MU10S Series

10W, Wide 4:1 Input, 1.5KV Isolation, SIP DC/DC Converters

Features

- Rated power: 10W Max
- Input voltage range 4:1
- Regulated output
- High efficiency up to 86%
- Isolation voltage 1.5KVDC
- Low ripple and noise
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SIP package
- Remote On/Off control
- Under voltage, over current and short circuit protection
- Meet IEC/EN/UL 62368-1 CISPR32, EN55032
- 3 year warranty

Overview

The MU10S series are 1.5KV isolated 10Watt DC/DC converters with compact SIP8 footprint. Designed with high efficiency, they operate in a wide temperature range from -40°C to +85°C. Other features include wide 4:1 input voltage range, remote On/Off control, under voltage, over current, and short circuit protections. These converters are ideally suitable for battery operated equipment, measurement equipment, telecom, wireless network, industrial control system.

Model Numbers

Model Number	Input Voltage [VDC]			V_{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	Range	*Max.		Max.	Min.		
MU10S-2403	24	9-36	40	3.3	2400	0	82	2200
MU10S-2405	24	9-36	40	5	2000	0	82	2200
MU10S-2406	24	9-36	40	6	1667	0	84	1500
MU10S-2409	24	9-36	40	9	1111	0	86	680
MU10S-2410	24	9-36	40	10	1000	0	86	680
MU10S-2412	24	9-36	40	12	833	0	86	470
MU10S-2415	24	9-36	40	15	667	0	86	330
MU10S-2424	24	9-36	40	24	417	0	86	220
MU10S-2415D	24	9~36	40	±15	±330	0	86	100

* Only typical models are listed. Other models may be available upon request.

* Input voltage exceed the Max. value may cause permanent damage. For dual output models, max capacitive load stipulated in the above list is for each output.

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_{OUT}=3.3V Others	-	389 474	-	mA	
Input current No load	V_{OUT}=3.3V, 5V Others	-	25 10	-	mA	
Reflected ripple current		-	50	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom}$ = 24V	-0.7	-	50	VDC	
Startup input voltage		-	-	9	VDC	
Input under voltage shutdown	$V_{IN, Nom}$ = 24V	5.5	6.5	-	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	3.5 0 -	- - 6	12 1.2 10	VDC VDC mA	Positive Logic
Output voltage accuracy	I_{OUT}=0 to 100%	-	±1	±2	%	
Line regulation Full load, V_{IN} = $V_{IN, Min}$ to $V_{IN, Max}$		-	±0.5	±1.0	%	
Load regulation		-	±0.5	±1.0	%	
Output ripple and noise I_{OUT}=5% to 100% of $I_{OUT, rated}$	20MHz bandwidth	-	75	150	mVp-p	
Temperature coefficiency	Full load	-	-	±0.03	%/°C	
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation** Peak deviation Recovery time	-	±5 ±3 300	±8 ±5 500	% V_{OUT} % V_{OUT} uS	**V_{OUT}=3.3, 5
Output over current protection		110	160	230	% I_{OUT}	
Output short circuit protection		Continuous, automatic recovery				
Input filter		Capacitor				
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

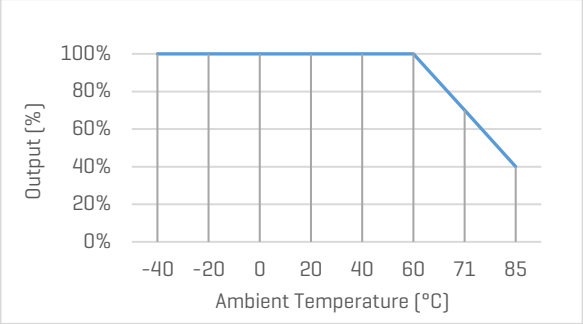
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	I/P to O/P	-	1000	-	pF	
Switching frequency*	Full load	-	500	-	KHz	PWM mode
Operating temperature	See "Derating Curve"	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
Pin soldering temperature		-	-	300	°C	
Case material		Black plastic, UL94-V0				
Cooling method		Free air convection				
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z				
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	CE ESD RS EFT Surge CS	CISPR32, EN55032 Class B with "External Circuit" IEC/EN61000-4-2, Contact ±6kV, Criteria B IEC/EN61000-4-3, 10V/m, Criteria A IEC/EN61000-4-4, ±2kV, Criteria B IEC/EN61000-4-5, Line to Line ±2kV, Criteria B IEC/EN61000-4-6, 3Vrms, Criteria A				
Size, and Weight		22.0x9.5x12.0mm, 4.9g				

* 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

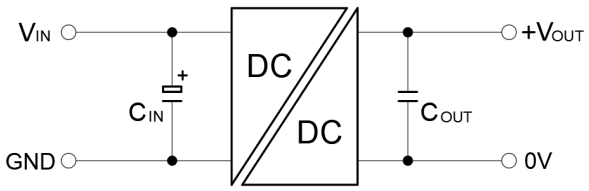


Figure 1. Typical external circuit

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

Item	C_{IN}	C_{OUT}
Spec	47uF, 100V	22uF, 50V

EMC Enhancement for EN55032 Class B

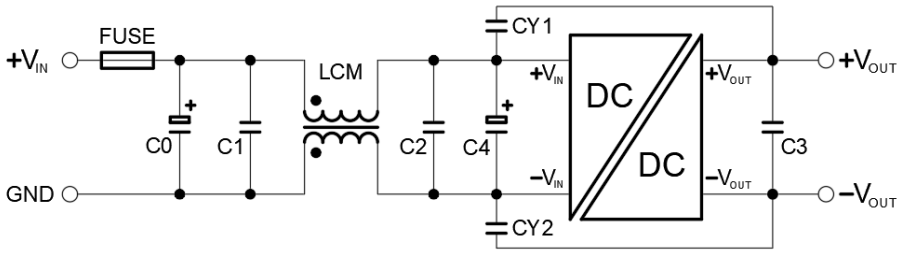


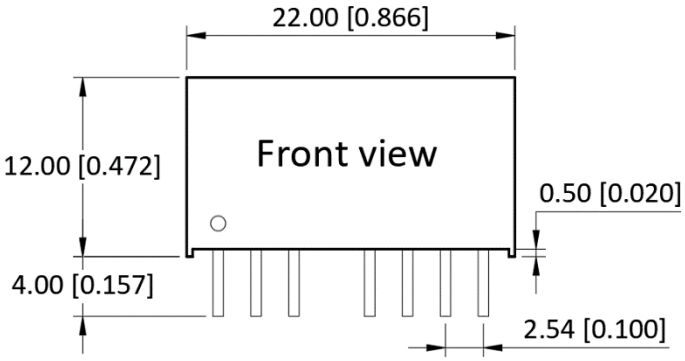
Figure 2. Circuit for EMC enhancement

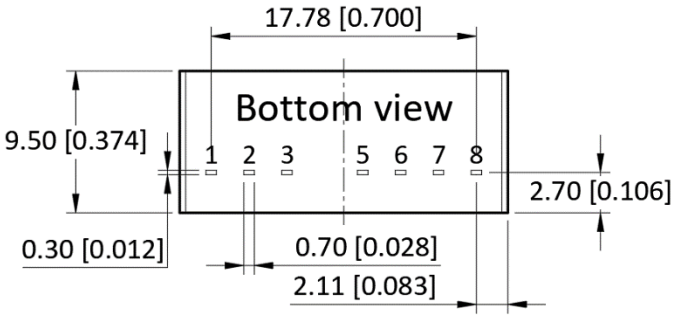
[Table 2] Recommended component spec

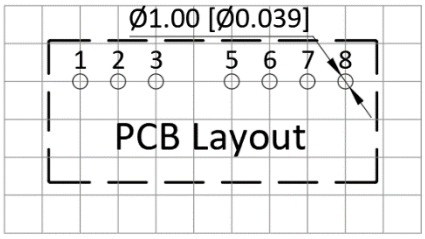
Items	C0, C4	C1, C2	LCM	CY1, CY2	C3
Spec	330uF, 100V	10uF, 100V	470uH	1nF, 2KV	22uF, 50V

* Fuse to be selected according to application needs.

Mechanical Specifications







Pin Definition

Pin #	Single Out	Dual Out
1	GND	GND
2	V_{IN}	V_{IN}
3	Ctrl	Ctrl
5	No connection	No connection
6	$+V_{OUT}$	$+V_{OUT}$
7	0V	0V
8	No connection	$-V_{OUT}$

* 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