

TEMPERATURE CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		85	°C
Case temperature above ambient				40	
Storage		-50		125	
Cooling	Free air convection				

ABSOLUTE MAXIMUM RATINGS	
Short-circuit protection	Continuous
Lead temperature 1.5mm from case for 10 seconds	260°C
Wave Solder	Wave Solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. Please refer to application notes for further information.
Input voltage V_{IN} , MEF1S03 types	4V
Input voltage V_{IN} , MEF1S05 types	7V
Input voltage V_{IN} , MEF1S12 types	18V
Input voltage V_{IN} , MEF1S24 types	28V

ISOLATION VOLTAGE

Murata Power Solutions MEF1 series of DC-DC converters are all 100% production tested at their stated isolation voltage. This is 1kVDC for 1 second for SPC versions and 3.5kVDC for 1 minute for SP3C versions.

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

The MEF1 has been recognised by Underwriters Laboratory for functional insulation, 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.

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 MEF1 series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enamelled 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 recognised 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.

The MEF1 series has been recognised by Underwriters Laboratory (UL) to UL 60950 for functional insulation, file number E151252 applies. The MEF1 Series of converters are not internally fused so to meet the requirements of UL 60950 an anti-surge input line fuse should always be used with ratings as defined below.

MEF1S24xxxC: 100mA

All fuses should be UL approved and rated to at least the maximum allowable DC input voltage.

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 260°C for 10 seconds. Please refer to [application notes](#) for further information. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin over Nickel Preplate. This series is backward compatible with Sn/Pb soldering systems.
For further information, please visit www.murata-ps.com/rohs

The diagram illustrates the breakdown of the part number **MEF 1 S XX XX S P X C** into its constituent parts:

- MEF 1**: Series name
- S**: Power rating
- XX**: Output type
 - S - Single
 - D - Dual
 - T - Triple
 - Q - Quad
- XX**: Input voltage
- S**: Output voltage
- P**: Package type
 - S - SIP
 - D - DIP
 - M - Surface mount
 - Z - ZIP
- X**: Short circuit protection
- C**: RoHS compliant

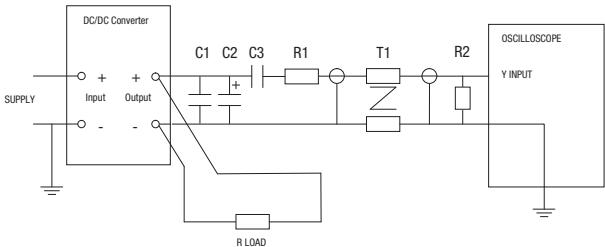
CHARACTERISATION TEST METHODS

Ripple & Noise Characterisation Method

Ripple and noise measurements are performed with the following test configuration.

C1	1 μ F X7R multilayer ceramic capacitor, voltage rating to be a minimum of 3 times the output voltage of the DC-DC converter
C2	10 μ F tantalum capacitor, voltage rating to be a minimum of 1.5 times the output voltage of the DC-DC converter with an ESR of less than 100m Ω at 100 kHz
C3	100nF multilayer ceramic capacitor, general purpose
R1	450 Ω resistor, carbon film, $\pm 1\%$ tolerance
R2	50 Ω BNC termination
T1	3T of the coax cable through a ferrite toroid
RLOAD	Resistive load to the maximum power rating of the DC-DC converter. Connections should be made via twisted wires
Measured values are multiplied by 10 to obtain the specified values.	

Differential Mode Noise Test Schematic



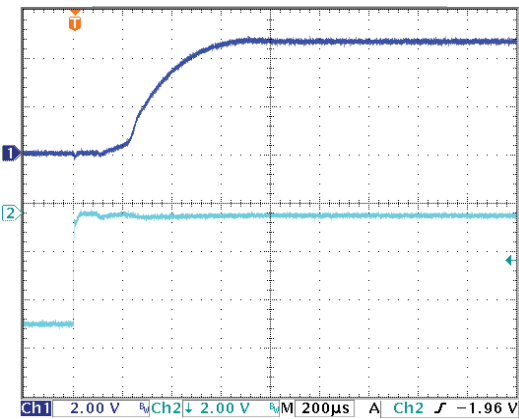
APPLICATION NOTES

Capacitive loading and start up

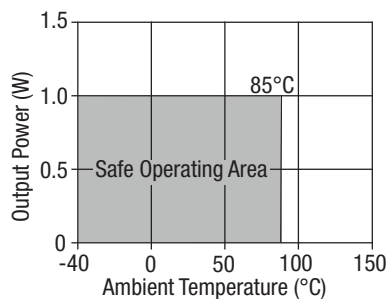
Typical start up times for this series, with a typical input voltage rise time of 2.2 μ s and output capacitance of 10 μ F, are shown in the table below. The product series will start into a capacitance of 47 μ F with an increased start time, however, the maximum recommended output capacitance is 10 μ F.

	Start-up time	
	μ s	
MEF1S0303SPC	310	
MEF1S0305SPC	550	
MEF1S0503SPC	225	
MEF1S0505SPC	460	
MEF1S1203SPC	185	
MEF1S1205SPC	390	
MEF1S2403SPC	160	
MEF1S2405SPC	430	
MEF1S0303SP3C	310	
MEF1S0305SP3C	550	
MEF1S0503SP3C	225	
MEF1S0505SP3C	460	
MEF1S1203SP3C	185	
MEF1S1205SP3C	390	
MEF1S2403SP3C	160	
MEF1S2405SP3C	430	

MEF1S0305SP3C

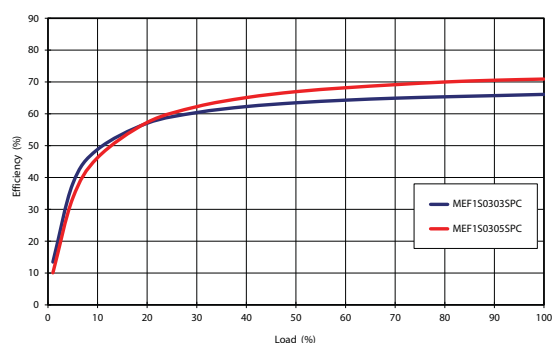


TEMPERATURE DERATING GRAPH

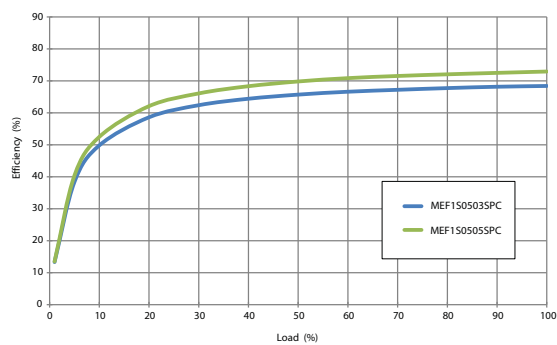


EFFICIENCY VS LOAD

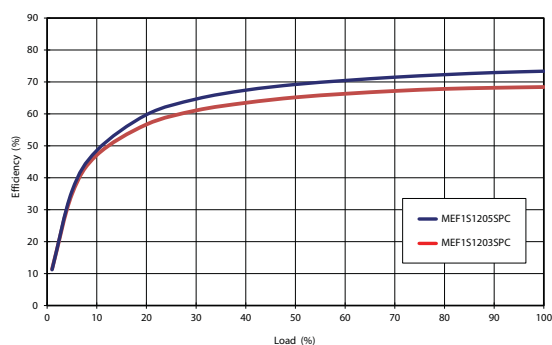
3.3V Input



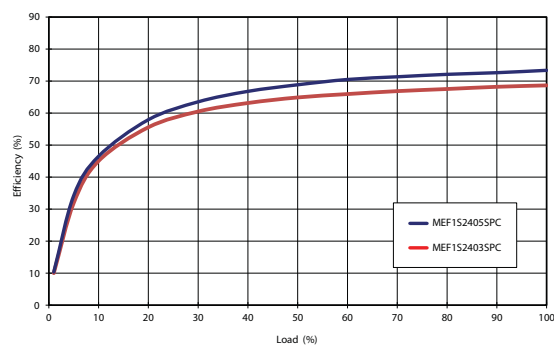
5V Input



12V Input

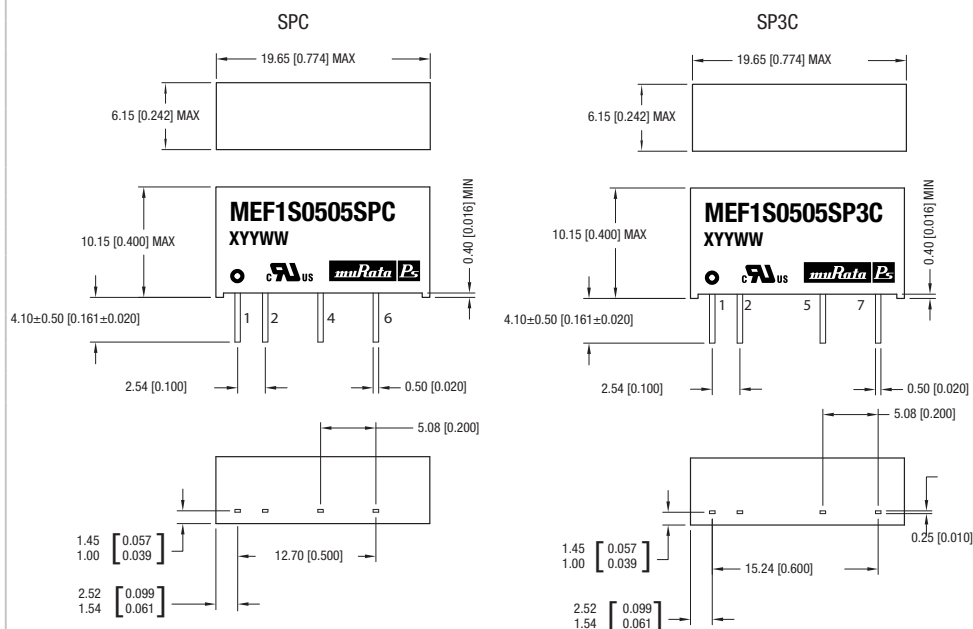


24V Input



PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



Unless otherwise stated all dimensions in mm (inches) $\pm 0.05\text{mm}$ (0.002"). Controlling dimension is mm.
All pins on a 2.54mm (0.100") pitch and within 0.25mm (0.010") of true position.

Weight: 1.6g

PIN CONNECTIONS - SPC

Pin	Function
1	+VIN
2	-VIN
4	-VOUT
6	+VOUT

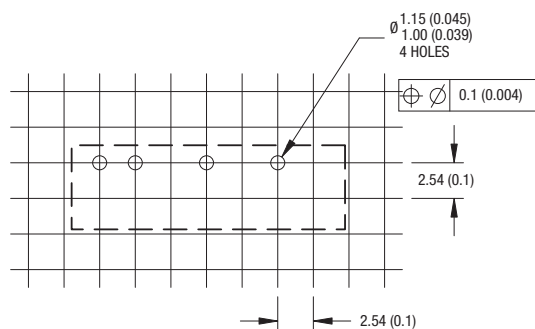
PIN CONNECTIONS - SP3C

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

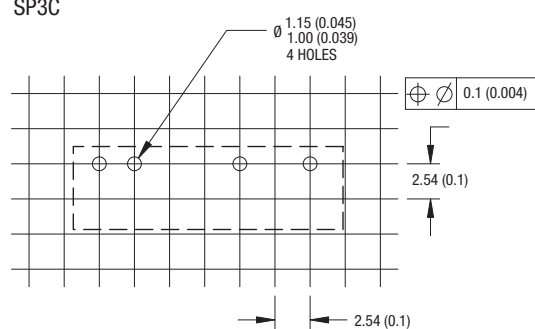
PACKAGE SPECIFICATIONS (Continued)

RECOMMENDED FOOTPRINT DETAILS

SPC



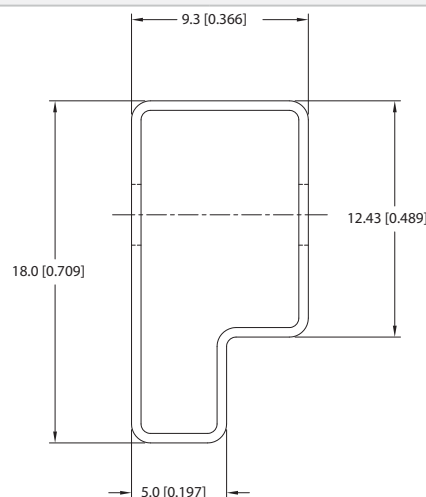
SP3C



All dimensions in mm ± 0.25 mm (inches ± 0.01).

TUBE OUTLINE DIMENSIONS

7 Pin SIP Tube



Unless otherwise specified all dimensions in mm [inches] ± 0.55 mm [0.022].
Tube Length : 520mm [20.472] ± 2.0 [0.079].

Tube Quantity : 25

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- Undersea equipment
- Power plant control equipment
- Medical equipment
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- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Data Processing equipment

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