



### FEATURES

- RoHS compliant
- Efficiency from 80%
- Power density 0.85W/cm<sup>3</sup>
- Wide temperature performance at full 1 Watt load, -40°C to 85°C
- UL 94V-0 package material
- No heatsink required
- Industry standard pinout
- 3kVDC isolation (1 minute)
- 5V & 12V input
- 5V, 9V, 12V, & 15V output
- Fully encapsulated with toroidal magnetics
- No external components required
- No electrolytic or tantalum capacitors

### PRODUCT OVERVIEW

The MEV series is the new high performance version of our 1W NMV series. The MEV series is more efficient and offers improved regulation performance  $\leq 5\%$  for applications where a wide output voltage variation can not be tolerated. They are ideally suited for providing local supplies on control system boards with the added benefit of 3kVDC galvanic isolation to reduce switching noise. The MEV series is currently available in an industry SIP 7 package.

### SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Load Regulation (Typ)	Load Regulation (Max)	Ripple & Noise (Typ) <sup>1</sup>	Ripple & Noise (Max) <sup>1</sup>	Efficiency (Min.)	Efficiency (Typ.)	Isolation Capacitance	MTTF <sup>2</sup>
	V	V	mA	mA	%	%	mVp-p		%	%	pF	kHrs
MEV1S0505SC	5	5	200	233	5.2	6	20	30	80.5	84	38	3583
MEV1S0509SC	5	9	111	227	4	5	12	20	82.5	86	42	3286
MEV1S0512SC	5	12	84	226	4.5	5.5	10	20	84	87	40	2886
MEV1S0515SC	5	15	67	225	4.2	5	8	15	84.5	87	39	2419
MEV1S1205SC	12	5	200	98	4.4	4.8	12	15	80	83.5	28	3308
MEV1S1209SC	12	9	111	96	2.9	3.2	8	15	83	86	50	3054
MEV1S1212SC	12	12	84	94	2.9	3.1	7	15	84	87	70	2705
MEV1S1215SC	12	15	67	94	2.4	2.8	7	15	82	87	59	2290

When operated with additional external load capacitance the rise time of the input voltage will determine the maximum external capacitance value for guaranteed start up. The slower the rise time of the input voltage the greater the maximum value of the additional external capacitance for reliable start up.

### INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 5V input types	4.5	5	5.5	V
	Continuous operation, 12V input types	10.8	12	13.2	
Reflected ripple current	5V input types		11	20	mA p-p
	12V input types		5	15	

### ABSOLUTE MAXIMUM RATINGS

Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	300mW
Input voltage V <sub>IN</sub> , MEV05 types	7V
Input voltage V <sub>IN</sub> , MEV12 types	15V

### OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	T <sub>A</sub> = -40°C to 85°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High V <sub>IN</sub> to low V <sub>IN</sub>		1.05	1.2	%/%

### ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 minute	3000			VDC
Resistance	Viso = 1000VDC	10			GΩ

### GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	5V input types		60		kHz
	12V input types		75		

### TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		85	°C
Storage		-50		125	
Case Temperature above ambient	5V output types			20	
	All other output types			20	
Cooling	Free air convection				

1. See Ripple & Noise characterisation method.

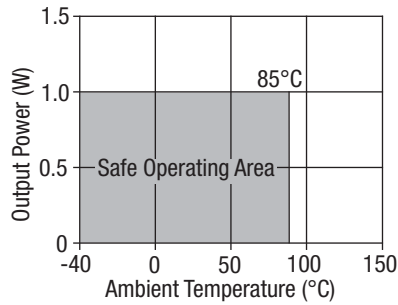
2. Calculated using MIL-HDBK-217F FN2 with nominal input voltage at full load.

All specifications typical at T<sub>A</sub> = 25°C, nominal input voltage and rated output current unless otherwise specified.

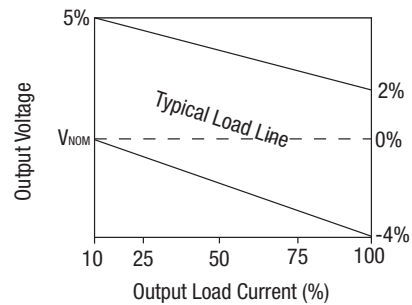


For full details go to [www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

**TEMPERATURE DERATING GRAPH**



**TOLERANCE ENVELOPE**



**TECHNICAL NOTES**

**ISOLATION VOLTAGE**

'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage' are all terms that relate to the same thing, a test voltage, applied for a specified time, across a component designed to provide electrical isolation, to verify the integrity of that isolation.

Murata Power Solutions MEV series of DC/DC converters are all 100% production tested at their stated isolation voltage. This is 3kVDC for 1 minute.

A question commonly asked is, "What is the continuous voltage that can be applied across the part in normal operation?"

For a part holding no specific agency approvals, such as the MEV series, both input and output should normally be maintained within SELV limits i.e. less than 42.4V peak, or 60VDC. The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with several hundred volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

**REPEATED HIGH-VOLTAGE ISOLATION TESTING**

It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. The MEV series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enameled wire. While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation. Any material, including this enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

This consideration equally applies to agency recognized parts rated for better than functional isolation where the wire enamel insulation is always supplemented by a further insulation system of physical spacing or barriers.

**RoHS COMPLIANT INFORMATION**



This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems. For further information, please visit [www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

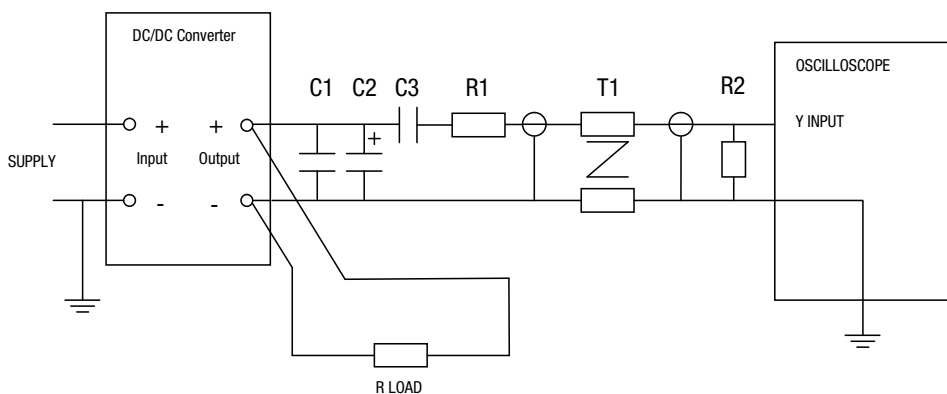
**RIPPLE & NOISE CHARACTERISATION METHOD**

All measurement to be taken with the following components connected to the UUT as detailed below.

50 Ohm coax cable, solder connections one end, BNC plug at the other end.

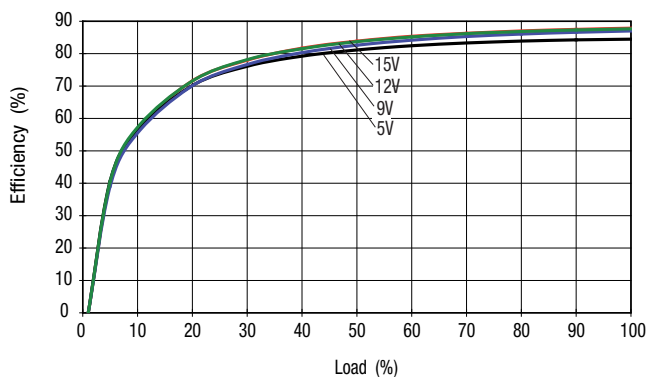
- C1 – 1µF X7R multilayer ceramic capacitor rated at minimum 3 x the output voltage of the UUT
- C2 – 10µF tantalum capacitor rated at minimum 1.5 x the output voltage of the UUT with ESR of less than 100 milliohms at 100 kHz e.g. AVX TPS series.
- C3 – 100nF multilayer ceramic capacitor, general purpose
- R1 – 450 Ohm resistor, carbon film, ±1%
- R2 – 50 Ohm BNC termination
- T1 – 3T of the coax cable through a ferrite toroid eg Ferroxcube TN32/19/13-3E25
- RLOAD – Resistive load at the UUT maximum rating. Connections via twisted wires.

Differential Mode Noise Test Schematic

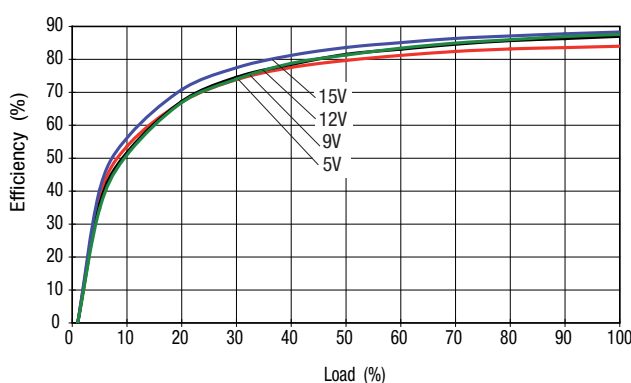


**EFFICIENCY VS LOAD**

MEV 5V Input Voltage

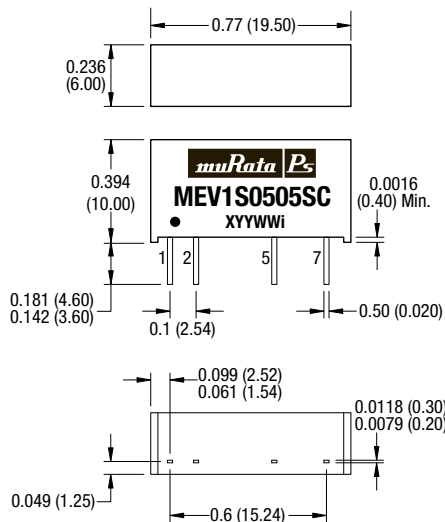


MEV 12V Input Voltage



**PACKAGE SPECIFICATIONS**

**MECHANICAL DIMENSIONS**

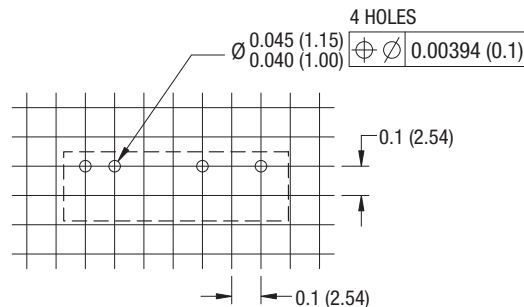


All dimensions in inches  $\pm 0.01$  (mm  $\pm 0.25$ mm). All pins on a 0.1 (2.54) pitch and within  $\pm 0.01$  (0.25) of true position.

**PIN CONNECTIONS**

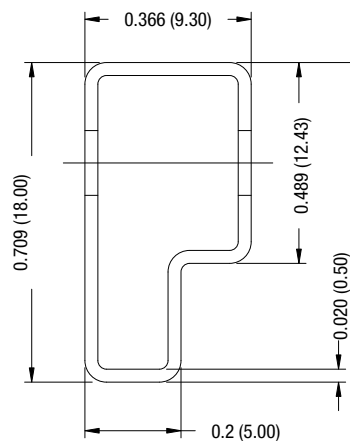
Pin	Function
1	+VIN
2	-VIN
5	-VOUT
7	+VOUT

**RECOMMENDED FOOTPRINT DETAILS**



Unless otherwise stated all dimensions in inches (mm)  $\pm 0.5$ mm.

**TUBE OUTLINE DIMENSIONS**



Unless otherwise stated all dimensions in inches (mm)  $\pm 0.5$ mm.  
Tube length : 20.47 (520mm  $\pm 2$ mm).

Tube Quantity : 25