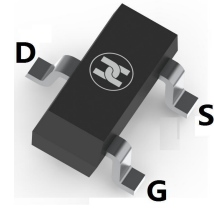
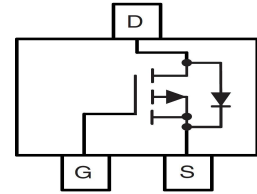


**P-Channel Power MOSFET**
**FEATURES**

- Generation V Technology
- Ultra Low On-Resistance
- Low Profile (<1.1mm)
- Fast Switching

**MECHANICAL DATA**

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)

**MARKING:1C7A**

**SOT-23**

**Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)**

	Parameter	Max.	Units
I <sub>D</sub> @ T <sub>A</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V	-0.78	A
I <sub>D</sub> @ T <sub>A</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V	-0.62	
I <sub>DM</sub>	Pulsed Drain Current ①	-4.9	
P <sub>D</sub> @ T <sub>A</sub> = 25°C	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
T <sub>J</sub> , T <sub>STG</sub>	Junction and Storage Temperature Range	-55 to + 150	°C
R <sub>θJA</sub>	Maximum Junction-to-Ambient ④	230	°C/W

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	-4.9	—	mV/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	—	—	0.60	Ω	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.61A ③
		—	—	0.90		V <sub>GS</sub> = -2.7V, I <sub>D</sub> = -0.31A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	-0.70	—	-1.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	0.56	—	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.31A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-1.0	μA	V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V
		—	—	-25		V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -12V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 12V
Q <sub>g</sub>	Total Gate Charge	—	2.4	3.6	nC	I <sub>D</sub> = -0.61A
Q <sub>gs</sub>	Gate-to-Source Charge	—	0.56	0.84		V <sub>DS</sub> = -16V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	1.0	1.5		V <sub>GS</sub> = -4.5V, See Fig. 6 and 9 ③
t <sub>d(on)</sub>	Turn-On Delay Time	—	13	—	ns	V <sub>DD</sub> = -10V
t <sub>r</sub>	Rise Time	—	18	—		I <sub>D</sub> = -0.61A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	22	—		R <sub>G</sub> = 6.2Ω
t <sub>f</sub>	Fall Time	—	22	—		R <sub>D</sub> = 16Ω, See Fig. 10 ③
C <sub>iss</sub>	Input Capacitance	—	97	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	53	—		V <sub>DS</sub> = -15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	28	—		f = 1.0MHz, See Fig. 5

**Source-Drain Ratings and Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-0.54	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-4.9		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -0.61A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	35	53	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -0.61A
Q <sub>rr</sub>	Reverse Recovery Charge	—	26	39	nC	di/dt = 100A/μs ③

**Notes:** ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )

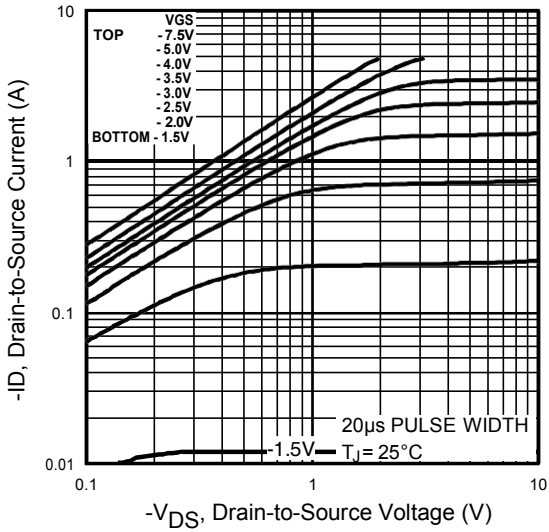
② I<sub>SD</sub> ≤ -0.61A, di/dt ≤ 76A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

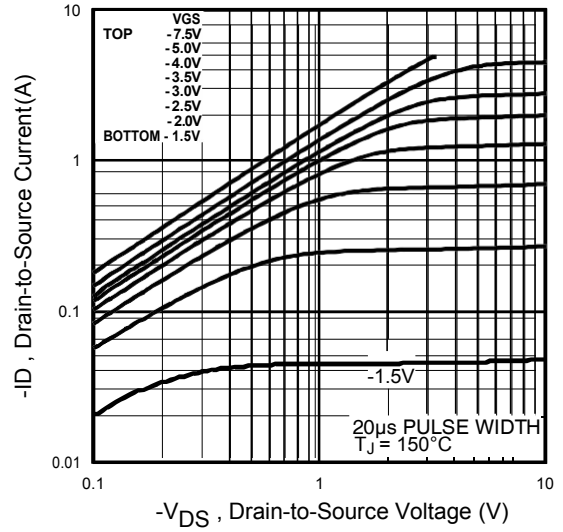
④ Surface mounted on FR-4 board, t ≤ 5sec.

P-Channel Power MOSFET

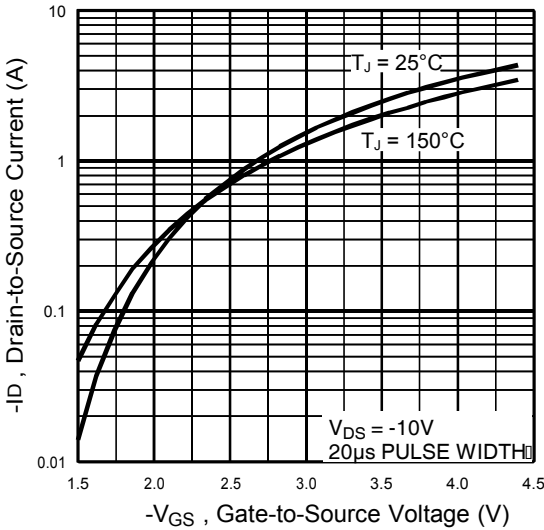
**Typical Characteristics**



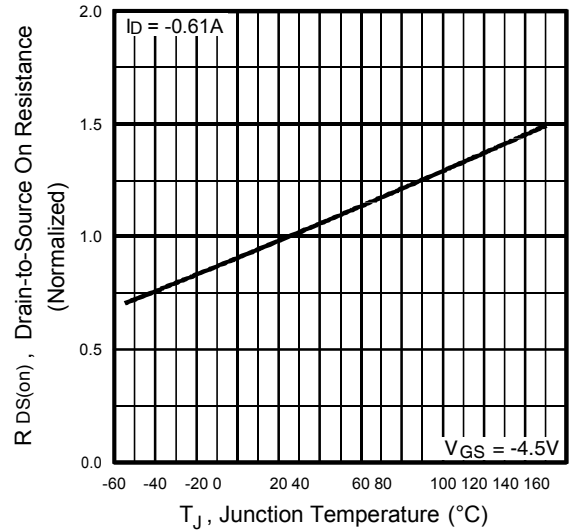
**Fig 1.** Typical Output Characteristics



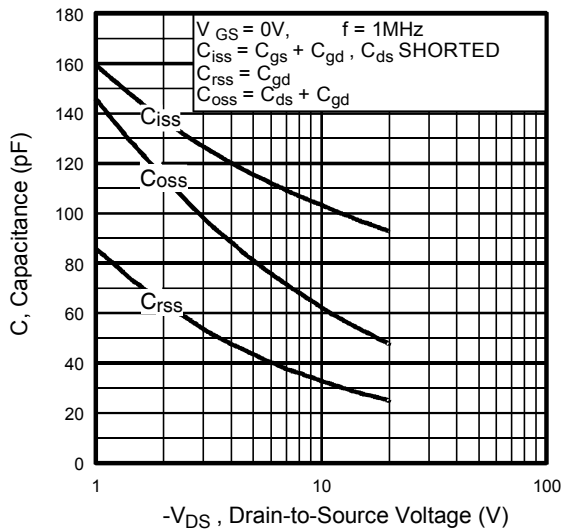
**Fig 2.** Typical Output Characteristics



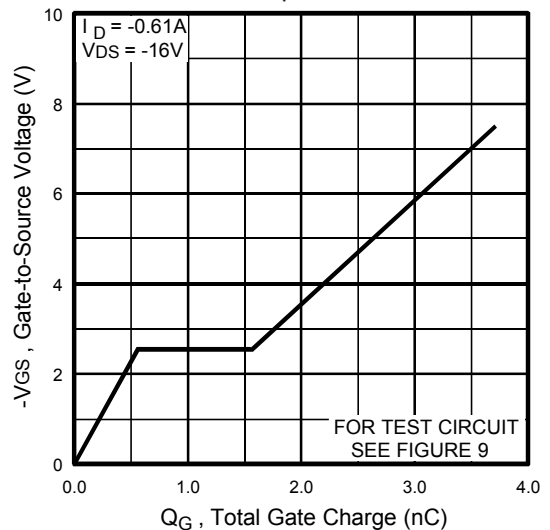
**Fig 3.** Typical Transfer Characteristics



**Fig 4.** Normalized On-Resistance Vs. Temperature

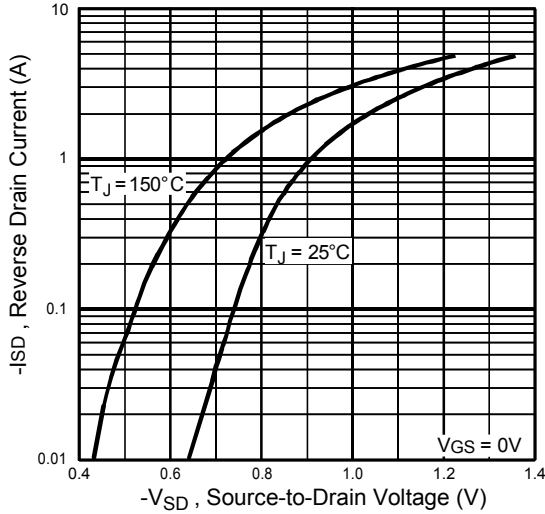


**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

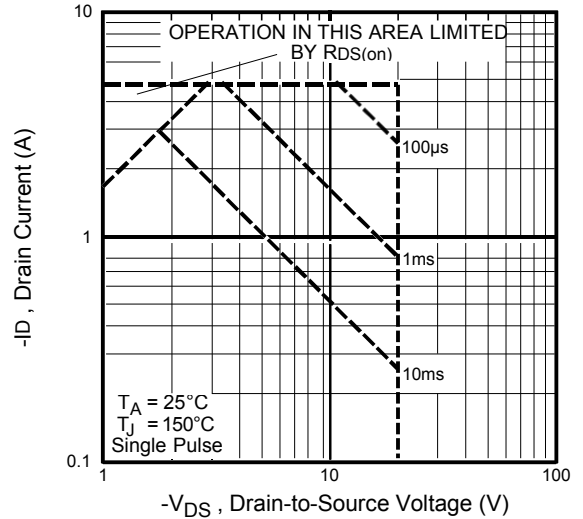


**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

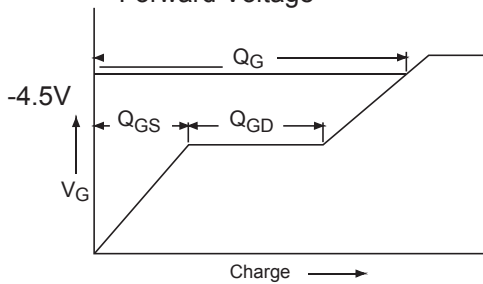
P-Channel Power MOSFET



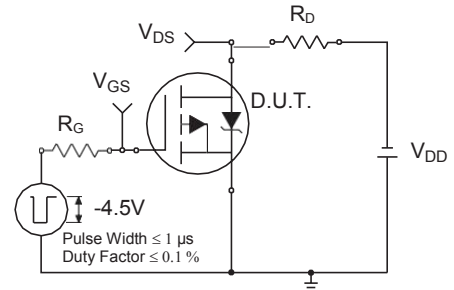
**Fig 7. Typical Source-Drain Diode Forward Voltage**



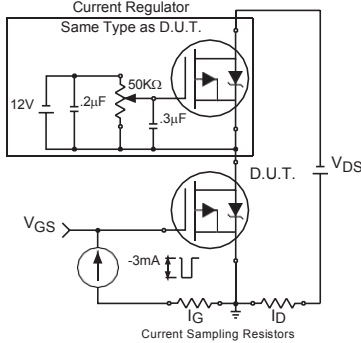
**Fig 8. Maximum Safe Operating Area**



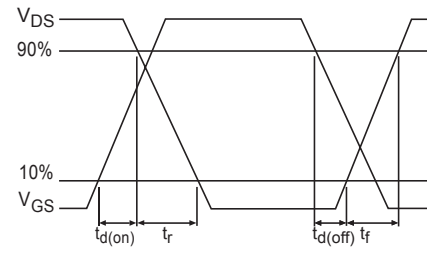
**Fig 9a. Basic Gate Charge Waveform**



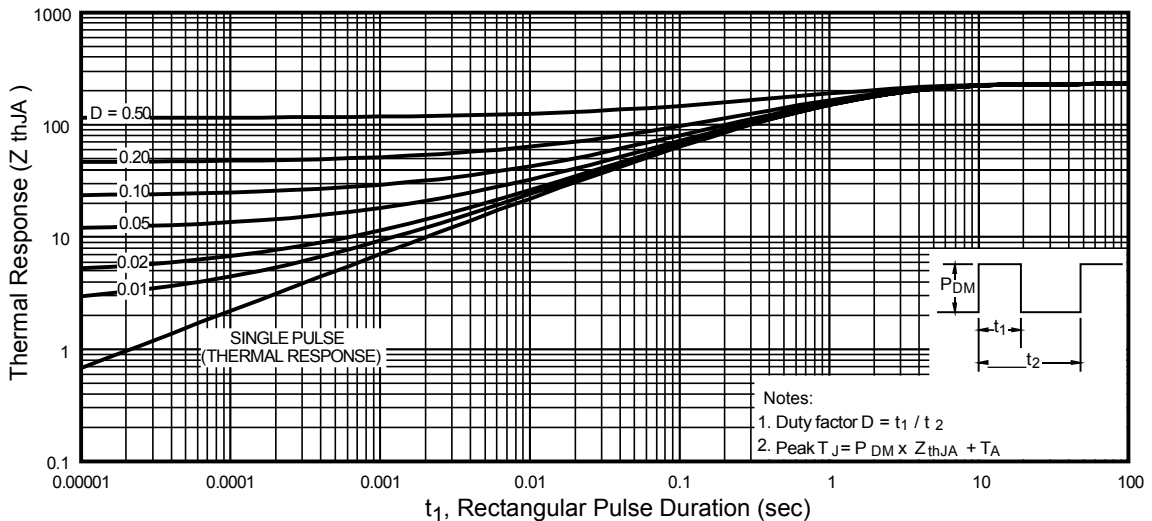
**Fig 10a. Switching Time Test Circuit**



**Fig 9b. Gate Charge Test Circuit**

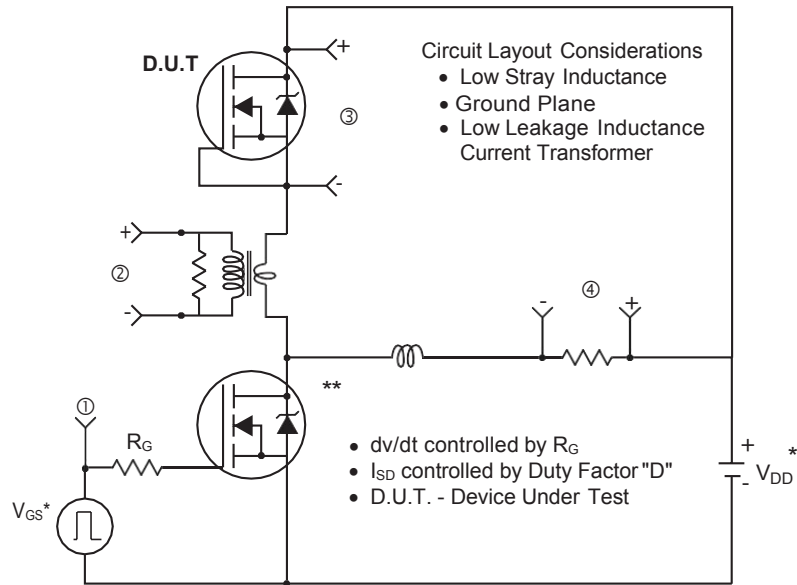


**Fig 10b. Switching Time Waveforms**



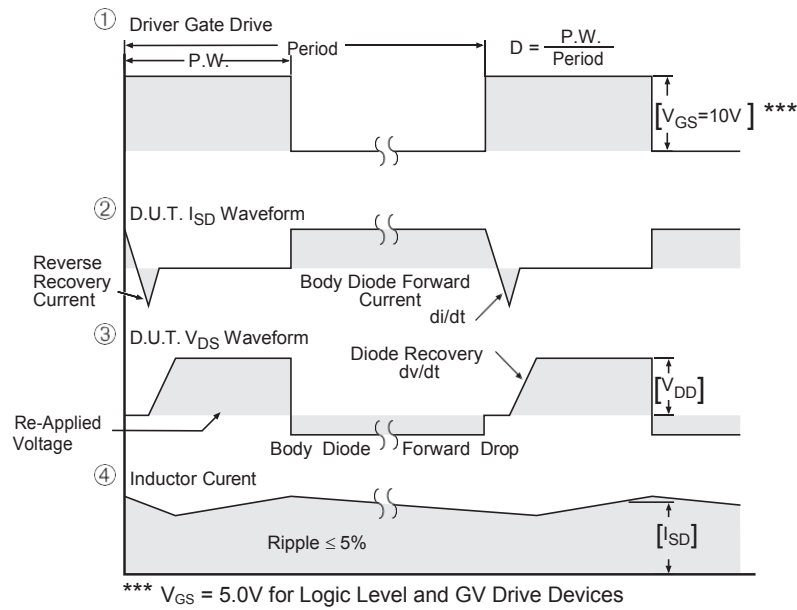
**Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient**

**Peak Diode Recovery dv/dt Test Circuit**

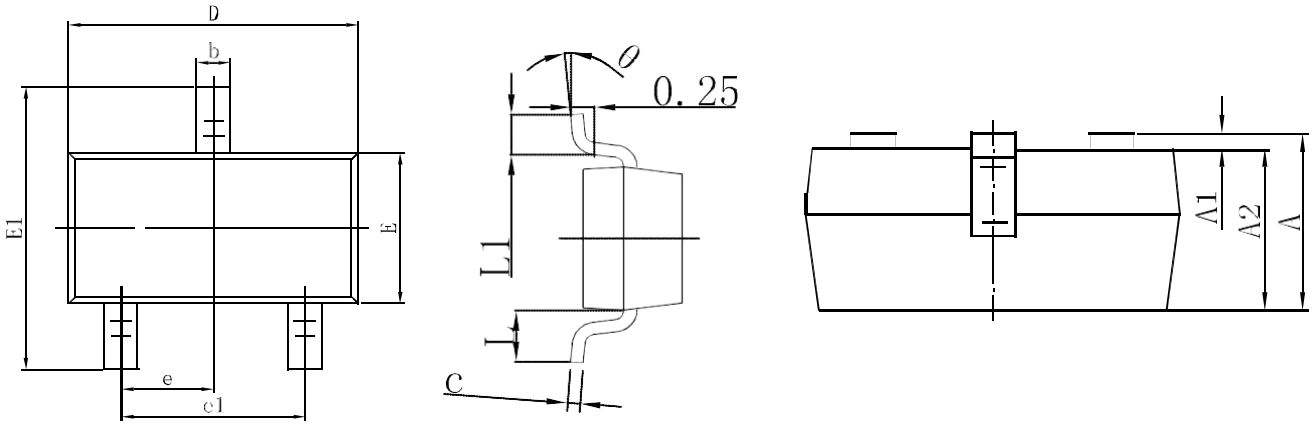


\* Reverse Polarity for P-Channel

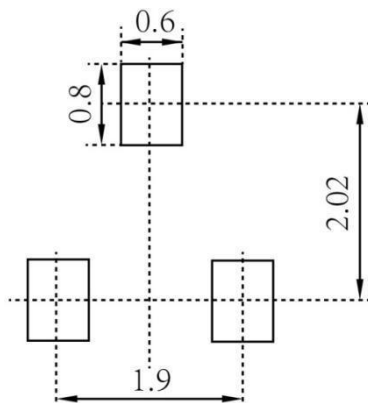
\*\* Use P-Channel Driver for P-Channel Measurements



**Fig 13. For P-Channel HEXFETS**

**SOT-23 Package Outline Dimensions**


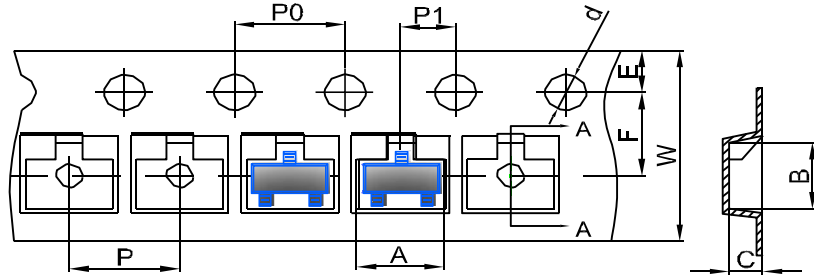
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

**SOT-23 Suggested Pad Layout**

**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

## SOT-23 Tape and Reel

### SOT-23 Embossed Carrier Tape

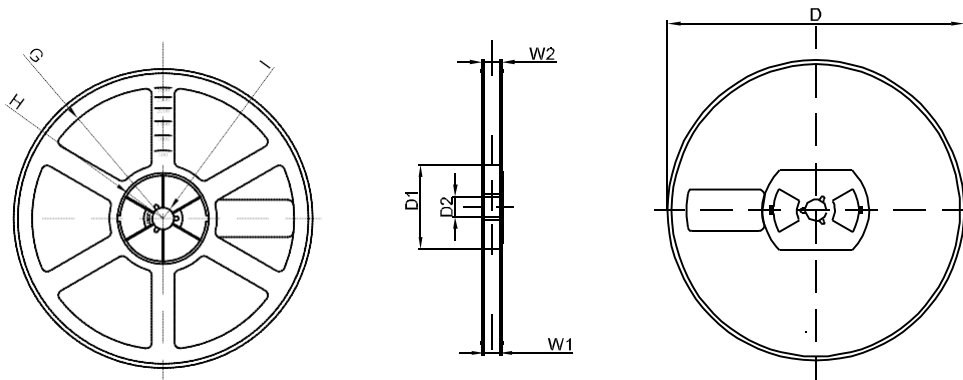


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

### SOT-23 Tape Leader and Trailer



### SOT-23 Reel



DIMENSIONS ARE IN MILLIMETER								
REEL OPTION	D	D1	D2	G	H	I	W1	W2
7" DIA	Ø178	54.40	13.00	R78	R25.60	R6.50	9.50	12.30
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1