MEG1S Series

1W, Unregulated, 6KV Isolation, DC/DC Converters

Features

- Rated power: 1W Max
- Input voltage range ±10%
- Unregulated output
- Creepage & clearance >5mm
- Isolation capacitance 4pF Typ.
- High efficiency up to 81%
- Isolation 4.2KVAC or 6KVDC
- Patient leakage current 2uA Max
- RoHS compliant
- Compact SIP7 package
- Continuous short circuit protection
- Meet UL/EN/IEC 62368-1 EN 60601-1
- Operating temp. range: -40 ~ +105°C ambient
- 5 year warranty

RoHS CE

Overview

The MEG1S series are unregulated SIP7 package DC/DC converters with single or dual outputs, and 6KVDC isolation. These converters feature reinforced insulation, low leakage current, high efficiency, low ripple and noise, continuous short circuit protection, and wide operating temperature range. They are widely used in industrial and medical applications where high isolation is needed.

Model Numbers

Model Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
MEG1S-0505	5 [4.5~5.5]	5	200	79	220
MEG1S-0509		9	111	79	220
MEG1S-0512		12	84	80	220
MEG1S-0515		15	67	81	220
MEG1S-0505D	5 [4.5~5.5]	±5	±100	79	±100
MEG1S-0509D		±9	±55	79	±100
MEG1S-0512D		±12	±40	81	±100
MEG1S-0515D		±15	±35	81	±100
MEG1S-1205	12 [10.8~13.2]	5	200	79	220
MEG1S-1212		12	84	81	220
MEG1S-1215		15	67	79	220
MEG1S-1205D	12 [10.8~13.2]	±5	±100	79	±100
MEG1S-1212D		±12	±40	81	±100
MEG1S-1215D		±15	±35	81	±100
MEG1S-1505	15 [13.5~16.5]	5	200	79	220
MEG1S-1505D	15 [13.5~16.5]	±5	±100	77	±100
MEG1S-1515D		±15	±33	79	±100

Model Numbers

Model Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
MEG1S-2405	24 [21.6~26.4]	5	200	76	220
MEG1S-2412		12	84	79	220
MEG1S-2415		15	67	79	220
MEG1S-2424		24	42	76	220
MEG1S-2405D	24 [21.6~26.4]	±5	±100	75	±100
MEG1S-2412D		±12	±40	76	±100
MEG1S-2415D		±15	±35	76	±100

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
Input current Full load	V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	274 114 93 56	-	mA
Input current No load	V_{IN}=5V Others	-	35 15	-	mA
Reflected Ripple Current		-	15	-	mA
Surge voltage 1 second max	V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-0.7 -0.7 -0.7 -0.7	-	9 18 21 30	VDC
Output voltage accuracy	All models	Refer to graphic in “Characteristic Curves” section			
Line regulation For V_{IN} change of ±1%		-	-	±1.5	%
Load regulation [2] I_{OUT}=10% to 100% of $I_{OUT, rated}$	V_{OUT}=3.3, 5V Others	-	-	20 15	%
Temperature coefficiency	Full load	-	±0.02	-	%/°C
Output ripple and noise	20MHz bandwidth	-	100	150	mVp-p
Output short circuit protection		Continuous, automatic recovery			
Input filter		Capacitor			
Hot plug		None			

Note [2]: Operating with less than 10% of rated load will not cause permanent damage to the converters, but the performances data may not fall into the specifications, and reliable operating is not assured. Dual output models need to operate with balanced load. The load difference between two outputs over 10% may cause unstable operating of the converter.

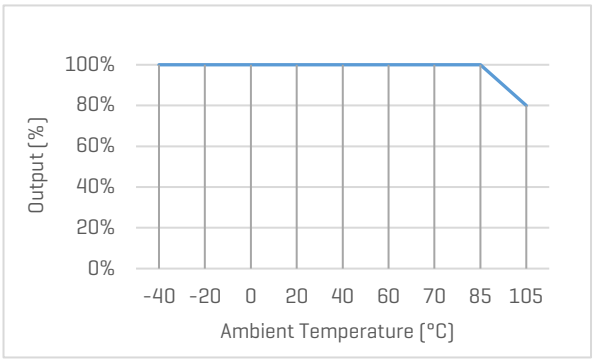
General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute, leakage current <1mA	Input to Output Input to Output	4200 6000	-	-	VAC VDC
Patient leakage current	250VAC, 50/60Hz	-	-	2	uA
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm
Isolation capacitance 100KHz, 0.1V	Input to Output	-	4	-	pF
Creepage & Clearance distance		5	-	-	mm
Switching frequency	Full load	-	220	-	KHz
Temperature rise at case	Full load	-	25	-	°C
Operating temperature	See "Derating Curve"	-40	-	+105	°C
Storage temperature		-55	-	+125	°C
Storage humidity	Non-condensing	5	-	95	%RH
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	>19,360,000 Hours, T_A=25°C			
Safety standards		UL/EN/IEC 62368-1, EN/ES 60601-1			
EMC standards	CISPR32, EN55032	Class B with "External Circuit"			
ESD	IEC/EN61000-4-2	Contact ±8kV, Air ±15kV, perf. Criteria B			
Size & Weight		19.5x9.8x12.5mm, 4.2g Typ.			

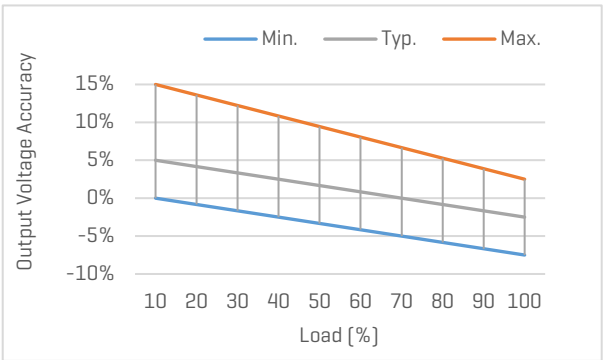
Characteristic Curves

Derating Curve

Output vs Ambient Temperature



Output Voltage Accuracy vs Load



Recommended External Circuit

Typical Application Circuit

*Typical application circuit is to further lower the input and output ripple. It is not mandatory.

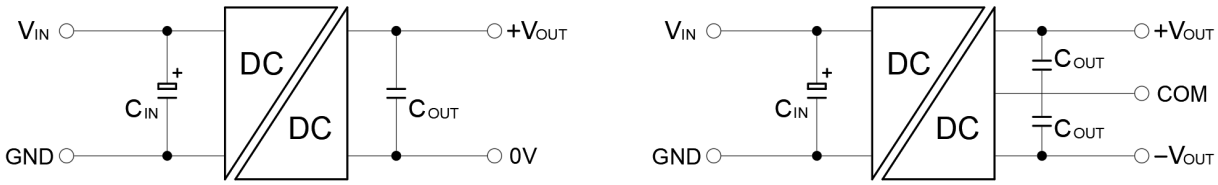


Figure 1. Typical Application Circuit

[Table 1] Recommended component spec

Input voltage	5V	12, 15V	24V
C_{IN}	4.7uF, 16V	2.2uF, 25V	1uF, 50V

Output voltage	5V	9, 12V	15, 24V	±5, ±9V	±12, ±15V
C_{OUT}	10uF, 16V	2.2uF, 25V	1uF, 50V	4.7uF, 16V	1uF, 25V

EMC Enhancement for EN55032 Class B

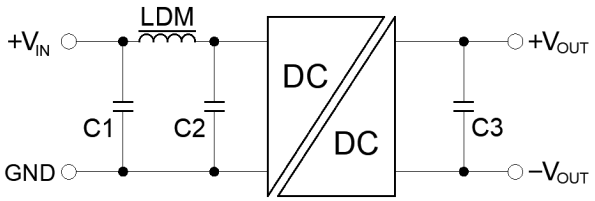


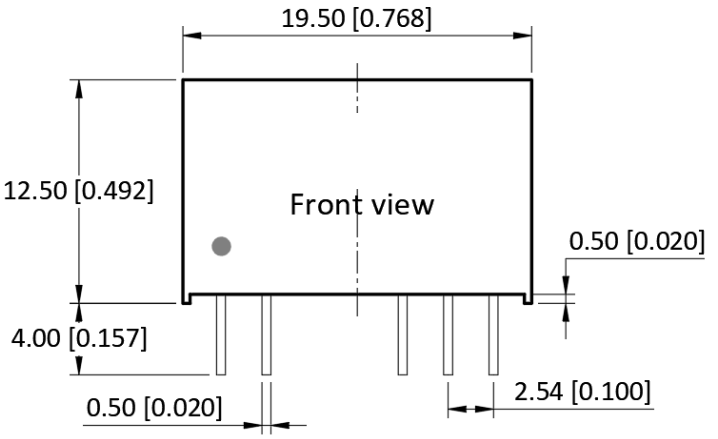
Figure 2. Circuit for EMC enhancement

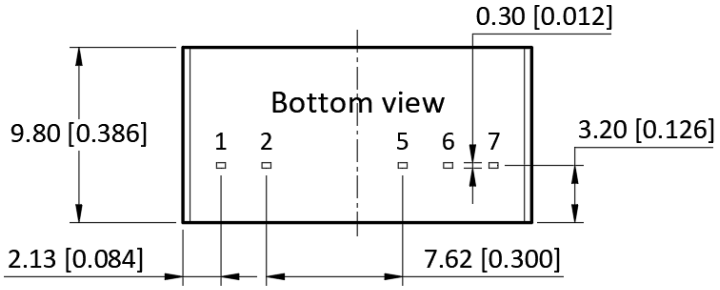
[Table 2] Recommended component spec

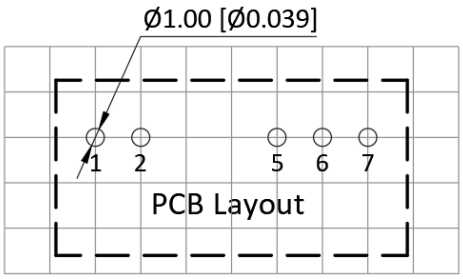
Output voltage	C1, C2	LDM
Spec	4.7uF, 50V	6.8uH

*"C3" refer to C_{OUT} in [Table 1]

Mechanical Specifications







Pin Definition

Pin #	Single Out	Dual Out
1	$+V_{IN}$	$+V_{IN}$
2	$-V_{IN}$	$-V_{IN}$
5	$-V_{OUT}$	$-V_{OUT}$
6	No Pin	COM
7	$+V_{OUT}$	$+V_{OUT}$

* 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