MU10H Series

10W, Wide 4:1 Input, 1.5KV Isolation, DIP2"X1" DC/DC Converters

Features

- Rated power: 10W Max
- Input voltage range 4:1
- Regulated output
- High efficiency up to 87%
- Isolation voltage 1.5KVDC
- Remote On/Off control
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Standard 2"x1" package
- Under voltage, over voltage, over current, and short circuit protection
- Meet IEC/EN/UL 62368-1 CISPR32, EN55032
- 3 year warranty

Model Numbers

Model Number	Input Voltage [VDC]			V_{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	Range	*Max.		Max.	Min.		
MU10H-2403	24	9~36	40	3.3	2400	0	78	2200
MU10H-2405	24	9~36	40	5	2000	0	83	2200
MU10H-2409	24	9~36	40	9	1111	0	85	680
MU10H-2412	24	9~36	40	12	833	0	86	470
MU10H-2415	24	9~36	40	15	667	0	86	330
MU10H-2424	24	9~36	40	24	416	0	88	100
MU10H-2405D	24	9~36	40	±5	±1000	0	83	1000
MU10H-2409D	24	9~36	40	±9	±555	0	86	680
MU10H-2412D	24	9~36	40	±12	±416	0	87	470
MU10H-2415D	24	9~36	40	±15	±333	0	87	330
MU10H-2424D	24	9~36	40	±24	±208	0	87	100
MU10H-4803	48	18~75	80	3.3	2400	0	79	2200
MU10H-4805	48	18~75	80	5	2000	0	83	2200
MU10H-4812	48	18~75	80	12	833	0	87	470
MU10H-4815	48	18~75	80	15	667	0	87	330
MU10H-4824	48	18~75	80	24	416	0	88	100
MU10H-4805D	48	18~75	80	±5	±1000	0	83	1000
MU10H-4812D	48	18~75	80	±12	±416	0	87	470
MU10H-4815D	48	18~75	80	±15	±333	0	87	330
MU10H-4824D	48	18~75	80	±24	±208	0	87	100

* Input voltage exceed the Max. value may cause permanent damage.
* Only typical models are listed. Other models may be available upon request.

Electrical Specifications

Unless otherwise indicated, specifications are measured at T_A=25°C, nominal input voltage, full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Input current Full load, $V_{IN, Nom}$=24V	V_{OUT}=3.3V Others	-	423 502	-	mA	
Input current Full load, $V_{IN, Nom}$=48V	V_{OUT}=3.3V Others		190 251	-	mA	
Input current No load	$V_{IN, Nom}$=24V $V_{IN, Nom}$=48V		5 4	-	mA	
Reflected ripple current	$V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	-	40 30	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	-0.7 -0.7	-	50 100	VDC	
Startup input voltage	$V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	-	-	9 18	VDC	
Startup time	Resistive load	-	10	-	mS	
Input under voltage shutdown	$V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	5.5 12	6.5 15.5	-	VDC	
Remote On/Off control "Ctrl" pin open or logic high [ON] "Ctrl" pin grounded or logic low [OFF]	Logic high Logic low Ctrl pin current	2.7 0 -	- - 5	9 1.2 10	VDC VDC mA	Positive Logic
Output voltage accuracy	I_{OUT}=0% to 100%	-	±1	±3	%	
Line regulation Full load, V_{IN}=$V_{IN, Min}$ to $V_{IN, Max}$	Main output Other output	-	±0.2 ±0.5	±0.5 ±1.0	%	
Load regulation I_{OUT}=5% to 100% of $I_{OUT, rated}$	Main output Other output	-	±0.5 ±0.5	±1.0 ±1.5	%	
Cross regulation +I_{OUT}=50%, -I_{OUT}=10% to 100%	Dual output models	-	-	±5	%	
Output ripple and noise 20MHz bandwidth, peak to peak		-	40	80	mVp-p	
Temperature coefficiency	Full load	-	-	±0.03	%/°C	
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation Recovery time	-	±3 300	±5 500	% V_{OUT} uS	
Output over voltage protection		110	-	160	% V_{OUT}	
Output over current protection		110	140	190	% I_{OUT}	
Output short circuit protection		Continuous, automatic recovery				
Input filter		PI filter				
Hot plug		None				

* Operating with less than 5% of rated load will not cause damage to the converters, but the performances data may not fall into the specifications, and stable operating is not assured.

General Specifications

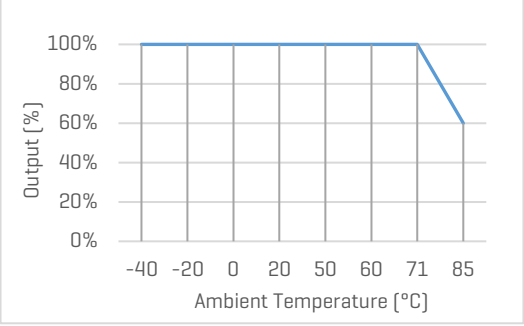
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	I/P to O/P	-	2000	-	pF	
Switching frequency*	Full load	-	300	-	KHz	PWM mode
Operating temperature	See "Derating Curve"	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Cooling method		Free air convection				
Case material		Aluminum alloy				
Vibration		IEC/EN61373 – Category 1, Grade B				
MTBF	MIL-HDBK-217F	>1,000,000 Hours, T_A=25°C				
Design based on standards		IEC/EN/UL 62368-1				
Safety certifications		IEC/EN 62368-1				
EMC		CISPR32, EN55032 Class B with external circuit IEC/EN61000-4-2, 3, 4, 5, 6				
Size, and Weight		50.8 x 25.4 x 12 mm, 30g				

* Switching frequency is measured at full load. The converter reduces the switching frequency at low load (less than 50% load) for better efficiency.

Characteristic Curves

Derating Curve

Output vs Ambient Temperature



Recommended Application Circuit

Typical Application Circuit

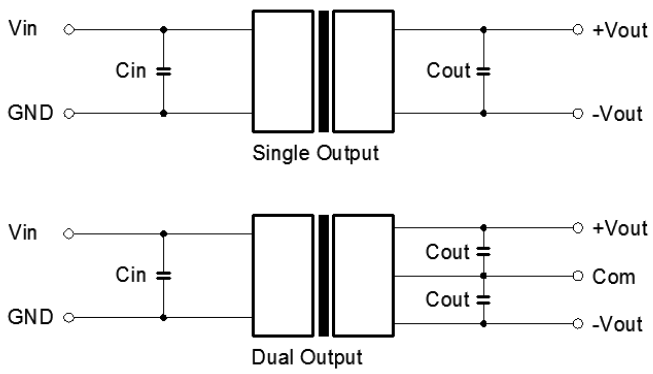


Figure 1. Typical external circuit

Note

*Typical application circuit is to further lower the input and output ripple. It is not required for general use.

*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.

[Table 1] Recommended component spec

Input voltage	24V	48V
C_{IN}	100uF, 50V	10...47uF, 100V
C_{OUT}	10uF	10uF

EMC Enhancement for EN55032 Class B

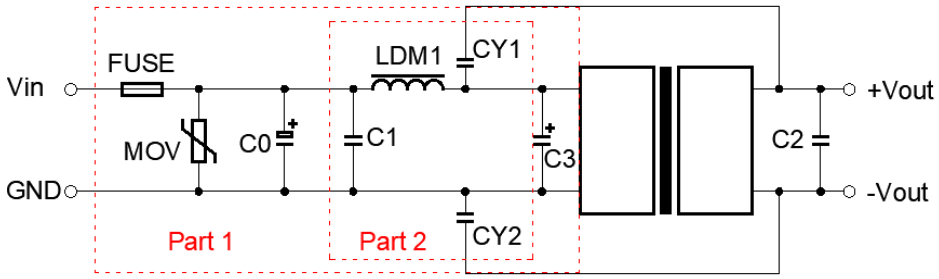


Figure 2. Circuit for EMC enhancement

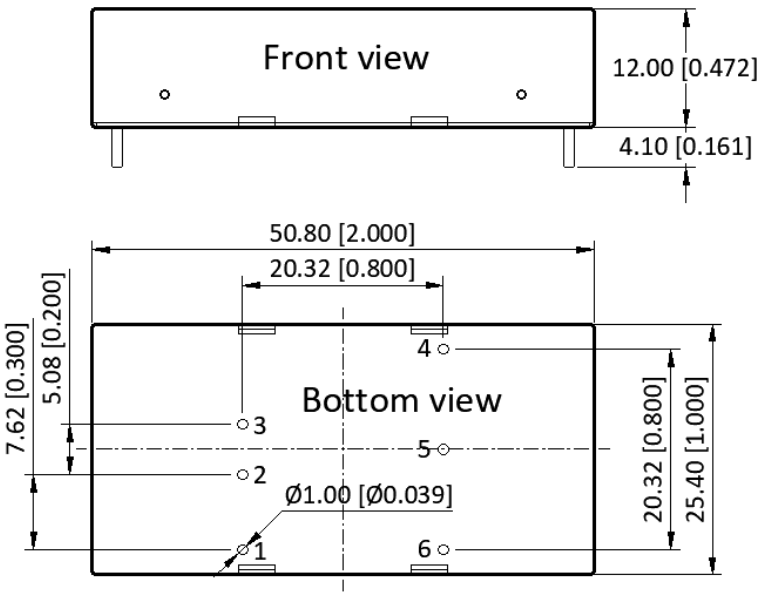
[Table 2] Recommended component spec

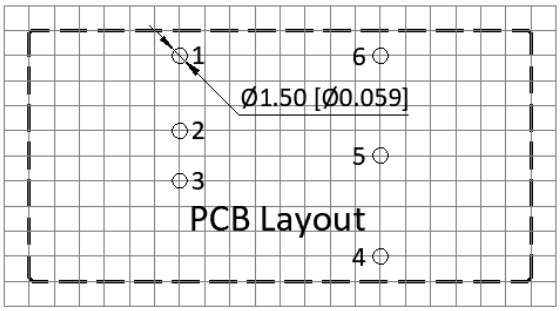
Component	LDM	MOV	C0, C3	C1	CY1, CY2
V_{IN}=24V	4.7uH	20D470K	330uF, 50V	1uF, 50V	1nF, 2KV
V_{IN}=48V	4.7uH	14D101K	330uF, 100V	1uF, 100V	1nF, 2KV

* Fuse to be selected according to application needs.

* C2 refer to relative C_{OUT} values in Table 1.

Mechanical Specifications





Pin Definition

Pin #	Single Out	Dual Out
1	Ctrl	Ctrl
2	GND	GND
3	V_{IN}	V_{IN}
4	$+V_{OUT}$	$+V_{OUT}$
5	NO Pin	COM
6	0V	$-V_{OUT}$

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±0.50 [±0.020]
* Pin thickness: ±0.10 [±0.004]
* Footprint grid 2.54 x 2.54 mm