MV10H Series

10W, Wide 2:1 Input, 1.5KV Isolation, DIP2"X1" DC/DC Converters

Features

- Rated power: 10W Max
- Input voltage range 2:1
- 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 current, and short circuit protection
- Meet IEC/EN/UL 62368-1 CISPR32, EN55032
- 3 year warranty

Overview

The MV10H series are 1.5KV isolated 10Watt DC/DC converters with standard DIP2"x1" 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, output trimming, under voltage, over current, and short circuit protections. These converters are ideally suitable for industrial control system, measurement equipment, telecom, wireless network.

Model Numbers

Model Number	Input Voltage [VDC]			V_{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	Range	*Max.		Max.	Min.		
MV10H-0505	5	4.5~9	12	5	2000	0	85	470
MV10H-0512	5	4.5~9	12	12	834	0	83	470
MV10H-0515	5	4.5~9	12	15	667	0	84	330
MV10H-0524	5	4.5~9	12	24	417	0	83	100
MV10H-0505D	5	4.5~9	12	±5	±1000	0	78	1000
MV10H-0512D	5	4.5~9	12	±12	±417	0	83	470
MV10H-0515D	5	4.5~9	12	±15	±334	0	84	330
MV10H-0524D	5	4.5~9	12	±24	±209	0	83	100
MV10H-1205	12	9~18	20	5	2000	0	83	2200
MV10H-1212	12	9~18	20	12	833	0	85	470
MV10H-1215	12	9~18	20	15	667	0	86	330
MV10H-1224	12	9~18	20	24	416	0	86	100
MV10H-1215D	12	9~18	20	±15	±334	0	86	330
MV10H-2405	24	18~36	40	5	2000	0	83	2200
MV10H-2412	24	18~36	40	12	833	0	87	470
MV10H-2415	24	18~36	40	15	667	0	88	330
MV10H-2424	24	18~36	40	24	416	0	88	100

Model Numbers

Model Number	Input Voltage [VDC]			V_{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	Range	*Max.		Max.	Min.		
MV10H-4803	48	36~75	80	3.3	2400	0	79	2200
MV10H-4805	48	36~75	80	5	2000	0	83	2200
MV10H-4812	48	36~75	80	12	834	0	87	470
MV10H-4815	48	36~75	80	15	667	0	87	330
MV10H-4824	48	36~75	80	24	416	0	88	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 voltage surge 1 second max	$V_{IN, Nom}$=5V $V_{IN, Nom}$=12V $V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	-0.7 -0.7 -0.7 -0.7	-	16 25 50 100	VDC	
Startup input voltage	$V_{IN, Nom}$=5V $V_{IN, Nom}$=12V $V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	-	-	4.5 9 18 36	VDC	
Startup time	Resistive load	-	10	-	mS	
Input under voltage shutdown	$V_{IN, Nom}$=5V $V_{IN, Nom}$=12V $V_{IN, Nom}$=24V $V_{IN, Nom}$=48V	3 5.5 12 26	3.5 6.5 15.5 30	-	VDC	
Remote On/Off control "Ctrl" pin open or logic high [ON] "Ctrl" pin grounded or logic low [OFF]	Logic high Logic low	2.7 0	- -	9 1.2	VDC VDC	Positive Logic
Output voltage accuracy	I_{OUT}=0% to 100%	-	±1.0	±3.0	%	
Line regulation Full load, V_{IN}=$V_{IN, Min}$ to $V_{IN, Max}$		-	-	±0.5	%	
Load regulation I_{OUT}=5% to 100% of $I_{OUT, rated}$	Main output Other output	-	-	±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	100	mVp-p	
Temperature coefficiency	Full load	-	-	±0.03	%/°C	

Electrical Specifications (continued)

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation Recovery time	-	±3 300	±5 500	% V_{OUT} uS	
Output voltage trim	Trim range	-	-	±10	% 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	-	1000	-	pF	
Switching frequency*	Full load	-	312.5	-	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				

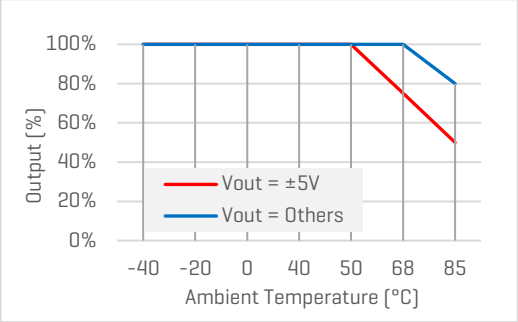
* Switching frequency is measured at full load. The converter reduces the switching frequency at low load (less than 50% load) for better efficiency.

Characteristic Curves

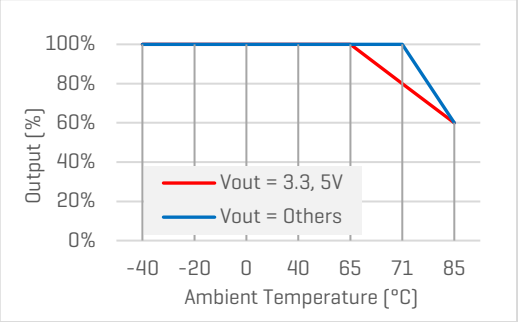
Derating Curve

Output vs Ambient Temperature

V_{IN}=5V



V_{IN}=Others



Recommended Application Circuit

Typical Application Circuit

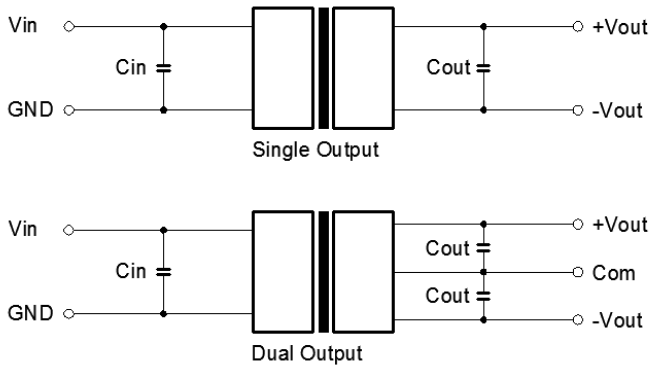


Figure 1. Typical external circuit

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.

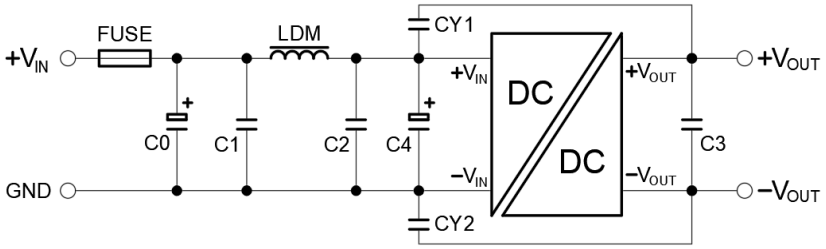
[Table 1] Recommended component spec

C_{IN}	100uF
C_{OUT}	10uF

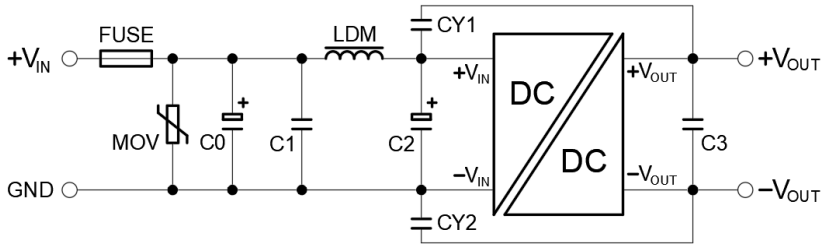
Recommended Application Circuit

EMC Enhancement for EN55032 Class B

V_{IN}=5V



V_{IN}=12V



V_{IN}=24, 48V

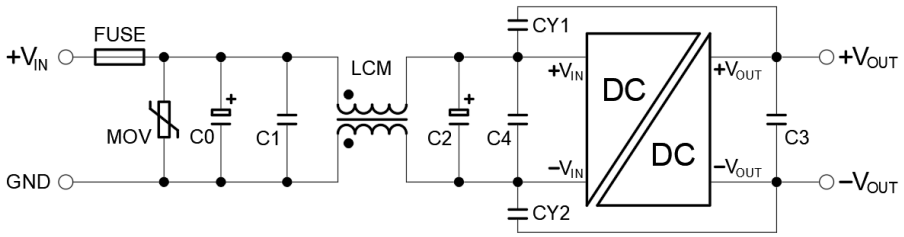


Figure 2. Circuit for EMC enhancement

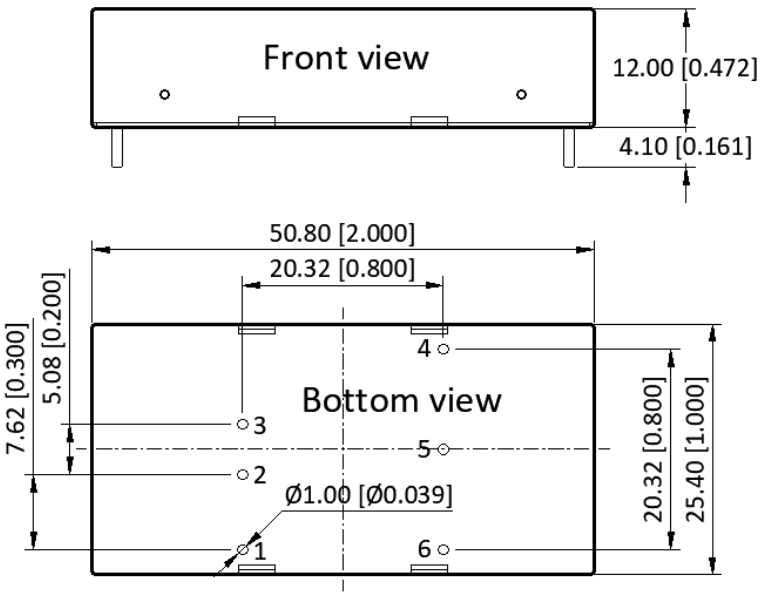
[Table 2] Recommended component spec

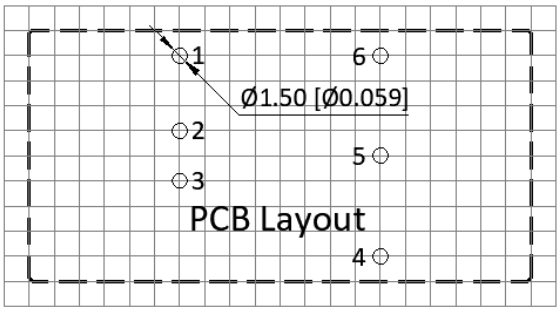
Items	MOV	LCM	LDM	CO	C1	C2	C4	CY1, CY2
V_{IN}=5V	-	-	4.7uF	2200uF	4.7uF	4.7uF	1000uF	1nF, 2KV
V_{IN}=12V	20D470K	-	4.7uF	330uF	1uF	330uF	-	1nF, 2KV
V_{IN}=24V	20D470K	4.7mH	-	680uF	1uF	330uF	4.7uF	1nF, 2KV
V_{IN}=48V	14D101K	4.7mH	-	680uF	1uF	330uF	4.7uF	1nF, 2KV

* Fuse to be selected according to application needs.

* C3 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