

MV6S Series

6W, Wide 2:1 Input, 1.5KV Isolation, SIP8 DC/DC Converters



Features

- Rated power: 6W Max
- Input voltage range: 2:1
- Regulated output
- High efficiency up to 83%
- Isolation voltage 1.5KVDC
- Standby power only 0.12W
- 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 MV6S series are 1.5KV isolated 6Watt 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.		
MV6S-0505	5	4.5~9	12	5	1200	0	80	1000
MV6S-0512	5	4.5~9	12	12	500	0	84	470
MV6S-0515	5	4.5~9	12	15	400	0	84	220
MV6S-0524	5	4.5~9	12	24	250	0	84	100
MV6S-0505D	5	4.5~9	12	±5	±500	0	80	500
MV6S-0512D	5	4.5~9	12	±12	±208	0	84	220
MV6S-0515D	5	4.5~9	12	±15	±167	0	84	100
MV6S-0524D	5	4.5~9	12	±24	±104	0	84	50
MV6S-1203	12	9~18	20	3.3	1350	0	76	1800
MV6S-1205	12	9~18	20	5	1200	0	80	1000
MV6S-1209	12	9~18	20	9	667	0	82	470
MV6S-1212	12	9~18	20	12	500	0	84	470
MV6S-1215	12	9~18	20	15	400	0	84	220
MV6S-1224	12	9~18	20	24	250	0	84	100
MV6S-2403	24	18~36	40	3.3	1350	0	78	1800
MV6S-2405	24	18~36	40	5	1200	0	82	1000
MV6S-2409	24	18~36	40	9	667	0	84	470

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Model Numbers [continued]

Model Number	Input Voltage [VDC]			V _{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] *Max.
	Nominal	Range	*Max.		Max.	Min.		
MV6S-2412	24	18~36	40	12	500	0	86	470
MV6S-2415	24	18~36	40	15	400	0	87	220
MV6S-2424	24	18~36	40	24	250	0	85	100
MV6S-4803	48	36~75	80	3.3	1350	0	76	1800
MV6S-4805	48	36~75	80	5	1200	0	81	1000
MV6S-4809	48	36~75	80	9	667	0	83	470
MV6S-4812	48	36~75	80	12	500	0	85	470
MV6S-4815	48	36~75	80	15	400	0	86	220
MV6S-4824	48	36~75	80	24	250	0	84	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.

* Add suffix "X" to the model numbers for optional Ctrl pin removed, e.g. MV6S-2405X.

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} = 5V		-	1538	-	mA	
Input current Full load, V _{IN, Nom} = 12V	V _{OUT} =3.3V Others	-	489 625	-	mA	
Input current Full load, V _{IN, Nom} = 24V	V _{OUT} =3.3V Others	-	238 305	-	mA	
Input current Full load, V _{IN, Nom} = 48V	V _{OUT} =3.3V Others	-	156 146	-	mA	
Input current No load	V _{IN, Nom} = 5V V _{IN, Nom} = 12V Others	-	28 12 5	-	mA	
Input reflected ripple current		-	50	-	mA	
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	-	12 25 50 100	VDC	

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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
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	
Input under voltage shutdown	$V_{IN, Nom} = 5V$ $V_{IN, Nom} = 12V$ $V_{IN, Nom} = 24V$ $V_{IN, Nom} = 48V$	- 5.5 12 26	- 6.5 15.5 30	4.5 - - -	VDC	
Remote On/Off control	Logic high	3.5	-	12	VDC	Positive Logic
"Ctrl" pin open or logic high [ON]	Logic low	0	-	1.2	VDC	
"Ctrl" pin grounded or logic low [OFF]	Ctrl pin current	-	5	10	mA	
Output voltage accuracy	$V_{OUT}=3.3V, 5V$ All others	-	± 2 ± 1	± 5 ± 3	%	
Line regulation Full load, $V_{IN} = V_{IN, Min}$ to $V_{IN, Max}$		-	± 0.5	± 1.0	%	
Load regulation $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$		-	± 0.5	± 1.5	%	
Temperature coefficient	Full load	-	0.02	0.03	%/ $^{\circ}\text{C}$	
Dynamic load response	Peak deviation	-	± 3	± 8	% V_{OUT}	
$I_{OUT}=25\%\sim 50\%\sim 75\%$ of $I_{OUT, rated}$	Recovery time		0.3	0.5	mS	
Output ripple and noise 20MHz bandwidth, peak to peak		-	50	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

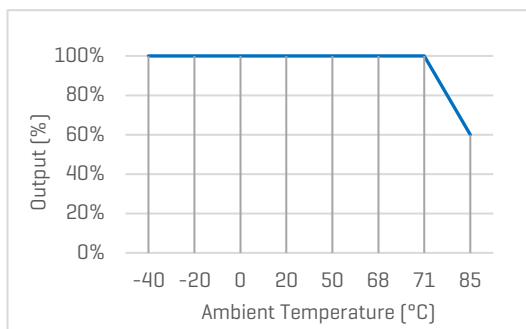
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Isolation voltage Tested for 1 minute	Input to Output	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	1000	-	pF	
Operating temperature	No derating	-40	-	+85	°C	
Storage 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 9.5 x 12 mm, 4.5g				

*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



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Recommended Application Circuit

Typical Application Circuit

*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.

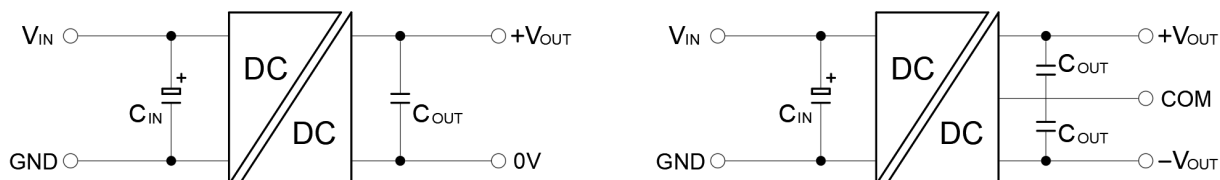


Figure 1. Typical Application Circuit

[Table 1] Recommended component spec

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

EMC Enhancement for EN55032 Class B

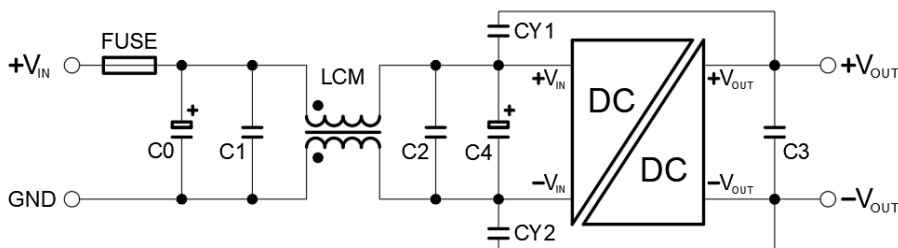


Figure 2. Circuit for EMC enhancement

[Table 2] Recommended component spec

Items	LCM	$C0, C4$	$C1, C2$	$CY1, CY2$	$C3$
Spec	1.4...1.7mH	330uF, 100V	10uF, 100V	1nF, 400VAC	22uF, 50V

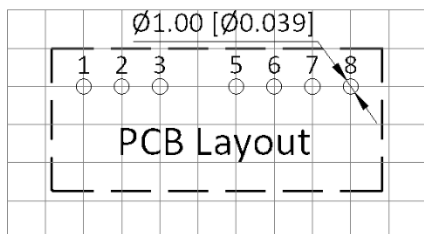
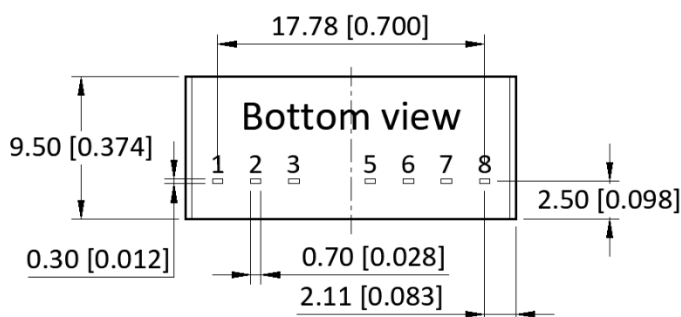
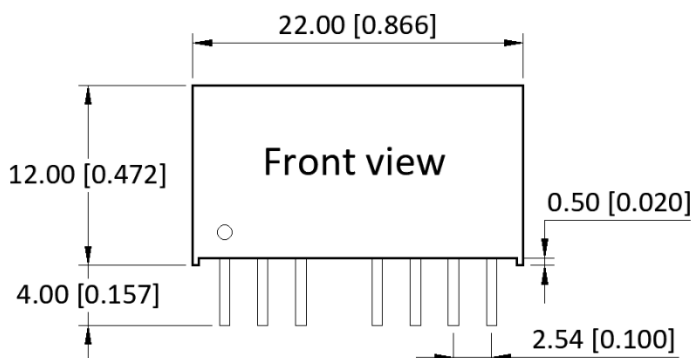
* Fuse to be selected according to application needs.

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Mechanical Specifications



Pin Definition

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

* 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