

ME200SE Series

Low Cost, 2W Ultra-Miniature SIP DC/DC Converters



Key Features:

- 2W Output Power
- Ultra-Miniature SIP Case
- 1,500 VDC Isolation
- >3.50 MHour MTBF
- Nine Standard Models
- Meets EN 55032 Class B
- -40°C to +85°C Operation
- Low Cost!



Also Available In
Ultra-Miniature
DIP Case

MicroPower Direct

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Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	5 VDC Input	4.50	5.0	5.50	VDC
	12 VDC Input	10.80	12.0	13.20	
	24 VDC Input	21.60	24.0	26.40	
Input Reflected Ripple Current			15		mA P - P
Input Filter	Internal Capacitor				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	See Tolerance Graphs on Page 2				
Line Regulation, For VIN Change of 1%	3.3 Vout Models			±1.5	%
	All Other Models			±1.2	
Load Regulation, See Note 1	3.3 Vout Models		15		%
	All Other Models		10		
Ripple & Noise (20 MHz)	See Note 2		75	150	mV P - P
Temperature Coefficient				±0.03	%/°C
Output Short Circuit, See Note 3	ME205S-05E	Continuous (Autorecovery)			
	All Other Models	Momentary (0.5 Sec.)			

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,500			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V		20		pF
Switching Frequency			100		kHz

EMI Characteristics (See Page 3)

Parameter	Standard	Criteria	Level
Radiated Emissions	EN 55032		Class B
Conducted Emissions	See Note 4	EN 55032	Class B
ESD	EN 61000-4-2	A	±8 kV Contact

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+85	°C
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size & Weight	See Mechanical Diagrams (Page 4)				
Case Material	Non-Conductive Black Plastic (UL-94V0)				

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.50			MHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	5 VDC Input			9.0	VDC
	12 VDC Input			18.0	
	24 VDC Input			30.0	
Lead Temperature	1.5 mm From Case For 10 Sec			300	°C

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

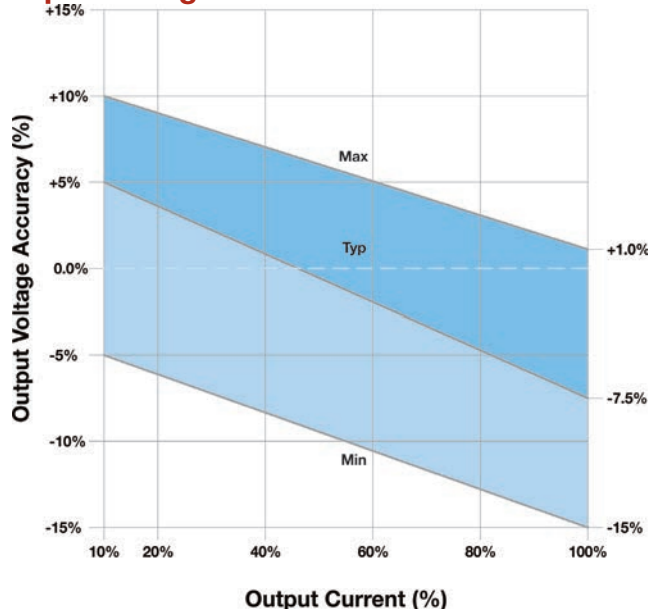
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Model Number	Input				Output			Efficiency (% Typ)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA)				
	Nominal	Range	Full-Load	No-Load		Max.	Min.			
ME205S-05E	5.0	4.5 - 5.5	506	23	5.0	400	40	79	220	1,000
ME205S-09E	5.0	4.5 - 5.5	476	23	9.0	223	23	84	220	1,000
ME205S-12E	5.0	4.5 - 5.5	506	23	12.0	167	17	79	220	1,000
ME205S-15E	5.0	4.5 - 5.5	506	23	15.0	133	13	79	220	1,000
ME205S-24E	5.0	4.5 - 5.5	476	23	24.0	84	9	84	220	1,000
ME212S-03E	12	10.8 - 13.2	151	15	3.3	400	40	73	220	300
ME212S-12E	15	10.8 - 13.2	200	15	12.0	167	17	83	220	400
ME224S-05E	24	21.6 - 26.4	105	6	5.0	400	40	79	220	200
ME224S-15E	24	21.6 - 26.4	102	6	15.0	133	13	82	220	200

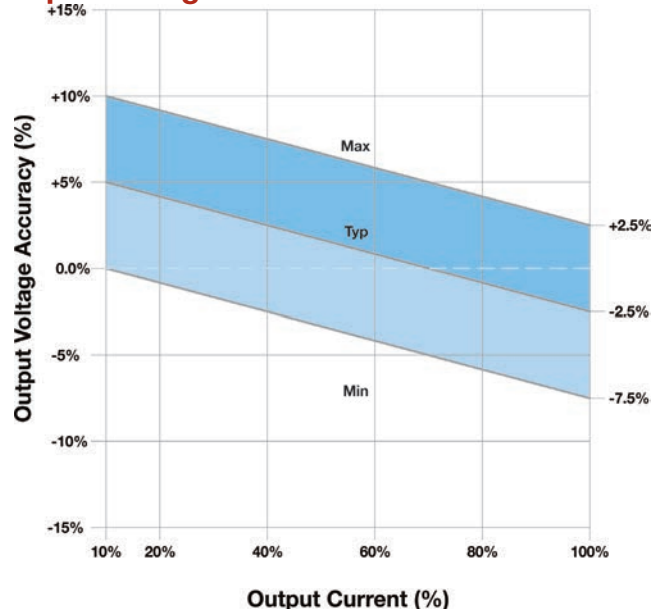
Notes:

- Output load regulation is specified for a load change of 10% to 100%.
- When measuring output ripple, it is recommended that an external 0.33µF ceramic capacitor be placed from the +VOUT pin to the -VOUT pin. ing frequency is typically 80 kHz, but may vary with differing operating conditions.
- Units with limited short circuit protection must be restarted after a fault.
- These converters will operate without external components. However, to meet the specified EMI limits, a simple external input filter is required. See the input filter note on page 3 for more information.
- Operation at no-load will not damage these units. However, they may not meet all specifications.
- It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

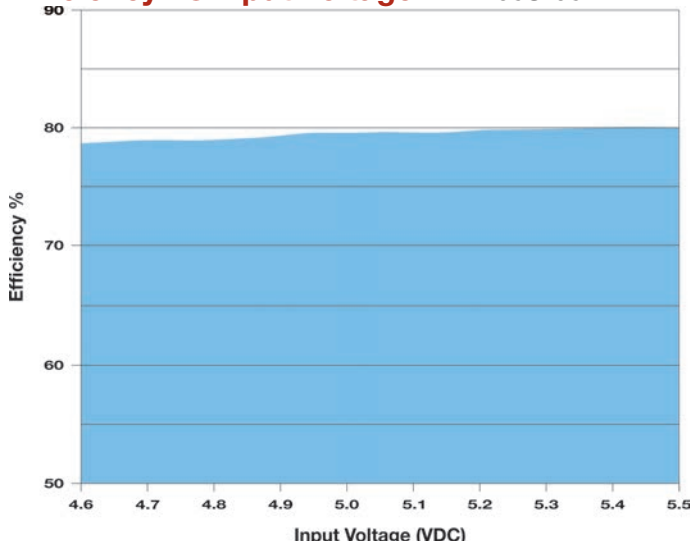
Output Voltage Tolerance: ME212S-03E



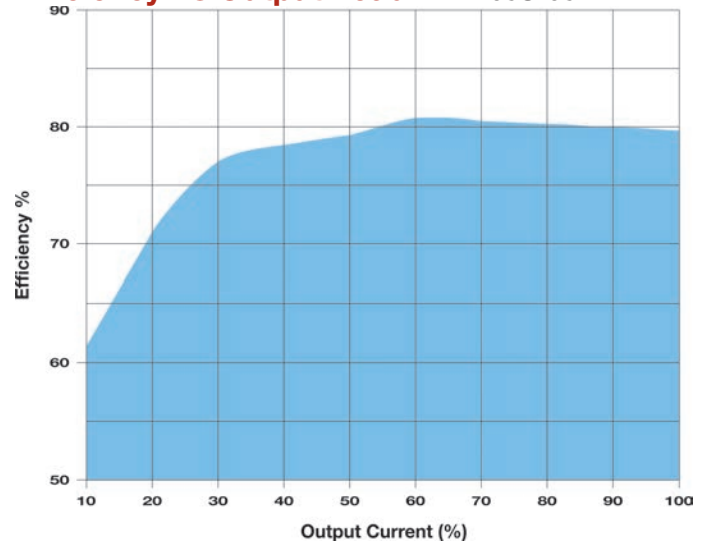
Output Voltage Tolerance: All Other Models



Efficiency Vs Input Voltage: ME205S-05E



Efficiency Vs Output Load: ME205S-05E



Simple Connection

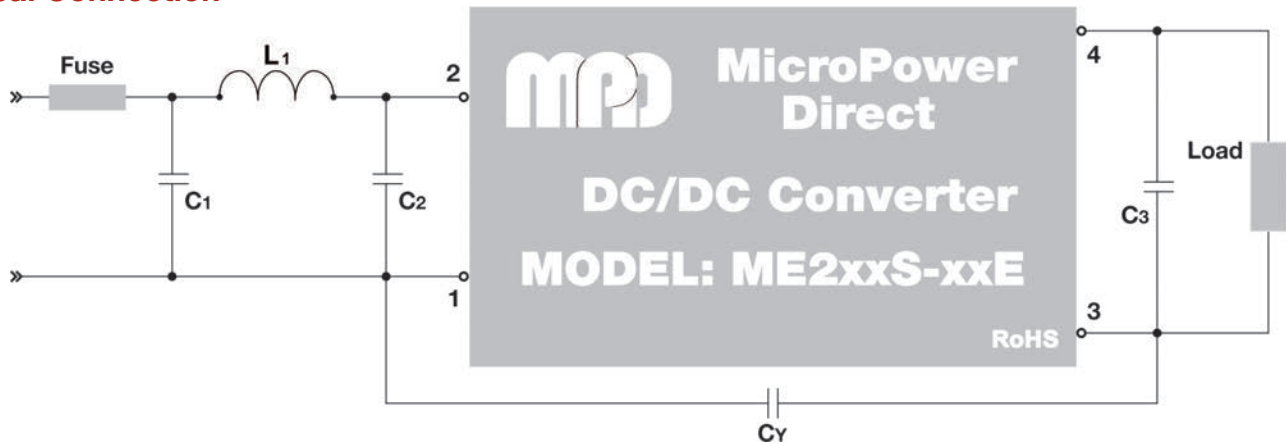


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V _{IN}	C1	V _{OUT}	C3/C4
5 VDC	4.7 μ F/50V	3.3 VDC	10 μ F
12 VDC	2.2 μ F/50V	5 VDC	10 μ F
24 VDC	1.0 μ F/50V	9 VDC	10 μ F
		12 VDC	10 μ F
		15 VDC	1.0 μ F
		24 VDC	1.0 μ F

The diagram above illustrates a simple connection of the ME200SE series. For applications that do not require the circuit to meet EMI/EMC specifications, the capacitors C1 and C4 will reduce input/output ripple and improve the converter stability over time and temperature. The recommended component values are given in the table at right.

Typical Connection



The diagram above illustrates a typical connection of the ME200SE series for an application that requires compliance to EMI/EMC standards EN 55032 and EN 61000-4 (as specified on page 1). Some notes on these components are:

1. An external fuse is recommended to protect the unit in the event of a fault on the input line. A recommended value is given in model selection table on page 2.
2. The output filtering capacitor (C3) is a high frequency, low resistance electrolytic capacitor. Care must be taken in choosing this capacitor not to exceed the capacitive load specification

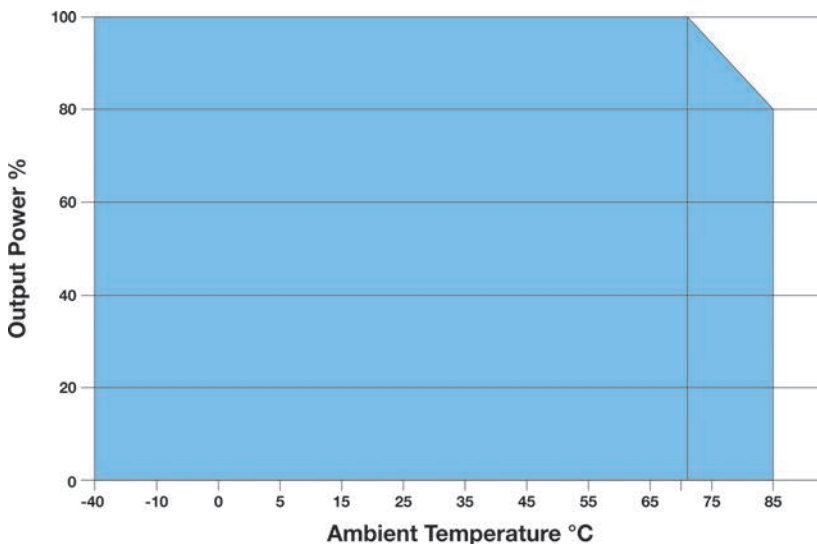
for the unit. Voltage derating of capacitors should be 80% or above.

3. Suggested component values are:

Component	V _{IN} : 5V, 12V, 15V	V _{IN} : 24V
C1	4.7 μ F/50V	4.7 μ F/50V
C2	4.7 μ F/50V	4.7 μ F/50V
L1	6.8 μ H	6.8 μ H
C3	See C3/C4 in Table Above	
CY	---	1 nF/2 kV

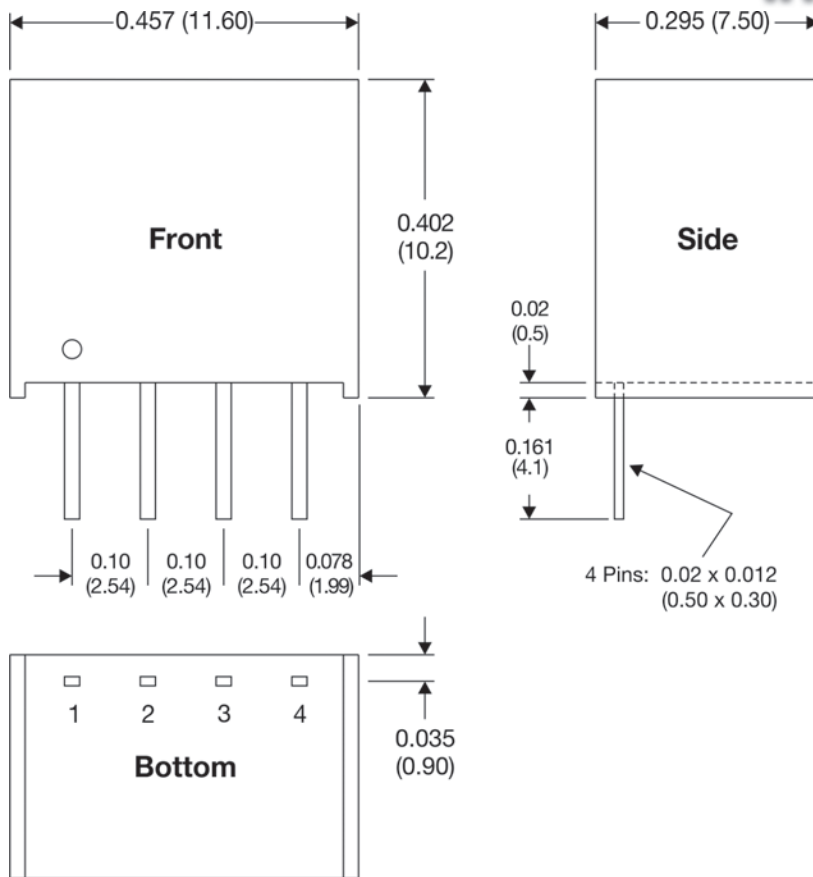
4. In many applications, simply adding input/output capacitors will enhance the input surge protection & and reduce output ripple sufficiently. In this case, capacitors C1 and C3 could be connected as shown in the simple connection above, without the other filter components. Recommended capacitor values are given in the table above.

Derating Curve



MPD offers a wide range of miniature DC/DC converters. Many of these are in the popular single inline "SIP" package. Models range from 0.25W to 3W and offer a variety of input/output voltage combinations, I/O isolation and wide temperature operation. Our new 3W series offers 2:1 input ranges, tight regulation, single & dual outputs, and up to 3 kV isolation. For full information, go to our website or contact the factory.

Mechanical Dimensions



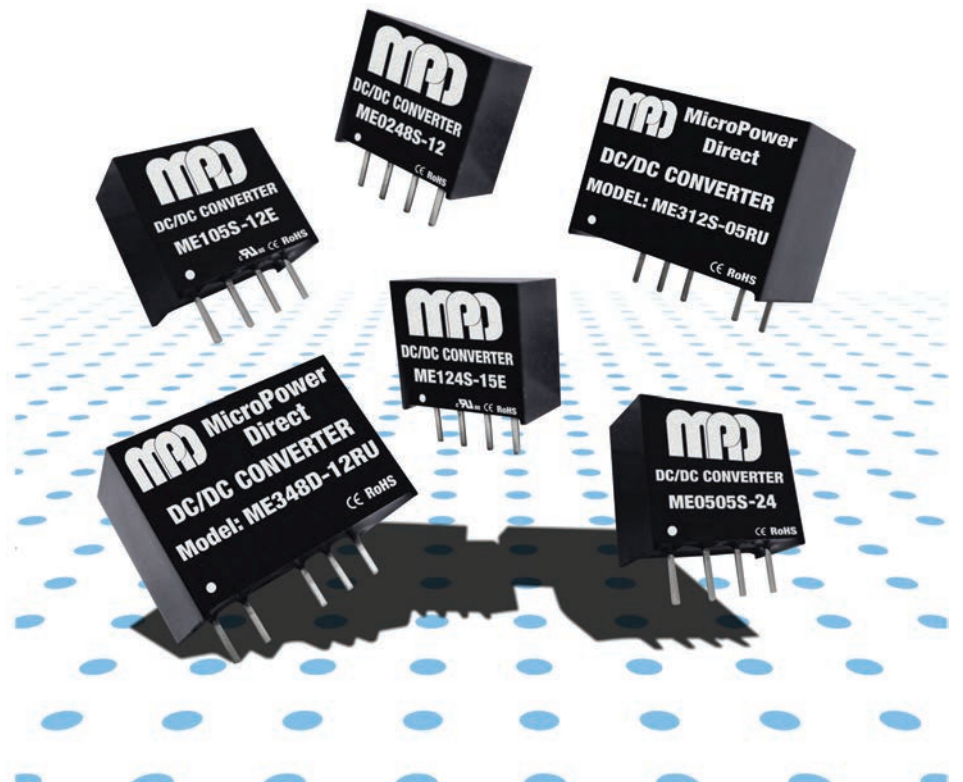
Pin Connections

Pin	Description
1	-VIN
2	+VIN
3	-VOUT
4	+VOUT

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Pin 1 is marked by a "dot" or indentation on the front of the unit
- Weight: 0.043 Oz (1.3g)

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