AHG102	50	
160	1	6.3	11.2	17	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG010()	200	2000
	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG2R2()	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG3R3()	200	2000
	4.7	6.3	11.2	43	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG4R7()	200	2000
	10	10	12.5	70	0.15	2000	0.6	5.0	5.0		ECA2CHG100()	200	500
	22	10	20	130	0.15	2000	0.6	5.0	5.0		ECA2CHG220()	200	500
	33	10	20	180	0.15	2000	0.6	5.0	5.0		ECA2CHG330()	200	500
	47	12.5	20	220	0.15	2000	0.6	5.0	5.0		ECA2CHG470()	200	500
	100	16	25	335	0.15	2000	0.8	7.5	7.5		ECA2CHG101()	100	250
	220	16	31.5	540	0.15	2000	0.8	7.5			ECA2CHG221	100	
	330	18	31.5	705	0.15	2000	0.8	7.5			ECA2CHG331	50	
200	1	6.3	11.2	17	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG010()	200	2000
	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG2R2()	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG3R3()	200	2000
	4.7	8	11.5	50	0.15	2000	0.6	3.5	5.0		ECA2DHG4R7()	200	1000
	10	10	16	80	0.15	2000	0.6	5.0	5.0		ECA2DHG100()	200	500
	22	10	20	140	0.15	2000	0.6	5.0	5.0		ECA2DHG220()	200	500
	33	12.5	20	190	0.15	2000	0.6	5.0	5.0		ECA2DHG330()	200	500
	47	12.5	20	220	0.15	2000	0.6	5.0	5.0		ECA2DHG470()	200	500
	100	16	25	335	0.15	2000	0.8	7.5	7.5	2.5	ECA2DHG101()	100	250
	220	18	31.5	575	0.15	2000	0.8	7.5			ECA2DHG221	50	
	250	1	6.3	11.2	17	0.15	2000	0.5	2.5	5.0	2.5	ECA2EHG010()	200
2.2		6.3	11.2	29	0.15	2000	0.5	2.5	5.0	2.5	ECA2EHG2R2()	200	2000
3.3		8	11.5	42	0.15	2000	0.6	3.5	5.0		ECA2EHG3R3	200	1000
4.7		8	11.5	50	0.15	2000	0.6	3.5	5.0		ECA2EHG4R7()	200	1000
10		10	16	88	0.15	2000	0.6	5.0	5.0		ECA2EHG100()	200	500
22		12.5	20	155	0.15	2000	0.6	5.0	5.0		ECA2EHG220()	200	500
33		12.5	20	190	0.15	2000	0.6	5.0	5.0		ECA2EHG330()	200	500
47		12.5	25	230	0.15	2000	0.6	5.0	5.0		ECA2EHG470()	200	500
100		16	31.5	365	0.15	2000	0.8	7.5			ECA2EHG101	100	
350	1	6.3	11.2	18	0.20	2000	0.5	2.5	5.0	2.5	ECA2VHG010()	200	2000
	2.2	8	11.5	31	0.20	2000	0.6	3.5	5.0		ECA2VHG2R2()	200	1000
	3.3	10	12.5	38	0.20	2000	0.6	5.0	5.0		ECA2VHG3R3()	200	500
	4.7	10	16	50	0.20	2000	0.6	5.0	5.0		ECA2VHG4R7()	200	500
	10	10	20	82	0.20	2000	0.6	5.0	5.0		ECA2VHG100()	200	500
	22	12.5	20	130	0.20	2000	0.6	5.0	5.0		ECA2VHG220()	200	500
	33	16	25	195	0.20	2000	0.8	7.5	7.5		ECA2VHG330()	100	250
	47	16	25	230	0.20	2000	0.8	7.5	7.5		ECA2VHG470()	100	250
	100	18	31.5	375	0.20	2000	0.8	7.5			ECA2VHG101	50	

· When requesting taped product, please put the letter "B" or "I" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
 · Please refer to the page of "Taping Dimensions".

■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endur- ance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *i			
		(mm)	(mm)	(mA r.m.s.)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
400	1	6.3	11.2	18	0.24	2000	0.5	2.5	5.0	2.5	ECA2GHG010()	200	2000
	2.2	8	11.5	30	0.24	2000	0.6	3.5	5.0		ECA2GHG2R2()	200	1000
	3.3	10	12.5	40	0.24	2000	0.6	5.0	5.0		ECA2GHG3R3()	200	500
	4.7	10	16	50	0.24	2000	0.6	5.0	5.0		ECA2GHG4R7()	200	500
	10	10	20	80	0.24	2000	0.6	5.0	5.0		ECA2GHG100()	200	500
	22	12.5	25	145	0.24	2000	0.6	5.0	5.0		ECA2GHG220()	200	500
	33	16	25	195	0.24	2000	0.8	7.5	7.5		ECA2GHG330()	100	250
	47	16	31.5	250	0.24	2000	0.8	7.5			ECA2GHG470	100	
450	1	8	11.5	18	0.24	2000	0.6	3.5	5.0		ECA2WHG010()	200	1000
	2.2	10	12.5	29	0.24	2000	0.6	5.0	5.0		ECA2WHG2R2()	200	500
	3.3	10	16	41	0.24	2000	0.6	5.0	5.0		ECA2WHG3R3()	200	500
	4.7	10	20	49	0.24	2000	0.6	5.0	5.0		ECA2WHG4R7()	200	500
	10	12.5	20	75	0.24	2000	0.6	5.0	5.0		ECA2WHG100()	200	500
	22	16	25	115	0.24	2000	0.8	7.5	7.5		ECA2WHG220()	100	250
	33	16	31.5	155	0.24	2000	0.8	7.5			ECA2WHG330	100	

- When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
- Please refer to the page of "Taping Dimensions".

Radial Lead Type

Series: **HD** Type: **A**

■ Features

- Endurance : 105 °C 1000 h to 2000 h
- Minaturize, Higher Capacitance :
1 Size Miniturized Product of Current A-NHG
- RoHS directive compliant



■ Specifications

Category Temp. Range	-55 °C to +105 °C	
Rated W.V. Range	10 V.DC to 50 V.DC	
Nominal Cap. Range	2.2 μF to 22000 μF	
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$I \leq 0.01 CV$ or 3 (μA) After 2 minutes (Which is greater)	
tan δ	Please see the attached standard products list	
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), When the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.	
	Duration : φ5 to φ8=1000 hours, φ10 to φ18=2000 hours	
	Capacitance change	±20 % of initial measured value
	tan δ	≤ 200 % of initial specified value
Shelf Life	DC leakage current	≤ initial specified value
	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap. (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
10 to 50	2.2 to 33	0.75	1.00	1.55	1.80	2.00
	47 to 470	0.80	1.00	1.35	1.50	1.50
	1000 to 22000	0.85	1.00	1.10	1.15	1.15

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. φD	5	6.3	8	10	12.5	16	18
Lead Dia. φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

Endurance : 105 °C ϕ 5 to ϕ 8=1000 h, ϕ 10 to ϕ 18=2000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance (hours)	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
10	330	6.3	11.2	200	0.24	1000	0.5	2.5	5.0	2.5	EEUHD1A331()	200	2000
	470	8	11.5	250	0.24	1000	0.6	3.5	5.0		EEUHD1A471()	200	1000
	1000	10	12.5	460	0.24	2000	0.6	5.0	5.0		EEUHD1A102()	200	500
	2200	10	16	760	0.26	2000	0.6	5.0	5.0		EEUHD1A222()	200	500
	4700	12.5	20	1260	0.30	2000	0.6	5.0	5.0		EEUHD1A472()	200	500
	6800	12.5	25	1570	0.34	2000	0.6	5.0	5.0		EEUHD1A682()	200	500
	10000	16	25	1890	0.42	2000	0.8	7.5	7.5		EEUHD1A103()	100	250
	15000	16	31.5	2180	0.52	2000	0.8	7.5			EEUHD1A153	100	
	22000	18	35.5	2400	0.66	2000	0.8	7.5			EEUHD1A223	50	
16	100	5	11	110	0.20	1000	0.5	2.5	5.0	2.5	EEUHD1C101()	200	2000
	220	6.3	11.2	180	0.20	1000	0.5	2.5	5.0	2.5	EEUHD1C221()	200	2000
	330	8	11.5	260	0.20	1000	0.6	3.5	5.0		EEUHD1C331()	200	1000
	470	8	11.5	310	0.20	1000	0.6	3.5	5.0		EEUHD1C471()	200	1000
	3300	12.5	20	1170	0.24	2000	0.6	5.0	5.0		EEUHD1C332()	200	500
	4700	12.5	25	1480	0.26	2000	0.6	5.0	5.0		EEUHD1C472()	200	500
	6800	16	25	1780	0.30	2000	0.8	7.5	7.5		EEUHD1C682()	100	250
	8200	16	25	1780	0.34	2000	0.8	7.5	7.5		EEUHD1C822()	100	250
	10000	16	31.5	2060	0.38	2000	0.8	7.5			EEUHD1C103	100	
	15000	18	35.5	2210	0.48	2000	0.8	7.5			EEUHD1C153	50	
25	47	5	11	91	0.16	1000	0.5	2.5	5.0	2.5	EEUHD1E470()	200	2000
	68	5	11	91	0.16	1000	0.5	2.5	5.0	2.5	EEUHD1E680()	200	2000
	100	6.3	11.2	130	0.16	1000	0.5	2.5	5.0	2.5	EEUHD1E101()	200	2000
	220	8	11.5	230	0.16	1000	0.6	3.5	5.0		EEUHD1E221()	200	1000
	330	8	11.5	310	0.16	1000	0.6	3.5	5.0		EEUHD1E331()	200	1000
	470	10	12.5	380	0.16	2000	0.6	5.0	5.0		EEUHD1E471()	200	500
	1000	10	16	680	0.16	2000	0.6	5.0	5.0		EEUHD1E102()	200	500
	2200	12.5	20	1090	0.18	2000	0.6	5.0	5.0		EEUHD1E222()	200	500
	3300	12.5	25	1400	0.20	2000	0.6	5.0	5.0		EEUHD1E332()	200	500
	4700	16	25	1750	0.22	2000	0.8	7.5	7.5		EEUHD1E472()	100	250
	5600	16	25	1750	0.24	2000	0.8	7.5	7.5		EEUHD1E562()	100	250
	6800	16	31.5	2040	0.26	2000	0.8	7.5			EEUHD1E682	100	
10000	18	35.5	2200	0.34	2000	0.8	7.5			EEUHD1E103	50		
35	47	5	11	90	0.14	1000	0.5	2.5	5.0	2.5	EEUHD1V470()	200	2000
	100	6.3	11.2	150	0.14	1000	0.5	2.5	5.0	2.5	EEUHD1V101()	200	2000
	220	8	11.5	270	0.14	1000	0.6	3.5	5.0		EEUHD1V221()	200	1000
	330	10	12.5	350	0.14	2000	0.6	5.0	5.0		EEUHD1V331()	200	500
	470	10	16	460	0.14	2000	0.6	5.0	5.0		EEUHD1V471()	200	500
	680	10	16	460	0.14	2000	0.6	5.0	5.0		EEUHD1V681()	200	500
	2200	12.5	25	1260	0.16	2000	0.6	5.0	5.0		EEUHD1V222()	200	500
	3300	16	25	1610	0.18	2000	0.8	7.5	7.5		EEUHD1V332()	100	250
	4700	16	31.5	1910	0.20	2000	0.8	7.5			EEUHD1V472	100	
	6800	18	35.5	2050	0.24	2000	0.8	7.5			EEUHD1V682	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.
 · Please refer to the page of "Taping Dimensions".

■ Standard Products

Endurance : 105 °C ϕ 5 to ϕ 8=1000 h, ϕ 10 to ϕ 18=2000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endurance	Lead Dia.	Lead Space				Straight Leads	Taping
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(hours)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
50	0.1	5	11	1.1	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1HR10()***	200	2000
	0.22	5	11	2.3	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1HR22()***	200	2000
	0.33	5	11	3.5	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1HR33()***	200	2000
	0.47	5	11	5	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1HR47()***	200	2000
	1	5	11	10	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H1R0()***	200	2000
	2.2	5	11	18	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H2R2()	200	2000
	3.3	5	11	22	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H3R3()	200	2000
	4.7	5	11	26	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H4R7()	200	2000
	10	5	11	39	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H100()	200	2000
	22	5	11	65	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H220()	200	2000
	33	5	11	90	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H330()	200	2000
	47	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H470()	200	2000
	68	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	EEUHD1H680()	200	2000
	100	8	11.5	180	0.12	1000	0.6	3.5	5.0		EEUHD1H101()	200	1000
	220	10	12.5	300	0.12	2000	0.6	5.0	5.0		EEUHD1H221()	200	500
	330	10	16	410	0.12	2000	0.6	5.0	5.0		EEUHD1H331()	200	500
	470	10	20	530	0.12	2000	0.6	5.0	5.0		EEUHD1H471()	200	500
	560	16	15	650	0.12	2000	0.8	7.5	7.5		EEUHD1H561S()	100	250
	680	16	15	650	0.12	2000	0.8	7.5	7.5		EEUHD1H681S()	100	250
	1000	12.5	25	950	0.12	2000	0.6	5.0	5.0		EEUHD1H102()	200	500
	2200	16	31.5	1470	0.14	2000	0.8	7.5			EEUHD1H222	100	
	3300	18	35.5	1770	0.16	2000	0.8	7.5			EEUHD1H332	50	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

Radial Lead Type

Series: **GA** Type: **A**

■ Features

- Endurance : 105 °C 1000 h
- RoHS directive compliant



■ Specifications

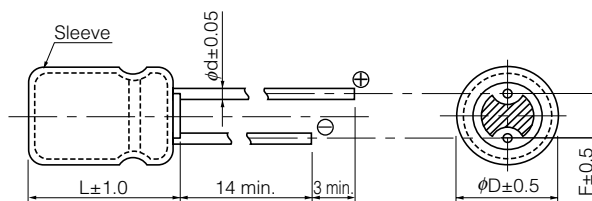
Category Temp. Range	-55 °C to +105 °C		
Rated W.V. Range	10 V.DC to 50 V.DC		
Nominal Cap. Range	1.5 μF to 220 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), for 1000 hours, when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.		
	Capacitance change	±20 % of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)		

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k to
10 to 50	1.5 to 220	0.85	1.00	1.30	1.40	1.55

■ Dimensions in mm(not to scale)

(Unit : mm)



Body Dia. ϕD	4	5	6.3	8
Lead Dia. ϕd	0.45	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5	2.5

■ Standard Products

Endurance : 105 °C 1000 h

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Endur- ance (hours)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
(V)	(μF)	(mm)	(mm)				(mm)	(mm)	(mm)	(mm)			
10	22	4	7	30	0.22	1000	0.45	1.5	5.0	2.5	EEAGA1A220()	200	2000
	33	5	7	50	0.22	1000	0.45	2.0	5.0	2.5	EEAGA1A330()	200	2000
	47	6.3	7	65	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A470()	200	2000
	68	6.3	7	75	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A680()	200	2000
	100	6.3	7	110	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A101()	200	2000
	220	8	7	160	0.22	1000	0.45	2.5	5.0	2.5	EEAGA1A221()	200	1000
16	10	4	7	30	0.18	1000	0.45	1.5	5.0	2.5	EEAGA1C100()	200	2000
	15	4	7	33	0.18	1000	0.45	1.5	5.0	2.5	EEAGA1C150()	200	2000
	22	5	7	50	0.18	1000	0.45	2.0	5.0	2.5	EEAGA1C220()	200	2000
	33	6.3	7	65	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C330()	200	2000
	47	6.3	7	77	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C470()	200	2000
	100	8	7	120	0.18	1000	0.45	2.5	5.0	2.5	EEAGA1C101()	200	1000
25	10	4	7	33	0.16	1000	0.45	1.5	5.0	2.5	EEAGA1E100()	200	2000
	15	5	7	45	0.16	1000	0.45	2.0	5.0	2.5	EEAGA1E150()	200	2000
	22	5	7	50	0.16	1000	0.45	2.0	5.0	2.5	EEAGA1E220()	200	2000
	33	6.3	7	75	0.16	1000	0.45	2.5	5.0	2.5	EEAGA1E330()	200	2000
	68	8	7	100	0.16	1000	0.45	2.5	5.0	2.5	EEAGA1E680()	200	1000
35	6.8	4	7	33	0.13	1000	0.45	1.5	5.0	2.5	EEAGA1V6R8()	200	2000
	10	5	7	35	0.13	1000	0.45	2.0	5.0	2.5	EEAGA1V100()	200	2000
	15	6.3	7	50	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V150()	200	2000
	22	6.3	7	70	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V220()	200	2000
	47	8	7	96	0.13	1000	0.45	2.5	5.0	2.5	EEAGA1V470()	200	1000
50	0.1	4	7	1.1	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR10()***	200	2000
	0.15	4	7	1.7	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR15()***	200	2000
	0.22	4	7	2.3	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR22()***	200	2000
	0.33	4	7	3.5	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR33()***	200	2000
	0.47	4	7	5	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR47()***	200	2000
	0.68	4	7	7	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1HR68()***	200	2000
	1	4	7	10	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H1R0()***	200	2000
	1.5	4	7	16	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H1R5()	200	2000
	2.2	4	7	18	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H2R2()	200	2000
	3.3	4	7	22	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H3R3()	200	2000
	4.7	4	7	26	0.10	1000	0.45	1.5	5.0	2.5	EEAGA1H4R7()	200	2000
	6.8	5	7	35	0.10	1000	0.45	2.0	5.0	2.5	EEAGA1H6R8()	200	2000
	10	6.3	7	39	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H100()	200	2000
	15	6.3	7	55	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H150()	200	2000
	22	8	7	70	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H220()	200	1000
33	8	7	91	0.10	1000	0.45	2.5	5.0	2.5	EEAGA1H330()	200	1000	

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, H=2.5 mm.

Suffix "BQ" for ø8×7, 5mm pitch products

· Please refer to the page of "Taping Dimensions".

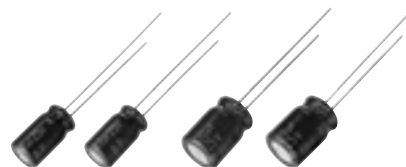
*** Please kindly accept last shipment : 31/Mar/2015

Radial Lead Type

Series: **GA(Bi-polar)** Type: **A**

■ Features

- Endurance : 105 °C 1000 h to 2000 h
- RoHS directive compliant



■ Specifications

Category Temp. Range	-40 °C to +105 °C		
Rated W.V. Range	6.3 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 μF to 330 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.03 CV +3 (μA) After 2 minutes or I ≤ 0.03 CV or 3 (μA) After 5 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After following life test of DC working voltage at +105 °C±2 °C when the capacitors are restored to 20 °C, the capacitors shall meet the following limits. Duration φ5 to φ8 : 1000 hours (500 hours for each polarity) φ10 : 2000 hours (1000 hours for each polarity)		
	Capacitance change	± 20% of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
	Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. φD	5	6.3	8	10
Lead Dia. φd	0.5	0.5	0.6	0.6
Lead space F	2.0	2.5	3.5	5.0

■ Standard Products (Bi-polar)

Endurance : 105 °C ϕ 5 to ϕ 8=1000 h (500 h for each polarity), ϕ 10=2000 h (1000 h for each polarity)

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+105 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	100	6.3	11.2	130	0.30	0.5	2.5	5.0	2.5	ECA0JEN101()	200	2000
	330	8	11.5	250	0.30	0.6	3.5	5.0		ECA0JEN331()	200	1000
10	47	5	11	90	0.24	0.5	2.0	5.0	2.5	ECA1AEN470()	200	2000
16	10	5	11	40	0.20	0.5	2.0	5.0	2.5	ECA1CEN100()	200	2000
	22	5	11	60	0.20	0.5	2.0	5.0	2.5	ECA1CEN220()	200	2000
	33	5	11	80	0.20	0.5	2.0	5.0	2.5	ECA1CEN330()	200	2000
	47	6.3	11.2	100	0.20	0.5	2.5	5.0	2.5	ECA1CEN470()	200	2000
25	10	5	11	45	0.15	0.5	2.0	5.0	2.5	ECA1EEN100()	200	2000
	22	6.3	11.2	60	0.15	0.5	2.5	5.0	2.5	ECA1EEN220()	200	2000
	33	6.3	11.2	90	0.15	0.5	2.5	5.0	2.5	ECA1EEN330()	200	2000
	47	6.3	11.2	110	0.15	0.5	2.5	5.0	2.5	ECA1EEN470()	200	2000
	100	8	11.5	180	0.15	0.6	3.5	5.0		ECA1EEN101()	200	1000
35	33	8	11.5	100	0.15	0.6	3.5	5.0		ECA1VEN330()	200	1000
	100	10	16	230	0.15	0.6	5.0	5.0		ECA1VEN101()	200	500
50	0.47	5	11	10	0.15	0.5	2.0	5.0	2.5	ECA1HENR47()***	200	2000
	1	5	11	10	0.15	0.5	2.0	5.0	2.5	ECA1HEN010()***	200	2000
	2.2	5	11	18	0.15	0.5	2.0	5.0	2.5	ECA1HEN2R2()	200	2000
	3.3	5	11	25	0.15	0.5	2.0	5.0	2.5	ECA1HEN3R3()	200	2000
	4.7	5	11	30	0.15	0.5	2.0	5.0	2.5	ECA1HEN4R7()	200	2000
	10	6.3	11.2	50	0.15	0.5	2.5	5.0	2.5	ECA1HEN100()	200	2000
	22	8	11.5	90	0.15	0.6	3.5	5.0		ECA1HEN220()	200	1000
	33	8	11.5	110	0.15	0.6	3.5	5.0		ECA1HEN330()	200	1000
	47	10	12.5	140	0.15	0.6	5.0	5.0		ECA1HEN470()	200	500
	100	10	20	250	0.15	0.6	5.0	5.0		ECA1HEN101()	200	500

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

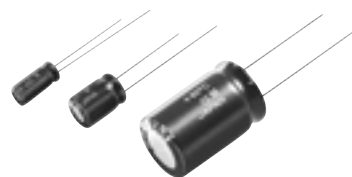
*** Please kindly accept last shipment : 31/Mar/2015

Radial Lead Type

Series: **M** Type: **A**

■ Features

- Endurance : 85 °C 2000 h
- Smaller than series SU
- RoHS directive compliant



■ Specifications

Category Temp. Range	-40 °C to +85 °C	-25 °C to +85 °C
Rated W.V. Range	6.3 V.DC to 100 V.DC	160 V.DC to 450 V.DC
Nominal Cap. Range	2.2 μF to 22000 μF	1 μF to 470 μF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$I \leq 0.01 CV$ or $3 (\mu A)$ After 2 minutes (Whichever is greater)	$I \leq 0.06 CV + 10 (\mu A)$ After 2 minutes
tan δ	Please see the attached standard products list	
Endurance	After applying rated working voltage for 2000 hours at +85°C±2 °C, when the capacitors are restored to 20 °C, capacitors shall meet the following limits.	
	Capacitance change	±20 % of initial measured value
	tan δ	≤150 % of initial specified value
	DC leakage current	≤initial specified value
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)

Body Dia. φD	5	6.3	8	10	12.5	16	18
Lead Dia. φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

■ Standard Products

Endurance : 85 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
		(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	220	5	11	240	0.28	0.5	2.0	5.0	2.5	ECA0JM221()	200	2000
	470	6.3	11.2	380	0.28	0.5	2.5	5.0	2.5	ECA0JM471()	200	2000
	1000	8	11.5	580	0.28	0.6	3.5	5.0		ECA0JM102()	200	1000
	2200	10	16	890	0.30	0.6	5.0	5.0		ECA0JM222()	200	500
	3300	10	20	1020	0.32	0.6	5.0	5.0		ECA0JM332()	200	500
	4700	12.5	20	1170	0.34	0.6	5.0	5.0		ECA0JM472()	200	500
	6800	12.5	25	1270	0.38	0.6	5.0	5.0		ECA0JM682()	200	500
	10000	16	25	1450	0.46	0.8	7.5	7.5		ECA0JM103()	100	250
	15000	16	31.5	1700	0.56	0.8	7.5			ECA0JM153	100	
22000	18	35.5	1900	0.70	0.8	7.5			ECA0JM223	50		
10	330	6.3	11.2	330	0.24	0.5	2.5	5.0	2.5	ECA1AM331()	200	2000
	1000	10	12.5	630	0.24	0.6	5.0	5.0		ECA1AM102()	200	500
	2200	10	20	920	0.26	0.6	5.0	5.0		ECA1AM222()	200	500
	3300	12.5	20	1090	0.28	0.6	5.0	5.0		ECA1AM332()	200	500
	4700	12.5	25	1200	0.30	0.6	5.0	5.0		ECA1AM472()	200	500
	6800	16	25	1400	0.34	0.8	7.5	7.5		ECA1AM682()	100	250
	10000	16	31.5	1600	0.42	0.8	7.5			ECA1AM103	100	
	15000	18	35.5	1850	0.52	0.8	7.5			ECA1AM153	50	
16	10	5	11	30	0.20	0.5	2.0	5.0	2.5	ECA1CM100()	200	2000
	22	5	11	75	0.20	0.5	2.0	5.0	2.5	ECA1CM220()	200	2000
	33	5	11	110	0.20	0.5	2.0	5.0	2.5	ECA1CM330()	200	2000
	47	5	11	130	0.20	0.5	2.0	5.0	2.5	ECA1CM470()	200	2000
	100	5	11	180	0.20	0.5	2.0	5.0	2.5	ECA1CM101()	200	2000
	220	6.3	11.2	280	0.20	0.5	2.5	5.0	2.5	ECA1CM221()	200	2000
	470	8	11.5	440	0.20	0.6	3.5	5.0		ECA1CM471()	200	1000
	1000	10	16	680	0.20	0.6	5.0	5.0		ECA1CM102()	200	500
	2200	12.5	20	1000	0.22	0.6	5.0	5.0		ECA1CM222()	200	500
	3300	12.5	25	1200	0.24	0.6	5.0	5.0		ECA1CM332()	200	500
	4700	16	25	1360	0.26	0.8	7.5	7.5		ECA1CM472()	100	250
	6800	16	31.5	1600	0.30	0.8	7.5			ECA1CM682	100	
10000	18	35.5	1800	0.38	0.8	7.5			ECA1CM103	50		
25	100	6.3	11.2	180	0.16	0.5	2.5	5.0	2.5	ECA1EM101()	200	2000
	330	8	11.5	390	0.16	0.6	3.5	5.0		ECA1EM331()	200	1000
	470	10	12.5	480	0.16	0.6	5.0	5.0		ECA1EM471()	200	500
	1000	10	20	850	0.16	0.6	5.0	5.0		ECA1EM102()	200	500
	2200	12.5	25	1200	0.18	0.6	5.0	5.0		ECA1EM222()	200	500
	3300	16	25	1300	0.20	0.8	7.5	7.5		ECA1EM332()	100	250
	4700	16	31.5	1500	0.22	0.8	7.5			ECA1EM472	100	
	6800	18	35.5	1750	0.26	0.8	7.5			ECA1EM682	50	
35	47	5	11	130	0.14	0.5	2.0	5.0	2.5	ECA1VM470()	200	2000
	100	6.3	11.2	210	0.14	0.5	2.5	5.0	2.5	ECA1VM101()	200	2000
	220	8	11.5	350	0.14	0.6	3.5	5.0		ECA1VM221()	200	1000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
· Please refer to the page of "Taping Dimensions".

■ Standard Products

Endurance : 85 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
		(mm)	(mm)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
35	330	10	12.5	440	0.14	0.6	5.0	5.0		ECA1VM331()	200	500
	470	10	16	550	0.14	0.6	5.0	5.0		ECA1VM471()	200	500
	1000	12.5	20	900	0.14	0.6	5.0	5.0		ECA1VM102()	200	500
	2200	16	25	1250	0.16	0.8	7.5	7.5		ECA1VM222()	100	250
	3300	16	31.5	1400	0.18	0.8	7.5			ECA1VM332	100	
	4700	18	35.5	1600	0.20	0.8	7.5			ECA1VM472	50	
50	0.1	5	11	1.3	0.12	0.5	2.0	5.0	2.5	ECA1HM0R1()***	200	2000
	0.22	5	11	2.9	0.12	0.5	2.0	5.0	2.5	ECA1HMR22()***	200	2000
	0.33	5	11	4.4	0.12	0.5	2.0	5.0	2.5	ECA1HMR33()***	200	2000
	0.47	5	11	5	0.12	0.5	2.0	5.0	2.5	ECA1HMR47()***	200	2000
	1	5	11	10	0.12	0.5	2.0	5.0	2.5	ECA1HM010()***	200	2000
	2.2	5	11	20	0.12	0.5	2.0	5.0	2.5	ECA1HM2R2()	200	2000
	3.3	5	11	35	0.12	0.5	2.0	5.0	2.5	ECA1HM3R3()	200	2000
	4.7	5	11	45	0.12	0.5	2.0	5.0	2.5	ECA1HM4R7()	200	2000
	10	5	11	65	0.12	0.5	2.0	5.0	2.5	ECA1HM100()	200	2000
	22	5	11	100	0.12	0.5	2.0	5.0	2.5	ECA1HM220()	200	2000
	33	5	11	110	0.12	0.5	2.0	5.0	2.5	ECA1HM330()	200	2000
	47	6.3	11.2	130	0.12	0.5	2.5	5.0	2.5	ECA1HM470()	200	2000
	100	8	11.5	250	0.12	0.6	3.5	5.0		ECA1HM101()	200	1000
	220	10	12.5	400	0.12	0.6	5.0	5.0		ECA1HM221()	200	500
	330	10	16	500	0.12	0.6	5.0	5.0		ECA1HM331()	200	500
	470	10	20	650	0.12	0.6	5.0	5.0		ECA1HM471()	200	500
	1000	12.5	25	1050	0.12	0.6	5.0	5.0		ECA1HM102()	200	500
	2200	16	31.5	1300	0.14	0.8	7.5			ECA1HM222	100	
	3300	18	35.5	1500	0.16	0.8	7.5			ECA1HM332	50	
63	10	5	11	70	0.11	0.5	2.0	5.0	2.5	ECA1JM100()	200	2000
	22	5	11	105	0.11	0.5	2.0	5.0	2.5	ECA1JM220()	200	2000
	33	6.3	11.2	130	0.11	0.5	2.5	5.0	2.5	ECA1JM330()	200	2000
	47	6.3	11.2	160	0.11	0.5	2.5	5.0	2.5	ECA1JM470()	200	2000
	100	8	11.5	270	0.11	0.6	3.5	5.0		ECA1JM101()	200	1000
	220	10	16	450	0.11	0.6	5.0	5.0		ECA1JM221()	200	500
	330	10	20	550	0.11	0.6	5.0	5.0		ECA1JM331()	200	500
	470	12.5	20	750	0.11	0.6	5.0	5.0		ECA1JM471()	200	500
	1000	16	25	1100	0.11	0.8	7.5	7.5		ECA1JM102()	100	250
	2200	18	35.5	1400	0.13	0.8	7.5			ECA1JM222	50	
100	0.47	5	11	10	0.10	0.5	2.0	5.0	2.5	ECA2AMR47()***	200	2000
	1	5	11	20	0.10	0.5	2.0	5.0	2.5	ECA2AM010()***	200	2000
	2.2	5	11	30	0.10	0.5	2.0	5.0	2.5	ECA2AM2R2()	200	2000
	3.3	5	11	40	0.10	0.5	2.0	5.0	2.5	ECA2AM3R3()	200	2000
	4.7	5	11	50	0.10	0.5	2.0	5.0	2.5	ECA2AM4R7()	200	2000
	10	5	11	70	0.10	0.5	2.0	5.0	2.5	ECA2AM100()	200	2000
	22	6.3	11.2	115	0.10	0.5	2.5	5.0	2.5	ECA2AM220()	200	2000

· When requesting taped product, please put the letter "B" or "I" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products

Endurance : 85 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
		(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
100	33	8	11.5	145	0.10	0.6	3.5	5.0		ECA2AM330()	200	1000
	47	8	11.5	180	0.10	0.6	3.5	5.0		ECA2AM470()	200	1000
	100	10	16	350	0.10	0.6	5.0	5.0		ECA2AM101()	200	500
	220	12.5	20	550	0.10	0.6	5.0	5.0		ECA2AM221()	200	500
	330	12.5	25	700	0.10	0.6	5.0	5.0		ECA2AM331()	200	500
	470	16	25	900	0.10	0.8	7.5	7.5		ECA2AM471()	100	250
	1000	18	35.5	1300	0.10	0.8	7.5			ECA2AM102	50	
160	1	6.3	11.2	36	0.16	0.5	2.5	5.0	2.5	ECA2CM010()	200	2000
	2.2	6.3	11.2	53	0.16	0.5	2.5	5.0	2.5	ECA2CM2R2()	200	2000
	3.3	6.3	11.2	66	0.16	0.5	2.5	5.0	2.5	ECA2CM3R3()	200	2000
	4.7	6.3	11.2	78	0.16	0.5	2.5	5.0	2.5	ECA2CM4R7()	200	2000
	10	10	12.5	105	0.16	0.6	5.0	5.0		ECA2CM100()	200	500
	22	10	16	175	0.16	0.6	5.0	5.0		ECA2CM220()	200	500
	33	10	20	235	0.16	0.6	5.0	5.0		ECA2CM330()	200	500
	47	12.5	20	320	0.16	0.6	5.0	5.0		ECA2CM470()	200	500
	100	12.5	25	515	0.16	0.6	5.0	5.0		ECA2CM101()	200	500
	220	16	31.5	830	0.16	0.8	7.5			ECA2CM221	100	
	330	18	31.5	1090	0.16	0.8	7.5			ECA2CM331	50	
	470	18	40	1440	0.16	0.8	7.5			ECA2CM471	50	
200	1	6.3	11.2	34	0.18	0.5	2.5	5.0	2.5	ECA2DM010()	200	2000
	2.2	6.3	11.2	50	0.18	0.5	2.5	5.0	2.5	ECA2DM2R2()	200	2000
	3.3	6.3	11.2	62	0.18	0.5	2.5	5.0	2.5	ECA2DM3R3()	200	2000
	4.7	8	11.5	86	0.18	0.6	3.5	5.0		ECA2DM4R7()	200	1000
	10	10	12.5	100	0.18	0.6	5.0	5.0		ECA2DM100()	200	500
	22	10	20	180	0.18	0.6	5.0	5.0		ECA2DM220()	200	500
	33	10	20	220	0.18	0.6	5.0	5.0		ECA2DM330()	200	500
	47	12.5	20	300	0.18	0.6	5.0	5.0		ECA2DM470()	200	500
	100	16	25	475	0.18	0.8	7.5	7.5		ECA2DM101()	100	250
	220	18	31.5	835	0.18	0.8	7.5			ECA2DM221	50	
	330	18	40	1140	0.18	0.8	7.5			ECA2DM331	50	
	250	1	6.3	11.2	34	0.18	0.5	2.5	5.0	2.5	ECA2EM010()	200
2.2		6.3	11.2	50	0.18	0.5	2.5	5.0	2.5	ECA2EM2R2()	200	2000
3.3		8	11.5	72	0.18	0.6	3.5	5.0		ECA2EM3R3()	200	1000
4.7		8	11.5	86	0.18	0.6	3.5	5.0		ECA2EM4R7()	200	1000
10		10	16	110	0.18	0.6	5.0	5.0		ECA2EM100()	200	500
22		10	20	180	0.18	0.6	5.0	5.0		ECA2EM220()	200	500
33		12.5	20	250	0.18	0.6	5.0	5.0		ECA2EM330()	200	500
47		12.5	25	330	0.18	0.6	5.0	5.0		ECA2EM470()	200	500
100		16	31.5	530	0.18	0.8	7.5			ECA2EM101	100	
220		18	40	930	0.18	0.8	7.5			ECA2EM221	50	
350		1	6.3	11.2	32	0.20	0.5	2.5	5.0	2.5	ECA2VM010()	200
	2.2	8	11.5	55	0.20	0.6	3.5	5.0		ECA2VM2R2()	200	1000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
· Please refer to the page of "Taping Dimensions".

■ Standard Products

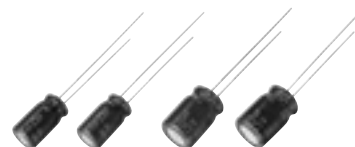
Endurance : 85 °C 2000 h

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
350	3.3	8	11.5	60	0.20	0.6	3.5	5.0		ECA2VM3R3()	200	1000
	4.7	10	12.5	65	0.20	0.6	5.0	5.0		ECA2VM4R7()	200	500
	10	10	20	115	0.20	0.6	5.0	5.0		ECA2VM100()	200	500
	22	12.5	20	195	0.20	0.6	5.0	5.0		ECA2VM220()	200	500
	33	16	25	300	0.20	0.8	7.5	7.5		ECA2VM330()	100	250
	47	16	25	325	0.20	0.8	7.5	7.5		ECA2VM470()	100	250
	100	18	31.5	535	0.20	0.8	7.5			ECA2VM101	50	
400	1	6.3	11.2	32	0.20	0.5	2.5	5.0	2.5	ECA2GM010()	200	2000
	2.2	8	11.5	50	0.20	0.6	3.5	5.0		ECA2GM2R2()	200	1000
	3.3	10	12.5	54	0.20	0.6	5.0	5.0		ECA2GM3R3()	200	500
	4.7	10	16	72	0.20	0.6	5.0	5.0		ECA2GM4R7()	200	500
	10	10	20	115	0.20	0.6	5.0	5.0		ECA2GM100()	200	500
	22	12.5	25	215	0.20	0.6	5.0	5.0		ECA2GM220()	200	500
	33	16	25	275	0.20	0.8	7.5	7.5		ECA2GM330()	100	250
	47	16	31.5	350	0.20	0.8	7.5			ECA2GM470	100	
100	18	40	600	0.20	0.8	7.5			ECA2GM101	50		
450	1	8	11.5	37	0.20	0.6	3.5	5.0		ECA2WM010()	200	1000
	2.2	10	12.5	44	0.20	0.6	5.0	5.0		ECA2WM2R2()	200	500
	3.3	10	16	60	0.20	0.6	5.0	5.0		ECA2WM3R3()	200	500
	4.7	10	20	79	0.20	0.6	5.0	5.0		ECA2WM4R7()	200	500
	10	12.5	20	130	0.20	0.6	5.0	5.0		ECA2WM100()	200	500
	22	16	25	210	0.20	0.8	7.5	7.5		ECA2WM220()	100	250
	33	16	31.5	285	0.20	0.8	7.5			ECA2WM330	100	

- When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
- Please refer to the page of "Taping Dimensions".

Radial Lead Type

Series: **SU(Bi-polar)** Type: **A**



■ Features

- Endurance : 85 °C 2000 h
- RoHS directive compliant

■ Specifications

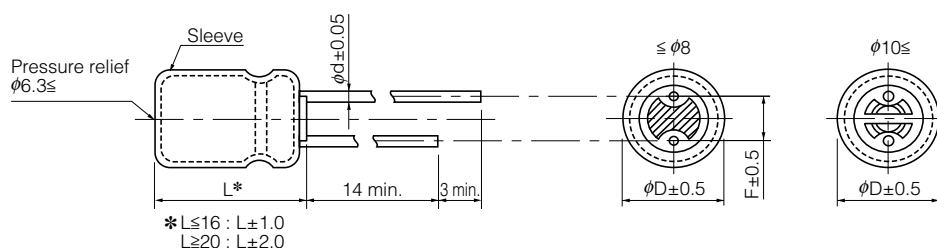
Category Temp. Range	-40 °C to +85 °C		
Rated W.V. Range	6.3 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 μF to 6800 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.03 CV +3 (μA) After 5 minutes		
tan δ	Please see the attached standard products list.		
Endurance	After 2000 hours application of DC working voltage (1000 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits.		
	Capacitance change	± 20 % of initial measured value	
	tan δ	≤ 150 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C capacitors shall meet the limits specified in Endurance. (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)



Body Dia. ϕD	5	6.3	8	10	12.5	16	18
Lead Dia. ϕd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
 Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

■ Standard Products (Bi-polar)

Endurance: 85 °C 2000 h (1000 hours for each polarity)

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C) (Ω)	Lead Dia. (mm)	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
6.3	330	8	11.5	250	0.30	0.6	3.5	5.0		ECEA0JN331U()	200	1000
	470	10	12.5	310	0.30	0.6	5.0	5.0		ECEA0JN471X()	200	500
	1000	10	20	430	0.30	0.6	5.0	5.0		ECEA0JN102U()	200	500
	2200	12.5	25	660	0.32	0.6	5.0	5.0		ECEA0JN222U()	200	500
	3300	16	25	760	0.34	0.8	7.5	7.5		ECEA0JN332U()	100	250
	4700	16	31.5	1170	0.36	0.8	7.5			ECEA0JN472U	100	
	6800	18	35.5	1450	0.40	0.8	7.5			ECEA0JN682U	50	
10	47	5	11	90	0.25	0.5	2.0	5.0	2.5	ECEA1AN470U()	200	2000
	100	6.3	11.2	130	0.25	0.5	2.5	5.0	2.5	ECEA1AN101X()	200	2000
	220	8	11.5	200	0.25	0.6	3.5	5.0		ECEA1AN221U()	200	1000
	330	10	16	280	0.25	0.6	5.0	5.0		ECEA1AN331U()	200	500
	470	10	16	340	0.25	0.6	5.0	5.0		ECEA1AN471U()	200	500
	1000	12.5	20	470	0.25	0.6	5.0	5.0		ECEA1AN102X()	200	500
	2200	16	25	690	0.27	0.8	7.5	7.5		ECEA1AN222U()	100	250
	3300	16	31.5	1090	0.29	0.8	7.5			ECEA1AN332U	100	
	4700	18	35.5	1200	0.31	0.8	7.5			ECEA1AN472U	50	
16	10	5	11	40	0.20	0.5	2.0	5.0	2.5	ECEA1CN100U()	200	2000
	22	5	11	60	0.20	0.5	2.0	5.0	2.5	ECEA1CN220U()	200	2000
	33	5	11	80	0.20	0.5	2.0	5.0	2.5	ECEA1CN330U()	200	2000
	47	6.3	11.2	100	0.20	0.5	2.5	5.0	2.5	ECEA1CN470U()	200	2000
	220	10	12.5	260	0.20	0.6	5.0	5.0		ECEA1CN221X()	200	500
	330	10	16	330	0.20	0.6	5.0	5.0		ECEA1CN331U()	200	500
	470	10	20	380	0.20	0.6	5.0	5.0		ECEA1CN471U()	200	500
	1000	12.5	25	560	0.20	0.6	5.0	5.0		ECEA1CN102U()	200	500
	2200	16	31.5	750	0.22	0.8	7.5			ECEA1CN222U	100	
	3300	18	35.5	900	0.24	0.8	7.5			ECEA1CN332U	50	
25	10	5	11	45	0.15	0.5	2.0	5.0	2.5	ECEA1EN100U()	200	2000
	22	5	11	60	0.15	0.5	2.0	5.0	2.5	ECEA1EN220X()	200	2000
	33	6.3	11.2	90	0.15	0.5	2.5	5.0	2.5	ECEA1EN330U()	200	2000
	47	6.3	11.2	110	0.15	0.5	2.5	5.0	2.5	ECEA1EN470U()	200	2000
	100	8	11.5	180	0.15	0.6	3.5	5.0		ECEA1EN101U()	200	1000
	220	10	16	320	0.15	0.6	5.0	5.0		ECEA1EN221U()	200	500
	330	12.5	20	350	0.15	0.6	5.0	5.0		ECEA1EN331U()	200	500
	470	12.5	20	430	0.15	0.6	5.0	5.0		ECEA1EN471U()	200	500
	1000	16	25	680	0.15	0.8	7.5	7.5		ECEA1EN102U()	100	250
	2200	18	35.5	900	0.17	0.8	7.5			ECEA1EN222U	50	
35	10	5	11	43	0.15	0.5	2.0	5.0	2.5	ECEA1VN100U()	200	2000
	22	6.3	11.2	80	0.15	0.5	2.5	5.0	2.5	ECEA1VN220U()	200	2000
	33	8	11.5	100	0.15	0.6	3.5	5.0		ECEA1VN330U()	200	1000
	47	8	11.5	120	0.15	0.6	3.5	5.0		ECEA1VN470U()	200	1000
	100	10	16	230	0.15	0.6	5.0	5.0		ECEA1VN101U()	200	500
	220	12.5	20	360	0.15	0.6	5.0	5.0		ECEA1VN221U()	200	500
	330	12.5	20	450	0.15	0.6	5.0	5.0		ECEA1VN331U()	200	500
	470	12.5	25	590	0.15	0.6	5.0	5.0		ECEA1VN471U()	200	500

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.
· Please refer to the page of "Taping Dimensions".

■ Standard Products (Bi-polar)

Endurance: 85 °C 2000 h (1000 hours for each polarity)

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C) (Ω)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
							Straight (mm)	Taping *B (mm)	Taping *i (mm)			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(mm)	(mm)	(mm)	(mm)			
50	0.47	5	11	10	0.15	0.5	2.0	5.0	2.5	ECEA1HNR47U()***	200	2000
	1	5	11	10	0.15	0.5	2.0	5.0	2.5	ECEA1HN010U()***	200	2000
	2.2	5	11	18	0.15	0.5	2.0	5.0	2.5	ECEA1HN2R2U()	200	2000
	3.3	5	11	25	0.15	0.5	2.0	5.0	2.5	ECEA1HN3R3U()	200	2000
	4.7	5	11	30	0.15	0.5	2.0	5.0	2.5	ECEA1HN4R7U()	200	2000
	10	6.3	11.2	50	0.15	0.5	2.5	5.0	2.5	ECEA1HN100U()	200	2000
	22	8	11.5	90	0.15	0.6	3.5	5.0		ECEA1HN220U()	200	1000
	33	8	11.5	110	0.15	0.6	3.5	5.0		ECEA1HN330U()	200	1000
	47	10	12.5	140	0.15	0.6	5.0	5.0		ECEA1HN470U()	200	500
	100	10	20	250	0.15	0.6	5.0	5.0		ECEA1HN101U()	200	500
	220	12.5	25	360	0.15	0.6	5.0	5.0		ECEA1HN221U()	200	500
	330	16	25	450	0.15	0.8	7.5	7.5		ECEA1HN331U()	100	250
	470	16	31.5	590	0.15	0.8	7.5			ECEA1HN471U	100	

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

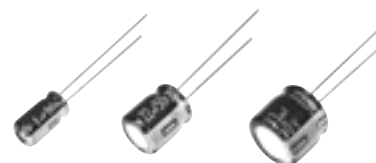
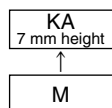
*** Please kindly accept last shipment : 31/Mar/2015

Radial Lead Type

Series: **KA**

Type: **A**

Low Profile



■ Features

- Endurance : 85° C 1000 h
- 7 mm height
- RoHS directive compliant

■ Specifications

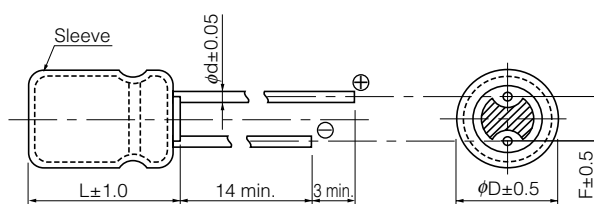
Category Temp. Range	-40 °C to +85 °C		
Rated W.V. Range	4 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 μF to 470 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After applying rated working voltage for 1000 hours at +85 °C±2 °C when the capacitors are restored to 20 °C, capacitors shall meet the following limits.		
	Capacitance change	± 20% of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)



Body Dia. ϕD	4	5	6.3	8
Lead Dia. ϕd	0.45	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5	2.5

■ Standard Products

Endurance : 85 °C 1000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
		(mm)	(mm)			(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
4	47	4	7	34	0.35	0.45	1.5	5.0	2.5	ECEA0GKA470()	200	2000
	100	5	7	61	0.35	0.45	2.0	5.0	2.5	ECEA0GKA101()	200	2000
	220	6.3	7	82	0.35	0.45	2.5	5.0	2.5	ECEA0GKA221()	200	2000
	330	8	7	110	0.35	0.45	2.5		2.5	ECEA0GKA331()	200	1000
		8	7	110	0.35	0.45		5.0		ECEA0GKA331Q		1000
	470	8	7	140	0.35	0.45	2.5		2.5	ECEA0GKA471()	200	1000
		8	7	140	0.35	0.45		5.0		ECEA0GKA471Q		1000
6.3	47	4	7	46	0.24	0.45	1.5	5.0	2.5	ECEA0JKA470()	200	2000
	100	5	7	71	0.24	0.45	2.0	5.0	2.5	ECEA0JKA101()	200	2000
	220	6.3	7	103	0.24	0.45	2.5	5.0	2.5	ECEA0JKA221()	200	2000
	330	8	7	130	0.24	0.45	2.5		2.5	ECEA0JKA331()	200	1000
		8	7	130	0.24	0.45		5.0		ECEA0JKA331Q		1000
10	33	4	7	43	0.20	0.45	1.5	5.0	2.5	ECEA1AKA330()	200	2000
	100	6.3	7	80	0.20	0.45	2.5	5.0	2.5	ECEA1AKA101()	200	2000
	220	8	7	120	0.20	0.45	2.5		2.5	ECEA1AKA221()	200	1000
		8	7	120	0.20	0.45		5.0		ECEA1AKA221Q		1000
16	10	4	7	28	0.16	0.45	1.5	5.0	2.5	ECEA1CKA100()	200	2000
	22	4	7	39	0.16	0.45	1.5	5.0	2.5	ECEA1CKA220()	200	2000
	33	5	7	60	0.16	0.45	2.0	5.0	2.5	ECEA1CKA330()	200	2000
	47	5	7	70	0.16	0.45	2.0	5.0	2.5	ECEA1CKA470()	200	2000
	100	6.3	7	91	0.16	0.45	2.5	5.0	2.5	ECEA1CKA101()	200	2000
25	10	4	7	28	0.14	0.45	1.5	5.0	2.5	ECEA1EKA100()	200	2000
	22	5	7	55	0.14	0.45	2.0	5.0	2.5	ECEA1EKA220()	200	2000
	33	6.3	7	65	0.14	0.45	2.5	5.0	2.5	ECEA1EKA330()	200	2000
	47	6.3	7	70	0.14	0.45	2.5	5.0	2.5	ECEA1EKA470()	200	2000
35	10	5	7	30	0.12	0.45	2.0	5.0	2.5	ECEA1VKA100()	200	2000
	22	6.3	7	60	0.12	0.45	2.5	5.0	2.5	ECEA1VKA220()	200	2000
	33	6.3	7	65	0.12	0.45	2.5	5.0	2.5	ECEA1VKA330()	200	2000
	47	8	7	85	0.12	0.45	2.5		2.5	ECEA1VKA470()	200	1000
		8	7	85	0.12	0.45		5.0		ECEA1VKA470Q		1000
50	0.1	4	7	1	0.10	0.45	1.5	5.0	2.5	ECEA1HKA0R1()***	200	2000
	0.22	4	7	2	0.10	0.45	1.5	5.0	2.5	ECEA1HKAR22()***	200	2000
	0.33	4	7	3	0.10	0.45	1.5	5.0	2.5	ECEA1HKAR33()***	200	2000
	0.47	4	7	5	0.10	0.45	1.5	5.0	2.5	ECEA1HKAR47()***	200	2000
	1	4	7	10	0.10	0.45	1.5	5.0	2.5	ECEA1HKA010()***	200	2000
	2.2	4	7	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKA2R2()	200	2000
	3.3	4	7	18	0.10	0.45	1.5	5.0	2.5	ECEA1HKA3R3()	200	2000
	4.7	4	7	23	0.10	0.45	1.5	5.0	2.5	ECEA1HKA4R7()	200	2000
	10	5	7	35	0.10	0.45	2.0	5.0	2.5	ECEA1HKA100()	200	2000
	22	6.3	7	60	0.10	0.45	2.5	5.0	2.5	ECEA1HKA220()	200	2000
	33	8	7	75	0.10	0.45	2.5		2.5	ECEA1HKA330()	200	1000
		8	7	75	0.10	0.45		5.0		ECEA1HKA330Q		1000

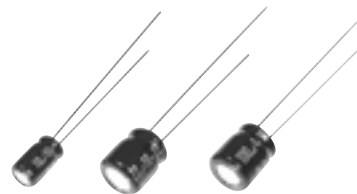
· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

Radial Lead Type

Series: **KA(Bi-polar)** Type: **A**



■ Features

- Endurance : 85° C 1000 h
- 7 mm height
- RoHS directive compliant

■ Specifications

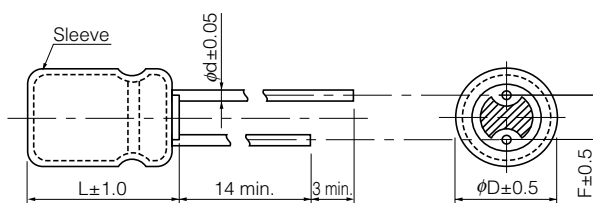
Category Temp. Range	-40 °C to +85 °C		
Rated W.V. Range	4 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 µF to 100 µF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.05 CV or 10 (µA) After 2 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After 1000 hours application of DC working voltage (500 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits.		
	Capacitance change	± 20% of initial measured value	
	tan δ	≤200 % of initial specified value	
	DC leakage current	≤initial specified value	
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)



Body Dia. ϕD	4	5	6.3
Lead Dia. ϕd	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5

■ Standard Products (Bi-polar)

Endurance : 85 °C 1000 h (500hours for each polarity)

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
4	100	6.3	7	61	0.35	0.45	2.5	5.0	2.5	ECEA0GKN101()	200	2000
6.3	22	5	7	29	0.24	0.45	2.0	5.0	2.5	ECEA0JKN220()	200	2000
	33	5	7	38	0.24	0.45	2.0	5.0	2.5	ECEA0JKN330()	200	2000
	47	6.3	7	46	0.24	0.45	2.5	5.0	2.5	ECEA0JKN470()	200	2000
10	10	4	7	25	0.20	0.45	1.5	5.0	2.5	ECEA1AKN100()	200	2000
	22	5	7	35	0.20	0.45	2.0	5.0	2.5	ECEA1AKN220()	200	2000
	33	6.3	7	43	0.20	0.45	2.5	5.0	2.5	ECEA1AKN330()	200	2000
	47	6.3	7	65	0.20	0.45	2.5	5.0	2.5	ECEA1AKN470()	200	2000
16	4.7	4	7	20	0.16	0.45	1.5	5.0	2.5	ECEA1CKN4R7()	200	2000
	10	5	7	25	0.16	0.45	2.0	5.0	2.5	ECEA1CKN100()	200	2000
	22	6.3	7	39	0.16	0.45	2.5	5.0	2.5	ECEA1CKN220()	200	2000
	33	6.3	7	60	0.16	0.45	2.5	5.0	2.5	ECEA1CKN330()	200	2000
25	3.3	4	7	16	0.16	0.45	1.5	5.0	2.5	ECEA1EKN3R3()	200	2000
	4.7	5	7	21	0.16	0.45	2.0	5.0	2.5	ECEA1EKN4R7()	200	2000
	10	6.3	7	28	0.16	0.45	2.5	5.0	2.5	ECEA1EKN100()	200	2000
	22	6.3	7	55	0.16	0.45	2.5	5.0	2.5	ECEA1EKN220()	200	2000
35	2.2	4	7	12	0.14	0.45	1.5	5.0	2.5	ECEA1VKN2R2()	200	2000
	3.3	5	7	16	0.14	0.45	2.0	5.0	2.5	ECEA1VKN3R3()	200	2000
	4.7	5	7	22	0.14	0.45	2.0	5.0	2.5	ECEA1VKN4R7()	200	2000
	10	6.3	7	30	0.14	0.45	2.5	5.0	2.5	ECEA1VKN100()	200	2000
50	0.1	4	7	1	0.12	0.45	1.5	5.0	2.5	ECEA1HKN0R1()***	200	2000
	0.22	4	7	2	0.12	0.45	1.5	5.0	2.5	ECEA1HKNR22()***	200	2000
	0.33	4	7	3	0.12	0.45	1.5	5.0	2.5	ECEA1HKNR33()***	200	2000
	0.47	4	7	5	0.12	0.45	1.5	5.0	2.5	ECEA1HKNR47()***	200	2000
	1	4	7	10	0.12	0.45	1.5	5.0	2.5	ECEA1HKN010()***	200	2000
	2.2	5	7	16	0.12	0.45	2.0	5.0	2.5	ECEA1HKN2R2()	200	2000
	3.3	5	7	16	0.12	0.45	2.0	5.0	2.5	ECEA1HKN3R3()	200	2000
	4.7	6.3	7	23	0.12	0.45	2.5	5.0	2.5	ECEA1HKN4R7()	200	2000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

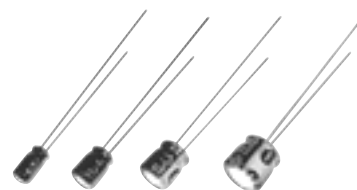
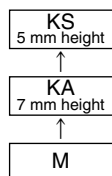
Radial Lead Type

Series: **KS** Type: **A**

■ Features

- Endurance : 85° C 1000 h
- 5 mm height
- RoHS directive compliant

Low Profile



■ Specifications

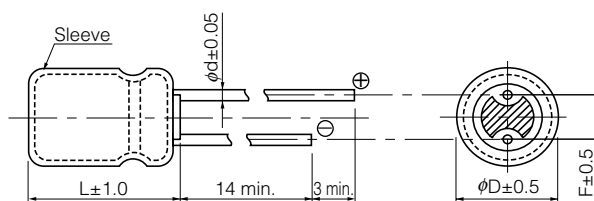
Category Temp. Range	-40 °C to +85 °C		
Rated W.V. Range	4 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 μF to 330 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After applying rated working voltage for 1000 hours at +85 °C±2 °C, when the capacitors are restored to 20°C capacitors, shall meet the following limits.		
	Capacitance change	± 20% of initial measured value (4 V : ±30 %)	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)



Body Dia. φD	4	5	6.3	8
Lead Dia. φd	0.45	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5	2.5

■ Standard Products

Endurance : 85 °C 1000 h

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia.	Lead Space				Straight Leads	Taping
							Straight	Taping *B	Taping *i			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)		(pcs)	(pcs)
4	33	4	5	26	0.35	0.45	1.5	5.0	2.5	ECEA0GKS330()	200	2000
	47	4	5	34	0.35	0.45	1.5	5.0	2.5	ECEA0GKS470()	200	2000
	100	5	5	61	0.35	0.45	2.0	5.0	2.5	ECEA0GKS101()	200	2000
	220	6.3	5	82	0.35	0.45	2.5	5.0	2.5	ECEA0GKS221()	200	2000
6.3	22	4	5	29	0.24	0.45	1.5	5.0	2.5	ECEA0JKS220()	200	2000
	33	5	5	38	0.24	0.45	2.0	5.0	2.5	ECEA0JKS330()	200	2000
	47	5	5	46	0.24	0.45	2.0	5.0	2.5	ECEA0JKS470()	200	2000
	100	6.3	5	71	0.24	0.45	2.5	5.0	2.5	ECEA0JKS101()	200	2000
	330	8	5	130	0.24	0.45	2.5		2.5	ECEA0JKS331()	200	1000
		8	5	130	0.24	0.45		5.0		ECEA0JKS331Q		1000
10	22	5	5	35	0.20	0.45	2.0	5.0	2.5	ECEA1AKS220()	200	2000
	33	5	5	43	0.20	0.45	2.0	5.0	2.5	ECEA1AKS330()	200	2000
	47	6.3	5	65	0.20	0.45	2.5	5.0	2.5	ECEA1AKS470()	200	2000
	100	6.3	5	80	0.20	0.45	2.5	5.0	2.5	ECEA1AKS101()	200	2000
	220	8	5	120	0.20	0.45	2.5		2.5	ECEA1AKS221()	200	1000
		8	5	120	0.20	0.45		5.0		ECEA1AKS221Q		1000
16	10	4	5	28	0.16	0.45	1.5	5.0	2.5	ECEA1CKS100()	200	2000
	22	5	5	39	0.16	0.45	2.0	5.0	2.5	ECEA1CKS220()	200	2000
	33	6.3	5	60	0.16	0.45	2.5	5.0	2.5	ECEA1CKS330()	200	2000
	47	6.3	5	70	0.16	0.45	2.5	5.0	2.5	ECEA1CKS470()	200	2000
	100	8	5	91	0.16	0.45	2.5		2.5	ECEA1CKS101()	200	1000
		8	5	91	0.16	0.45		5.0		ECEA1CKS101Q		1000
25	4.7	4	5	22	0.14	0.45	1.5	5.0	2.5	ECEA1EKS4R7()	200	2000
	10	5	5	28	0.14	0.45	2.0	5.0	2.5	ECEA1EKS100()	200	2000
	22	6.3	5	55	0.14	0.45	2.5	5.0	2.5	ECEA1EKS220()	200	2000
	33	6.3	5	65	0.14	0.45	2.5	5.0	2.5	ECEA1EKS330()	200	2000
	100	8	5	85	0.14	0.45	2.5		2.5	ECEA1EKS101()	200	1000
		8	5	85	0.14	0.45		5.0		ECEA1EKS101Q		1000
35	3.3	4	5	16	0.12	0.45	1.5	5.0	2.5	ECEA1VKS3R3()	200	2000
	4.7	4	5	22	0.12	0.45	1.5	5.0	2.5	ECEA1VKS4R7()	200	2000
	10	5	5	30	0.12	0.45	2.0	5.0	2.5	ECEA1VKS100()	200	2000
	22	6.3	5	60	0.12	0.45	2.5	5.0	2.5	ECEA1VKS220()	200	2000
	33	8	5	65	0.12	0.45	2.5		2.5	ECEA1VKS330()	200	1000
		8	5	65	0.12	0.45		5.0		ECEA1VKS330Q		1000
	47	8	5	85	0.12	0.45	2.5		2.5	ECEA1VKS470()	200	1000
		8	5	85	0.12	0.45		5.0		ECEA1VKS470Q		1000
50	0.1	4	5	1	0.10	0.45	1.5	5.0	2.5	ECEA1HKS0R1()***	200	2000
	0.22	4	5	2	0.10	0.45	1.5	5.0	2.5	ECEA1HKS0R2()***	200	2000
	0.33	4	5	3	0.10	0.45	1.5	5.0	2.5	ECEA1HKS0R3()***	200	2000
	0.47	4	5	5	0.10	0.45	1.5	5.0	2.5	ECEA1HKS0R4()***	200	2000
	1	4	5	10	0.10	0.45	1.5	5.0	2.5	ECEA1HKS010()***	200	2000
	2.2	4	5	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKS2R2()	200	2000
	3.3	4	5	16	0.10	0.45	1.5	5.0	2.5	ECEA1HKS3R3()	200	2000
	4.7	5	5	23	0.10	0.45	2.0	5.0	2.5	ECEA1HKS4R7()	200	2000
	10	6.3	5	35	0.10	0.45	2.5	5.0	2.5	ECEA1HKS100()	200	2000
	22	8	5	60	0.10	0.45	2.5		2.5	ECEA1HKS220()	200	1000
		8	5	60	0.10	0.45		5.0		ECEA1HKS220Q		1000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, i=2.5 mm.

· Please refer to the page of "Taping Dimensions".

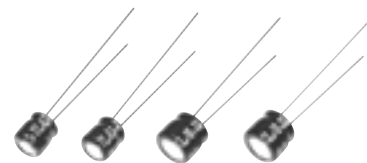
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Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 May. 2014

Radial Lead Type

Series: **KS(Bi-polar)** Type: **A**



■ Features

- Endurance : 85° C 1000 h
- 5 mm height
- RoHS directive compliant

■ Specifications

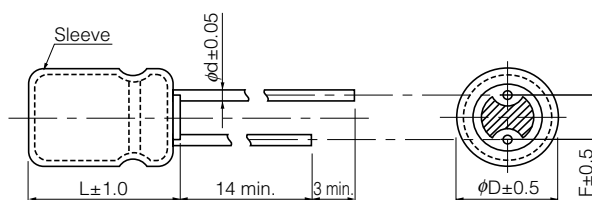
Category Temp. Range	−40 °C to +85 °C		
Rated W.V. Range	63 V.DC to 50 V.DC		
Nominal Cap. Range	2.2 μF to 47 μF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	I ≤ 0.05 CV or 10 (μA) After 2 minutes (Whichever is greater)		
tan δ	Please see the attached standard products list		
Endurance	After 1000 hours application of DC working voltage (500 hours for each polarity) at +85 °C±2 °C, when the capacitors are restored to 20 °C, the capacitors shall meet the following limits.		
	Capacitance change	± 20% of initial measured value	
	tan δ	≤200 % of initial specified value	
	DC leakage current	≤initial specified value	
Shelf Life	After storage for 1000 hours at +85 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)			
	50, 60	120	1 k	10 k to
Correction factor	0.70	1.00	1.30	1.70

■ Dimensions in mm (not to scale)

(Unit : mm)



Body Dia. φD	4	5	6.3
Lead Dia. φd	0.45	0.45	0.45
Lead space F	1.5	2.0	2.5

■ Standard Products (Bi-polar)

Endurance : 85 °C 1000 h (500hours for each polarity)

W.V.	Cap. (±20 %)	Case size		Specification		Lead Length				Part No.	Min. Packaging Q'ty	
		Dia.	Length	Ripple Current (120 Hz) (+85 °C) (mA r.m.s.)	tan δ (120 Hz) (+20 °C)	Lead Dia. (mm)	Lead Space				Straight Leads (pcs)	Taping (pcs)
							Straight (mm)	Taping *B (mm)	Taping *i (mm)			
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)		(mm)	(mm)	(mm)	(mm)			
6.3	22	5	5	29	0.24	0.45	2.0	5.0	2.5	ECEA0JSN220()	200	2000
	33	6.3	5	38	0.24	0.45	2.5	5.0	2.5	ECEA0JSN330()	200	2000
	47	6.3	5	46	0.24	0.45	2.5	5.0	2.5	ECEA0JSN470()	200	2000
10	10	4	5	25	0.20	0.45	1.5	5.0	2.5	ECEA1ASN100()	200	2000
	22	6.3	5	35	0.20	0.45	2.5	5.0	2.5	ECEA1ASN220()	200	2000
	33	6.3	5	43	0.20	0.45	2.5	5.0	2.5	ECEA1ASN330()	200	2000
16	4.7	4	5	20	0.20	0.45	1.5	5.0	2.5	ECEA1CSN4R7()	200	2000
	10	5	5	25	0.20	0.45	2.0	5.0	2.5	ECEA1CSN100()	200	2000
	22	6.3	5	39	0.20	0.45	2.5	5.0	2.5	ECEA1CSN220()	200	2000
25	3.3	5	5	18	0.20	0.45	2.0	5.0	2.5	ECEA1ESN3R3()	200	2000
	4.7	5	5	21	0.20	0.45	2.0	5.0	2.5	ECEA1ESN4R7()	200	2000
	10	6.3	5	28	0.20	0.45	2.5	5.0	2.5	ECEA1ESN100()	200	2000
35	2.2	4	5	12	0.20	0.45	1.5	5.0	2.5	ECEA1VSN2R2()	200	2000
50	0.1	4	5	1	0.20	0.45	1.5	5.0	2.5	ECEA1HSN0R1()***	200	2000
	0.22	4	5	2	0.20	0.45	1.5	5.0	2.5	ECEA1HSNR22()***	200	2000
	0.33	4	5	3	0.20	0.45	1.5	5.0	2.5	ECEA1HSNR33()***	200	2000
	0.47	4	5	5	0.20	0.45	1.5	5.0	2.5	ECEA1HSNR47()***	200	2000
	1	4	5	10	0.20	0.45	1.5	5.0	2.5	ECEA1HSN010()***	200	2000
	2.2	5	5	16	0.20	0.45	2.0	5.0	2.5	ECEA1HSN2R2()	200	2000

· When requesting taped product, please put the letter "B" or "i" between the "()". Lead wire pitch *B=5 mm, i=2.5 mm.

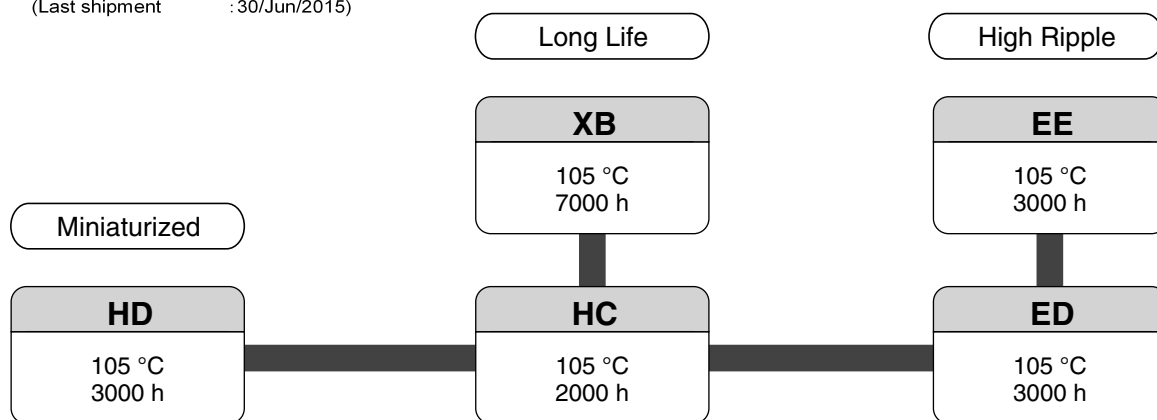
· Please refer to the page of "Taping Dimensions".

*** Please kindly accept last shipment : 31/Mar/2015

Large can type Aluminum Electrolytic Capacitors

Discontinued

(Last purchasing order: 31/Mar/2015)
(Last shipment : 30/Jun/2015)



Snap-in Type

Series: **EE** Type: **TS**

Discontinued

(Last purchasing order : 31/Mar/2015)
(Last shipment : 30/Jun/2015)

■ Features

- Endurance : 105 °C 3000 h
- Miniaturize (Maximum Ripple Current) Low profile
- RoHS directive compliant



■ Specifications

Category Temp. Range	-40 °C to +105 °C	-25 °C to +105 °C
Rated W.V. Range	200 V.DC, 250 V.DC	400 V.DC, 450 V.DC
Nominal Cap. Range	220 µF to 1800 µF	75 µF to 560 µF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$3\sqrt{CV}$ (µA) max. After 5 minutes application of rated working voltage at +20 °C C : Capacitance (µF) V: W.V. (V.DC)	
tan δ	Please see the attached standard products list	
Endurance	After 3000 hours application of DC voltage with specified ripple current ($\leq$ rated DC working voltage) at +105 °C±2 °C, the capacitors shall meet the following limits.	
	Capacitance change	$\leq \pm 20$ % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	$\leq$ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C within no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)	

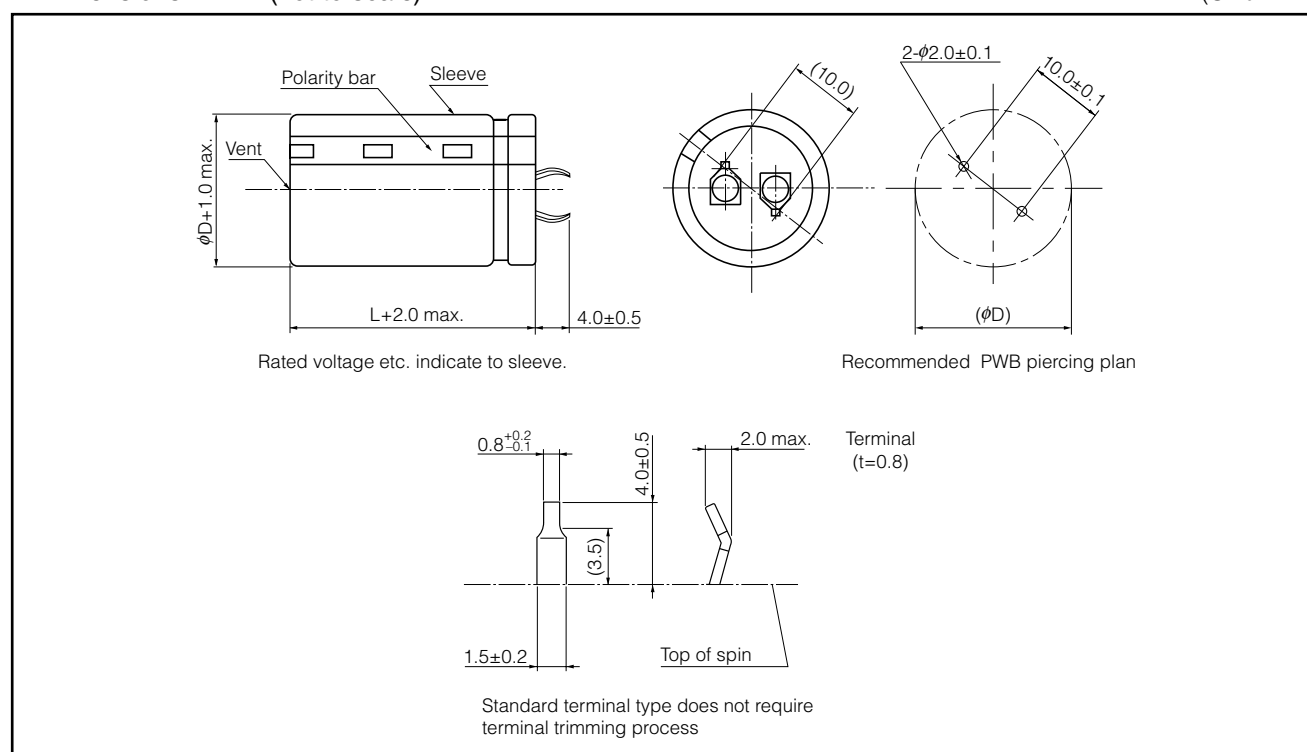
* A formula to calculate estimated lifetime of TS-EE Series is different from other series. Please contact us.

■ Frequency correction factor for ripple current

Rated Voltage	Frequency (Hz)						
	50	60	100	120	500	1 k	10 k to
200V.DC, 250V.DC	0.75	0.80	0.95	1.00	1.20	1.25	1.30
400V.DC, 450V.DC	0.75	0.80	0.95	1.00	1.20	1.25	1.40

■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
200	300	22	25	EETEE2D301HJ	1.70	0.15	200
	390	22	30	EETEE2D391HJ	2.17	0.15	200
	470	22	35	EETEE2D471HJ	2.22	0.15	200
	590	22	40	EETEE2D591HJ	2.30	0.15	200
		25	30	EETEE2D591JJ	2.30	0.15	200
	700	22	45	EETEE2D701HJ	2.65	0.15	200
		25	35	EETEE2D701JJ	2.65	0.15	200
	590	30	25	EETEE2D591KJ	3.08	0.15	100
	800	22	50	EETEE2D801HJ	3.08	0.15	200
		25	40	EETEE2D801JJ	3.08	0.15	200
		30	30	EETEE2D801KJ	3.48	0.15	100
		35	25	EETEE2D801LJ	3.48	0.15	100
	1000	25	50	EETEE2D102JJ	3.48	0.15	200
		30	35	EETEE2D102KJ	3.98	0.15	100
		35	30	EETEE2D102LJ	4.20	0.15	100
	1200	30	40	EETEE2D122KJ	4.20	0.15	100
	1300	30	45	EETEE2D132KJ	4.62	0.15	100
	1500	35	40	EETEE2D152LJ	4.62	0.15	100
		30	50	EETEE2D152KJ	5.22	0.15	100
	* 1800	35	45	EETEE2D182LJ	5.22	0.15	100
250	220	22	25	EETEE2E221HJ	1.43	0.15	200
	300	22	30	EETEE2E301HJ	1.56	0.15	200
		25	25	EETEE2E301JJ	1.70	0.15	200
	370	22	35	EETEE2E371HJ	1.70	0.15	200
	420	22	40	EETEE2E421HJ	1.82	0.15	200
		25	30	EETEE2E421JJ	1.82	0.15	200
		30	25	EETEE2E421KJ	2.20	0.15	100
	520	22	45	EETEE2E521HJ	2.00	0.15	200
		25	35	EETEE2E521JJ	2.00	0.15	200
	590	22	50	EETEE2E591HJ	2.30	0.15	200
		25	40	EETEE2E591JJ	2.30	0.15	200
		30	30	EETEE2E591KJ	2.50	0.15	100
		35	25	EETEE2E591LJ	2.50	0.15	100
	730	25	45	EETEE2E731JJ	2.70	0.15	200
		30	35	EETEE2E731KJ	3.00	0.15	100
		35	30	EETEE2E731LJ	3.00	0.15	100
	860	30	40	EETEE2E861KJ	3.30	0.15	100
	1000	30	45	EETEE2E102KJ	3.45	0.15	100
	* 1300	35	45	EETEE2E132LJ	3.75	0.15	100
	* 1500	35	50	EETEE2E152LJ	4.05	0.15	100

* When capacitors of $\phi 35 \times 45$ L and $\phi 35 \times 50$ L are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
400	100	22	25	EETEE2G101HJ	0.95	0.15	200
	120	22	30	EETEE2G121HJ	1.22	0.15	200
	150	22	35	EETEE2G151HJ	1.33	0.15	200
	180	25	30	EETEE2G181JJ	1.33	0.15	200
		30	25	EETEE2G181KJ	1.68	0.15	100
	220	22	45	EETEE2G221HJ	1.55	0.15	200
		25	35	EETEE2G221JJ	1.55	0.15	200
		30	30	EETEE2G221KJ	1.79	0.15	100
		35	25	EETEE2G221LJ	1.79	0.15	100
	270	22	50	EETEE2G271HJ	1.68	0.15	200
		25	40	EETEE2G271JJ	1.68	0.15	200
		30	35	EETEE2G271KJ	2.12	0.15	100
	320	25	45	EETEE2G321JJ	1.90	0.15	200
	330	30	40	EETEE2G331KJ	2.33	0.15	100
		35	30	EETEE2G331LJ	2.33	0.15	100
	370	25	50	EETEE2G371JJ	2.12	0.15	200
	390	30	45	EETEE2G391KJ	2.52	0.15	100
		35	35	EETEE2G391LJ	2.52	0.15	100
	470	30	50	EETEE2G471KJ	2.85	0.15	100
		35	40	EETEE2G471LJ	2.85	0.15	100
*	560	35	45	EETEE2G561LJ	3.18	0.15	100
450	75	22	25	EETEE2W750HJ	0.83	0.20	200
	100	22	30	EETEE2W101HJ	0.95	0.20	200
		25	25	EETEE2W101JJ	0.95	0.20	200
	120	22	35	EETEE2W121HJ	1.15	0.20	200
		25	30	EETEE2W121JJ	1.22	0.20	200
		30	25	EETEE2W121KJ	1.22	0.20	100
	150	22	40	EETEE2W151HJ	1.22	0.20	200
	180	22	45	EETEE2W181HJ	1.38	0.20	200
		25	40	EETEE2W181JJ	1.38	0.20	200
		30	30	EETEE2W181KJ	1.60	0.20	100
		35	25	EETEE2W181LJ	1.60	0.20	100
	220	25	45	EETEE2W221JJ	1.55	0.20	200
	250	35	30	EETEE2W251LJ	1.90	0.20	100
	270	25	50	EETEE2W271JJ	1.74	0.20	200
		30	40	EETEE2W271KJ	1.90	0.20	100
	300	35	35	EETEE2W301LJ	2.20	0.20	100
	330	30	45	EETEE2W331KJ	2.20	0.20	100
		35	40	EETEE2W331LJ	2.40	0.20	100
	390	30	50	EETEE2W391KJ	2.40	0.20	100
		35	45	EETEE2W391LJ	2.61	0.20	100
*	470	35	50	EETEE2W471LJ	2.85	0.20	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

Snap-in Type

Series: **ED** Type: **TS**

Discontinued

(Last purchasing order: 31/Mar/2015)
(Last shipment : 30/Jun/2015)



■ Features

- Endurance : 105 °C 3000 h
- High ripple current capability in high frequency range.
- RoHS directive compliant

■ Specifications

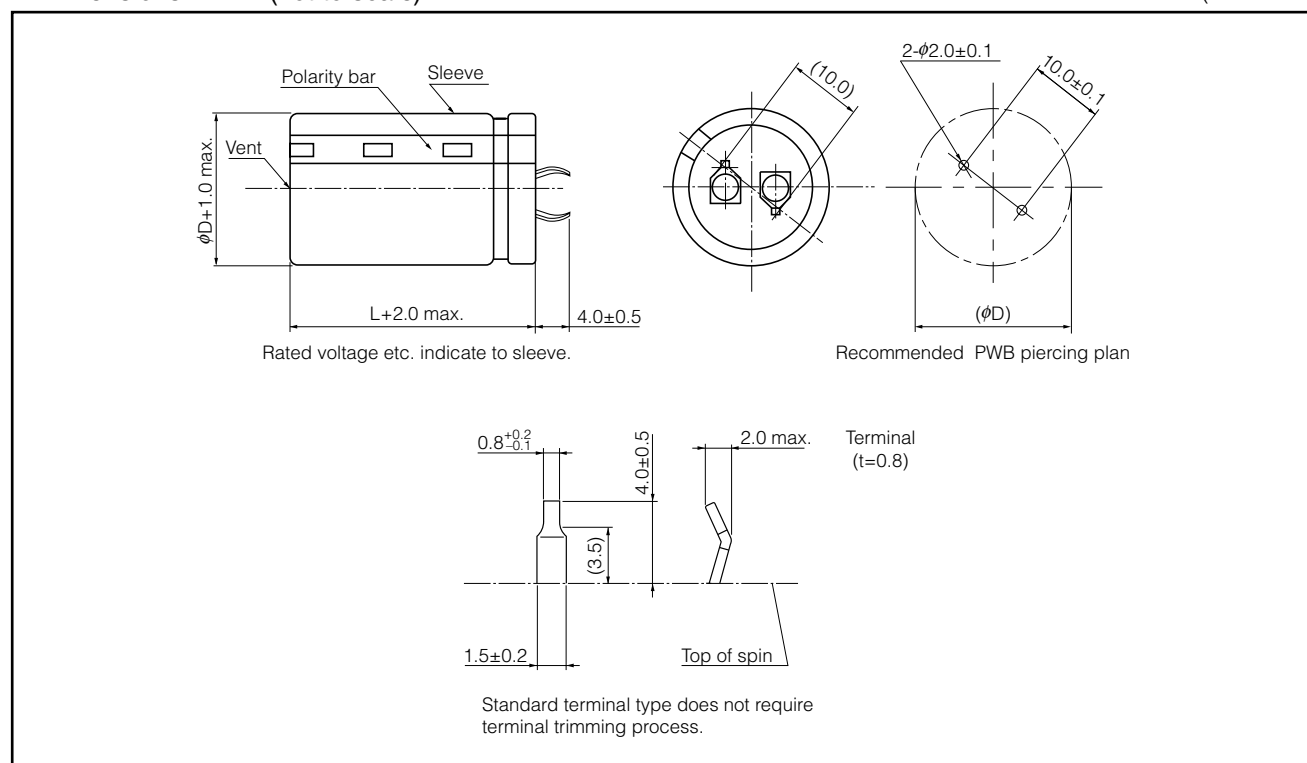
Category Temp. Range	−40 °C to + 105 °C	−25 °C to +105 °C
Rated W.V. Range	200 V.DC to 250 V.DC	400 V.DC to 450 V.DC
Nominal Cap. Range	220 µF to 2200 µF	56 µF to 560 µF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	$3\sqrt{CV}$ (µA) max. After 5 minutes application of rated working voltage at +20 °C C : Capacitance (µF) V: W.V. (V.DC)	
tan δ	Please see the attached standard products list	
Endurance	After 3000 hours application of DC voltage with specified ripple current ($\leq$ rated DC working voltage) at +105 °C±2 °C, the capacitors shall meet the following limits.	
	Capacitance change	$\leq \pm 20$ % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	$\leq$ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C within no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance (With voltage treatment)	

■ Frequency correction factor for ripple current

	Frequency (Hz)						
	50	60	100	120	500	1 k	10 k to
Correction factor	0.50	0.55	0.68	0.70	0.85	0.90	1.00

■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (50 kHz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
200	270	22	25	EETED2D271HJ	2.03	0.15	200
	330	22	30	EETED2D331HJ	2.23	0.15	200
	390	22	30	EETED2D391HJ	2.44	0.15	200
		25	25	EETED2D391JJ	2.44	0.15	200
	470	22	35	EETED2D471HJ	2.64	0.15	200
		25	30	EETED2D471JJ	2.64	0.15	200
	560	22	40	EETED2D561HJ	3.05	0.15	200
		25	30	EETED2D561JJ	3.05	0.15	200
		30	25	EETED2D561KJ	3.05	0.15	100
	680	22	45	EETED2D681HJ	3.45	0.15	200
		25	35	EETED2D681JJ	3.45	0.15	200
		30	30	EETED2D681KJ	3.45	0.15	100
	820	22	50	EETED2D821HJ	3.76	0.15	200
		25	40	EETED2D821JJ	3.76	0.15	200
		30	30	EETED2D821KJ	3.76	0.15	100
		35	25	EETED2D821LJ	3.76	0.15	100
	1000	25	45	EETED2D102JJ	4.06	0.15	200
		30	35	EETED2D102KJ	4.06	0.15	100
		35	30	EETED2D102LJ	4.06	0.15	100
	1200	30	40	EETED2D122KJ	4.47	0.15	100
		35	35	EETED2D122LJ	4.47	0.15	100
	1500	30	50	EETED2D152KJ	5.08	0.15	100
		35	40	EETED2D152LJ	5.08	0.15	100
*	1800	35	45	EETED2D182LJ	5.48	0.15	100
	2200	35	50	EETED2D222LJ	5.89	0.15	100
220	270	22	30	EETED2Q271HJ	2.03	0.15	200
	330	22	30	EETED2Q331HJ	2.23	0.15	200
		25	25	EETED2Q331JJ	2.23	0.15	200
	390	22	35	EETED2Q391HJ	2.44	0.15	200
		25	30	EETED2Q391JJ	2.44	0.15	200
	470	22	40	EETED2Q471HJ	2.64	0.15	200
		25	30	EETED2Q471JJ	2.64	0.15	200
		30	25	EETED2Q471KJ	2.64	0.15	100
	560	22	45	EETED2Q561HJ	3.05	0.15	200
		25	35	EETED2Q561JJ	3.05	0.15	200
		30	30	EETED2Q561KJ	3.05	0.15	100
	680	25	40	EETED2Q681JJ	3.45	0.15	200
		30	30	EETED2Q681KJ	3.45	0.15	100
		35	25	EETED2Q681LJ	3.45	0.15	100
	820	25	45	EETED2Q821JJ	3.76	0.15	200
		30	35	EETED2Q821KJ	3.76	0.15	100
		35	30	EETED2Q821LJ	3.76	0.15	100
	1000	30	40	EETED2Q102KJ	4.06	0.15	100
		35	35	EETED2Q102LJ	4.06	0.15	100
	1200	30	45	EETED2Q122KJ	4.47	0.15	100
		35	40	EETED2Q122LJ	4.47	0.15	100
*	1500	35	45	EETED2Q152LJ	5.08	0.15	100
	1800	35	50	EETED2Q182LJ	5.48	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (50 kHz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
250	220	22	30	EETED2E221HJ	1.83	0.15	200
	270	22	30	EETED2E271HJ	2.03	0.15	200
		25	25	EETED2E271JJ	2.03	0.15	200
	330	22	35	EETED2E331HJ	2.23	0.15	200
		25	30	EETED2E331JJ	2.23	0.15	200
	390	22	40	EETED2E391HJ	2.44	0.15	200
		25	30	EETED2E391JJ	2.44	0.15	200
		30	25	EETED2E391KJ	2.44	0.15	100
	470	22	45	EETED2E471HJ	2.64	0.15	200
		25	35	EETED2E471JJ	2.64	0.15	200
		30	30	EETED2E471KJ	2.64	0.15	100
	560	25	40	EETED2E561JJ	3.05	0.15	200
		30	30	EETED2E561KJ	3.05	0.15	100
		35	25	EETED2E561LJ	3.05	0.15	100
	680	25	45	EETED2E681JJ	3.45	0.15	200
		30	35	EETED2E681KJ	3.45	0.15	100
		35	30	EETED2E681LJ	3.45	0.15	100
	820	30	40	EETED2E821KJ	3.76	0.15	100
		35	35	EETED2E821LJ	3.76	0.15	100
	1000	30	50	EETED2E102KJ	4.06	0.15	100
		35	40	EETED2E102LJ	4.06	0.15	100
400	* 1200	35	45	EETED2E122LJ	4.47	0.15	100
	* 1500	35	50	EETED2E152LJ	5.08	0.15	100
400	82	22	25	EETED2G820HJ	1.14	0.15	200
	100	22	30	EETED2G101HJ	1.30	0.15	200
		25	25	EETED2G101JJ	1.30	0.15	200
	120	22	35	EETED2G121HJ	1.46	0.15	200
		25	30	EETED2G121JJ	1.46	0.15	200
	150	22	40	EETED2G151HJ	1.53	0.15	200
		25	30	EETED2G151JJ	1.53	0.15	200
		30	25	EETED2G151KJ	1.53	0.15	100
	180	22	45	EETED2G181HJ	1.60	0.15	200
		25	35	EETED2G181JJ	1.60	0.15	200
		30	30	EETED2G181KJ	1.60	0.15	100
	220	22	50	EETED2G221HJ	2.03	0.15	200
		25	40	EETED2G221JJ	2.03	0.15	200
		30	30	EETED2G221KJ	2.03	0.15	100
		35	25	EETED2G221LJ	2.03	0.15	100
	270	25	45	EETED2G271JJ	2.23	0.15	200
		30	35	EETED2G271KJ	2.23	0.15	100
		35	30	EETED2G271LJ	2.23	0.15	100
	330	30	40	EETED2G331KJ	2.44	0.15	100
		35	30	EETED2G331LJ	2.44	0.15	100
	390	30	45	EETED2G391KJ	2.64	0.15	100
		35	35	EETED2G391LJ	2.64	0.15	100
	470	35	40	EETED2G471LJ	2.84	0.15	100
	* 560	35	45	EETED2G561LJ	3.05	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (50 kHz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
420	68	22	25	EETED2S680HJ	1.08	0.15	200
	82	22	30	EETED2S820HJ	1.14	0.15	200
		25	25	EETED2S820JJ	1.14	0.15	200
	100	22	30	EETED2S101HJ	1.30	0.15	200
		25	25	EETED2S101JJ	1.30	0.15	200
	120	22	35	EETED2S121HJ	1.46	0.15	200
		25	30	EETED2S121JJ	1.46	0.15	200
	150	22	40	EETED2S151HJ	1.53	0.15	200
		25	35	EETED2S151JJ	1.53	0.15	200
		30	25	EETED2S151KJ	1.53	0.15	100
	180	22	45	EETED2S181HJ	1.60	0.15	200
		25	40	EETED2S181JJ	1.60	0.15	200
		30	30	EETED2S181KJ	1.60	0.15	100
		35	25	EETED2S181LJ	1.60	0.15	100
	220	25	45	EETED2S221JJ	2.03	0.15	200
		30	35	EETED2S221KJ	2.03	0.15	100
		35	30	EETED2S221LJ	2.03	0.15	100
	270	25	50	EETED2S271JJ	2.40	0.15	200
		30	40	EETED2S271KJ	2.40	0.15	100
		35	30	EETED2S271LJ	2.40	0.15	100
	330	30	45	EETED2S331KJ	2.54	0.15	100
		35	35	EETED2S331LJ	2.54	0.15	100
	390	30	50	EETED2S391KJ	2.73	0.15	100
		35	40	EETED2S391LJ	2.73	0.15	100
	* 470	35	45	EETED2S471LJ	3.18	0.15	100
450	56	22	25	EETED2W560HJ	0.95	0.15	200
	68	22	30	EETED2W680HJ	1.08	0.15	200
		25	25	EETED2W680JJ	1.08	0.15	200
	82	22	30	EETED2W820HJ	1.14	0.15	200
		25	25	EETED2W820JJ	1.14	0.15	200
	100	22	35	EETED2W101HJ	1.30	0.15	200
		25	30	EETED2W101JJ	1.30	0.15	200
	120	22	40	EETED2W121HJ	1.46	0.15	200
		25	35	EETED2W121JJ	1.46	0.15	200
		30	25	EETED2W121KJ	1.46	0.15	100
	150	22	45	EETED2W151HJ	1.53	0.15	200
		25	40	EETED2W151JJ	1.53	0.15	200
		30	30	EETED2W151KJ	1.53	0.15	100
		35	25	EETED2W151LJ	1.53	0.15	100
	180	22	50	EETED2W181HJ	1.60	0.15	200
		25	40	EETED2W181JJ	1.60	0.15	200
		30	30	EETED2W181KJ	1.60	0.15	100
		35	25	EETED2W181LJ	1.60	0.15	100
	220	25	45	EETED2W221JJ	2.03	0.15	200
		30	35	EETED2W221KJ	2.03	0.15	100
		35	30	EETED2W221LJ	2.03	0.15	100
	270	30	40	EETED2W271KJ	2.45	0.15	100
		35	35	EETED2W271LJ	2.45	0.15	100
	330	30	50	EETED2W331KJ	2.64	0.15	100
		35	40	EETED2W331LJ	2.64	0.15	100
	390	35	40	EETED2W391LJ	2.82	0.15	100
	* 470	35	50	EETED2W471LJ	3.53	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

Snap-in Type

Series: **HC** Type: **TS**

Discontinued

(Last purchasing order: 31/Mar/2015)
(Last shipment : 30/Jun/2015)



■ Features

- Endurance : 105 °C 2000 h
- 30 % smaller than series TS-HB
- RoHS directive compliant

■ Specifications

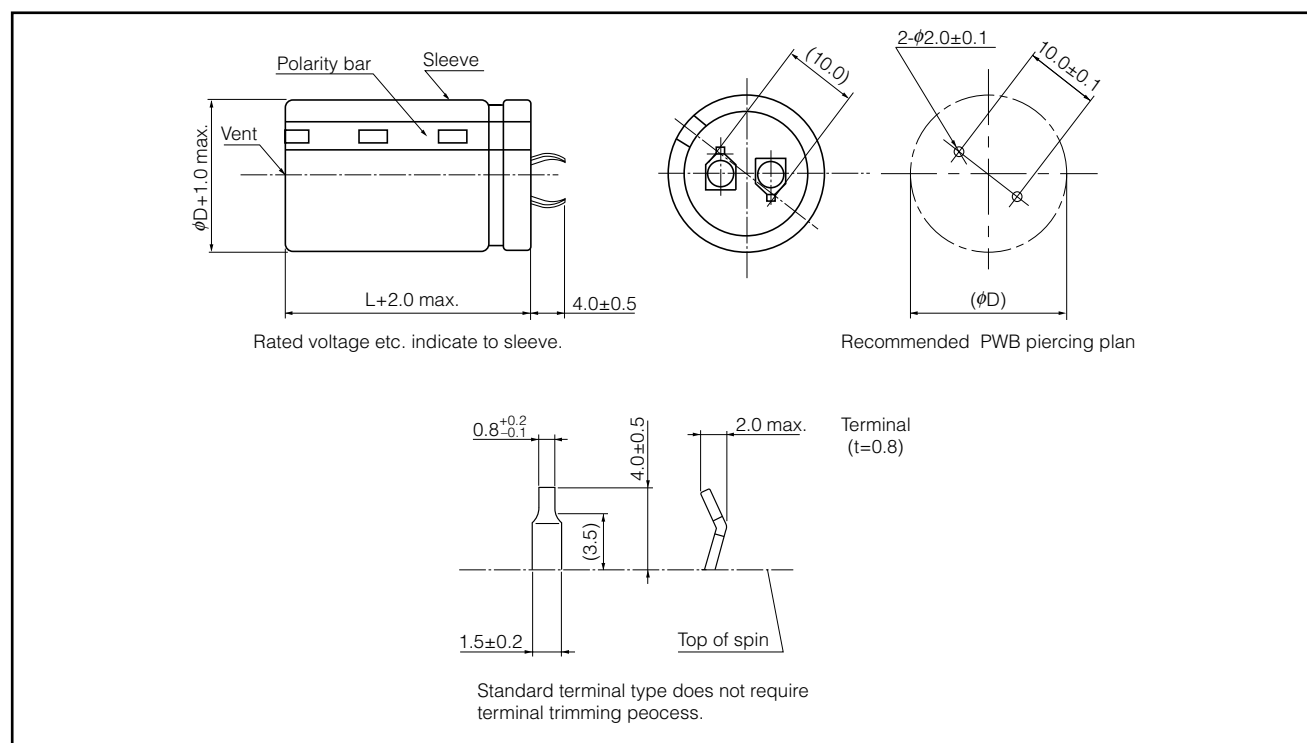
Category Temp. Range	-40 °C to +105 °C		-25 °C to +105 °C
Rated W.V. Range	10 V.DC to 100 V.DC	160 V.DC to 250 V.DC	315 V.DC to 450 V.DC
Nominal Cap. Range	820 μF to 100000 μF	150 μF to 3300 μF	39 μF to 1000 μF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	3√CV (μA) max. After 5 minutes application of rated working voltage at +20 °C. C : Capacitance (μF) V: W.V. (V.DC)		
tan δ	Please see the attached standard products list		
Endurance	After 2000 hours application of DC voltage with specified ripple current (≤ rated DC working voltage) at +105 °C±2 °C, the capacitors shall meet the following limits.		
	Capacitance change	≤ ±20 % of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +105 °C±2 °C within no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)		

■ Frequency correction factor for ripple current

Rated Voltage	Frequency (Hz)						
	50	60	100	120	500	1 k	10 k to
10 V.DC to 100 V.DC /C.F.	0.93	0.95	0.99	1.00	1.05	1.08	1.15
160 V.DC to 450 V.DC /C.F.	0.75	0.80	0.95	1.00	1.20	1.25	1.40

■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
10	12000	22	25	EETHC1A123HJ	2.20	0.65	200
	15000	22	30	EETHC1A153HJ	2.30	0.65	200
	18000	22	30	EETHC1A183HJ	2.40	0.65	200
		25	25	EETHC1A183JJ	2.40	0.65	200
	22000	22	35	EETHC1A223HJ	2.60	0.65	200
		25	30	EETHC1A223JJ	2.60	0.65	200
	27000	22	40	EETHC1A273HJ	3.10	0.65	200
		25	35	EETHC1A273JJ	3.10	0.65	200
		30	25	EETHC1A273KJ	3.10	0.65	100
	33000	22	45	EETHC1A333HJ	3.40	0.65	200
		25	40	EETHC1A333JJ	3.40	0.65	200
	39000	25	45	EETHC1A393JJ	3.70	0.71	200
		30	30	EETHC1A393KJ	3.70	0.71	100
		35	25	EETHC1A393LJ	3.70	0.71	100
	47000	25	50	EETHC1A473JJ	4.20	0.79	200
		30	35	EETHC1A473KJ	4.20	0.79	100
		35	30	EETHC1A473LJ	4.20	0.79	100
	56000	30	40	EETHC1A563KJ	5.00	0.88	100
		35	35	EETHC1A563LJ	5.00	0.88	100
	68000	30	45	EETHC1A683KJ	5.40	1.00	100
		35	40	EETHC1A683LJ	5.40	1.00	100
16	* 82000	35	45	EETHC1A823LJ	5.90	1.14	100
	* 100000	35	50	EETHC1A104LJ	6.50	1.32	100
	10000	22	25	EETHC1C103HJ	2.60	0.55	200
		22	30	EETHC1C123HJ	2.90	0.55	200
	12000	25	25	EETHC1C123JJ	2.90	0.55	200
		22	35	EETHC1C153HJ	3.20	0.55	200
	18000	22	40	EETHC1C183HJ	3.50	0.55	200
		25	30	EETHC1C183JJ	3.50	0.55	200
	22000	22	45	EETHC1C223HJ	3.80	0.55	200
		25	35	EETHC1C223JJ	3.80	0.55	200
		30	25	EETHC1C223KJ	3.80	0.55	100
	27000	22	50	EETHC1C273HJ	4.20	0.55	200
		25	40	EETHC1C273JJ	4.20	0.55	200
		30	30	EETHC1C273KJ	4.20	0.55	100
		35	25	EETHC1C273LJ	4.20	0.55	100
	33000	25	45	EETHC1C333JJ	4.70	0.55	200
		30	35	EETHC1C333KJ	4.70	0.55	100
	39000	30	40	EETHC1C393KJ	5.10	0.61	100
		35	30	EETHC1C393LJ	5.10	0.61	100
	47000	30	45	EETHC1C473KJ	5.50	0.69	100
		35	35	EETHC1C473LJ	5.50	0.69	100
	56000	30	50	EETHC1C563KJ	6.00	0.78	100
		35	40	EETHC1C563LJ	6.00	0.78	100
	* 68000	35	45	EETHC1C683LJ	6.40	0.90	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	$\tan \delta$ (120 Hz) (+20 °C) max.	
25	6800	22	25	EETHC1E682HJ	2.40	0.40	200
	8200	22	30	EETHC1E822HJ	2.70	0.40	200
		25	25	EETHC1E822JJ	2.70	0.40	200
	10000	22	35	EETHC1E103HJ	3.00	0.40	200
	12000	22	40	EETHC1E123HJ	3.20	0.40	200
		25	30	EETHC1E123JJ	3.20	0.40	200
	15000	22	45	EETHC1E153HJ	3.60	0.40	200
		25	35	EETHC1E153JJ	3.60	0.40	200
		30	25	EETHC1E153KJ	3.60	0.40	100
	18000	22	50	EETHC1E183HJ	3.90	0.40	200
		25	40	EETHC1E183JJ	3.90	0.40	200
		30	30	EETHC1E183KJ	3.90	0.40	100
		35	25	EETHC1E183LJ	3.90	0.40	100
	22000	25	45	EETHC1E223JJ	4.30	0.40	200
		30	35	EETHC1E223KJ	4.30	0.40	100
		35	30	EETHC1E223LJ	4.30	0.40	100
	27000	30	40	EETHC1E273KJ	4.80	0.40	100
		35	35	EETHC1E273LJ	4.80	0.40	100
	33000	30	45	EETHC1E333KJ	5.50	0.40	100
		35	40	EETHC1E333LJ	5.50	0.40	100
	39000	30	50	EETHC1E393KJ	5.80	0.46	100
		35	45	EETHC1E393LJ	5.80	0.46	100
	* 47000	35	50	EETHC1E473LJ	6.30	0.54	100
35	4700	22	25	EETHC1V472HJ	2.20	0.35	200
	5600	22	30	EETHC1V562HJ	2.40	0.35	200
		25	25	EETHC1V562JJ	2.40	0.35	200
	6800	22	35	EETHC1V682HJ	2.60	0.35	200
	8200	22	40	EETHC1V822HJ	2.90	0.35	200
		25	30	EETHC1V822JJ	2.90	0.35	200
	10000	22	45	EETHC1V103HJ	3.20	0.35	200
		25	35	EETHC1V103JJ	3.20	0.35	200
		30	25	EETHC1V103KJ	3.20	0.35	100
	12000	22	50	EETHC1V123HJ	3.50	0.35	200
		25	40	EETHC1V123JJ	3.50	0.35	200
		30	30	EETHC1V123KJ	3.50	0.35	100
		35	25	EETHC1V123LJ	3.50	0.35	100
	15000	25	45	EETHC1V153JJ	3.90	0.35	200
		30	35	EETHC1V153KJ	3.90	0.35	100
		35	30	EETHC1V153LJ	3.90	0.35	100
	18000	30	40	EETHC1V183KJ	4.30	0.35	100
		35	35	EETHC1V183LJ	4.30	0.35	100
	22000	30	45	EETHC1V223KJ	5.00	0.35	100
		35	40	EETHC1V223LJ	5.00	0.35	100
	* 27000	35	45	EETHC1V273LJ	5.30	0.35	100
	* 33000	35	50	EETHC1V333LJ	5.90	0.35	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
50	2700	22	25	EETHC1H272HJ	1.80	0.35	200
	3300	22	30	EETHC1H332HJ	2.00	0.35	200
	3900	22	35	EETHC1H392HJ	2.20	0.35	200
		25	25	EETHC1H392JJ	2.20	0.35	200
	4700	22	40	EETHC1H472HJ	2.50	0.35	200
		25	30	EETHC1H472JJ	2.50	0.35	200
	5600	22	45	EETHC1H562HJ	2.80	0.35	200
		25	35	EETHC1H562JJ	2.80	0.35	200
		30	25	EETHC1H562KJ	2.80	0.35	100
	6800	22	50	EETHC1H682HJ	3.30	0.35	200
		25	40	EETHC1H682JJ	3.30	0.35	200
		30	30	EETHC1H682KJ	3.30	0.35	100
		35	25	EETHC1H682LJ	3.30	0.35	100
	8200	25	45	EETHC1H822JJ	3.60	0.35	200
		30	35	EETHC1H822KJ	3.60	0.35	100
	10000	25	50	EETHC1H103JJ	4.00	0.35	200
		30	40	EETHC1H103KJ	4.00	0.35	100
		35	30	EETHC1H103LJ	4.00	0.35	100
	12000	30	45	EETHC1H123KJ	4.50	0.35	100
		35	35	EETHC1H123LJ	4.50	0.35	100
	15000	30	50	EETHC1H153KJ	4.80	0.35	100
		35	40	EETHC1H153LJ	4.80	0.35	100
	* 18000	35	45	EETHC1H183LJ	5.20	0.35	100
63	2200	22	25	EETHC1J222HJ	2.00	0.30	200
	2700	22	30	EETHC1J272HJ	2.20	0.30	200
		25	25	EETHC1J272JJ	2.20	0.30	200
	3300	22	35	EETHC1J332HJ	2.50	0.30	200
	3900	22	40	EETHC1J392HJ	2.70	0.30	200
		25	30	EETHC1J392JJ	2.70	0.30	200
		30	25	EETHC1J392KJ	2.70	0.30	100
	4700	22	45	EETHC1J472HJ	3.00	0.30	200
		25	35	EETHC1J472JJ	3.00	0.30	200
	5600	22	50	EETHC1J562HJ	3.30	0.30	200
		25	40	EETHC1J562JJ	3.30	0.30	200
		30	30	EETHC1J562KJ	3.30	0.30	100
		35	25	EETHC1J562LJ	3.30	0.30	100
	6800	25	45	EETHC1J682JJ	3.60	0.30	200
		30	35	EETHC1J682KJ	3.60	0.30	100
		35	30	EETHC1J682LJ	3.60	0.30	100
	8200	30	40	EETHC1J822KJ	3.90	0.30	100
		35	35	EETHC1J822LJ	3.90	0.30	100
	10000	30	45	EETHC1J103KJ	4.40	0.30	100
		35	40	EETHC1J103LJ	4.40	0.30	100
	* 12000	35	45	EETHC1J123LJ	4.80	0.30	100
	* 15000	35	50	EETHC1J153LJ	5.40	0.30	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
80	1200	22	25	EETHC1K122HJ	1.50	0.25	200
	1500	22	30	EETHC1K152HJ	1.70	0.25	200
		25	25	EETHC1K152JJ	1.70	0.25	200
	1800	22	35	EETHC1K182HJ	1.80	0.25	200
	2200	22	40	EETHC1K222HJ	2.10	0.25	200
		25	30	EETHC1K222JJ	2.10	0.25	200
	2700	22	45	EETHC1K272HJ	2.40	0.25	200
		25	35	EETHC1K272JJ	2.40	0.25	200
		30	25	EETHC1K272KJ	2.40	0.25	100
	3300	22	50	EETHC1K332HJ	2.60	0.25	200
		25	40	EETHC1K332JJ	2.60	0.25	200
		30	30	EETHC1K332KJ	2.60	0.25	100
		35	25	EETHC1K332LJ	2.60	0.25	100
	3900	25	45	EETHC1K392JJ	3.00	0.25	200
		30	35	EETHC1K392KJ	3.00	0.25	100
	4700	25	50	EETHC1K472JJ	3.30	0.25	200
		30	40	EETHC1K472KJ	3.30	0.25	100
		35	30	EETHC1K472LJ	3.30	0.25	100
	5600	30	45	EETHC1K562KJ	3.70	0.25	100
		35	35	EETHC1K562LJ	3.70	0.25	100
	6800	30	50	EETHC1K682KJ	3.90	0.25	100
		35	40	EETHC1K682LJ	3.90	0.25	100
100	* 8200	35	45	EETHC1K822LJ	4.30	0.25	100
	820	22	25	EETHC2A821HJ	1.40	0.25	200
	1000	22	30	EETHC2A102HJ	1.70	0.25	200
	1200	22	30	EETHC2A122HJ	1.80	0.25	200
		25	25	EETHC2A122JJ	1.80	0.25	200
	1500	22	35	EETHC2A152HJ	2.10	0.25	200
		25	30	EETHC2A152JJ	2.10	0.25	200
	1800	22	40	EETHC2A182HJ	2.30	0.25	200
		25	35	EETHC2A182JJ	2.30	0.25	200
		30	25	EETHC2A182KJ	2.30	0.25	100
	2200	25	40	EETHC2A222JJ	2.60	0.25	200
		30	30	EETHC2A222KJ	2.60	0.25	100
		35	25	EETHC2A222LJ	2.60	0.25	100
	2700	25	45	EETHC2A272JJ	2.90	0.25	200
		30	35	EETHC2A272KJ	2.90	0.25	100
	3300	25	50	EETHC2A332JJ	3.20	0.25	200
		30	40	EETHC2A332KJ	3.20	0.25	100
		35	30	EETHC2A332LJ	3.20	0.25	100
	3900	30	45	EETHC2A392KJ	3.60	0.25	100
		35	35	EETHC2A392LJ	3.60	0.25	100
	4700	30	50	EETHC2A472KJ	3.80	0.25	100
		35	40	EETHC2A472LJ	3.80	0.25	100
*	5600	35	45	EETHC2A562LJ	4.10	0.25	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
160	470	22	25	EETHC2C471HJ	1.40	0.15	200
	560	22	30	EETHC2C561HJ	1.50	0.15	200
	680	22	30	EETHC2C681HJ	1.70	0.15	200
		25	25	EETHC2C681JJ	1.70	0.15	200
	820	22	35	EETHC2C821HJ	2.00	0.15	200
		25	30	EETHC2C821JJ	2.00	0.15	200
	1000	22	40	EETHC2C102HJ	2.20	0.15	200
		25	35	EETHC2C102JJ	2.20	0.15	200
		30	25	EETHC2C102KJ	2.20	0.15	100
	1200	22	45	EETHC2C122HJ	2.30	0.15	200
		25	40	EETHC2C122JJ	2.30	0.15	200
		30	30	EETHC2C122KJ	2.30	0.15	100
		35	25	EETHC2C122LJ	2.30	0.15	100
	1500	25	45	EETHC2C152JJ	2.50	0.15	200
		30	35	EETHC2C152KJ	2.50	0.15	100
		35	30	EETHC2C152LJ	2.50	0.15	100
	1800	25	50	EETHC2C182JJ	2.70	0.15	200
		30	40	EETHC2C182KJ	2.70	0.15	100
		35	30	EETHC2C182LJ	2.70	0.15	100
	2200	30	45	EETHC2C222KJ	2.90	0.15	100
		35	35	EETHC2C222LJ	2.90	0.15	100
	2700	30	50	EETHC2C272KJ	3.10	0.15	100
		35	40	EETHC2C272LJ	3.10	0.15	100
180	* 3300	35	50	EETHC2C332LJ	3.30	0.15	100
	470	22	25	EETHC2P471HC	1.45	0.15	200
	560	22	30	EETHC2P561HJ	1.50	0.15	200
		25	25	EETHC2P561JJ	1.50	0.15	200
	680	22	35	EETHC2P681HJ	1.70	0.15	200
		25	30	EETHC2P681JJ	1.70	0.15	200
	820	22	40	EETHC2P821HJ	2.00	0.15	200
		25	30	EETHC2P821JJ	2.00	0.15	200
		30	25	EETHC2P821KJ	2.00	0.15	100
	1000	22	45	EETHC2P102HJ	2.20	0.15	200
		25	40	EETHC2P102JJ	2.20	0.15	200
		30	30	EETHC2P102KJ	2.20	0.15	100
		35	25	EETHC2P102LJ	2.20	0.15	100
	1200	25	45	EETHC2P122JJ	2.30	0.15	200
		30	30	EETHC2P122KC	2.30	0.15	100
		30	35	EETHC2P122KJ	2.30	0.15	100
	1500	25	50	EETHC2P152JJ	2.50	0.15	200
		30	40	EETHC2P152KJ	2.50	0.15	100
		35	30	EETHC2P152LJ	2.50	0.15	100
	1800	30	45	EETHC2P182KJ	2.70	0.15	100
		35	35	EETHC2P182LJ	2.70	0.15	100
	2200	30	50	EETHC2P222KJ	2.90	0.15	100
		35	40	EETHC2P222LJ	2.90	0.15	100
	* 2700	35	50	EETHC2P272LJ	3.10	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
200	390	22	25	EETHC2D391HJ	1.31	0.15	200
	470	22	30	EETHC2D471HJ	1.45	0.15	200
		25	25	EETHC2D471JC	1.45	0.15	200
	680	22	40	EETHC2D681HJ	1.75	0.15	200
		25	30	EETHC2D681JJ	1.75	0.15	200
	820	22	45	EETHC2D821HJ	2.04	0.15	200
		25	35	EETHC2D821JJ	2.04	0.15	200
	1000	22	50	EETHC2D102HJ	2.30	0.15	200
		25	40	EETHC2D102JC	2.30	0.15	200
		25	45	EETHC2D102JJ	2.30	0.15	200
		30	30	EETHC2D102KJ	2.30	0.15	100
		35	25	EETHC2D102LJ	2.30	0.15	100
	1200	25	45	EETHC2D122JC	2.65	0.15	200
		25	50	EETHC2D122JJ	2.65	0.15	200
		30	35	EETHC2D122KJ	2.65	0.15	100
		35	30	EETHC2D122LJ	2.65	0.15	100
	1500	30	40	EETHC2D152KJ	2.80	0.15	100
	1800	35	40	EETHC2D182LJ	3.08	0.15	100
	* 2200	35	45	EETHC2D222LJ	3.48	0.15	100
220	270	22	25	EETHC2Q271HJ	1.10	0.15	200
	330	22	25	EETHC2Q331HJ	1.26	0.15	200
	390	22	30	EETHC2Q391HJ	1.34	0.15	200
	470	22	35	EETHC2Q471HJ	1.48	0.15	200
		25	30	EETHC2Q471JJ	1.48	0.15	200
	560	22	35	EETHC2Q561HC	1.67	0.15	200
		22	40	EETHC2Q561HJ	1.67	0.15	200
		25	30	EETHC2Q561JJ	1.67	0.15	200
	680	22	45	EETHC2Q681HC	1.78	0.15	200
		25	35	EETHC2Q681JJ	1.78	0.15	200
		35	25	EETHC2Q681LJ	1.78	0.15	100
	820	22	50	EETHC2Q821HC	2.04	0.15	200
		25	40	EETHC2Q821JJ	2.04	0.15	200
		30	30	EETHC2Q821KJ	2.04	0.15	100
		35	25	EETHC2Q821LJ	2.04	0.15	100
	1000	25	45	EETHC2Q102JC	2.33	0.15	200
		25	50	EETHC2Q102JJ	2.33	0.15	200
		30	35	EETHC2Q102KJ	2.33	0.15	100
		35	30	EETHC2Q102LJ	2.33	0.15	100
	1200	30	40	EETHC2Q122KJ	2.65	0.15	100
		35	35	EETHC2Q122LJ	2.65	0.15	100
	1500	30	45	EETHC2Q152KC	2.80	0.15	100
		30	50	EETHC2Q152KJ	2.80	0.15	100
		35	40	EETHC2Q152LJ	2.80	0.15	100
	* 1800	35	45	EETHC2Q182LJ	3.11	0.15	100
	* 2200	35	50	EETHC2Q222LC	3.50	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
250	270	22	25	EETHC2E271HJ	1.10	0.15	200
	330	22	30	EETHC2E331HJ	1.20	0.15	200
		25	25	EETHC2E331JJ	1.20	0.15	200
	390	22	30	EETHC2E391HC	1.30	0.15	200
		22	35	EETHC2E391HJ	1.30	0.15	200
		25	25	EETHC2E391JJ	1.30	0.15	200
	470	22	35	EETHC2E471HC	1.40	0.15	200
		22	40	EETHC2E471HJ	1.40	0.15	200
		25	30	EETHC2E471JJ	1.40	0.15	200
		30	25	EETHC2E471KJ	1.40	0.15	100
	560	22	40	EETHC2E561HC	1.50	0.15	200
		22	45	EETHC2E561HJ	1.50	0.15	200
		25	35	EETHC2E561JJ	1.50	0.15	200
		30	25	EETHC2E561KJ	1.50	0.15	100
	680	22	45	EETHC2E681HC	1.70	0.15	200
		22	50	EETHC2E681HJ	1.70	0.15	200
		25	40	EETHC2E681JJ	1.70	0.15	200
		30	30	EETHC2E681KJ	1.70	0.15	100
		35	25	EETHC2E681LJ	1.70	0.15	100
	820	25	45	EETHC2E821JJ	2.00	0.15	200
		30	35	EETHC2E821KJ	2.00	0.15	100
		35	30	EETHC2E821LJ	2.00	0.15	100
	1000	25	50	EETHC2E102JC	2.20	0.15	200
		30	40	EETHC2E102KJ	2.20	0.15	100
		35	30	EETHC2E102LJ	2.20	0.15	100
	1200	30	45	EETHC2E122KJ	2.30	0.15	100
		35	35	EETHC2E122LJ	2.30	0.15	100
	* 1500	35	45	EETHC2E152LJ	2.50	0.15	100
	* 1800	35	50	EETHC2E182LJ	2.70	0.15	100
315	150	22	25	EETHC2F151HJ	0.82	0.15	200
	180	22	30	EETHC2F181HJ	0.90	0.15	200
	220	22	30	EETHC2F221HJ	1.00	0.15	200
	270	22	40	EETHC2F271HC	1.10	0.15	200
		25	30	EETHC2F271JJ	1.10	0.15	200
	330	22	45	EETHC2F331HJ	1.20	0.15	200
		25	35	EETHC2F331JJ	1.20	0.15	200
		30	25	EETHC2F331KJ	1.20	0.15	100
	390	22	50	EETHC2F391HC	1.30	0.15	200
		25	40	EETHC2F391JJ	1.30	0.15	200
		30	30	EETHC2F391KJ	1.30	0.15	100
		35	25	EETHC2F391LJ	1.30	0.15	100
	470	25	45	EETHC2F471JJ	1.40	0.15	200
		30	35	EETHC2F471KJ	1.40	0.15	100
	560	25	50	EETHC2F561JJ	1.50	0.15	200
		30	40	EETHC2F561KJ	1.50	0.15	100
		35	30	EETHC2F561LJ	1.50	0.15	100
	680	30	45	EETHC2F681KJ	1.70	0.15	100
		35	35	EETHC2F681LJ	1.70	0.15	100
	820	30	50	EETHC2F821KJ	2.00	0.15	100
		35	40	EETHC2F821LJ	2.00	0.15	100
	* 1000	35	45	EETHC2F102LJ	2.30	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
350	120	22	25	EETHC2V121HJ	0.75	0.15	200
	150	22	30	EETHC2V151HJ	0.82	0.15	200
	180	22	30	EETHC2V181HJ	0.90	0.15	200
		25	25	EETHC2V181JJ	0.90	0.15	200
	220	22	35	EETHC2V221HJ	1.00	0.15	200
		25	30	EETHC2V221JJ	1.00	0.15	200
	270	22	40	EETHC2V271HC	1.10	0.15	200
		25	35	EETHC2V271JJ	1.10	0.15	200
		30	25	EETHC2V271KJ	1.10	0.15	100
	330	22	45	EETHC2V331HC	1.20	0.15	200
		25	40	EETHC2V331JJ	1.20	0.15	200
		30	30	EETHC2V331KJ	1.20	0.15	100
	390	25	45	EETHC2V391JJ	1.30	0.15	200
		30	30	EETHC2V391KC	1.30	0.15	100
		30	35	EETHC2V391KJ	1.30	0.15	100
	470	25	50	EETHC2V471JJ	1.40	0.15	200
		30	35	EETHC2V471KC	1.40	0.15	100
		35	30	EETHC2V471LJ	1.40	0.15	100
	560	30	40	EETHC2V561KC	1.50	0.15	100
		30	45	EETHC2V561KJ	1.50	0.15	100
		35	35	EETHC2V561LJ	1.50	0.15	100
	680	30	45	EETHC2V681KC	1.70	0.15	100
		30	50	EETHC2V681KJ	1.70	0.15	100
		35	40	EETHC2V681LJ	1.70	0.15	100
	* 820	35	45	EETHC2V821LJ	1.90	0.15	100
	* 1000	35	50	EETHC2V102LC	1.90	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
400	100	22	25	EETHC2G101HJ	0.70	0.15	200
	120	22	30	EETHC2G121HJ	0.75	0.15	200
	150	22	30	EETHC2G151HJ	0.88	0.15	200
		25	25	EETHC2G151JC	0.88	0.15	200
	180	22	35	EETHC2G181HJ	0.95	0.15	200
		25	30	EETHC2G181JJ	0.95	0.15	200
	220	22	40	EETHC2G221HC	1.10	0.15	200
		22	45	EETHC2G221HJ	1.10	0.15	200
		25	35	EETHC2G221JJ	1.10	0.15	200
		30	25	EETHC2G221KJ	1.10	0.15	100
	270	22	45	EETHC2G271HC	1.22	0.15	200
		22	50	EETHC2G271HJ	1.22	0.15	200
		25	40	EETHC2G271JJ	1.22	0.15	200
		30	30	EETHC2G271KJ	1.22	0.15	100
		35	25	EETHC2G271LJ	1.22	0.15	100
	330	25	45	EETHC2G331JJ	1.44	0.15	200
		30	30	EETHC2G331KC	1.44	0.15	100
		30	35	EETHC2G331KJ	1.44	0.15	100
		35	30	EETHC2G331LJ	1.44	0.15	100
	390	25	50	EETHC2G391JJ	1.55	0.15	200
		30	35	EETHC2G391KC	1.55	0.15	100
		30	40	EETHC2G391KJ	1.55	0.15	100
		35	30	EETHC2G391LJ	1.55	0.15	100
	470	30	45	EETHC2G471KJ	1.68	0.15	100
		35	35	EETHC2G471LJ	1.68	0.15	100
	560	30	45	EETHC2G561KC	1.90	0.15	100
		30	50	EETHC2G561KJ	1.90	0.15	100
		35	40	EETHC2G561LJ	1.90	0.15	100
	* 680	35	45	EETHC2G681LJ	2.12	0.15	100
	* 820	35	50	EETHC2G821LJ	2.30	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
420	100	22	25	EETHC2S101HJ	0.70	0.15	200
	120	22	30	EETHC2S121HJ	0.74	0.15	200
		25	25	EETHC2S121JJ	0.74	0.15	200
	150	22	35	EETHC2S151HJ	0.84	0.15	200
		25	30	EETHC2S151JJ	0.84	0.15	200
	180	22	40	EETHC2S181HJ	0.91	0.15	200
		25	30	EETHC2S181JJ	0.91	0.15	200
		30	25	EETHC2S181KJ	0.91	0.15	100
	220	22	45	EETHC2S221HJ	1.05	0.15	200
		25	35	EETHC2S221JJ	1.05	0.15	200
		30	25	EETHC2S221KJ	1.05	0.15	100
	270	22	50	EETHC2S271HJ	1.20	0.15	200
		25	40	EETHC2S271JJ	1.20	0.15	200
		30	30	EETHC2S271KJ	1.20	0.15	100
		35	25	EETHC2S271LJ	1.20	0.15	100
	330	25	45	EETHC2S331JC	1.42	0.15	200
		25	50	EETHC2S331JJ	1.42	0.15	200
		30	35	EETHC2S331KJ	1.42	0.15	100
		35	35	EETHC2S331LJ	1.42	0.15	100
	390	30	40	EETHC2S391KJ	1.55	0.15	100
		35	30	EETHC2S391LC	1.55	0.15	100
		35	35	EETHC2S391LJ	1.55	0.15	100
	470	30	45	EETHC2S471KJ	1.71	0.15	100
		35	35	EETHC2S471LJ	1.71	0.15	100
	560	30	50	EETHC2S561KJ	1.90	0.15	100
		35	40	EETHC2S561LC	1.90	0.15	100
		35	45	EETHC2S561LJ	1.90	0.15	100
	680	35	45	EETHC2S681LC	2.10	0.15	100
		35	50	EETHC2S681LJ	2.10	0.15	100

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

Standard Products

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No.	Specification		Min. Packaging Q'ty
		Dia. (mm)	Length (mm)	PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
450	100	22	30	EETHC2W101HJ	0.64	0.20	200
		25	25	EETHC2W101JJ	0.64	0.20	200
	120	22	35	EETHC2W121HJ	0.72	0.20	200
		25	30	EETHC2W121JJ	0.72	0.20	200
	150	22	35	EETHC2W151HC	0.79	0.20	200
		22	40	EETHC2W151HJ	0.79	0.20	200
		25	30	EETHC2W151JJ	0.79	0.20	200
		30	25	EETHC2W151KJ	0.79	0.20	100
	180	22	45	EETHC2W181HJ	0.87	0.20	200
		25	35	EETHC2W181JC	0.87	0.20	200
		25	40	EETHC2W181JJ	0.87	0.20	200
		30	25	EETHC2W181KC	0.87	0.20	100
		30	30	EETHC2W181KJ	0.87	0.20	100
	220	22	50	EETHC2W221HJ	1.00	0.20	200
		25	40	EETHC2W221JC	1.00	0.20	200
		25	45	EETHC2W221JJ	1.00	0.20	200
		30	30	EETHC2W221KJ	1.00	0.20	100
		35	25	EETHC2W221LJ	1.00	0.20	100
	270	25	45	EETHC2W271JC	1.19	0.20	200
		25	50	EETHC2W271JJ	1.19	0.20	200
		30	35	EETHC2W271KC	1.19	0.20	100
		30	40	EETHC2W271KJ	1.19	0.20	100
		35	30	EETHC2W271LJ	1.19	0.20	100
	330	25	50	EETHC2W331JC	1.38	0.20	200
		30	40	EETHC2W331KC	1.38	0.20	100
		30	45	EETHC2W331KJ	1.38	0.20	100
		35	30	EETHC2W331LC	1.38	0.20	100
		35	35	EETHC2W331LJ	1.38	0.20	100
	390	30	45	EETHC2W391KC	1.55	0.20	100
		30	50	EETHC2W391KJ	1.55	0.20	100
		35	35	EETHC2W391LC	1.55	0.20	100
		35	40	EETHC2W391LJ	1.55	0.20	100
	470	30	50	EETHC2W471KC	1.74	0.20	100
		35	40	EETHC2W471LC	1.74	0.20	100
		35	45	EETHC2W471LJ	1.74	0.20	100
	* *	560	35	50	EETHC2W561LJ	1.90	0.20

*When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products (L:20 mm)

Discontinued

Endurance : 105 °C 2000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length max. (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
200	220	22	20	EETHC2D221HJ	0.85	0.15	200
	270	25	20	EETHC2D271JJ	0.95	0.15	200
	330	30	20	EETHC2D331KJ	1.10	0.15	100
	390	30	20	EETHC2D391KJ	1.20	0.15	100
	470	35	20	EETHC2D471LJ	1.41	0.15	100
	560	35	20	EETHC2D561LJ	1.48	0.15	100
250	150	22	20	EETHC2E151HJ	0.69	0.15	200
	180	25	20	EETHC2E181JJ	0.77	0.15	200
	220	30	20	EETHC2E221KJ	0.95	0.15	100
	270	30	20	EETHC2E271KJ	1.00	0.15	100
	330	35	20	EETHC2E331LJ	1.16	0.15	100
	390	35	20	EETHC2E391LJ	1.30	0.15	100
400	56	22	20	EETHC2G560HJ	0.40	0.15	200
	68	25	20	EETHC2G680JJ	0.49	0.15	200
	82	30	20	EETHC2G820KJ	0.55	0.15	100
	100	30	20	EETHC2G101KJ	0.60	0.15	100
	120	35	20	EETHC2G121LJ	0.75	0.15	100
	150	35	20	EETHC2G151LJ	0.80	0.15	100
450	39	22	20	EETHC2W390HJ	0.36	0.20	200
	47	25	20	EETHC2W470JJ	0.41	0.20	200
	56	25	20	EETHC2W560JJ	0.43	0.20	200
	68	30	20	EETHC2W680KJ	0.50	0.20	100
	82	30	20	EETHC2W820KJ	0.53	0.20	100
	100	35	20	EETHC2W101LJ	0.61	0.20	100

Snap-in Type

Series: **HD** Type: **TS**

Discontinued

(Last purchasing order: 31/Mar/2015)
(Last shipment : 30/Jun/2015)



■ Features

- Endurance : 105 °C 3000 h
- 30 % smaller than series TS-HC
- RoHS directive compliant

■ Specifications

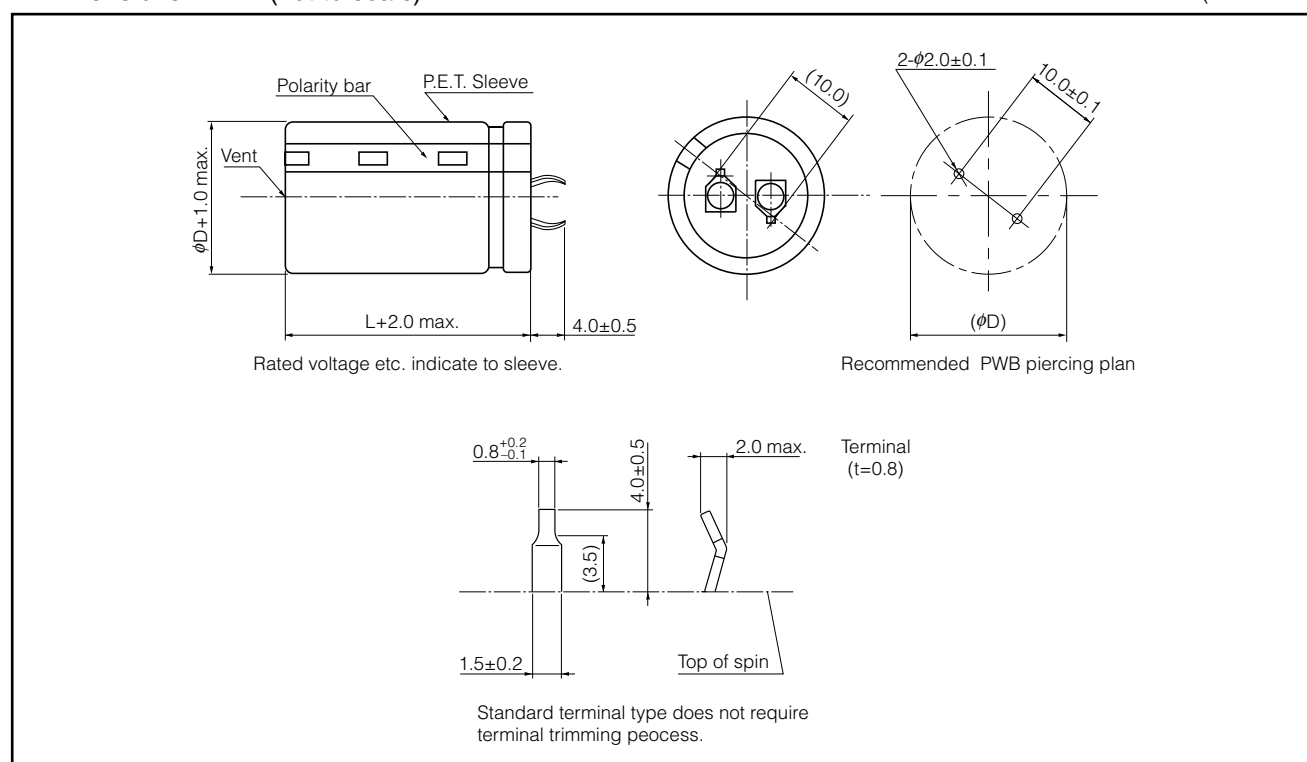
Category Temp. Range	-25 °C to +105 °C		
Rated W.V. Range	400 V.DC to 450 V.DC		
Nominal Cap. Range	120 µF to 680 µF		
Capacitance Tolerance	±20 % (120 Hz/+20 °C)		
DC Leakage Current	3√CV (µA) max. After 5 minutes application of rated working voltage at +20 °C. C : Capacitance (µF) V: W.V. (V.DC)		
tan δ	Please see the attached standard products list		
Endurance	After 3000 hours application of DC voltage with specified ripple current (≤ rated DC working voltage) at +105 °C, the capacitors shall meet the following limits.		
	Capacitance change	≤ ±20 % of initial measured value	
	tan δ	≤ 200 % of initial specified value	
	DC leakage current	≤ initial specified value	
Shelf Life	After storage for 1000 hours at +105 °C±20 °C within no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)		

■ Frequency correction factor for ripple current

	Frequency (Hz)						
	50	60	100	120	500	1 k	10 k to
Correction factor	0.75	0.80	0.95	1.00	1.20	1.25	1.40

■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

Standard Products

Discontinued

Endurance : 105 °C 3000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
400	120	22	25	EETHD2G121HJ	0.75	0.15	200
	180	25	25	EETHD2G181JJ	0.95	0.15	200
	220	22	35	EETHD2G221HJ	1.10	0.15	200
		25	30	EETHD2G221JJ	1.10	0.15	200
	270	25	35	EETHD2G271JJ	1.22	0.15	200
		30	25	EETHD2G271KJ	1.22	0.15	100
	330	22	50	EETHD2G331HJ	1.44	0.15	200
		25	40	EETHD2G331JJ	1.44	0.15	200
		35	25	EETHD2G331LJ	1.44	0.15	100
	390	25	45	EETHD2G391JJ	1.55	0.15	200
		35	25	EETHD2G391LJ	1.55	0.15	100
	470	25	50	EETHD2G471JJ	1.68	0.15	200
		30	35	EETHD2G471KJ	1.68	0.15	100
		35	30	EETHD2G471LJ	1.68	0.15	100
	560	30	40	EETHD2G561KJ	1.90	0.15	100
		35	35	EETHD2G561LJ	1.90	0.15	100
	680	30	50	EETHD2G681KJ	2.12	0.15	100
		35	40	EETHD2G681LJ	2.12	0.15	100
420	120	22	25	EETHD2S121HJ	0.74	0.15	200
	150	22	30	EETHD2S151HJ	0.84	0.15	200
		25	25	EETHD2S151JJ	0.84	0.15	200
	180	22	35	EETHD2S181HJ	0.91	0.15	200
		25	30	EETHD2S181JJ	0.91	0.15	200
	220	22	40	EETHD2S221HJ	1.05	0.15	200
		25	35	EETHD2S221JJ	1.05	0.15	200
	270	22	50	EETHD2S271HJ	1.20	0.15	200
		25	40	EETHD2S271JJ	1.20	0.15	200
		30	30	EETHD2S271KJ	1.20	0.15	100
		35	25	EETHD2S271LJ	1.20	0.15	100
	330	25	45	EETHD2S331JJ	1.42	0.15	200
		30	35	EETHD2S331KJ	1.42	0.15	100
	390	25	50	EETHD2S391JJ	1.55	0.15	200
		30	40	EETHD2S391KJ	1.55	0.15	100
		35	30	EETHD2S391LJ	1.55	0.15	100
	470	30	45	EETHD2S471KJ	1.71	0.15	100
		35	35	EETHD2S471LJ	1.71	0.15	100
	560	30	50	EETHD2S561KJ	1.90	0.15	100
		35	40	EETHD2S561LJ	1.90	0.15	100
450	120	22	30	EETHD2W121HJ	0.72	0.20	200
		25	25	EETHD2W121JJ	0.72	0.20	200
	180	22	35	EETHD2W181HJ	0.87	0.20	200
		25	30	EETHD2W181JJ	0.87	0.20	200
	220	22	45	EETHD2W221HJ	1.00	0.20	200
		25	35	EETHD2W221JJ	1.00	0.20	200
		30	25	EETHD2W221KJ	1.00	0.20	100
	270	22	50	EETHD2W271HJ	1.19	0.20	200
		25	40	EETHD2W271JJ	1.19	0.20	200
		30	30	EETHD2W271KJ	1.19	0.20	100
		35	25	EETHD2W271LJ	1.19	0.20	100
	330	25	45	EETHD2W331JJ	1.38	0.20	200
		30	35	EETHD2W331KJ	1.38	0.20	100
	390	30	40	EETHD2W391KJ	1.55	0.20	100
		35	30	EETHD2W391LJ	1.55	0.20	100
	470	30	45	EETHD2W471KJ	1.74	0.20	100
		35	35	EETHD2W471LJ	1.74	0.20	100
	560	30	50	EETHD2W561KJ	1.90	0.20	100
		35	40	EETHD2W561LJ	1.90	0.20	100

Snap-in Type

Series: **XB** Type: **TS**

Discontinued

(Last purchasing order : 31/Mar/2015)
(Last shipment : 30/Jun/2015)



■ Features

- Endurance : 105 °C 7000 h
- RoHS directive compliant

■ Specifications

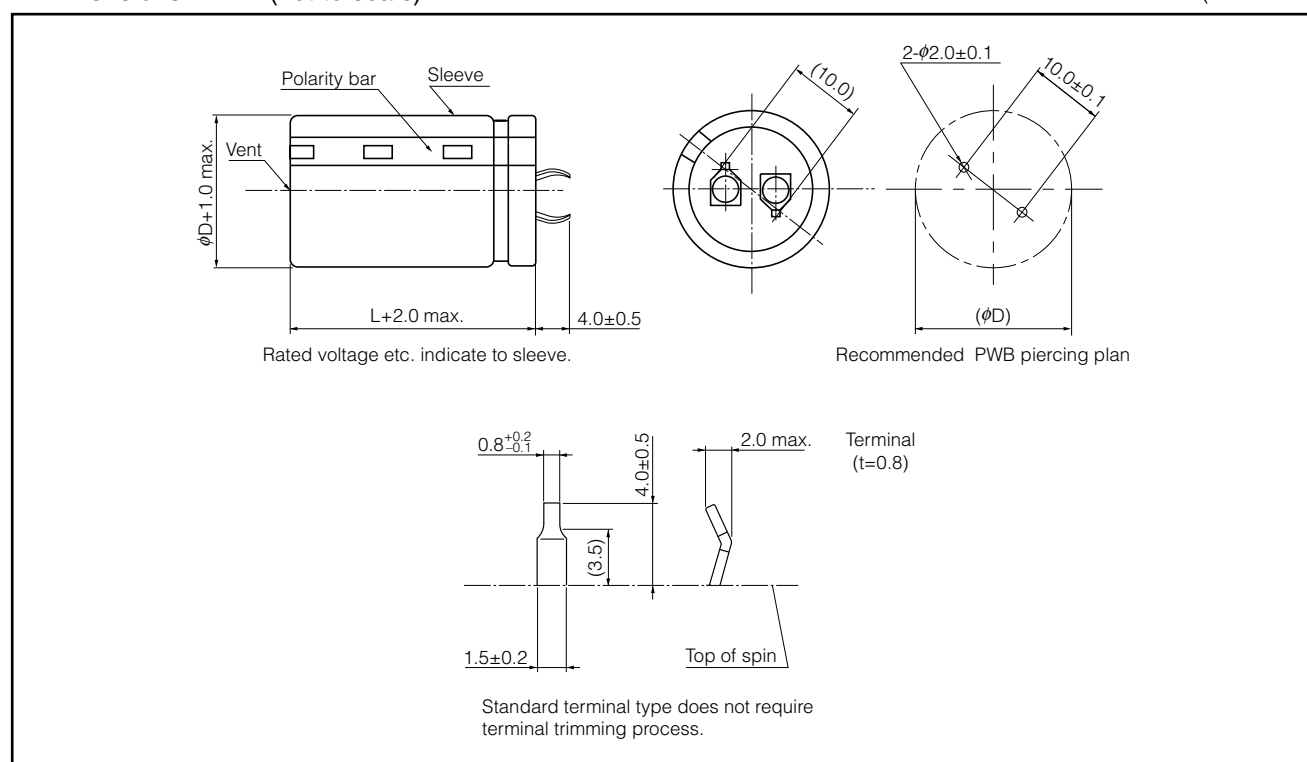
Category Temp. Range	-40 °C to +105 °C	-25 °C to +105 °C
Rated W.V. Range	160 V.DC to 250 V.DC	315 V.DC to 450 V.DC
Nominal Cap. Range	180 µF to 2200 µF	39 µF to 680 µF
Capacitance Tolerance	±20 % (120 Hz/+20 °C)	
DC Leakage Current	3√CV (µA) max. After 5 minutes application of rated working voltage at +20 °C. C : Capacitance (µF) V: W.V. (V.DC)	
tan δ	Please see the attached standard products list	
Endurance	After 7000 hours application of DC voltage with specified ripple current (≤ rated DC working voltage) at +105 °C±2 °C, the capacitors shall meet the following limits.	
	Capacitance change	≤±20 % of initial measured value
	tan δ	≤ 200 % of initial specified value
	DC leakage current	≤ initial specified value
Shelf Life	After storage for 1000 hours at +105 °C±2 °C within no voltage applied and then being stabilized at +20 °C, capacitor shall meet the limits specified in Endurance (With voltage treatment)	

■ Frequency correction factor for ripple current

	Frequency (Hz)						
	50	60	100	120	500	1 k	10 k to
Correction factor	0.75	0.80	0.95	1.00	1.20	1.25	1.40

■ Dimensions in mm (not to scale)

(Unit : mm)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Sep. 2013

■ Standard Products

Discontinued

Endurance : 105 °C 7000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
160	270	22	25	EETXB2C271HJ	1.10	0.15	200
	330	22	30	EETXB2C331HJ	1.20	0.15	200
	390	22	30	EETXB2C391HJ	1.30	0.15	200
		25	25	EETXB2C391JJ	1.30	0.15	200
	470	22	35	EETXB2C471HJ	1.40	0.15	200
		25	30	EETXB2C471JJ	1.40	0.15	200
	560	22	40	EETXB2C561HJ	1.50	0.15	200
		25	30	EETXB2C561JJ	1.50	0.15	200
		30	25	EETXB2C561KJ	1.50	0.15	100
	680	22	45	EETXB2C681HJ	1.70	0.15	200
		25	35	EETXB2C681JJ	1.70	0.15	200
		30	30	EETXB2C681KJ	1.70	0.15	100
	820	25	40	EETXB2C821JJ	2.00	0.15	200
		30	30	EETXB2C821KJ	2.00	0.15	100
	1000	25	45	EETXB2C102JJ	2.20	0.15	200
		30	35	EETXB2C102KJ	2.20	0.15	100
	1200	25	50	EETXB2C122JJ	2.30	0.15	200
		30	40	EETXB2C122KJ	2.30	0.15	100
		35	35	EETXB2C122LJ	2.30	0.15	100
	1500	30	45	EETXB2C152KJ	2.50	0.15	100
		35	35	EETXB2C152LJ	2.50	0.15	100
	1800	30	50	EETXB2C182KJ	2.70	0.15	100
		35	40	EETXB2C182LJ	2.70	0.15	100
180	* 2200	35	50	EETXB2C222LJ	2.90	0.15	100
	220	22	25	EETXB2P221HJ	1.00	0.15	200
	270	22	25	EETXB2P271HJ	1.10	0.15	200
	330	22	30	EETXB2P331HJ	1.20	0.15	200
		25	25	EETXB2P331JJ	1.20	0.15	200
	390	22	30	EETXB2P391HJ	1.30	0.15	200
		25	25	EETXB2P391JJ	1.30	0.15	200
	470	22	35	EETXB2P471HJ	1.40	0.15	200
		25	30	EETXB2P471JJ	1.40	0.15	200
		30	25	EETXB2P471KJ	1.40	0.15	100
	560	22	40	EETXB2P561HJ	1.50	0.15	200
		25	35	EETXB2P561JJ	1.50	0.15	200
		30	25	EETXB2P561KJ	1.50	0.15	100
	680	22	50	EETXB2P681HJ	1.70	0.15	200
		25	40	EETXB2P681JJ	1.70	0.15	200
		30	30	EETXB2P681KJ	1.70	0.15	100
	820	25	45	EETXB2P821JJ	2.00	0.15	200
		30	35	EETXB2P821KJ	2.00	0.15	100
		35	30	EETXB2P821LJ	2.00	0.15	100
	1000	30	40	EETXB2P102KJ	2.20	0.15	100
		35	30	EETXB2P102LJ	2.20	0.15	100
	1200	30	45	EETXB2P122KJ	2.30	0.15	100
		35	35	EETXB2P122LJ	2.30	0.15	100
	1500	30	50	EETXB2P152KJ	2.50	0.15	100
		35	40	EETXB2P152LJ	2.50	0.15	100
	* 1800	35	45	EETXB2P182LJ	2.70	0.15	100
	* 2200	35	50	EETXB2P222LJ	2.90	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 7000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
200	220	22	25	EETXB2D221HJ	1.00	0.15	200
	270	22	30	EETXB2D271HJ	1.10	0.15	200
		25	25	EETXB2D271JJ	1.10	0.15	200
	330	22	30	EETXB2D331HJ	1.20	0.15	200
		25	25	EETXB2D331JJ	1.20	0.15	200
	390	22	35	EETXB2D391HJ	1.30	0.15	200
		25	30	EETXB2D391JJ	1.30	0.15	200
		30	25	EETXB2D391KJ	1.30	0.15	100
	470	22	40	EETXB2D471HJ	1.40	0.15	200
		25	35	EETXB2D471JJ	1.40	0.15	200
		30	30	EETXB2D471KJ	1.40	0.15	100
	560	22	45	EETXB2D561HJ	1.50	0.15	200
		25	35	EETXB2D561JJ	1.50	0.15	200
		30	30	EETXB2D561KJ	1.50	0.15	100
	680	25	40	EETXB2D681JJ	1.70	0.15	200
		30	35	EETXB2D681KJ	1.70	0.15	100
	820	25	50	EETXB2D821JJ	2.00	0.15	200
		30	40	EETXB2D821KJ	2.00	0.15	100
		35	30	EETXB2D821LJ	2.00	0.15	100
	1000	30	45	EETXB2D102KJ	2.20	0.15	100
		35	35	EETXB2D102LJ	2.20	0.15	100
	1200	30	50	EETXB2D122KJ	2.30	0.15	100
		35	40	EETXB2D122LJ	2.30	0.15	100
250	* 1500	35	50	EETXB2D152LJ	2.50	0.15	100
	180	22	30	EETXB2E181HJ	0.90	0.15	200
		25	25	EETXB2E181JJ	0.90	0.15	200
	220	22	30	EETXB2E221HJ	1.00	0.15	200
		25	25	EETXB2E221JJ	1.00	0.15	200
	270	22	35	EETXB2E271HJ	1.10	0.15	200
		25	30	EETXB2E271JJ	1.10	0.15	200
		30	25	EETXB2E271KJ	1.10	0.15	100
	330	22	40	EETXB2E331HJ	1.20	0.15	200
		25	35	EETXB2E331JJ	1.20	0.15	200
		30	25	EETXB2E331KJ	1.20	0.15	100
	390	22	45	EETXB2E391HJ	1.30	0.15	200
		25	35	EETXB2E391JJ	1.30	0.15	200
		30	30	EETXB2E391KJ	1.30	0.15	100
	470	25	45	EETXB2E471JJ	1.40	0.15	200
		30	35	EETXB2E471KJ	1.40	0.15	100
		35	30	EETXB2E471LJ	1.40	0.15	100
	560	25	50	EETXB2E561JJ	1.50	0.15	200
		30	35	EETXB2E561KJ	1.50	0.15	100
		35	30	EETXB2E561LJ	1.50	0.15	100
	680	30	45	EETXB2E681KJ	1.70	0.15	100
		35	35	EETXB2E681LJ	1.70	0.15	100
	820	30	50	EETXB2E821KJ	2.00	0.15	100
		35	40	EETXB2E821LJ	2.00	0.15	100
	* 1000	35	45	EETXB2E102LJ	2.20	0.15	100
	* 1200	35	50	EETXB2E122LJ	2.30	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 7000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
315	82	22	25	EETXB2F820HJ	0.64	0.15	200
	100	22	30	EETXB2F101HJ	0.69	0.15	200
	120	22	30	EETXB2F121HJ	0.75	0.15	200
		25	25	EETXB2F121JJ	0.75	0.15	200
	150	22	35	EETXB2F151HJ	0.82	0.15	200
		25	30	EETXB2F151JJ	0.82	0.15	200
		30	25	EETXB2F151KJ	0.82	0.15	100
	180	22	40	EETXB2F181HJ	0.90	0.15	200
		25	35	EETXB2F181JJ	0.90	0.15	200
		30	25	EETXB2F181KJ	0.90	0.15	100
	220	22	45	EETXB2F221HJ	1.00	0.15	200
		25	40	EETXB2F221JJ	1.00	0.15	200
		30	30	EETXB2F221KJ	1.00	0.15	100
	270	25	45	EETXB2F271JJ	1.10	0.15	200
		30	35	EETXB2F271KJ	1.10	0.15	100
		35	30	EETXB2F271LJ	1.10	0.15	100
	330	25	50	EETXB2F331JJ	1.20	0.15	200
		30	40	EETXB2F331KJ	1.20	0.15	100
		35	30	EETXB2F331LJ	1.20	0.15	100
	390	30	45	EETXB2F391KJ	1.30	0.15	100
		35	35	EETXB2F391LJ	1.30	0.15	100
	470	30	50	EETXB2F471KJ	1.40	0.15	100
		35	40	EETXB2F471LJ	1.40	0.15	100
*	560	35	45	EETXB2F561LJ	1.50	0.15	100
	680	35	50	EETXB2F681LJ	1.70	0.15	100
350	82	22	25	EETXB2V820HJ	0.64	0.15	200
	100	22	30	EETXB2V101HJ	0.69	0.15	200
		25	25	EETXB2V101JJ	0.69	0.15	200
	120	22	35	EETXB2V121HJ	0.75	0.15	200
		25	30	EETXB2V121JJ	0.75	0.15	200
	150	22	40	EETXB2V151HJ	0.82	0.15	200
		25	30	EETXB2V151JJ	0.82	0.15	200
		30	25	EETXB2V151KJ	0.82	0.15	100
	180	22	45	EETXB2V181HJ	0.90	0.15	200
		25	35	EETXB2V181JJ	0.90	0.15	200
		30	30	EETXB2V181KJ	0.90	0.15	100
	220	22	50	EETXB2V221HJ	1.00	0.15	200
		25	40	EETXB2V221JJ	1.00	0.15	200
		30	30	EETXB2V221KJ	1.00	0.15	100
	270	25	50	EETXB2V271JJ	1.10	0.15	200
		30	35	EETXB2V271KJ	1.10	0.15	100
		35	30	EETXB2V271LJ	1.10	0.15	100
	330	30	45	EETXB2V331KJ	1.20	0.15	100
		35	35	EETXB2V331LJ	1.20	0.15	100
	390	30	50	EETXB2V391KJ	1.30	0.15	100
		35	40	EETXB2V391LJ	1.30	0.15	100
	470	35	40	EETXB2V471LJ	1.40	0.15	100
	560	35	50	EETXB2V561LJ	1.50	0.15	100

* When capacitors of $\phi 35 \times 45L$ and $\phi 35 \times 50L$ are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

■ Standard Products

Discontinued

Endurance : 105 °C 7000 h

W.V. (V. DC)	Cap. (120 Hz) (±20 %) (μF)	Case size		Part No. PET sleeve Terminal Length 4.0 mm (Without Top Plate)	Specification		Min. Packaging Q'ty (pcs)
		Dia. (mm)	Length (mm)		Ripple Current (120 Hz) (+105 °C) (A r.m.s.)	tan δ (120 Hz) (+20 °C) max.	
400	56	22	25	EETXB2G560HJ	0.51	0.15	200
	68	22	30	EETXB2G680HJ	0.56	0.15	200
		25	25	EETXB2G680JJ	0.56	0.15	200
	82	22	35	EETXB2G820HJ	0.64	0.15	200
		25	25	EETXB2G820JJ	0.64	0.15	200
	100	22	35	EETXB2G101HJ	0.69	0.15	200
		25	30	EETXB2G101JJ	0.69	0.15	200
	120	22	40	EETXB2G121HJ	0.75	0.15	200
		25	35	EETXB2G121JJ	0.75	0.15	200
		30	25	EETXB2G121KJ	0.75	0.15	100
	150	22	50	EETXB2G151HJ	0.82	0.15	200
		25	40	EETXB2G151JJ	0.82	0.15	200
		30	30	EETXB2G151KJ	0.82	0.15	100
	180	25	45	EETXB2G181JJ	0.90	0.15	200
		30	35	EETXB2G181KJ	0.90	0.15	100
		35	25	EETXB2G181LJ	0.90	0.15	100
	220	25	50	EETXB2G221JJ	1.00	0.15	200
		30	40	EETXB2G221KJ	1.00	0.15	100
		35	30	EETXB2G221LJ	1.00	0.15	100
	270	30	45	EETXB2G271KJ	1.10	0.15	100
		35	35	EETXB2G271LJ	1.10	0.15	100
	330	30	50	EETXB2G331KJ	1.20	0.15	100
		35	40	EETXB2G331LJ	1.20	0.15	100
*	390	35	45	EETXB2G391LJ	1.30	0.15	100
	470	35	50	EETXB2G471LJ	1.40	0.15	100
450	39	22	25	EETXB2W390HJ	0.37	0.15	200
	47	22	30	EETXB2W470HJ	0.40	0.15	200
	56	22	35	EETXB2W560HJ	0.47	0.15	200
		25	25	EETXB2W560JJ	0.47	0.15	200
	68	22	40	EETXB2W680HJ	0.53	0.15	200
		25	30	EETXB2W680JJ	0.53	0.15	200
	82	22	45	EETXB2W820HJ	0.56	0.15	200
		25	35	EETXB2W820JJ	0.56	0.15	200
		30	25	EETXB2W820KJ	0.56	0.15	100
	100	22	50	EETXB2W101HJ	0.64	0.15	200
		25	40	EETXB2W101JJ	0.64	0.15	200
		30	30	EETXB2W101KJ	0.64	0.15	100
	120	25	45	EETXB2W121JJ	0.72	0.15	200
		30	30	EETXB2W121KJ	0.72	0.15	100
		25	50	EETXB2W151JJ	0.79	0.15	200
	150	30	40	EETXB2W151KJ	0.79	0.15	100
		35	30	EETXB2W151LJ	0.79	0.15	100
		30	45	EETXB2W181KJ	0.87	0.15	100
	180	35	35	EETXB2W181LJ	0.87	0.15	100
		30	50	EETXB2W221KJ	1.00	0.15	100
	220	35	40	EETXB2W221LJ	1.00	0.15	100
		35	45	EETXB2W271LJ	1.19	0.15	100
	330	35	50	EETXB2W331LJ	1.38	0.15	100

* When capacitors of φ35×45L and φ35×50L are mounted on PWB, reinforce them with mounting clamp or adhesives.
(Avoid using adhesives including halogenated compositions.)

Notices

■ Applicable laws and regulations

- This product satisfies the requirements of the RoHS Directive (2011/65/EU) (related to the specified hazardous substances contained in electrical and electronic equipment).
- The ozone-depleting chemicals regulated by the Montreal Protocol are not intentionally used in the materials used in our manufacturing processes.
- PBBs(Poly-Brominated Biphenyls)/PBDEs (Poly-Brominated Diphenyl ethers)
The above specified brominated flame retardants are not intentionally used.
- When exporting this product, observe the export procedures specified in export control laws such as the Foreign Exchange and Foreign Trade Control Law.

■ Limited applications

- This product is intended to be used for general-purpose standard applications for general electronic equipment (such as AV equipment, household appliances, business or office equipment, information or communications equipment, etc.)
- If this product is being examined for possible use in applications where higher reliability or safety is required, in cases where a malfunction of this product may endanger life or property, then the delivery specifications meeting the application requirements must be agreed to and exchanged.

Items to be observed

- (1) The purpose of these specifications is to ensure the quality of components as individual components.
Before use, check and evaluate their operation when mounted on your products.
- (2) Do not use our components outside of the corresponding specifications.

■ When using this capacitor in a product where safety is critical

We take great care in the quality of this product. However, performance may deteriorate and short-circuiting or open-circuiting may occur if it will be used in transportation equipment (e.g. trains, cars, traffic lights), medical equipment, airborne equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, or other equipment where a defect in this component may cause the loss of human life or other significant damage. Ensure that the target equipment has a failsafe design and is provided with the following systems to guarantee adequate safety.

- (1) * Ensure the safety of the whole system by installing a protection circuit and a protection device.
- (2) Redundant circuits, etc. to maintain the safety of the entire system so that a single independent failure will not lead to unsafe conditions.

■ Conditions of use

This product is intended to be used in electronic equipment for general-purpose standard applications and is not designed for use in any special environments.
When this capacitor is used in a special environment or under special conditions, its performance may be affected. Before use, verify the performance and reliability of the capacitor.

⚠ Application Guidelines

1. Circuit design

Verify the usage and fitting environments and make sure to observe the rated performance specified in the corresponding catalog or specifications.

1.1 Operating temperature and frequency

Variations in temperature and frequency can affect the electrical characteristics of capacitors. Design circuits allowing for these variations.

- (1) At high temperatures leakage current increases.
- (2) At low temperatures the capacitance decreases and an increase in the tangent of the loss angle and impedance.
- (3) As frequency increases, capacitance decreases and the tangent of the loss angle increases, while the capacitive portion of impedance decreases till the resonant frequency is reached.
- (4) At low frequency there is temperature rise caused by ripple currents accompanying the increase in equivalent series resistance.

1.2 Operating temperature and life expectancy

- (1) The capacitor life is affected by usage temperature.
In general, the capacitor life is approximately doubled when the temperature decreases by 10 °C.
Reduce the usage temperature as much as possible.
- (2) The use of capacitors beyond the upper category temperatures may cause rapid deterioration in the characteristics and break down may occur.
The temperature referred to here includes the ambient temperature(within equipment), including heat produced by heat generating devices (power transistors, resistors, etc.), self-heating due to ripple currents, etc. Take these factors into consideration when checking the temperature of capacitors.
Do not place any heat generating devices, etc. on the back of capacitors.
- (3) The life acceleration can be calculated with the following equation:

$$L_2 = L_1 \times 2^{\frac{T_1 - T_2}{10}}$$

L₁: Life at a temperature T₁ °C (h)

L₂: Life at a temperature T₂ °C (h)

T₁: Category upper limit temperature + heat generation due to ripple currents (°C)

T₂: Ambient temperature to calculate the life + heat generation due to ripple currents (°C)

1.3 Common application conditions to avoid

If the loads shown below are applied to a capacitor, then its characteristics may degrade rapidly or it may short-circuit. Rapid heat or gas generation may occur, which leads to the activation of the pressure valve. Electrolytes will then leak from the sealing section. In the worst case, an explosion or ignition may occur.

When the capacitor breaks down, combustible materials (electrolytes, element fixing materials, etc.) may flow externally in all directions.

(1) Polarity

Aluminum electrolytic capacitors have polarities.

Do not apply a reversed or alternating-current voltage.

If the polarity is reversed, then short-circuiting may occur in the initial state or the pressure valve may be activated, leading to capacitor breakdown.

Check the polarity when using a polar capacitor.

If the polarity is unstable or unclear in a circuit, then use bipolar capacitors. However, bipolar capacitors cannot be used in alternating current circuits.

(2) Applied voltage

Do not apply an excessive voltage (voltage exceeding the rating).

The peak direct current voltage superposed with a ripple voltage (alternating current component) must be equal to or less than the rated voltage. A surge voltage exceeding the rated voltage is allowed and specified. However, the allowable conditions are limited and the specifications do not guarantee the application of such a surge voltage for a long time.

(3) Ripple current

Do not allow an excessive current (current exceeding the rated ripple current) to pass.

If an excessive ripple current passes through, then the amount of internally generated heat will grow, the capacitor life will be reduced, or the pressure valve will be activated, leading to breakdown.

Even if the current is equivalent to or less than the allowable level, a reversed voltage may be applied when a direct current bias voltage is low.

Use capacitors so that a reversed voltage is not applied.

- (4) Charging/discharging applications
Standard capacitors are not suitable for use in repeating charge/discharge applications. For charge/discharge applications, consult us with your actual application condition.
For rush current, please do not exceed 100 A.
- (5) ON-OFF circuit
Do not use capacitors in circuit where ON-OFF switching is repeated more than 10000 times/per day.
In case of applying to the these ON-OFF circuit, consult with us about circuit condition and so on.
- (6) Series/parallel connection
[Parallel connection]
If capacitors are connected in parallel, then the balance of currents between these capacitors may be disrupted and an excessive ripple current may pass through only part of these capacitors.
Wire your circuits such that excessive ripple current does not pass through the capacitors.
[Series connection]
If capacitors are connected in series, then the balance of voltages between these capacitors may be disrupted and excessive voltage may be applied. Add a bleeder resistor in parallel with each capacitor. By taking leak currents into consideration the balance of voltages will not be disrupted.
- (7) Electrical isolation of the capacitors
Isolate capacitors completely in a circuit in the following cases.
Between the housing and cathode and anode terminals and between circuit traces.
- (8) Capacitor sleeve
Exterior sleeves or lamination covering capacitors are for indication purposes only and do not guarantee electrical insulation.

1.4 Capacitor mounting considerations

For aluminum electrolytic capacitors, conductive electrolysis whose main solvent is combustible organic solvent and combustible electrolytic paper is used.

If the electrolysis leaks onto a printed circuit board, then it may corrode or short-circuit the traces, leading to smoke or fire. Check the following points when designing products.

- (1) Double-sided circuit board
If capacitors are used in double-sided boards, then do not lay wiring traces immediately below the capacitors.
If the sealed part of a capacitor adheres to the surface of a through-hole printed circuit board, then the solder may be absorbed into the gap during dip soldering and the anode and cathode terminals may be short-circuited.
- (2) Circuit board hole positioning
Solder may protrude from the through-holes or holes for post-mounted component leads and damage the capacitor exterior sleeves. Be mindful of the hole positions.
- (3) Circuit board hole spacing
Make holes for capacitors with a gap equivalent to that of capacitor leads (terminals) during design. Otherwise, there will be stress on the capacitor leads when they are inserted into these holes, leading to current leaks, short-circuiting, or electrolysis leakage.
- (4) Surface-mount types
For surface-mount type capacitors, design land traces with reference to the recommended board land sizes described in the delivery specifications, etc.
- (5) Capacitors equipped with pressure valves
Provide a space above the pressure valve so that it can operate properly.
For capacitors equipped with a pressure valve (as per the shape and dimensional descriptions of each series), provide a space as follows. If the space is smaller than the requirements, then the pressure valve may not operate properly, leading to an explosion.

Product diameter	Space
φ6.3 to φ16 mm	2 mm or more
φ18 to φ35 mm	3 mm or more
φ40 mm or more	5 mm or more

- (6) Clearance for seal mounted pressure relief vents
When the pressure valve section of a capacitor faces the printed wiring, provide a degassing hole aligned with the pressure valve position for proper operation of the valve.
- (7) Wiring near the pressure relief vent.
Considerations must be taken in designing circuits so that there are no traces, particularly for high-voltage or large-current wiring, above the pressure valve sections.
When a pressure valve is activated, combustible high-temperature gas exceeding 100°C will be released. Gas may condense or the wiring covers may melt and secondary accidents may occur.
- (8) Circuit board patterns under the capacitor.
If electrolysis leaks, then the circuit traces may short-circuit and tracking or migration may occur.

2. Mounting

2.1 Considerations before using

- (1) Do not reuse capacitors that have been installed and energized.
- (2) Capacitors may generate transient recovery voltages. In this case, discharge them using a resistor of approx. 1 k Ω .
- (3) Capacitors stored for a long time may have a larger current leak.
In this case, dispose the voltage using a resistor of approx. 1 k Ω .
- (4) Do not drop capacitors onto a floor, etc.
Do not use dropped capacitors because they may be damaged mechanically or electrically.
- (5) Do not use corrupted capacitors.
If a capacitor's seal is deteriorated, then its performance will be degraded, life reduced, and/or the electrolyte will leak.

2.2 Capacitor insertion

- (1) Check the capacitor ratings (capacitance and voltage) before mounting.
- (2) Check the capacitor polarity before mounting.
- (3) Check the capacitor lead and hole intervals and land size before mounting.
If these intervals are different, then stress will be applied to the inside of the capacitor through its leads when they are inserted into the board holes, leading to short-circuiting or other failures.
- (4) When an automatic mounter is used, the force to clinch and fix capacitor leads must not be excessive.
When capacitor leads are clinched and fixed onto a circuit board, the leads may be pulled and a large force applied to the capacitor if there are missing cogs or the gap between the clinching section and the circuit board is too small.
If this is the case, then the capacitor may break down.
For surface-mount type capacitors, if the mounting pressure is excessive, then current leaks may increase, short-circuiting may occur, or the capacitor may break down and come off.

2.3 Manual soldering

- (1) Solder capacitors under the soldering conditions (temperature and time) as described in the specifications or at 350 °C for three seconds or less.
- (2) If the capacitor lead terminals must be pre-processed in order to align the gaps between the terminals and holes, place them before soldering to prevent stress from being applied to the capacitor body.
- (3) If it is necessary to manually remove soldered capacitors, repair them after the solder has sufficiently melted to prevent stress from being applied to the capacitor terminals.
- (4) Do not touch the capacitor body with the soldering iron tip. Otherwise, a hole may occur on the capacitor exterior sleeve. The sleeve may break or become damaged.

2.4 Flow soldering

- (1) Do not immerse the capacitor body in a solder bath. The capacitor's inner pressure could increase and the capacitor will break down.
- (2) Solder capacitors under the soldering conditions (temperature and time) described in the specifications.
- (3) When soldering, do not allow other components to fall or touch the capacitors.
When soldering, if resistors, ceramic capacitors, or other components (with a high heat conductance) fall and their lead terminals or metallic sections touch the capacitor, then local thermal stress can occur causing the capacitor's exterior sleeve to break down. This phenomenon is identical to short-circuiting.
- (4) Prevent flux from adhering to anything other than the terminals.

2.5 Reflow soldering for chip capacitors

- (1) Surface-mount type capacitor are exclusively for reflow soldering. When reflow solder is used an ambient heat condition system such as the simultaneous use of infrared and hot-air is recommended.
* This system cannot be used for flow or dip soldering.
- (2) Soldering capacitors under the soldering conditions (pre-heating, soldering temperature and time) described in the specifications.
- (3) Reflow-solder only once.
If you need to apply reflow soldering twice, then make sure to contact us.
- (4) Do not reuse the installed surface-mount type capacitors.
- (5) The crack on top marking might be occurred by reflow heat stress.
But please acknowledge that it does not influence the reliability of the product.
- (6) VPS (Vapor Phase Soldering) reflow can cause significant characteristics change and/ or mounting failure due to deformation by acute temperature rise. VPS is acceptable provided that the process does not exceed recommended reflow profile and temperature rise is less than 3degC/sec. Please contact Panasonic for detailed conditions.

2.6 Other soldering considerations

If the chip capacitor temperature becomes very high due to pre-heating or hardening of the fixing resin, then the capacitor exterior sleeve may shrink or crack. If capacitors are passed through a heat-curing furnace, then the ambient temperature must be 150°C or less and the duration must be two minutes or less.

2.7 Capacitor handling after soldering

- (1) Do not tilt, bring down, or twist the capacitors soldered to the printed circuit board; otherwise a torque will be generated with the capacitor circumference as the fulcrum. As a result, a large force will be applied to the inside of the element through the terminals and the capacitor may break down.
- (2) Do not hold the capacitors soldered to the printed circuit board to carry the board; otherwise the board's entire weight will be applied to the inside of the element through the terminals and the capacitor may break down.
- (3) Do not hit the capacitors soldered to the printed circuit board with foreign objects. When stacking printed circuit boards, do not hit the capacitors with circuit boards or other components (terminals, etc.)

2.8 Circuit board cleaning

- (1) Apply the following conditions to flux cleaning after soldering

Temperature: 60°C or less, duration: Five minutes or less (Ultrasonic waves may be used.)

However, rinse sufficiently and dry the boards (at 100°C for 20 minutes or less).

[Applicable solvents]

Pine Alpha ST-100S

Clean-thru 750H, 750L, or 710M

Aqua Cleaner 210SEP

Sunelec B-12

DK Beclear CW-5790

Techno Cleaner 219

Cold Cleaner P3-375

Telpen Cleaner EC-7R

Techno Care FRW-17, FRW-1, or FRV-1

Isopropyl alcohol (IPA)

Remarks

1 : If you wish to use solvents other than the above or Deionized water, please contact us.

2 : Please do not use ozone-depleting chemicals in order to protect the environment.

3 : Depending on the cleaning method, the marking on a capacitor may be erased or blurred.

- (2) **Avoid using the following solvent groups unless specifically allowed for in the specification**

- (a) Halogen solvents: Corrode the inside capacitors.

The solvent may enter (diffuse) inside the capacitor, decompose and cause a reaction. Then, the released chlorine ions may react with the aluminum and corrode it.

For capacitors for which we guarantee cleaning, use solvents under the cleaning conditions (temperature, time, etc.) described in the specifications.

- (b) Alkaline solvents: Corrode (melt) aluminum housings.

- (c) Petroleum solvents: Deteriorate sealing rubber.

- (d) Xylene solvents: Deteriorate sealing rubber.

- (e) Acetone: Erases indications.

- (3) Be sure to dry the printed circuit boards immediately after cleaning so that the solvent does not remain between the capacitor's sealed section and the circuit board.

- (4) Manage the contamination of solvents (conductance, PH, specific gravity, amount of water, etc.)

If the solvent is contaminated, then the chlorine concentration will become high and the inside capacitor may be corroded. Control the flux concentration against the solvent to 2 %wt or less.

2.9 Mounting adhesives and coating agents

- (1) If bond or coating agents are used to fix capacitors or prevent moisture, then solvents contained in these materials may corrode the capacitors. Select solvents other than halogen compounds. Do not use chloroprene-derived polymers.

Also, if the bond and coating material containing organic solvents, such as xylene and toluene, are used, resin of the top plate of a snap-in terminal type capacitor will be dissolved.

In this case please select part number without the top plate.

- (2) If fixing or coating agents are used for capacitors, then check the following points.

- (a) Do not allow flux residue or contaminants to remain between the capacitor's sealed section and the circuit board.

- (b) Harden and dry bond or coating agents so that the solvents do not remain. Do not completely block the sealed section of a capacitor. (At least 1/3 of the sealed section must be exposed.)

2.10 Fumigation process

When electronic equipment incorporating aluminum electrolytic capacitors is exported, wooden packing materials may be fumigated using halogen compounds such as bromomethane. If drying after the fumigation process is insufficient, halogen remaining in the packing materials may be released, enter and corrode the capacitors.

If the fumigation process is carried out, then check carefully for remaining halogen after processing and drying.

Make sure not to apply the fumigation process to completely packed electronic equipment.

3. Precautions for using capacitors

3.1 Environmental Conditions

Capacitors should not be stored or used in the following environments.

- (1) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.

- (2) Direct contact with water, salt water, or oil.

- (3) High humidity conditions where water could condense on the capacitor.

- (4) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, Chlorine compound, Bromine, Bromine compound or ammonia.

- (5) Exposure to ozone, radiation, or ultraviolet rays.

- (6) Vibration and shock conditions exceeding specified requirements.

3.2 Electrical Precautions

- (1) Do not touch the capacitor terminals directly.
If you touch the capacitor terminals, you will receive an electric shock. Do not touch the exposed aluminum sections of a capacitor, such as the pressure valve sections because they are not insulated.
- (2) Do not short-circuit the capacitor terminals.
Do not spill conductive solutions such as acidic or alkaline solutions on the capacitors. Otherwise, short-circuiting will occur. The circuit will malfunction and the capacitors break down.
- (3) A low-molecular-weight-siloxane which is included in a silicon material shall causes abnormal electrical characteristics.

4. Precautions for checks and maintenance

- (1) Periodically check the capacitors used in industrial equipment. When checking and maintaining capacitors, turn off the equipment and discharge the capacitors beforehand. In this case, do not apply stress to the capacitor lead terminals, etc.
- (2) Periodically check the following items.
 - (a) Significant appearance abnormalities (deformation, electrolysis leakage, etc.)
 - (b) Electrical characteristics (described in the corresponding catalog or delivery specifications)
 If any abnormalities are found, then replace the capacitors or take appropriate actions.

5. Emergency procedures

- (1) Capacitors of a certain size or larger are equipped with a pressure valve to release excessive pressure.
If the capacitor pressure valve is activated and gas becomes visible when using equipment, then turn off the equipment or unplug it. If the power is not turned off, then the short-circuited capacitors may damage the circuit or the gas may become liquefied and cause a short-circuit. In the worst case, secondary disasters such as equipment damage may occur.
Gases released from the capacitor's pressure valve is not fume but liquefied electrolysis.
- (2) When a pressure valve is activated, a high-temperature gas exceeding 100 °C will be released. Do not place your face close to the capacitor.
If the gas gets into your eyes or you inhale it, then immediately wash your eyes with water or gargle. If the gas comes in contact with your skin, then wash it with soap.

6. Long Term Storage

- (1) Leakage current of a capacitor increases with long storage times. The aluminum oxide film deteriorates as a function of temperature and time.
If used without reconditioning, an abnormally high current will be required to restore the oxide film.
This surge current could cause the circuit or the capacitor to fail.
Storage period is one year. When storage period is over 12 months, a capacitor should be reconditioned by applying the rated voltage in series with a 1000 Ω current limiting resistor for a time period of 30 minutes.
For storage condition, keep room temperature (5 °C to 35 °C) and humidity (45% to 85%) where direct sunshine doesn't reach.
- (2) Environmental Conditions
 - (a) Exposure to temperatures above the upper category or below the lower category temperature of the capacitor.
 - (b) Direct contact with water, salt water, or oil
 - (c) High humidity conditions where water could condense on the capacitor.
 - (d) Exposure to toxic gases such as hydrogen sulfide, sulfuric acid, nitric acid, chlorine, Chlorine compound, Bromine, Bromine compound or ammonia.
 - (e) Exposure to ozone, radiation, or ultraviolet rays.
 - (f) Vibration and shock conditions exceeding specified requirements.

7. Discarding

When discarding capacitors, use either of the following procedures.

- (1) Make holes on the capacitor or break it up completely.
Then burn it at a temperature of 800°C or higher.
If capacitors are burnt as is, then they may explode.
- (2) If you do not burn them, then ask professional waste disposer.

The precautions in using aluminum electrolytic capacitors follow the Precautionary Guidelines for the Use of Fixed Aluminum Electrolytic Capacitors for Electronic equipment, RCR-2367B issued by EIAJ in March 2002.
Please refer to the above guidelines for details.

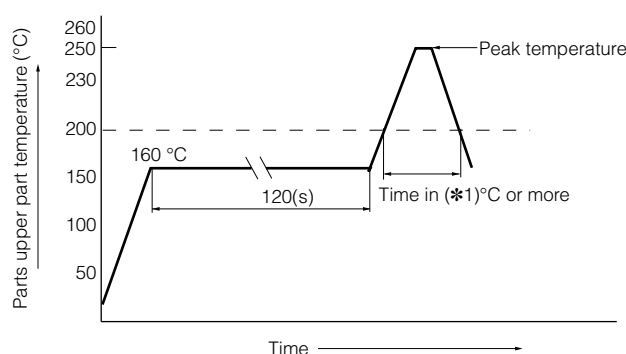
* Intellectual property right

We, Panasonic Group are providing the product and service that customers can use without anxiety, and are working positively on the protection of our products under intellectual property rights.

Representative patents relating to Conductive Polymer Hybrid Aluminum Electrolytic Capacitors are as follows :
US Patent Nos. 7497879 and 7621970 JP Patent No. 5360250

■ Reflow guaranteed condition

● RoHS compliant



Lead-Free reflow

Reflow No.	Fig. (1)	Fig. (2)	Fig. (3)	Fig. (4)
Category	φ3 to φ6.3	φ8 to φ10	φ12.5 to φ18	EB series (φ10 to φ18)
Peak temperature	250 °C	235 °C	230 °C (220 °C)	230 °C
Time in peak temperature	5 s	5 s	5 s (5 s)	5 s
Time in (*1) °C or more	≥200 °C 60 s	≥200 °C 60 s	≥200 °C 20 s (30 s)	≥200 °C 20 s
Time of reflow	1 time	1 time	1 time	1 time

High temperature Lead-Free reflow

Reflow No.	Fig. (5)	Fig. (6)		Fig. (7)		Fig. (8)	
Category	φ4 to φ6.3	φ8 to φ10		φ8 to φ10		φ6.3 to φ10 (TK · TP series)	
Peak temperature	260 °C (255 °C)	245 °C	260 °C	250 °C	260 °C	255 °C	260 °C
Time in peak temperature	≥250 °C 5 s (10 s)	≥240 °C 10 s	≥250 °C 5 s	≥240 °C 10 s	≥250 °C 5 s	≥250 °C 30 s	≥250 °C 20 s
Time in (*1) °C or more	≥230 °C 30 s	≥230 °C 30 s	≥230 °C 30 s	≥230 °C 30 s	≥230 °C 30 s	≥230 °C 40 s	≥230 °C 30 s
	≥217 °C 40 s	≥217 °C 40 s	≥217 °C 40 s	≥217 °C 40 s	≥217 °C 40 s	≥217 °C 65 s	≥217 °C 65 s
	≥200 °C 70 s	≥200 °C 70 s	≥200 °C 70 s	≥200 °C 70 s	≥200 °C 70 s	≥200 °C 90 s	≥200 °C 70 s
Time of reflow	2 times	2 times	1 time	2 times	1 time	2 times	2 times

Reflow No.	Fig. (9)	Fig. (10)	Fig. (11)
Category	φ12.5 to φ18 (FK, TK, HD series) 6.3 V to 35 V	φ12.5 to φ18 (FK series) 50 V to 63 V (TK series) 50 V	φ12.5 to φ18 (FK series) 80 V to 100 V (TK series) 63 V to 100 V
Peak temperature	245 °C	245 °C	245 °C
Time in peak temperature	≥240 °C 30 s	≥240 °C 5 s	≥240 °C 5 s
Time in (*1) °C or more	≥217 °C 90 s	≥217 °C 30 s	≥217 °C 30 s
Time of reflow	2 times	2 times	1 time

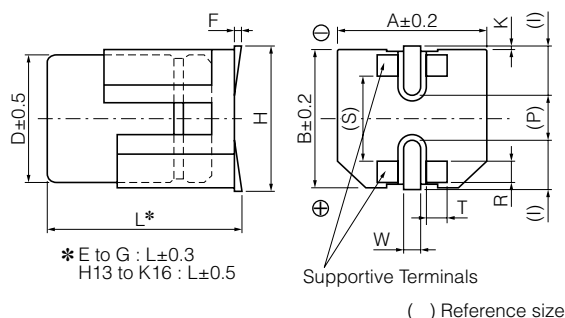
* For reflow, use a thermal condition system such as infrared radiation (IR) or hot blast.

* Panasonic have several series available for pure Tin terminal and ZVEI reflow based on J-STD-020D (JEDEC).
(Please contact sales for details.)

■ Dimensions (Vibration-proof products)

* The size and shape are different from standard products. Please inquire details of our company.

(Unit : mm)



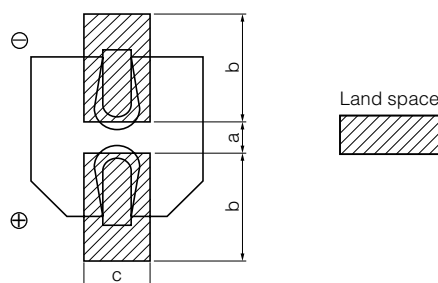
Size Code	φD	L	A, B	H max.	F	I	W	P	K	R	S	T
E	8.0	6.5	8.3	9.5	0 to +0.15	3.4	0.7±0.1	2.2	0.35 ^{+0.15} _{-0.20}	0.70±0.2	5.3±0.2	1.7±0.2
F	8.0	10.5	8.3	10.0	0 to +0.15	3.4	1.2±0.2	3.1	0.70±0.2	0.70±0.2	5.3±0.2	1.3±0.2
G	10.0	10.5	10.3	12.0	0 to +0.15	3.5	1.2±0.2	4.6	0.70±0.2	0.70±0.2	6.9±0.2	1.3±0.2
H13	12.5	13.8	13.5	15.0	-0.1 to +0.15	4.7	1.2±0.2	4.4	0.70±0.3	2.2±0.2	7.1±0.2	2.4±0.2
J16	16.0	16.8	17.0	19.0	-0.1 to +0.15	5.5	1.4±0.2	6.7	0.70±0.3	3.0±0.2	9.0±0.2	1.9±0.2
K16	18.0	16.8	19.0	21.0	-0.1 to +0.15	6.7	1.4±0.2	6.7	0.70±0.3	3.0±0.2	11.0±0.2	1.9±0.2

■ Land/Pad Pattern

The circuit board land/pad pattern size for chip capacitors is specified in the following table.

The land pitch influences installation strength and consider it.

● Standard products

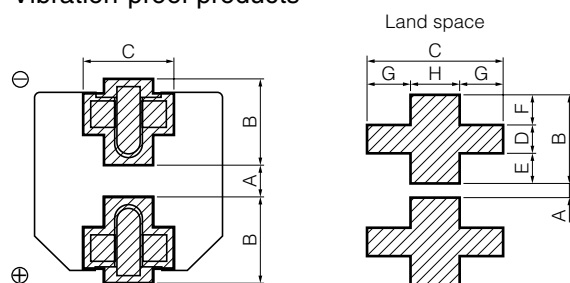


[Table of Board Land Size vs. Capacitor Size] (Unit : mm)

Size/Dimension	a	b	c
A (φ3)	0.6	2.2	1.5
B (φ4)	1.0	2.5	1.6
C (φ5)	1.5	2.8	1.6
D (φ6.3)	1.8	3.2	1.6
E (φ8 × 6.2L)	2.2	4.0	1.6
F (φ8 × 10.2L)	3.1	4.0	2.0
G (φ10 × 10.2L)	4.6	4.1	2.0
H (φ12.5)	4.0	5.7	2.0
J (φ16)	6.0	6.5	2.5
K (φ18)	6.0	7.5	2.5

* When size "a" is wide, back fillet can be made, decreasing fitting strength.

● Vibration-proof products



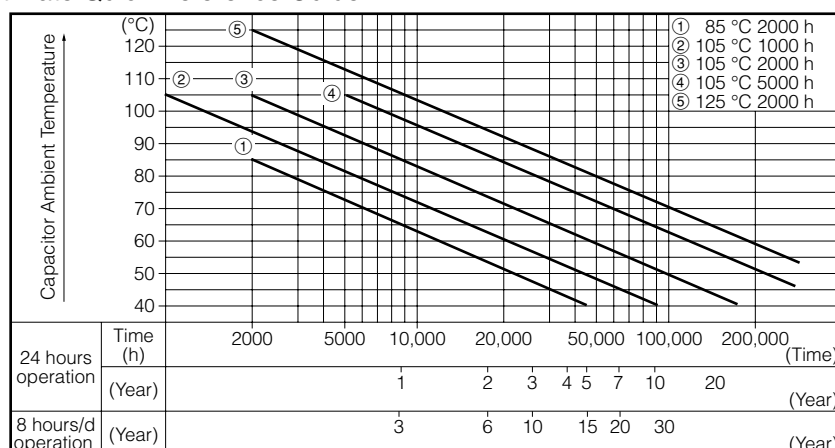
[Table of Board Land Size vs. Capacitor Size] (Unit : mm)

Size/Dimension	A	B	C	D	E	F	G	H
E (φ8 × 6.5L)	1.8	4.2	5.0	1.3	1.5	1.4	1.5	2.0
F (φ8 × 10.5L)	2.7	4.0	4.7	1.3	1.0	1.7	1.1	2.5
G (φ10)	3.9	4.4	4.7	1.3	1.2	1.9	1.1	2.5
H (φ12.5)	3.9	6.0	6.9	2.8	1.3	1.9	2.2	2.5
J (φ16)	5.8	6.8	6.2	3.6	1.3	1.9	1.7	2.8
K (φ18)	5.8	7.3	6.2	3.6	1.8	1.9	1.7	2.8

* When size "A" is wide, back fillet can be made, decreasing fitting strength.

* Take mounting conditions, solderability and fitting strength into consideration when selecting parts for your company's design.

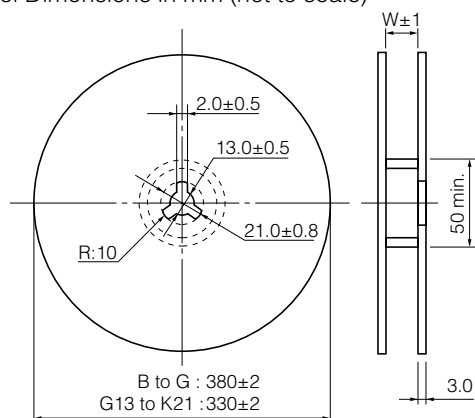
■ Expected Life Estimate Quick Reference Guide



Surface Mount Type

■ Packaging Specifications.

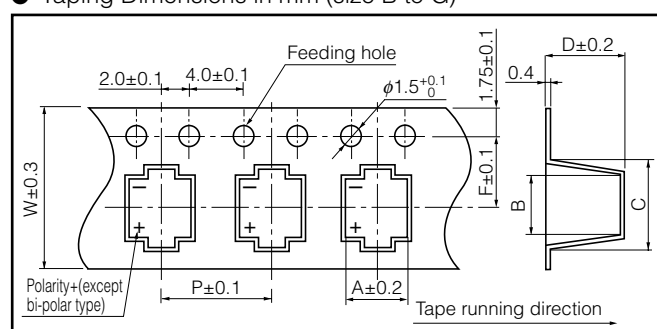
- Reel Dimensions in mm (not to scale)



(Unit : mm)

Size	W	Size	W
B, C	14	G13, G17	34
D, E, D8	18	H13, H16	
F, G	26	J16, J21	46
		K16, K21	

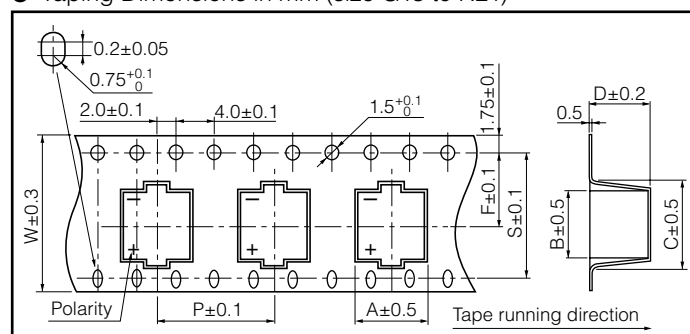
- Taping Dimensions in mm (size B to G)



Ask factory for technical specifications.

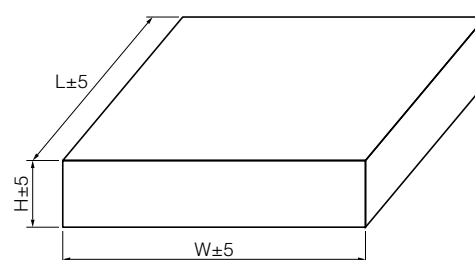
Size code	W	A	B	C	P	F	D	
							Height	
							L=5.4 mm	L=5.8 mm
B	12.0	4.7	4.6 ^{+0.2} _{-0.1}	6.5±0.3	8.0	5.5	5.8	6.2
C	12.0	5.7	5.7 ^{+0.3} _{-0.2}	8.0±0.5	12.0	5.5	5.8	6.4
D	16.0	7.0	7.0 ^{+0.3} _{-0.2}	9.0±0.5	12.0	7.5	5.8	6.4
D8	16.0	7.0	7.0 ^{+0.3} _{-0.2}	9.0±0.5	12.0	7.5	8.4	
E	16.0	8.7	8.7 ^{+0.3} _{-0.2}	11.4±0.5	12.0	7.5	6.8	
F	24.0	8.7	8.7 ^{+0.3} _{-0.2}	12.5±0.5	16.0	11.5	11.0	
G	24.0	10.7	10.7 ^{+0.3} _{-0.2}	14.5±0.5	16.0	11.5	11.0	

- Taping Dimensions in mm (size G13 to K21)



Ask factory for technical specifications.

- Dimensions of Outer Carton Box



(Unit : mm)

Size code	H	W, L
B, C	220	395
D, D8, E	250	395
F, G	220	395
G13, G17	210	350
H13, H16		
J16, J21	230	350
K16, K21		

- Min.Packing Quantity

Size code	Height	Min.Packing Quantity pcs.
		380 mm reel
B	L=5.4 mm	2000
	L=5.8 mm	2000
C, D	L=5.4 mm	1000
	L=5.8 mm	1000
E	—	1000
D8	—	900
F, G	—	500

Size code	Min.Packing Quantity pcs.
	330 mm reel
G13	250
G17, H13	200
H16	150
J16, K16	125
J21, K21	75

Size	Taping Size							
	A	B	C	D	F	P	S	W
G13	10.7	10.7	14.5	14.5	14.2	20.0	28.4	32.0
G17	10.7	10.7	14.5	17.5	14.2	20.0	28.4	32.0
H13	14.0	14.0	18.0	14.5	14.2	24.0	28.4	32.0
H16	14.0	14.0	18.0	17.5	14.2	24.0	28.4	32.0
J16	17.5	17.5	23.0	17.5	20.2	28.0	40.4	44.0
J21	17.5	17.5	23.0	22.5	20.2	28.0	40.4	44.0
K16	19.5	19.5	26.0	17.5	20.2	32.0	40.4	44.0
K21	19.5	19.5	26.0	22.5	20.2	32.0	40.4	44.0

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

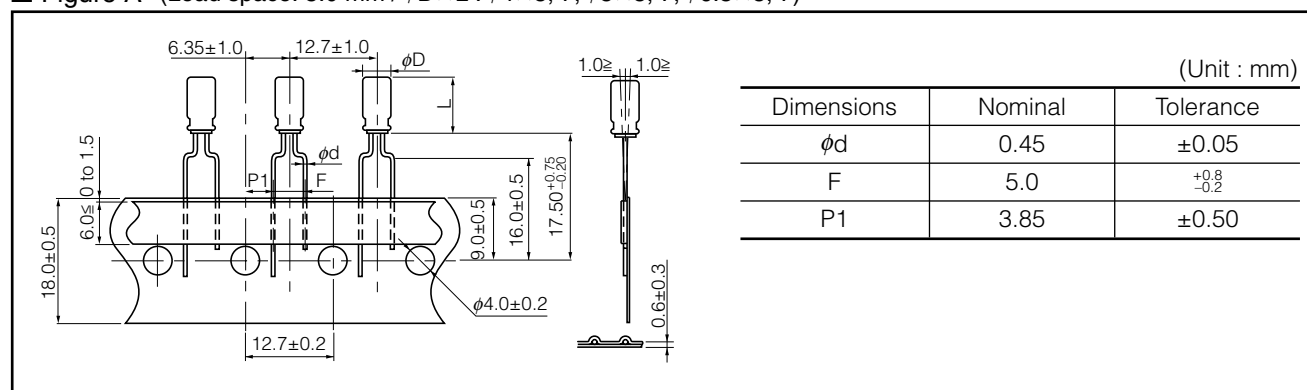
05 Mar. 2014

Lead Taping Radial Lead Type

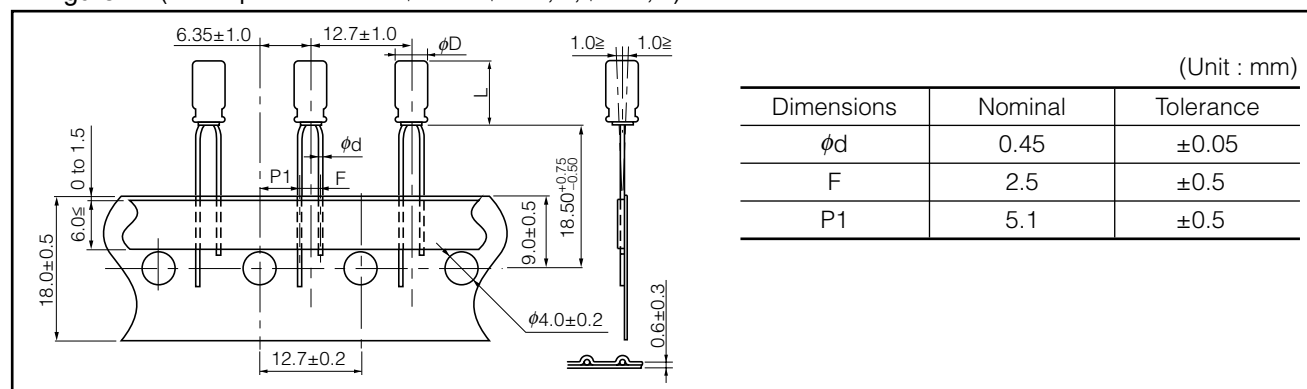
● Dimensions in mm (not to scale)

Case size	Lead space (F)		
	2.5 mm	5.0 mm	7.5 mm
φ4 × 5L	B	A	
φ5 × 5L	B	A	
φ6.3 × 5L	C	A	
φ8 × 5L	C	E	
φ4 × 7L	B	A	
φ5 × 7L	B	A	
φ6.3 × 7L	C	A	
φ8 × 7L	C	E	
φ5 × 11L	C	D	
φ6.3 × 11.2L, 15L	C	D	
φ8 × 11.5L, 15L, 20L		E	
φ10 × 12.5L, 16L, 20L, 25L		F	
φ12.5 × 15L, 20L, 25L		G	
φ16 × 15L, 20L, 25L			H
φ18 × 15L, 20L, 25L			H

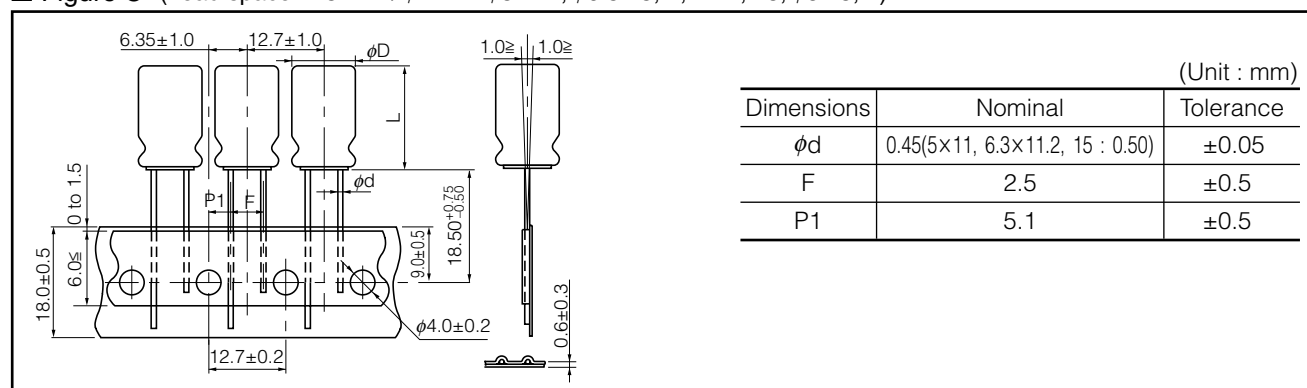
■ Figure A (Lead space: 5.0 mm / φD×L : φ4×5, 7, φ5×5, 7, φ6.3×5, 7)



■ Figure B (Lead space: 2.5 mm / φD×L : φ4×5, 7, φ5×5, 7)



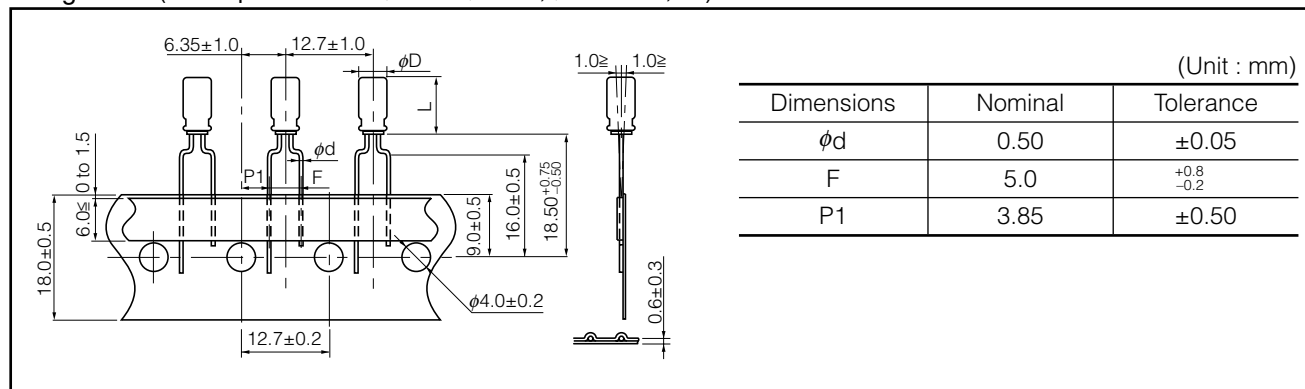
■ Figure C (Lead space: 2.5 mm / φD×L : φ5×11, φ6.3×5, 7, 11.2, 15, φ8×5, 7)



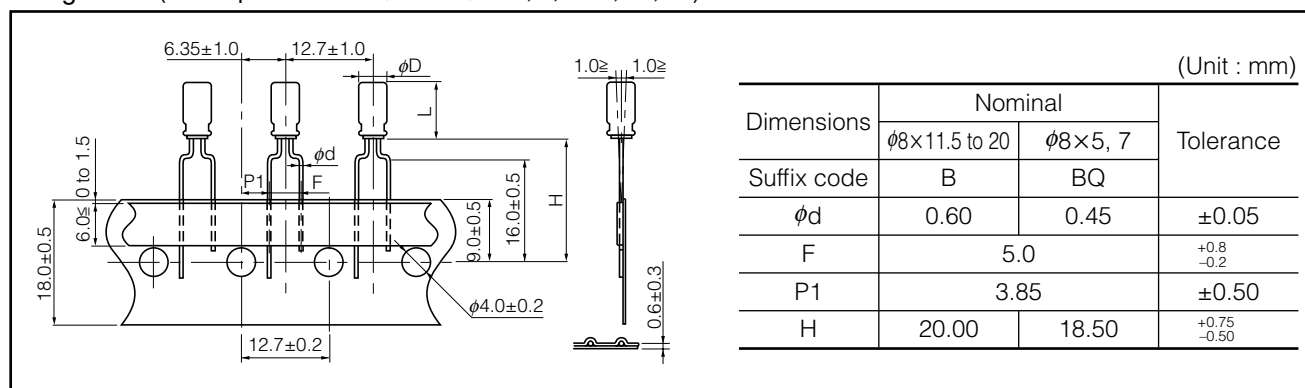
Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

05 Mar. 2014

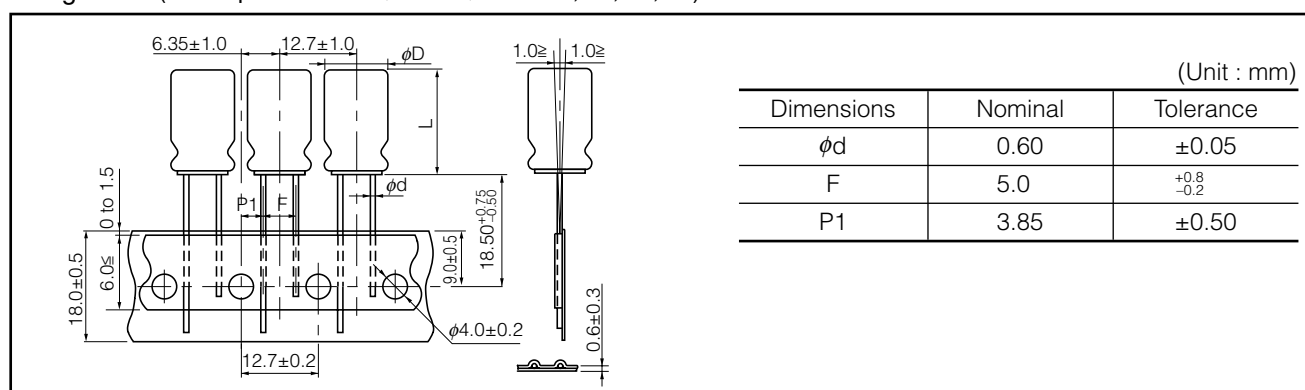
■ Figure D (Lead space: 5 mm / $\phi D \times L$: $\phi 5 \times 11$, $\phi 6.3 \times 11.2$, 15)



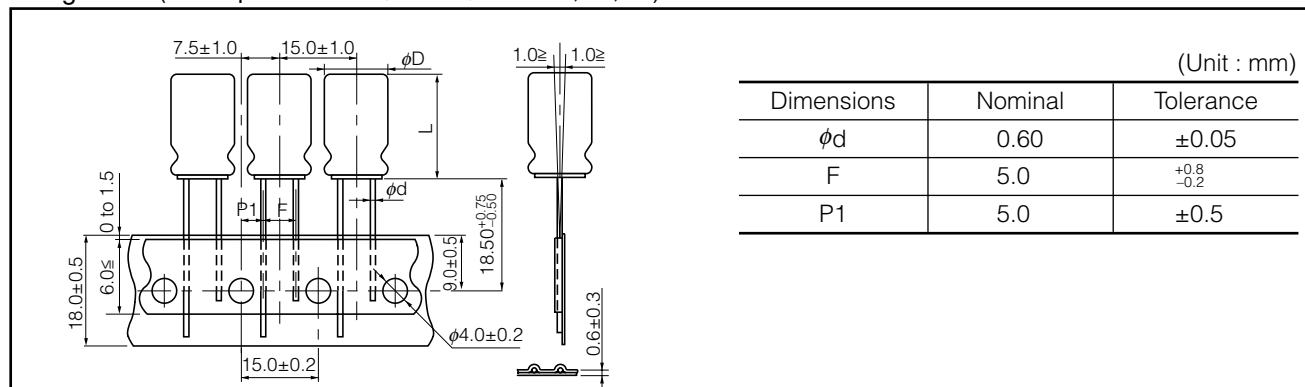
■ Figure E (Lead space: 5 mm / $\phi D \times L$: $\phi 8 \times 5$, 7, 11.5, 15, 20)



■ Figure F (Lead space: 5 mm / $\phi D \times L$: $\phi 10 \times 12.5$, 16, 20, 25)



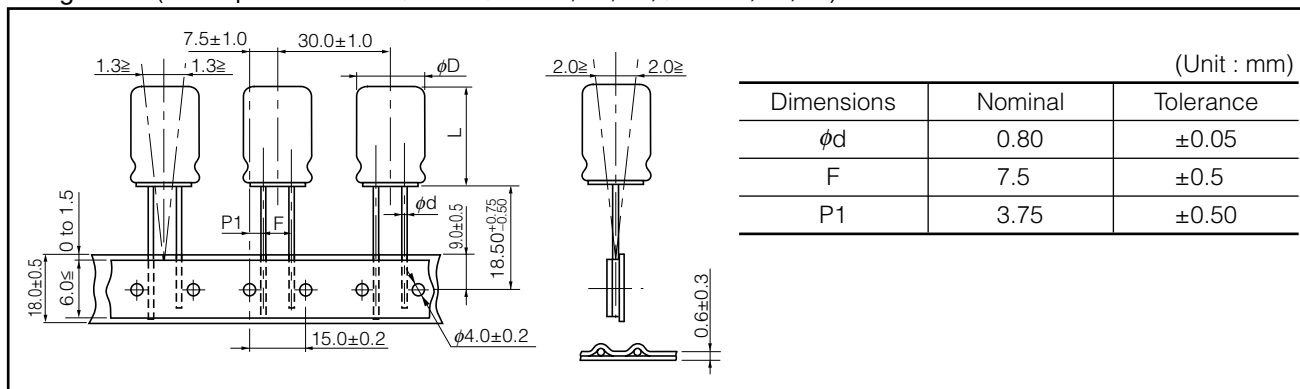
■ Figure G (Lead space: 5 mm / $\phi D \times L$: $\phi 12.5 \times 15$, 20, 25)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

05 Mar. 2014

■ Figure H (Lead space: 7.5 mm / $\phi D \times L$: $\phi 16 \times 15, 20, 25, \phi 18 \times 15, 20, 25$)

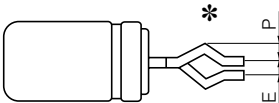
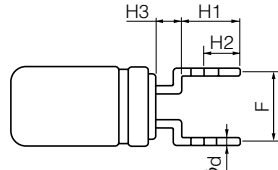
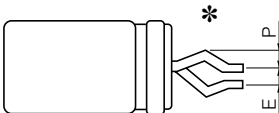
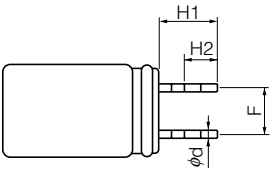


■ Packaging Specifications

Dimensions (mm)		Dimensions of Outer Carton Box				
		(Unit : mm)				
		$\phi 4$ to $\phi 5$	$\phi 6.3$	$\phi 8$	$\phi 10, \phi 12.5$	$\phi 16, \phi 18$
a		340 max.	340 max.	340 max.	340 max.	340 max.
b		to 55 max.	to 55 max.	to 55 max.	55 to 66 max.	62 to 75 max.
c		170 to 210 max.	270 max.	230 max.	170 to 270 max.	225 to 310 max.
Packaging Quantity		2000 pcs.	2000 pcs.	1000 pcs.	500 pcs.	250 pcs.

Lead Forming Type (Snap-in)

Lead formed Aluminium Electrolytic Capacitor for self mounting, for rationalization and upgrade of soldering process.

$\phi 4, \phi 5, \phi 6.3, \phi 8$		
$\phi 10, \phi 12.5, \phi 16, \phi 18$		

* Direction of bending shape is not specified

■ Dimensions in mm (not to scale)

(Unit : mm)

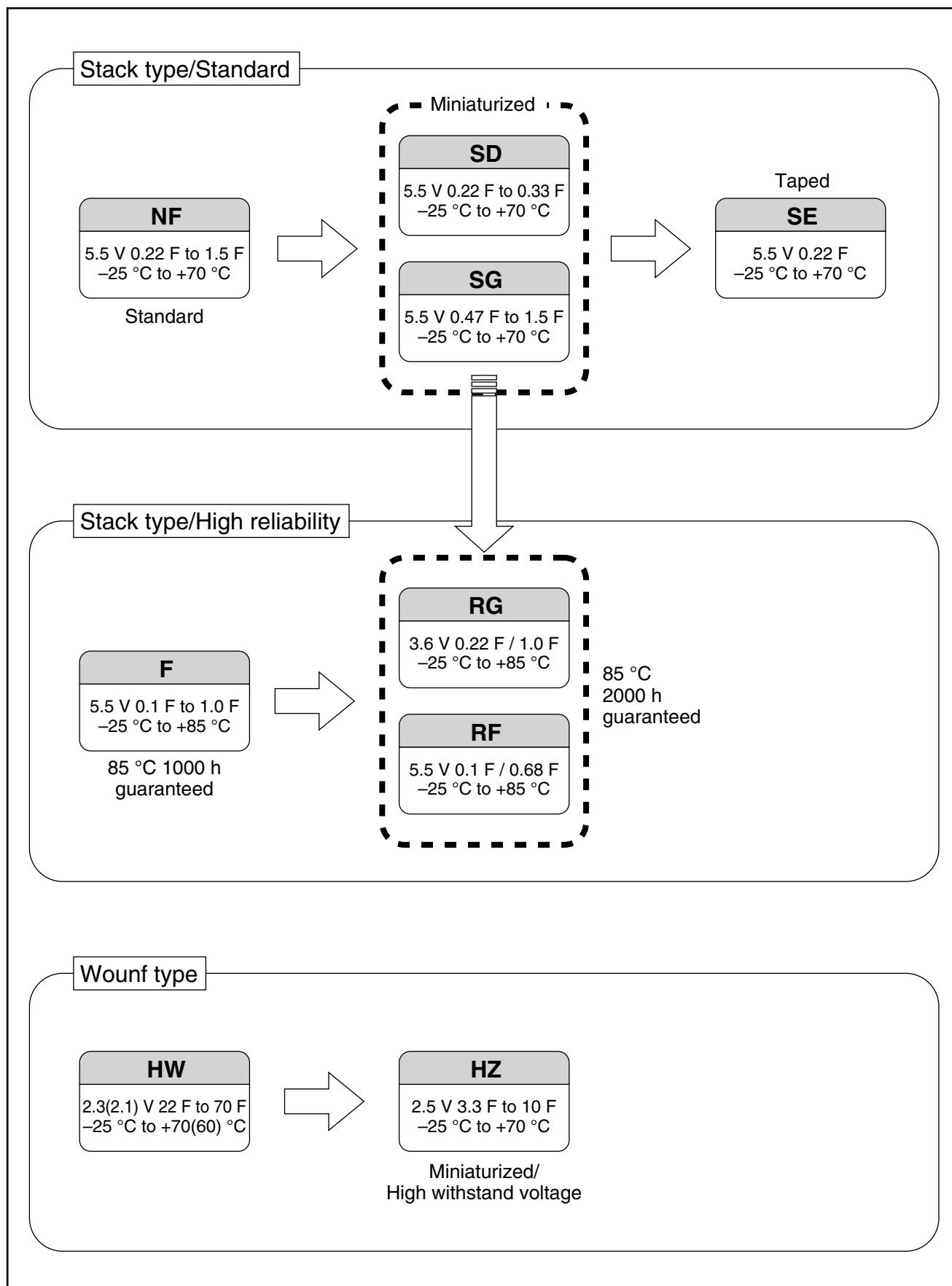
Dia ϕD	$H1 \pm 0.5$	$H2$	$H3$	$F \pm 0.5$	P	$E \text{ max.}$	ϕd	for PWB	
								hole dia. ϕ	thickness
5	4.5	2.7	2.5	5.0	1.0	1.0	0.5	0.9	1.6
6.3	4.5	2.7	2.5	5.0	1.0	1.0	0.5	1.0	1.6
8	4.5	2.7	2.5	5.0	1.0	1.0	0.6	1.0	1.6
10	4.5	2.7		5.0	1.0	1.0	0.6	1.0	1.6
12.5	4.5	2.7		5.0	1.0/0.9	1.0	0.6/0.8	1.0 / 1.1	1.6
16	4.5	2.7		7.5	0.9	1.0	0.8	1.1	1.6
18	4.5	2.7		7.5	0.9	1.0	0.8	1.1	1.6

■ Series KA/KS Dimensions in mm (not to scale)

(Unit : mm)

Dia ϕD	$H1 \pm 0.5$	$H2$	$H3 \pm 0.3$	$F \pm 0.5$	P	$E \text{ max.}$	ϕd	for PWB	
								hole dia. ϕ	thickness
4	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
5	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
6.3	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6
8	4.5	2.7	1.5	5.0	0.95	1.0	0.45	0.9	1.6

Electric Double Layer Capacitors



Stacked Coin Type

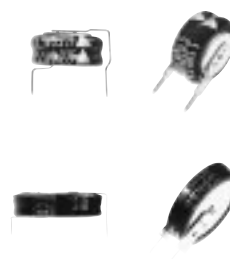
Series: **RG**

■ Features

- Endurance: 85 °C 2000 h
- Can be discharged mA current
- RoHS directive compliant

■ Recommended Applications

- Backup of data/RTC of base station, electronic meter, and industrial equipment
- For assist of rapid load change

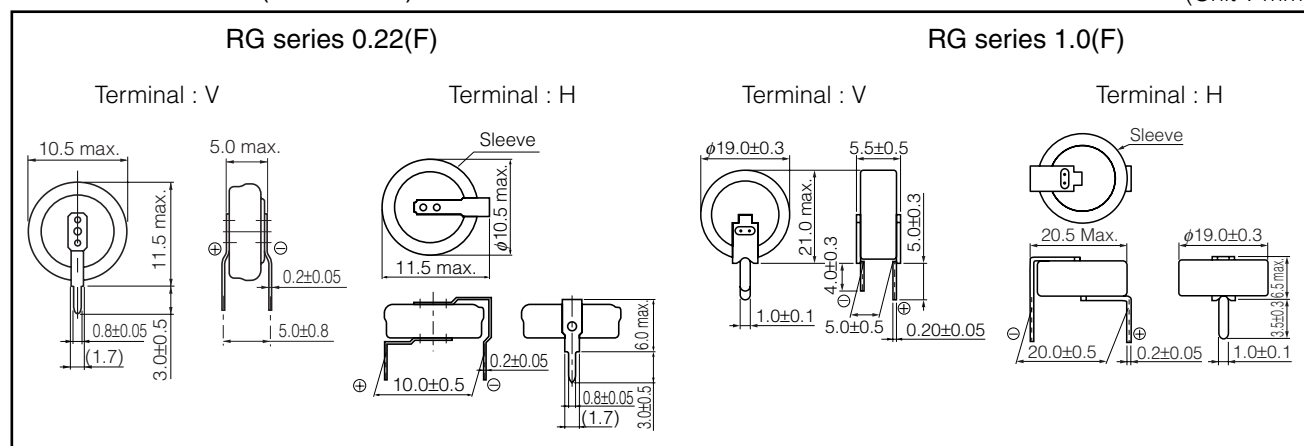


■ Specifications

Category temp. range		-25 °C to +85 °C	
Maximum operating voltage		3.6 V DC	
Nominal capacitance		0.22 F	1.0 F
Capacitance tolerance		-20 % to +80%	
Characteristics at Low Temperature		Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
		Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
		After 2000 hours application of maximum operating voltage at +85 °C	
Endurance	Capacitance change	±30 % of initial measured value at 20 °C	±30 % of initial measured value at 20 °C
	Internal resistance	100 Ω or less	40 Ω or less
		After 2000 hours storage at +85 °C without load (voltage)	
Shelf life	Capacitance change	Capacitance change shall meet the specified limits for Endurance	
	Internal resistance	Internal resistance shall meet the specified limits for Endurance	

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

Maximum operating voltage (V DC)	Capacitance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (mA)	Parts number	Mass (g)	Min. packaging Q'ty (pcs)
3.6	0.22	≤50	1 or less	EECRG0V224()	1.0	200
	1.0	≤20	20 or less	EECRG0V105()	4.1	100

Do not use reflow soldering (IR, Atmospheric heating methods, etc.) Please refer to the page of "Application Guidelines".

(): Please use V or H to indicate terminal type.

The recommended discharge current is a reference value. Please design your equipment(circuit) in consideration of IR drop.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Stacked Coin Type

Series: **RF**

■ Features

- Endurance: 85 °C 2000 h
- Can be discharged mA current
- RoHS directive compliant

■ Recommended Applications

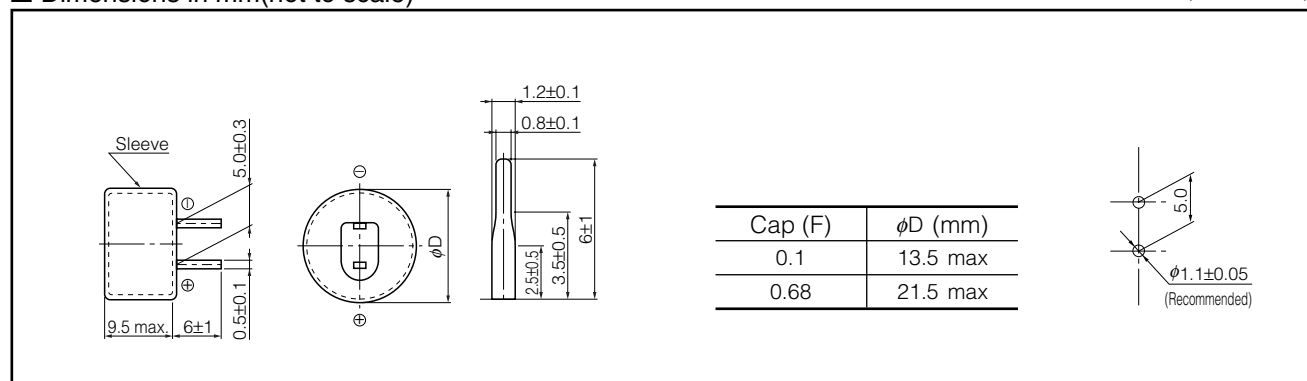
- Backup of data/RTC of base station, electronic meter, and industrial equipment
- For assist of rapid load change

■ Specifications

Category temp. range		-25 °C to +85 °C	
Maximum operating voltage		5.5 V DC	
Nominal capacitance		0.1 F	0.68 F
Capacitance tolerance		-20 % to +80%	
Characteristics at Low Temperature		Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
		Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
After 2000 hours application of maximum operating voltage at +85 °C			
Endurance	Capacitance change	±30 % of initial measured value at 20 °C	±30 % of initial measured value at 20 °C
	Internal resistance	150 Ω or less	40 Ω or less
After 2000 hours storage at +85 °C without load (voltage)			
Shelf life	Capacitance change	Capacitance change shall meet the specified limits for Endurance	
	Internal resistance	Internal resistance shall meet the specified limits for Endurance	

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

Maximum operating voltage (V DC)	Capacitance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Recommended discharge current (mA)	Parts number	Mass (g)	Min. packaging Q'ty (pcs)
5.5	0.1	≤75	3 or less	EECRF0H104	3.3	200
	0.68	≤20	20 or less	EECRF0H684	10.0	100

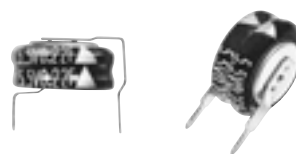
Do not use reflow soldering (IR, Atmospheric heating methods, etc.) Please refer to the page of "Application Guidelines".
The recommended discharge current is a reference value. Please design your equipment (circuit) in consideration of IR drop.

Stacked Coin Type

Series: **SD**

■ Features

- Endurance : 70 °C 1000 h
- RoHS directive compliant



■ Recommended Applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers, intelligent remote controls

■ Specifications

Category Temp. Range	-25 °C to +70 °C	
Maximum Operating Voltage	5.5 V.DC	
Nominal Cap.Range	0.22 F to 0.33 F	
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V. DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤4 times of initial specified value
Shelf Life	After 1000 hours storage at +70°C without load, the capacitor shall meet the specified limits for Endurance.	

■ Dimensions in mm(not to scale)

(Unit : mm)

Terminal: V		Terminal: H	
Cap. (F)	B	Cap. (F)	A
0.022 to 0.22	5.0	0.022 to 0.1	5.5
0.33	5.5	0.22	6.0
		0.33	6.5

■ Standard Products

* : Last purchasing order : Received by the end of Sep. of 2014 / Last shipment : The end of Mar. of 2015
Please consider more than 0.22 F.

Maximum Operating Voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Part number	Min. Packaging Q'ty (pcs)
5.5	* 0.022	0.0176 to 0.0396	≤ 150	EECS0HD 223()	200
	* 0.047	0.0376 to 0.0846	≤ 120	EECS0HD 473()	200
	* 0.10	0.080 to 0.180	≤ 75	EECS0HD 104()	200
	0.22	0.176 to 0.396	≤ 75	EECS0HD 224()	200
	0.33	0.264 to 0.594	≤ 75	EECS0HD 334()	200

() Please use V or H, to indicate the terminal style.

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application Guidelines".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Nov. 2013

Stacked Coin Type

Series: **SG**

■ Features

- Endurance : 70 °C 1000 h
- Maximum height of 6.5 mm (H Terminal)
- RoHS directive compliant



■ Recommended Applications

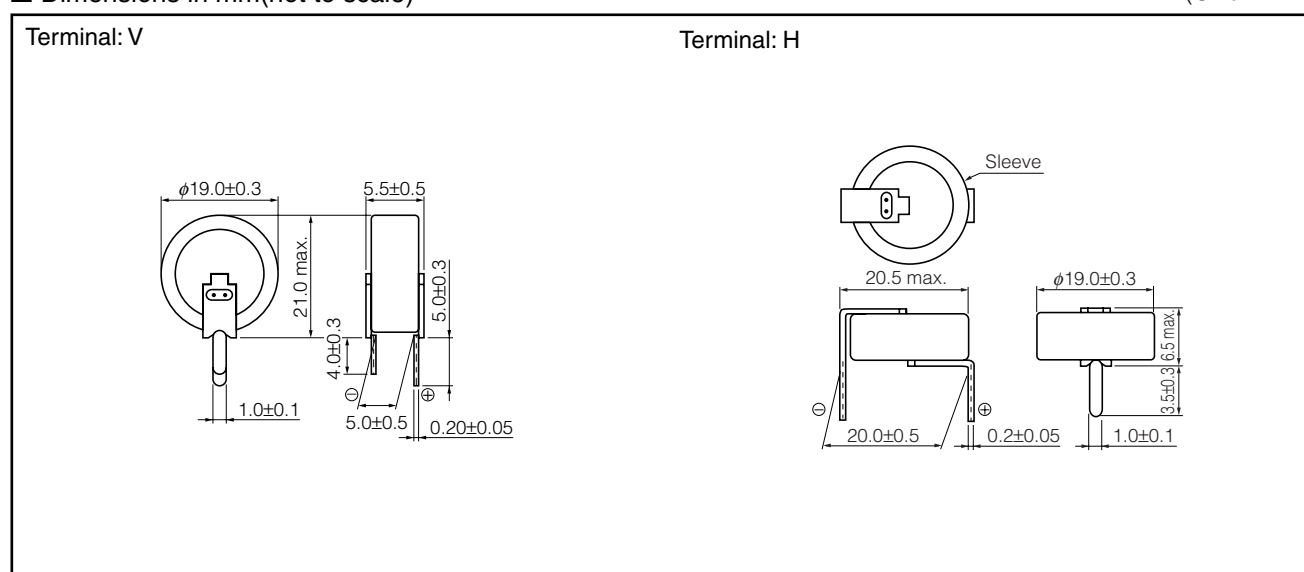
- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls

■ Specifications

Category Temp. Range	-25 °C to +70 °C	
Maximum Operating Voltage	5.5 V.DC	
Nominal Cap.Range	0.47 F to 1.5 F	
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V. DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤4 times of initial specified value
Shelf Life	After 1000 hours storage at +70°C without load, the capacitor shall meet the specified limits for Endurance.	

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

Maximum Operating Voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Part number	Min. Packaging Q'ty (pcs)
5.5	0.47	0.376 to 1.41	≤ 30	EECS5R5()474	100
	1.0	0.80 to 1.80	≤ 30	EECS5R5()105	100
	1.5	1.20 to 2.70	≤ 30	EECS5R5()155	100

() Please use V or H, to indicate the terminal style.

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application Guidelines".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Nov. 2012

Stacked Coin Type

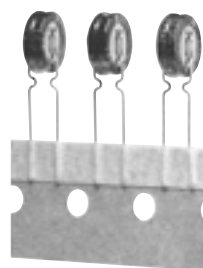
Series: **SE**

■ Features

- Endurance : 70 °C 1000 h
- Automatic insertion available
- RoHS directive compliant

■ Recommended Applications

- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.



■ Specifications

Category Temp. Range	-25 °C to +70 °C	
Maximum Operating Voltage	5.5 V.DC	
Nominal Cap.Range	0.22 F	
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V. DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤4 times of initial specified value
Shelf Life	After 1000 hours storage at +70 °C without load, the capacitor shall meet the specified limits for Endurance.	

■ Dimensions in mm(not to scale)

(Unit : mm)

		<table border="1"> <thead> <tr> <th>Dimensions</th><th>Nominal</th><th>Tolerance</th></tr> </thead> <tbody> <tr> <td>φd</td><td>0.55</td><td>±0.05</td></tr> <tr> <td>P0</td><td>12.7</td><td>±0.2</td></tr> <tr> <td>F</td><td>5.0</td><td>+0.8 -0.2</td></tr> <tr> <td>W</td><td>18.0</td><td>±0.5</td></tr> <tr> <td>W0</td><td>5.5≤</td><td>—</td></tr> <tr> <td>W1</td><td>9.0</td><td>±0.5</td></tr> <tr> <td>W2</td><td>0 to 3.0</td><td>—</td></tr> <tr> <td>H0</td><td>16.4</td><td>±0.5</td></tr> <tr> <td>φD0</td><td>4.0</td><td>±0.2</td></tr> <tr> <td>P</td><td>12.7</td><td>±1.0</td></tr> <tr> <td>P1</td><td>3.85</td><td>±0.50</td></tr> <tr> <td>P2</td><td>6.35</td><td>±1.00</td></tr> <tr> <td>Δh, Δh1</td><td>0</td><td>±1.0</td></tr> <tr> <td>H1</td><td>30.3≥</td><td>—</td></tr> </tbody> </table>	Dimensions	Nominal	Tolerance	φd	0.55	±0.05	P0	12.7	±0.2	F	5.0	+0.8 -0.2	W	18.0	±0.5	W0	5.5≤	—	W1	9.0	±0.5	W2	0 to 3.0	—	H0	16.4	±0.5	φD0	4.0	±0.2	P	12.7	±1.0	P1	3.85	±0.50	P2	6.35	±1.00	Δh, Δh1	0	±1.0	H1	30.3≥	—
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■ Standard Products

* : Last purchasing order : Received by the end of Sep. of 2014 / Last shipment : The end of Mar. of 2015
Please consider 0.22 F.

Maximum Operating Voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Part number	Min. Packaging Q'ty (pcs)
5.5	* 0.022	0.0176 to 0.0396	≤ 150	EECSE0H223	1000
	* 0.047	0.0376 to 0.0846	≤ 120	EECSE0H473	1000
	* 0.10	0.080 to 0.180	≤ 75	EECSE0H104	1000
	0.22	0.176 to 0.396	≤ 75	EECSE0H224	1000

Note: 1. When ordering please observe the minimum packaging quantity.

2. When the surface mount component goes through UV or a heat oven to affix the adhesive glue, the capacitor's surface temperature should not exceed 100 °C for more than 60 seconds (maximum temperature should not exceed 105 °C)

3. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)

Please refer to the page of "Application Guidelines".

Stacked Coin Type

Series: **NF**

■ Features

- Endurance : 70 °C 1000 h
- RoHS directive compliant



■ Recommended Applications

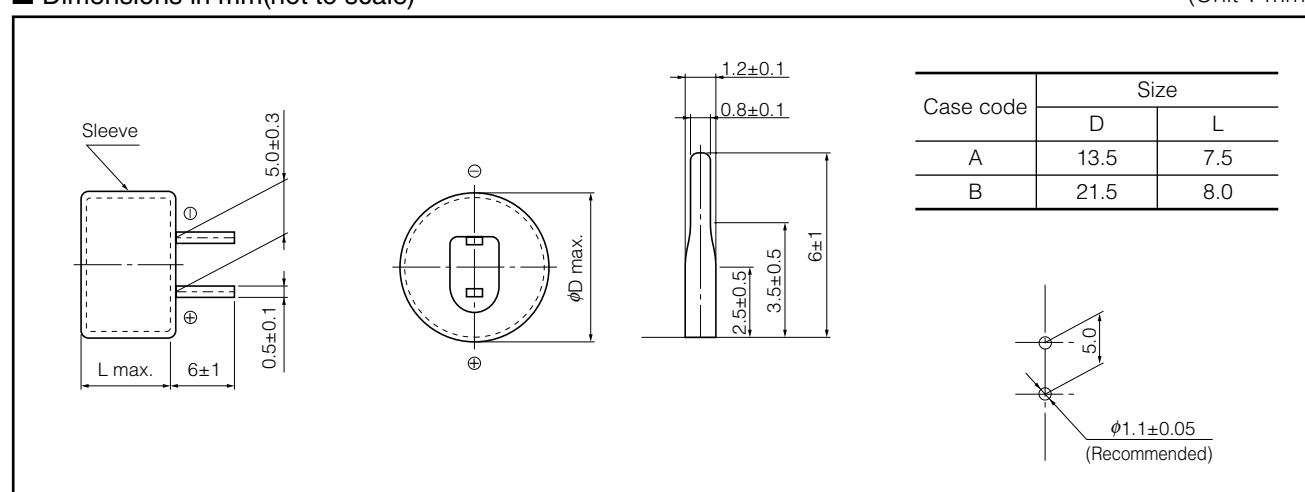
- Memory back-up for video and audio equipment, cameras, telephones, printers, data terminals, rice cookers and intelligent remote controls.

■ Specifications

Category Temp. Range	-25 °C to +70 °C	
Maximum Operating Voltage	5.5 V.DC	
Nominal Cap.Range	0.22 F to 1.5 F	
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V. DC at +70 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤4 times of initial specified value
Shelf Life	After 1000 hours storage at +70°C without load, the capacitor shall meet the specified limits for Endurance.	

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

* : Last purchasing order : Received by the end of Sep. of 2014 / Last shipment : The end of Mar. of 2015
Please consider more than 0.22 F.

Maximum Operating Voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Case code	Part number	Min. Packaging Q'ty		
						Quantity per box (pcs)	Quantity per outer packaging (pcs)	
5.5	*	0.10	0.08 to 0.18	≤ 75	A	EECF5R5U104	200	2000
		0.22	0.176 to 0.396	≤ 75	A	EECF5R5U224	200	2000
		0.47	0.376 to 1.410	≤ 30	B	EECF5R5U474	100	500
		1.0	0.80 to 1.80	≤ 30	B	EECF5R5U105	100	500
		1.5	1.20 to 2.70	≤ 30	B	EECF5R5U155	100	500

Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application Guidelines".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

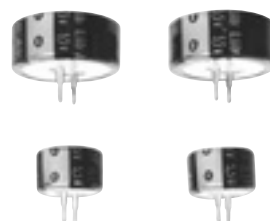
01 Nov. 2013

Stacked Coin Type

Series: **F**

■ Features

- Endurance : +85 °C 1000 h
- RoHS directive compliant

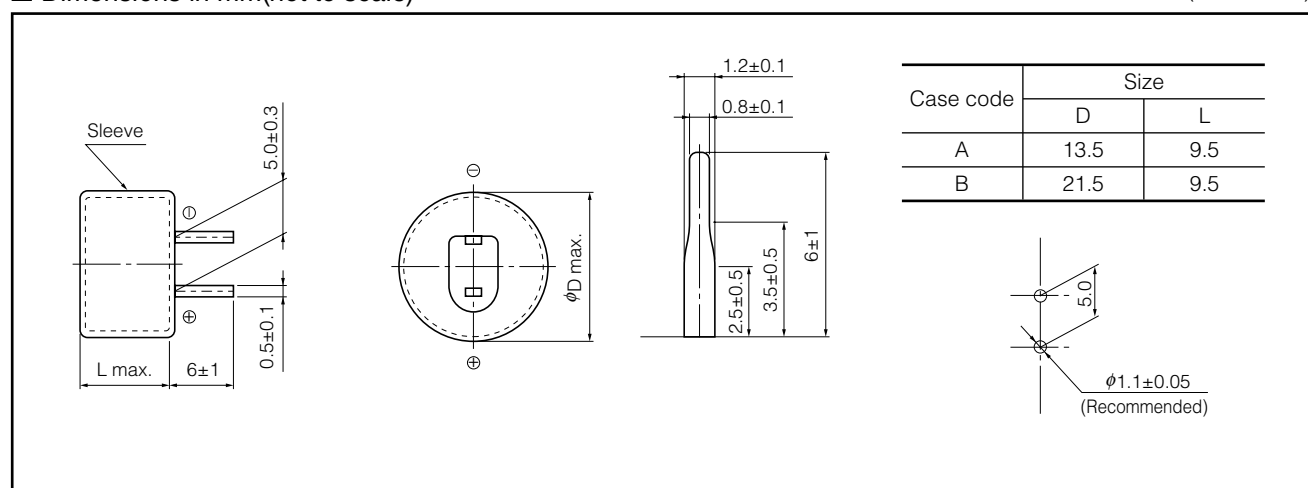


■ Specifications

Category Temp. Range	-25 °C to +85 °C	
Maximum Operating Voltage	5.5 V.DC	
Nominal Cap.Range	0.1 F to 1.0 F	
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)
	Internal resistance	≤5 times of initial measured value at +20 °C (at -25 °C)
Endurance	After 1000 hours application of 5.5 V. DC at +85 °C, the capacitor shall meet the following limits.	
	Capacitance change	±30 % of initial measured value
	Internal resistance	≤4 times of initial specified value
Shelf Life	After 1000 hours storage at +85 °C without load, the capacitor shall meet the specified limits for Endurance.	

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products

* : Last purchasing order : Received by the end of Sep. of 2014 / Last shipment : The end of Mar. of 2015
Please consider more than 0.1 F.

Maximum Operating Voltage (V.DC)	Capacitance (F)	Capacitance tolerance (F)	Internal resistance (Initial specified value) (Ω) at 1kHz	Case code	Part number	Min. Packaging Q'ty		
						Quantity per box (pcs)	Quantity per outer packaging (pcs)	
5.5	*	0.033	0.0264 to 0.0594	≤ 150	A	EECF5R5H333	200	2000
	*	0.047	0.0376 to 0.0846	≤ 120	A	EECF5R5H473	200	2000
		0.10	0.080 to 0.180	≤ 100	A	EECF5R5H104	200	2000
		0.47	0.376 to 0.846	≤ 75	B	EECF5R5H474	100	500
		0.68	0.476 to 1.224	≤ 50	B	EECF5R5H684	100	500
		1.00	0.80 to 1.80	≤ 50	B	EECF5R5H105	100	500

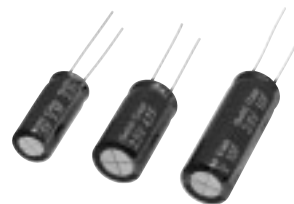
Note : Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application Guidelines".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

01 Nov. 2013

Radial lead Type

Series: **HZ**



■ Features

- Miniaturized, High withstand voltage
- Can be discharge mA or more current
- RoHS directive compliant

■ Recommended Applications

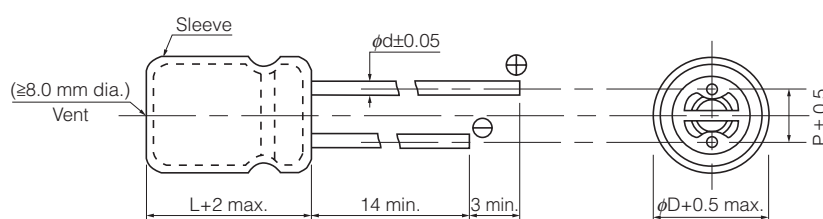
- Solar battery operated circuits
- Back-up Power Supplies (UPS)

■ Specifications

Category Temp. Range	-25 °C to +70 °C		
Maximum Operating Voltage	2.5 V.DC		
Nominal Cap. Range	3.3 F	4.7 F	10 F
Capacitance Tolerance	-20 % to +40 %		
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at 20 °C (at -25 °C)	
	Internal resistance	≤4 times of initial specified value. (at -25 °C)	
Endurance	After 1000 hours application of 2.5 V at +70 °C		
	Capacitance change	±30 % of initial measured value at 20 °C	
	Internal resistance	≤4 times of initial specified value.	
Shelf Life	After 1000 hours storage at +70 °C without load (voltage)		
	Capacitance change	±30 % of initial measured value at 20 °C	
	Internal resistance	≤4 times of initial specified value.	

■ Dimensions in mm (not to scale)

(Unit : mm)



■ Standard Products

Category temp. range (°C)	Max. Operating Voltage (V.DC)	Capacitance (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Size (mm)				Part number	Mass (g)	Min. Packaging Q'ty (pcs)
				ϕD	L	ϕd	P			
-25 to +70	2.5	3.3	≤0.3	8.0	20	0.6	3.5	EECHZ0E335	1.5	200
		4.7	≤0.3	10	20	0.6	5.0	EECHZ0E475	2.1	200
		10	≤0.2	10	30	0.6	5.0	EECHZ0E106	3.1	200

Note : 1. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application Guidelines".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

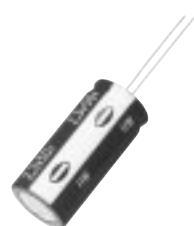
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Radial lead Type

Series: **HW**

■ Features

- Can be discharged mA or more current.
- RoHS directive compliant



■ Recommended Applications

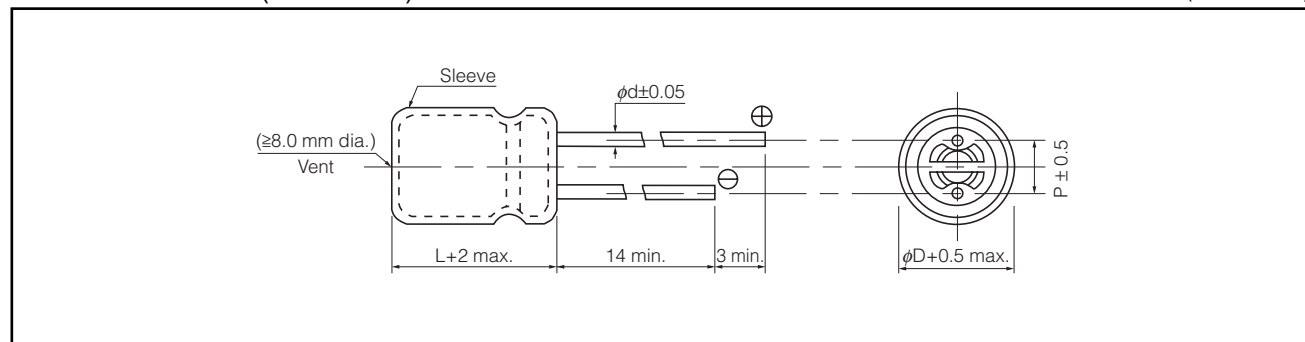
- Solar battery operated circuits (Road guidance flasher),
Quick charging motor drives (Toy car)
- Back-up Power Supplies (UPS)

■ Specifications

Specifications					
Category	Temp. Range	-25 °C to +70 °C		-25 °C to +60 °C	
Maximum Operating Voltage		2.3 V.DC		2.3 V.DC	2.1 V.DC
Nominal Cap. Range		22 F		30, 50 F	70 F
Capacitance Tolerance	-20 % to +40 % (1F : +80 %)				
Characteristics at Low Temperature	Capacitance change	±30 % of initial measured value at +20 °C (at -25 °C)			
	Internal resistance	≤4 times of initial measured value at +20 °C (at -25 °C)			
Endurance	After 1000 hours application of 2.3 V. DC at +70 °C (+60 °C), the capacitor shall meet the following limits.				
	Capacitance change	±30 % of initial measured value			
	Internal resistance	≤2 time of initial specified value			
Shelf Life	After 1000 hours storage at +70 °C (+60 °C) without load, the capacitor shall meet the specified limits for Endurance.				

■ Dimensions in mm(not to scale)

(Unit : mm)



■ Standard Products * : 10 F or less HW series is not recommended for new design. Please consider HZ series.

Category temp. range (°C)	Max. Operating Voltage (V.DC)	Capacitance* (F)	Internal resistance (Initial specified value) (Ω) at 1 kHz	Size (mm)				Part number	Min. Packaging Q'ty (pcs)
				φD	L	φd	P		
-25 to +70	2.3	22	≤ 0.1	18.0	35.0	0.8	7.5	EECHW0D226	50
-25 to +60		30	≤ 0.1	18.0	35.0	0.8	7.5	EECHW0D306	50
		50	≤ 0.1	18.0	40.0	0.8	7.5	EECHW0D506	50
	2.1	70	≤ 0.1	18.0	50.0	0.8	7.5	EECHW0D706	50

Note : 1. Do not use reflow soldering. (IR, Atmosphere heating methods, etc.)
Please refer to the page of "Application Guidelines".

Notices

■ Applicable Laws and Regulations

- This product satisfies the requirements of the RoHS Directive (2011/65/EU) (related to the specified hazardous substances contained in electrical and electronic equipment).
- The ozone-depleting chemicals regulated by the Montreal Protocol are not intentionally used in the materials used in our manufacturing processes.
PBBs (Poly-Brominated Biphenyls)/PBDEs (Poly-Brominated Diphenyl ethers)
The above specified brominated flame retardants are not intentionally used.
- When exporting this product, observe the export procedures specified in export control laws such as the Foreign Exchange and Foreign Trade Control Law.

■ Limited applications

- This product is intended to be used for general-purpose standard applications for general electronic equipment (such as AV equipment, household appliances, business or office equipment, information or communications equipment, etc.)
- If this product is being examined for possible use in applications where higher reliability or safety is required, in cases where a malfunction of this product may endanger life or property, then the delivery specifications meeting the application requirements must be agreed to and exchanged.

Items to be observed

- <1> The purpose of these specifications is to ensure the quality of components as individual components.
Before use, check and evaluate their operation when mounted on your products.
- <2> Do not use our components outside of the corresponding specifications.

■ When using this capacitor in a product where safety is critical

We take great care in the quality of this product. However, performance may deteriorate and short-circuiting or open-circuiting may occur if it will be used in transportation equipment (e.g. trains, cars, traffic lights), medical equipment, airborne equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, disaster/crime prevention equipment, or other equipment where a defect in this component may cause the loss of human life or other significant damage. Ensure that the target equipment has a failsafe design and is provided with the following systems to guarantee adequate safety.

(1) * Ensure the safety of the whole system by installing a protection circuit and a protection device.

(2) Redundant circuits, etc. to maintain the safety of the entire system so that a single independent failure will not lead to unsafe conditions.

■ Conditions of use:

This product is intended to be used in electronic equipment for general-purpose standard applications and is not designed for use in any special environments.

When this capacitor is used in a special environment or under special conditions, its performance may be affected.

Before use, verify the performance and reliability of the capacitor.

△ Application Guidelines

1. Circuit design

1.1 Product Life

Electric Double-Layer Capacitors (Gold Capacitors, hereafter referred to as capacitors) have a limited life.

The life of an electric double layer capacitor is limited. Its capacitance will decrease and its internal resistance will increase over time.

The life of a capacitor greatly depends on the ambient temperature, humidity, applied voltage and discharging currents. Capacitor life can be extended when these parameters are set well below the ratings.

The guaranteed durability of electric double-layer capacitors is between 1000 hours at 70 °C and 2000 hours at 85 °C, depending on product series. Generally, it is 1000 hours at 70 °C. The life of the capacitor is guaranteed to be 16000 hours at a normal temperature (30 °C) by applying the acceleration double for every 10 °C. Please choose the product that is suitable for the reliability that you need.

If your application incorporates this capacitor over a long period of time, then check it periodically and replace it when necessary.

1.2 Polarity and voltage

Capacitors have polarities.

Do not apply a reverse or AC voltage. If a reversed voltage is applied to a capacitor for a long period of time, then its life will be reduced and critical failures such as electrolyte leakage might occur.

Do not apply an over-voltage (a voltage exceeding the rated voltage).

If voltage exceeding the rating is applied to the capacitor for a long time, then its life will be reduced and critical failures such as electrolyte leakage or physical damage due to gas generated by electrochemical reaction or explosion might occur.

1.3 Circuits through which ripple currents pass

When using a capacitor in a circuit through which ripple currents pass, please note following matters.

- (1) The internal resistance of electric double-layer capacitors is higher than that of electrolytic capacitors. Electric double-layer capacitors may generate heat due to ripple currents.
- (2) Please do not exceed the maximum operating voltage when the voltage changes from ripple.
- (3) Because internal resistance is high, the gold capacitor is not basically suitable for the absorption of ripple current.

1.4 Ambient temperature and product life

Capacitor life is affected by usage temperatures. Generally speaking, capacitor life is approximately doubled when the temperature is decreased by 10 °C. Therefore, lower the usage temperature as much as possible. Using capacitors beyond the guaranteed range might cause rapid deterioration of their characteristics and cause them to break down. The temperature referred to here includes the ambient temperature within the equipment, the heat produced by heat generating devices (power transistor, resistors, etc.), self-heating due to ripple currents, etc. Take all of these factors into consideration when checking the capacitor's temperature.

Do not place any heat generating devices on the back of the capacitors. Life acceleration can be calculated with the following equation :

$$L_2 = L_1 \times 2^{\left(\frac{T_1 - T_2}{10}\right)}$$

L₁ : Life at temperature T₁ °C (h)

L₂ : Life at temperature T₂ °C (h)

T₁ : Category's upper limit temperature

T₂ : Ambient temperature to calculate the life + heat generation due to ripple current (°C)

- * Humidity also affects the capacitor's life. When using capacitors outside the following conditions, please contact us.
A temperature at +55 °C and a relative humidity of 90 % to 95% for 500 hours.

1.5 Voltage drop

Pay particular attention to the instantaneous working current and the voltage drop due to the capacitor's internal resistance when used in backup mode. The discharging current level is different depending on the capacitor's internal resistance. Use a capacitor with a discharging current below what is specified by the corresponding capacitor.

Series	Max. Discharging Current				
	0.047 F or less	0.1 to 0.33 F	0.47 to 1.5 F	3.3 to 4.7 F	10 to 50 F
SG/SD/SE/NF/F	200 μA	300 μA	1 mA	—	—
RF	—	3 mA	20 mA	—	—
RG	—	1 mA	20 mA	—	—
HZ/HW	—	—	—	300 mA	1 A

1.6 Series connection

When connecting capacitors in series, add a bleeder resistor in parallel with each capacitor by taking the leakage current into consideration so that the balance of voltages is not disrupted.

1.7 Electrolyte is used in the products

Electrolyte is used in the capacitors. Therefore, misuse can result in rapid deterioration of characteristics and functions of each product. Electrolyte leakage will damage printed circuit boards and can affect their performance, characteristics, and functions.

1.8 External sleeve

The external sleeve is not electrical insulation, and thus capacitors should not be used in an environment that requires electrical insulation. The sleeve is covered only for showing ratings.

2. Mounting

2.1 Heat stress at the soldering

When soldering a capacitor to a printed circuit board, excessive heat stress could cause the deterioration of the capacitor's electrical characteristics. For example the integrity of the seal can be compromised causing the electrolyte to leak, and short circuits could occur in addition to and failure of the appearance.

Please observe the following guidelines.

(1) Manual soldering

Do not touch the capacitor body with a soldering iron. Solder the capacitor using a soldering tip temperature of 350 °C or less for 4 seconds or less. Solder a the capacitor three times or less at intervals of 15 seconds or more.

(2) Flow soldering

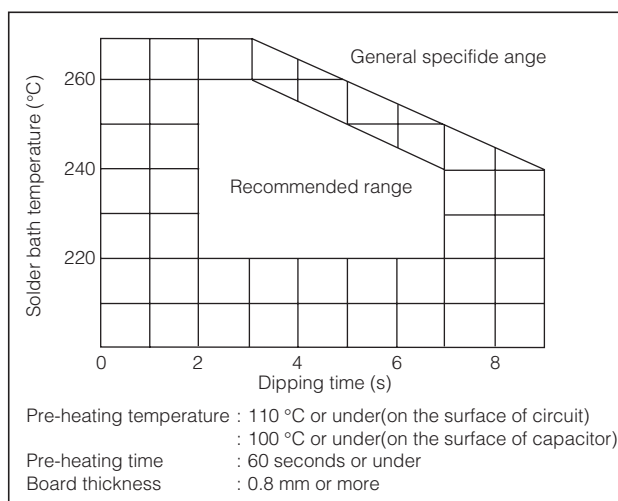
- 1) Do not dip the body of the products into a soldering bath.
- 2) Keep the product's surface temperature at or below 100 °C for no more than 60 seconds (the peak 105 °C) when soldering. Please refer to the chart at right to set soldering temperature and time. It is recommended to check the product temperature before you use.
- 3) The terminals of the NF/F/RF type are designed so the bottom of the product floats from the PWB. This is to protect against heat stress during soldering. Do not touch the bottom of the product directly to the PWB.

(3) Other heat stress

- 1) Keep the product's surface temperature at or below 100 °C for no more than 60 seconds (the peak 105 °C) when applying heat to bake the PWB or fixing resin, etc. The capacitor voltage must be 0.3 V or less.
- 2) Do not use a product more than once after it has been mounted on the PWB. Excessive heat stress is applied when detaching it from the PWB. Please observe "(1)Manual soldering" when you adjusting it.
- 3) Be sure that excessive heat stress is not applied to the Gold capacitor when other parts in its surroundings of the Gold capacitor are detached or adjusted.

(4) Others

- 1) The lead wires and terminals are plated for solderability. Rasping or filing lead wires or terminals might damage the plating layer and degrade the solderability.
- 2) Do not apply a large mechanical force to the lead wires or terminals. Otherwise, they may break or come off or the capacitor characteristics may be damaged.
- 3) There is a possibility that the sealing performance of the product is deteriorated if a coating material that contains an organic solvent is used.



2.2 Circuit Design

Do not set wiring pattern directly under the mounted capacitor, and pass between terminals. If the electrolyte leaks, short circuit might occur and tracking or migrations are anticipated. If a capacitor is directly touching a PWB, then the bottom of the capacitor and the circuit pattern may short-circuit. On PWBs, blowing flux or solder may cause the capacitor's external sleeve to break or shrink, potentially affecting the internal structure. In addition, please refer to application guidelines for the aluminum electrolytic capacitor.

2.3 Residual voltage

Gold Capacitors can hold a large charge and could have residual voltage. Therefore, some electronic components with a low withstand voltage, such as semi-conductors, might be damaged.

2.4 Circuit board cleaning

Apply the following conditions for flux cleaning after soldering. (Excepted for NF,F and RF series)

Temperature : 60 °C or less

Duraiton : 5 minutes or less

Rinse sufficiently and dry the boards.

[Recommended cleaning solvents include]

Pine Alpha ST-100s, Sunelec B-12, DK be-clear CW-5790, Aqua Cleaner 210SEP, Cold Cleaner P3-375, Cclear-th-ru 750H, Clean-thru 750L, Clean-thru 710M, Techno Cleaner219, Techno Care FRW-17, Techno Care FRW-1, Techno Care FRV1

- Consult with us if you are using a solvent other than any of those listed above or Deionized water.
- The uses of ozone depleting cleaning agents is not recommended in the interest protecting the environment.

3. Precautions for using equipment

Avoid using mounting equipment in environments where :

- (1) Capacitors are exposed to water, salt water or oil.
- (2) Capacitors are exposed to direct sunlight.
- (3) Capacitors are exposed to high temperature and humidity where water can condense on the capacitor surface.
- (4) Capacitors are subject to various active gases.
- (5) Capacitors are exposed to acidic or alkaline environments.
- (6) Capacitors are subject to high-frequency induction.
- (7) Capacitors are subject to excessive vibrations or mechanical impact.

A brown excretion might be caused around the sealing, depending on the conditions of use. This excretion is insulation and does not have influence on the electrical characteristics.

4. Maintenance Precautions

Periodically check capacitors used in industrial equipment. When checking and maintaining capacitors, turn off the equipment and discharge the capacitors beforehand. Do not apply stress to the capacitor lead terminals.

Periodically check the following items.

- 1) Significant appearance abnormalities (deformation, electrolyte leakage, etc.)
 - 2) Electrical characteristics (described in the catalog or delivery specifications)
- If any abnormalities are found, then replace the capacitors or take appropriate actions.

5. Emergency procedures

If the capacitors generate heat, then smoke may come out of the exterior resin. Under these conditions turn off the equipment immediately and stop using it.

Do not place your face or hands close to the capacitor, burns might be caused.

6. Storage

Do not store capacitors in a high-temperature or high-humidity environment. Store capacitors at a room temperature of 5 to 35 °C and a relative humidity of 85 % or less. (Recommended storage term: 1year or less.) Store capacitors in their packaging as long as possible. Avoid storing capacitors under the following conditions.

- (1) Exposed to water, high temperatures or humidity, or when condensation can occurs.
- (2) Exposed to oil or in environments filled with gaseous oil contents.
- (3) Exposed to salt water or environments filled with saline substances.
- (4) In environments filled with harmful gases
(hydrogen disulfide, sulfurous acid, nitrous acid, chlorine, bromine, bromomethane, etc.)
- (5) In environments filled with harmful alkaline gases such as ammonia.
- (6) Exposed to acid or alkaline solvents.
- (7) Exposed to direct sunlight, ozone, ultraviolet or radial rays.
- (8) Exposed to vibration or mechanical impact.

7. Discarding

Dispose of capacitors as industrial waste. They are comprised of various metals and resin.

The precautions for the use of Electric Double Layer Capacitors (Gold Capacitors) follow the "Precautionary guidelines for the use of fixed Electric Double Layer Capacitors for electronic equipment", RCR-2370C issued by EIAJ in July 2008. Please refer to the above guidelines for details.

For more Information please contact the respective sales office of factory

Factory

Capacitor Business Division

Automotive & Industrial Systems Company, Panasonic Corporation

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