

MV10S Series

10W, Wide 2:1 Input Range, 1.5KV Isolation, SIP8 Package DC/DC Converters

Features

- ▶ Rated power: 10W Max
- ▶ Input voltage range: 2:1
- ▶ Regulated output
- ▶ High efficiency up to 88%
- ▶ Isolation voltage 1.5KVDC
- ▶ Low ripple and noise
- ▶ Operating temperature range: -40 ~ +85°C ambient
- ▶ RoHS compliant
- ▶ Compact SIP8 package
- ▶ Optional remote ON/OFF
- ▶ Under voltage, over current and short circuit protection
- ▶ Meet IEC/EN/UL 62368-1 CISPR32, EN55032
- ▶ 3 year warranty



Overview

The MV10S 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 2:1 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.
	Nominal	Range	*Max.		Max.	Min.		
MV10S-1203	12	9~18	20	3.3	2400	0	82	2200
MV10S-1205	12	9~18	20	5	2000	0	85	2200
MV10S-1209	12	9~18	20	9	1111	0	86	680
MV10S-1212	12	9~18	20	12	833	0	86	470
MV10S-1215	12	9~18	20	15	667	0	86	330
MV10S-1224	12	9~18	20	24	417	0	86	220
MV10S-2403	24	18~36	40	3.3	2400	0	84	2200
MV10S-2405	24	18~36	40	5	2000	0	87	2200
MV10S-2409	24	18~36	40	9	1111	0	88	680
MV10S-2412	24	18~36	40	12	833	0	88	470
MV10S-2415	24	18~36	40	15	667	0	88	330
MV10S-2424	24	18~36	40	24	417	0	88	220

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

* Input voltage exceed the Max. value may cause permanent damage.

* Add suffix "X" to the model numbers for optional Ctrl pin removed, e.g. MV10S-2405X.

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Electrical Specifications

Unless otherwise indicated, specifications are measured at $T_A=25^{\circ}\text{C}$, nominal input voltage, full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Input current Full load, $V_{IN, Nom} = 12\text{V}$	$V_{OUT}=3.3\text{V}$ Others	-	777 969	-	mA	
Input current Full load, $V_{IN, Nom} = 24\text{V}$	$V_{OUT}=3.3\text{V}$ Others	-	389 474	-	mA	
Input current No load	$V_{OUT}=3.3\text{V}, 5\text{V}$ Others	-	30 10	-	mA	
Input reflected ripple current		-	50	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$	-0.7 -0.7	-	25 50	VDC	
Startup input voltage	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$	-	-	9 18	VDC	
Input under voltage shutdown	$V_{IN, Nom} = 12\text{V}$ $V_{IN, Nom} = 24\text{V}$	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	3.5 0 -	- - 6	12 1.2 10	VDC VDC mA	Positive Logic
Output voltage accuracy $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$		-	± 1.0	± 2.0	%	
Line regulation Full load, $V_{IN} = V_{IN, Min}$ to $V_{IN, Max}$		-	± 0.25	± 0.5	%	
Load regulation $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$		-	± 0.5	± 1.0	%	
Temperature coefficient	Full load	-	0.02	0.03	%/ $^{\circ}\text{C}$	
Dynamic load response $I_{OUT}=25\%\sim 50\%\sim 75\%$ of $I_{OUT, rated}$	Peak deviation Recovery time	-	± 5 0.3	± 8 0.5	% V_{OUT} mS	
Output ripple and noise 20MHz bandwidth, peak to peak		-	75	150	mVp-p	
Output over current protection		110	160	230	% 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.

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General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage Tested for 1 minute	Input to Output	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	1000	-	pF	
Operating temperature	No derating	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
Switching frequency	Full load	-	500	-	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	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	Emission Immunity	CISPR32, EN55032 Class B* IEC/EN61000-4-2, 3, 4, 5, 6, 29				
Size & Weight		22 x 10 x 14 mm, 5g				

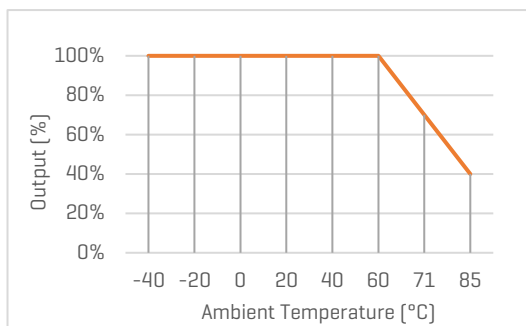
*External circuit is required in order to meet Class B, refer to Figure 2 in Recommended External Circuit

Characteristic Curves

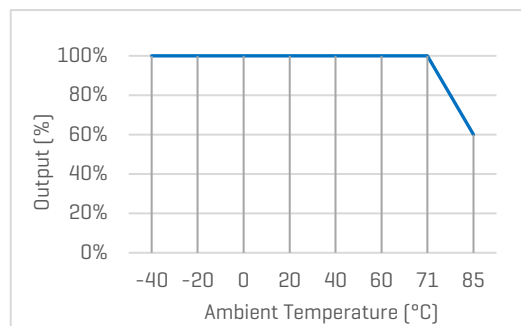
Derating Curve

Output vs Ambient Temperature

Free air convection



100 LFM



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Recommended Application Circuit

Typical Application Circuit

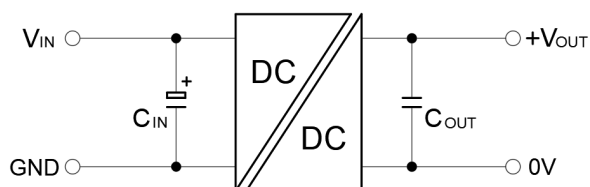


Figure 1. Typical external circuit

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	100uF	22uF

EMC Enhancement for EN55032 Class B

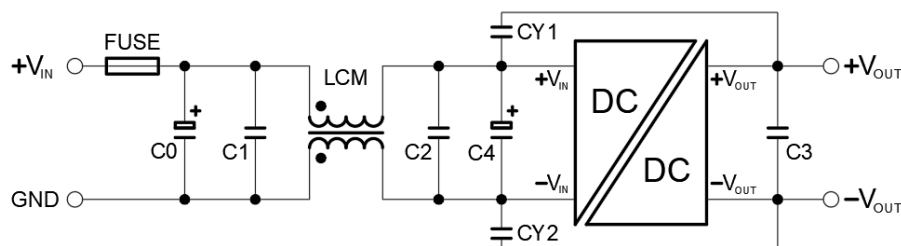


Figure 2. Circuit for EMC enhancement

[Table 2] Recommended component spec

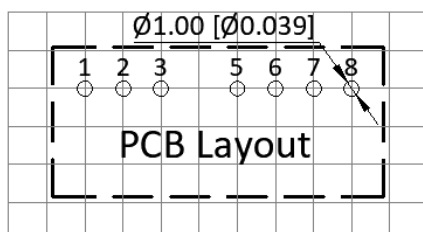
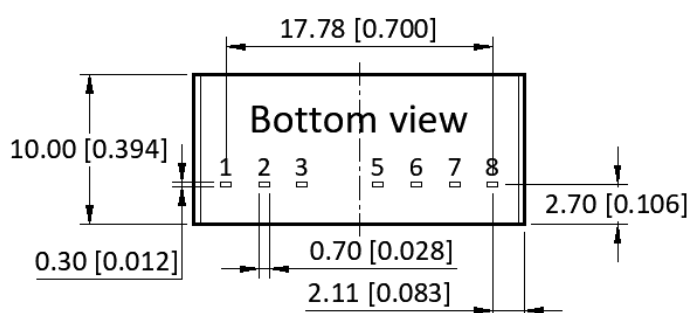
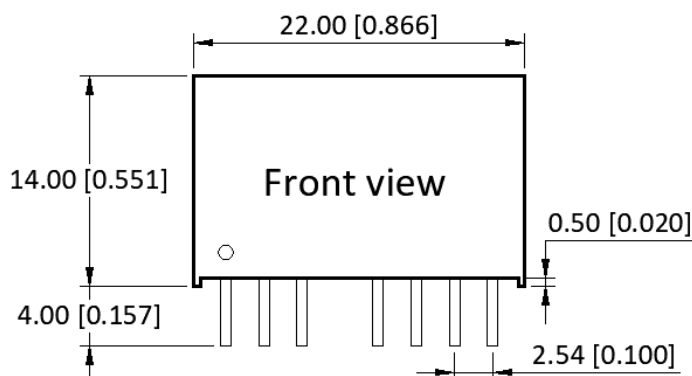
Item	LCM	$C0, C4$	$C1, C2$	$CY1, CY2$	$C3$
Spec	470uH	330uF, 50V	10uF, 50V	1nF, 2KVDC	22uF, 50V

* Fuse to be selected according to application needs.

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Mechanical Specifications



Pin Definition

Pin #	Single Out
1	GND
2	V _{IN}
3	Ctrl*
5	NC
6	+V _{OUT}
7	OV
8	NC

* Add suffix "X" to the model numbers for optional Ctrl pin removed

* Unless otherwise specified unit: mm [inch]

* General tolerance: ±0.25 [±0.010]

* Pin thickness: ±0.10 [±0.004]

* Footprint grid 2.54 x 2.54 mm

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