

### FEATURES

- UL60950 recognised
- Short circuit protection
- Operation to zero load
- Output regulation <1%
- Single isolated output
- 1kVDC or 3.5kVDC isolation options 'Hi Pot Test'
- 3.3V, 5V, 12V & 24V inputs
- 3.3V & 5V outputs
- SMD construction
- Fully encapsulated with toroidal magnetics

### DESCRIPTION

The MEF1 series of DC-DC converters is used where a tightly regulated supply is required. They are ideal for situations where the input voltage is not tightly controlled. The single rail regulated output makes the ideal choice to power sensors, such as pressure transducers, hall effect sensors and mass airflow sensors.

### SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Ripple & Noise (Typ.)	Ripple & Noise (Max.)	Input Current (Typ.)	Efficiency (Min.)	Efficiency (Typ.)	Isolation Capacitance	MTTF
	V	V	mA	mVp-p	mVp-p	mA	%	%	pF	kHrs
MEF1S0303SPC	3.3	3.3	303	11	35	460	63	66	40	495
MEF1S0305SPC	3.3	5	200	9	35	430	68	71	30	867
MEF1S0503SPC	5	3.3	303	8	30	290	65	68.5	40	665
MEF1S0505SPC	5	5	200	10	40	275	69	73	50	1051
MEF1S1203SPC	12	3.3	303	11	35	120	65	69	40	511
MEF1S1205SPC	12	5	200	10	35	115	69	73.5	60	1044
MEF1S2403SPC	24	3.3	303	13	40	60	64	69	35	580
MEF1S2405SPC	24	5	200	13	40	55	68	73	45	834
3.5kVDC Isolation Part Numbers										
MEF1S0303SP3C	3.3	3.3	303	11	35	460	63	66	40	495
MEF1S0305SP3C	3.3	5	200	9	35	430	68	71	30	867
MEF1S0503SP3C	5	3.3	303	8	30	290	65	68.5	40	665
MEF1S0505SP3C	5	5	200	10	40	275	69	73	50	1051
MEF1S1203SP3C	12	3.3	303	11	35	120	65	69	40	511
MEF1S1205SP3C	12	5	200	10	35	115	69	73.5	60	1044
MEF1S2403SP3C	24	3.3	303	13	40	60	64	69	35	580
MEF1S2405SP3C	24	5	200	13	40	55	68	73	45	834

### INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 3.3V input types	3.135	3.3	3.465	V
	Continuous operation, 5V input types	4.75	5	5.25	
	Continuous operation, 12V input types	11.4	12	12.6	
	Continuous operation, 24V input types	22.8	24	25.2	
Reflected ripple current			5	20	mA p-p

### OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage set point accuracy	3.3V Output			± 2.5	%
	5V Output			± 2	
Rated power	T <sub>A</sub> = -40°C to 85°C			1	W
Line regulation	High V <sub>IN</sub> to low V <sub>IN</sub>			0.25	%/%
Load regulation	10% load to rated load		0.3	1	%

### ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	SPC Versions Flash tested for 1 second	1000			VDC
	SP3C Versions Flash tested for 1 minute	3500			
Resistance	Viso= 1kVDC	10			GΩ

### GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	0303		45		kHz
	5V input types		50		
	12V input types & 0305		60		
	24V input types		75		

1. Calculated using MIL-HDBK-217F 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 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 <a href="#">application notes</a> 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



**CHARACTERISATION TEST METHODS**

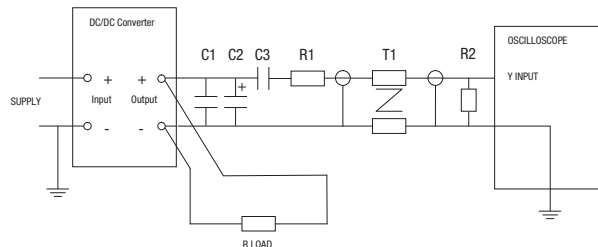
**Ripple & Noise Characterisation Method**

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

C1	1µF X7R multilayer ceramic capacitor, voltage rating to be a minimum of 3 times the output voltage of the DC-DC converter
C2	10µF 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 100mΩ at 100 kHz
C3	100nF multilayer ceramic capacitor, general purpose
R1	450Ω resistor, carbon film, ±1% tolerance
R2	50Ω 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**



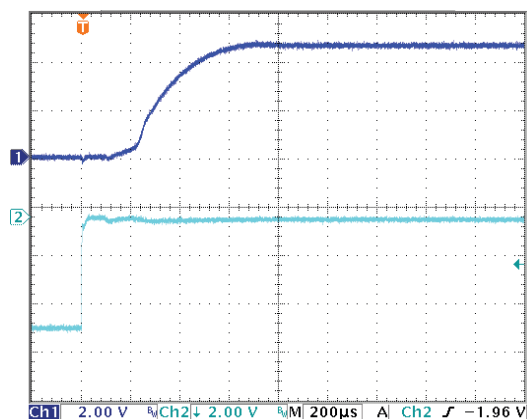
**APPLICATION NOTES**

**Capacitive loading and start up**

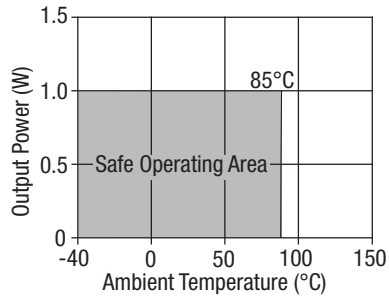
Typical start up times for this series, with a typical input voltage rise time of 2.2µs and output capacitance of 10µF, are shown in the table below. The product series will start into a capacitance of 47µF with an increased start time, however, the maximum recommended output capacitance is 10µF.

	Start-up time	
	µs	
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

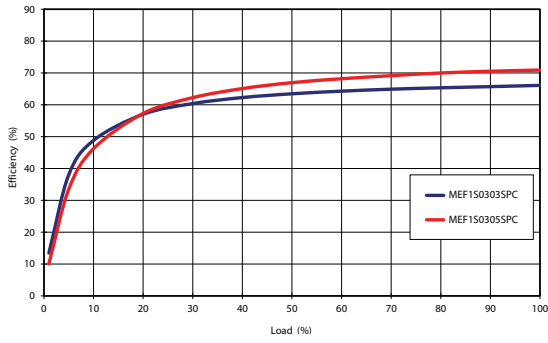


## TEMPERATURE DERATING GRAPH

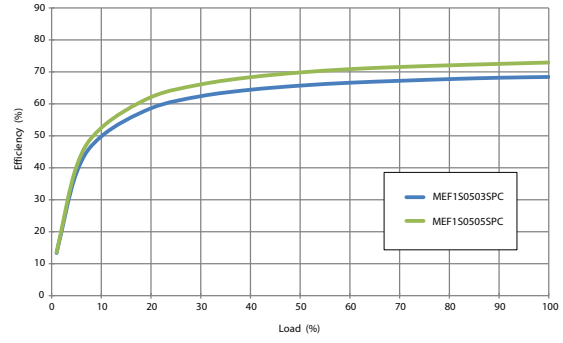


**EFFICIENCY VS LOAD**

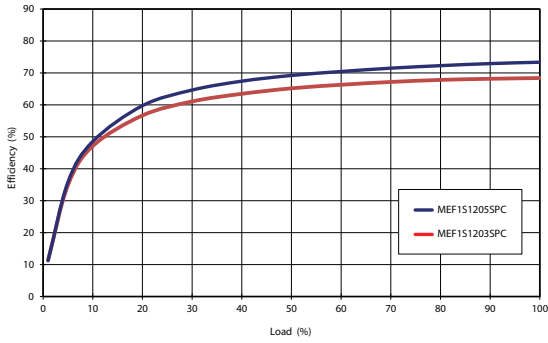
**3.3V Input**



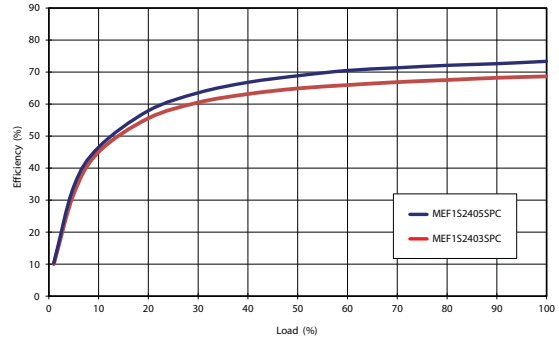
**5V Input**



**12V Input**

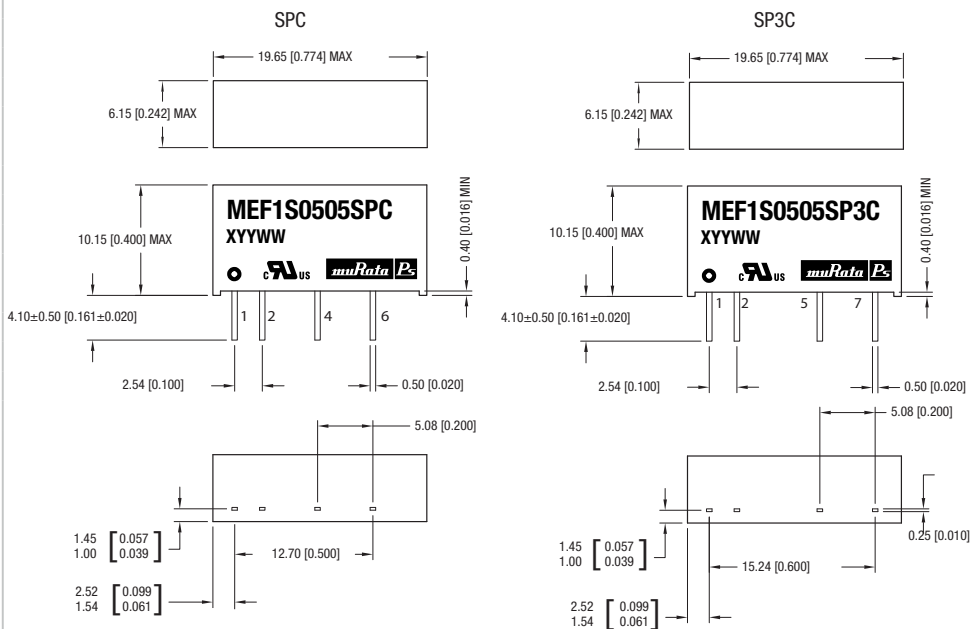


**24V Input**



### PACKAGE SPECIFICATIONS

#### MECHANICAL DIMENSIONS



Unless otherwise stated all dimensions in mm (inches) ±0.05mm (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

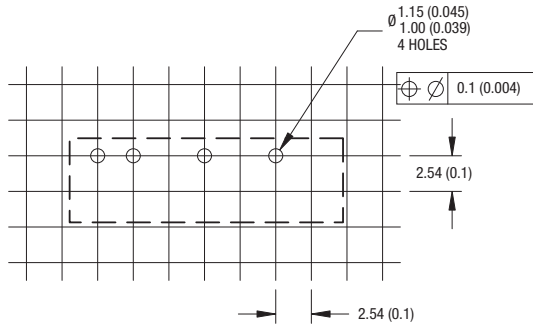
#### PIN CONNECTIONS - SP3C

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

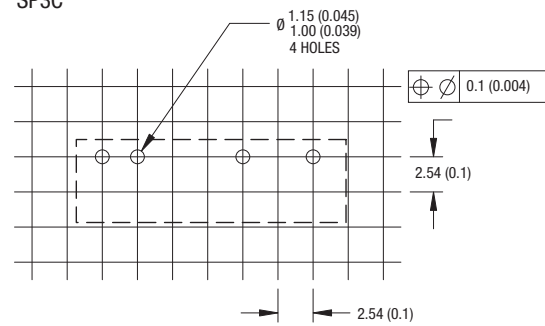
**PACKAGE SPECIFICATIONS (Continued)**

**RECOMMENDED FOOTPRINT DETAILS**

SPC



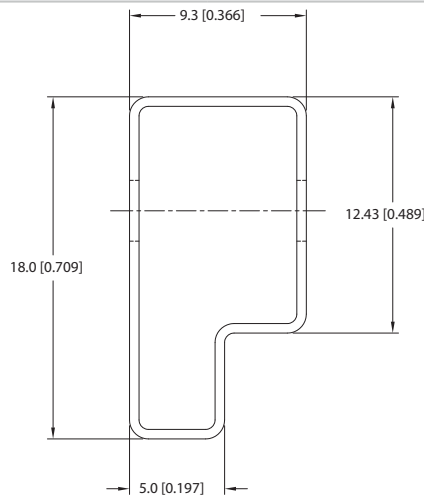
SP3C



All dimensions in mm  $\pm 0.25$ mm (inches  $\pm 0.01$ ).

**TUBE OUTLINE DIMENSIONS**

7 Pin SIP Tube



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

Tube Quantity : 25



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