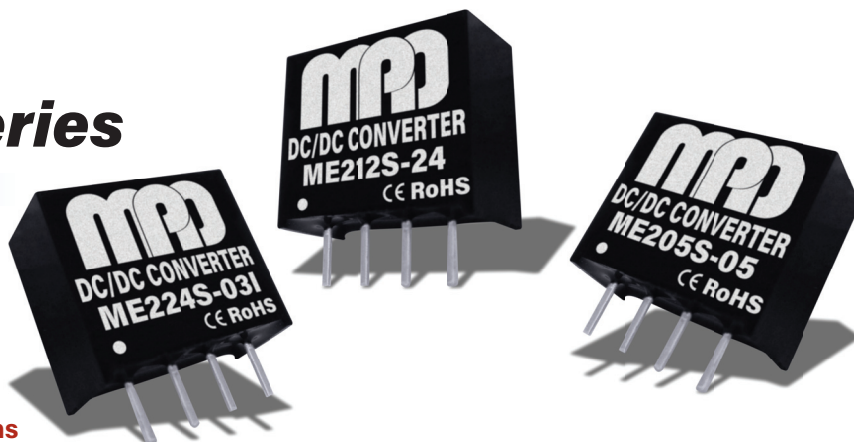


ME200S Series

Low Cost, 2.0W Ultra-Miniature SIP DC/DC Converters



Key Features:

- 2.0W Output Power
- Ultra-Miniature SIP Case
- 28 Standard Models
- Up To 3,000 VDC Isolation
- >1.12 MHour MTBF
- Meets EN 55032 Class B
- -40°C to +85°C Operation



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			
	15 VDC Input	13.50	15.0	16.50			
	24 VDC Input	21.60	24.0	26.40			
Input Reflected Ripple Current			20		mA P - P		
Input Filter	Internal Capacitors						

Output					
Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±3.0		%
Line Regulation	For VIN Change of 1%		±1.2		%
Load Regulation, See Note 1	See Model Selection Guide				
Ripple & Noise (20 MHz)				150	mV P - P
Temperature Coefficient			±0.02		%/°C
Output Short Circuit	Momentary (0.5 Sec.)				

General					
Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,000			VDC
	Units With "I" Suffix	3,000			
Isolation Resistance				1,000	MΩ
Isolation Capacitance			60		pF
Switching Frequency	See Note 2		70		kHz

EMI Characteristics, See Page 4

Environmental					
Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+85	°C
	Case			+100	
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical						
Case Size	See Mechanical Diagrams (Page 6)					
Case Material	Non-Conductive Black Plastic (UL-94V0)					
Weight	See Mechanical Diagrams (Page 6)					

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.121			MHours	

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (0.1 Sec)	5 VDC Input			7.0	VDC
	12 VDC Input			15.0	
	15 VDC Input			18.0	
	24 VDC Input			28.0	
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C

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

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Model Number	Input				Output		Load Regulation (% Typ)	Efficiency (% Typ)	Capacitive Load (μF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)				
	Nominal	Range	Full-Load	No-Load						
ME205S-03(I)	5.0	4.5 - 5.5	338	32	3.3	400	±20	78	470	1,000
ME205S-05(I)	5.0	4.5 - 5.5	494	30	5.0	400	±10	81	470	1,000
ME205S-07(I)	5.0	4.5 - 5.5	500	40	7.2	278	±10	80	470	1,000
ME205S-09(I)	5.0	4.5 - 5.5	482	30	9.0	222	±10	83	470	1,000
ME205S-12(I)	5.0	4.5 - 5.5	476	38	12.0	167	±10	84	470	1,000
ME205S-15(I)	5.0	4.5 - 5.5	471	35	15.0	133	±10	85	470	1,000
ME205S-24(I)	5.0	4.5 - 5.5	465	35	24.0	83	±10	86	470	1,000
ME212S-03(I)	12	10.8 - 13.2	152	20	3.3	400	±20	72	470	400
ME212S-05(I)	12	10.8 - 13.2	206	25	5.0	400	±10	81	470	400
ME212S-07(I)	12	10.8 - 13.2	208	20	7.2	278	±10	80	470	400
ME212S-09(I)	12	10.8 - 13.2	200	23	9.0	222	±10	83	470	400
ME212S-12(I)	12	10.8 - 13.2	196	20	12.0	167	±10	85	470	400
ME212S-15(I)	12	10.8 - 13.2	196	20	15.0	133	±10	85	470	400
ME212S-24(I)	12	10.8 - 13.2	196	30	24.0	83	±10	85	470	400
ME215S-03(I)	15	13.5 - 16.5	116	25	3.3	400	±20	76	470	300
ME215S-05(I)	15	13.5 - 16.5	165	20	5.0	400	±10	81	470	300
ME215S-07(I)	15	13.5 - 16.5	161	20	7.2	278	±10	83	470	300
ME215S-09(I)	15	13.5 - 16.5	167	20	9.0	222	±10	80	470	300
ME215S-12(I)	15	13.5 - 16.5	158	20	12.0	167	±10	84	470	300
ME215S-15(I)	15	13.5 - 16.5	155	15	15.0	133	±10	86	470	300
ME215S-24(I)	15	13.5 - 16.5	159	20	24.0	83	±10	84	470	300
ME224S-03(I)	24	21.6 - 26.4	68	7	3.3	400	±20	81	470	200
ME224S-05(I)	24	21.6 - 26.4	100	9	5.0	400	±10	83	470	200
ME224S-07(I)	24	21.6 - 26.4	102	12	7.2	278	±10	82	470	200
ME224S-09(I)	24	21.6 - 26.4	98	10	9.0	222	±10	85	470	200
ME224S-12(I)	24	21.6 - 26.4	97	12	12.0	167	±10	86	470	200
ME224S-15(I)	24	21.6 - 26.4	97	8	15.0	133	±10	86	470	200
ME224S-24(I)	24	21.6 - 26.4	95	10	24.0	83	±10	88	470	200

For the 3 kV isolation models, add suffix "I" to model number (i.e. ME224S-05I)

Notes:

1. Output load regulation is specified for a load change of 20% to 100%.
2. Switching frequency is typically 80 kHz, but may vary with differing operating conditions.
3. Operation at no-load will not damage these units. However, they may not meet all specifications.
4. All units are rated for operation at full output power to +85°C. Operation over +85°C without airflow is not recommended. Output power should be derated linearly from 100% at 85°C to 0% at 100°C.
5. 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.

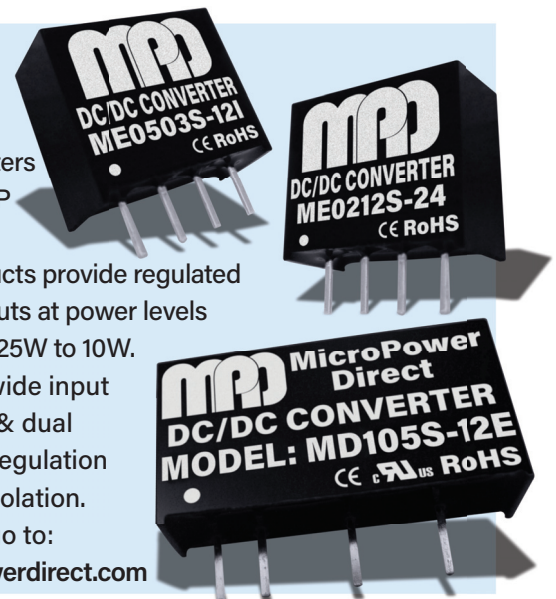
MPD offers a wide variety of DC/DC converters in miniature SIP packages.

Standard products provide regulated & isolated outputs at power levels ranging from 0.25W to 10W.

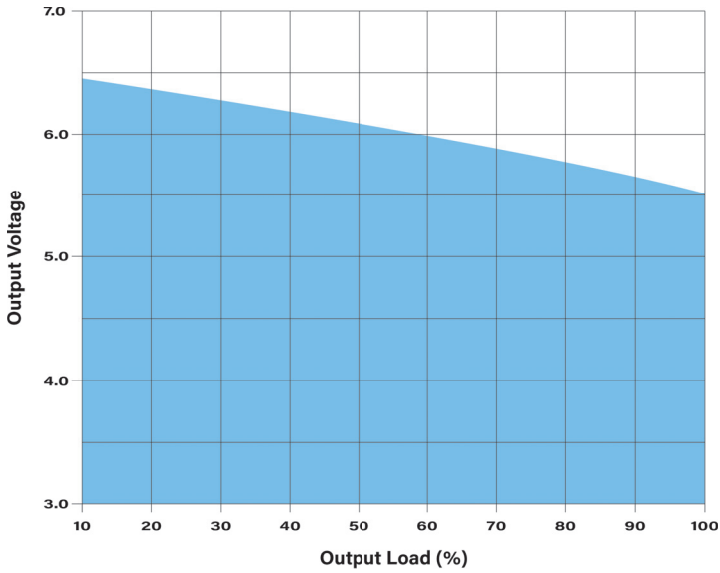
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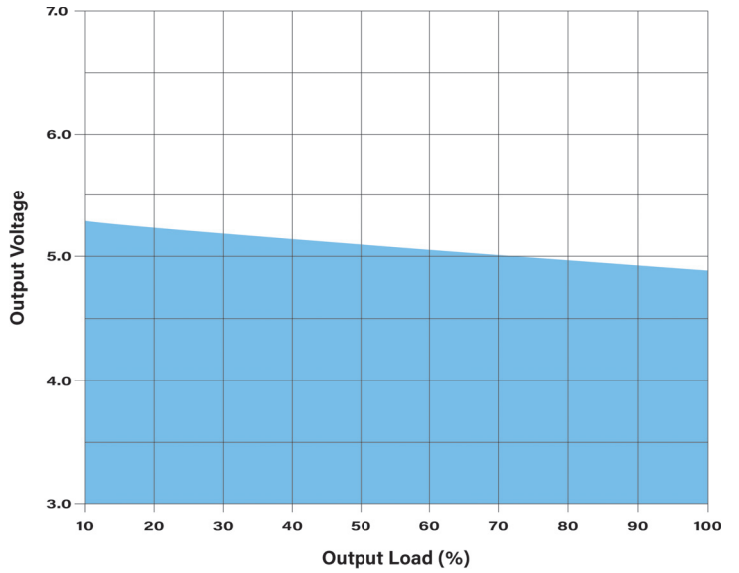
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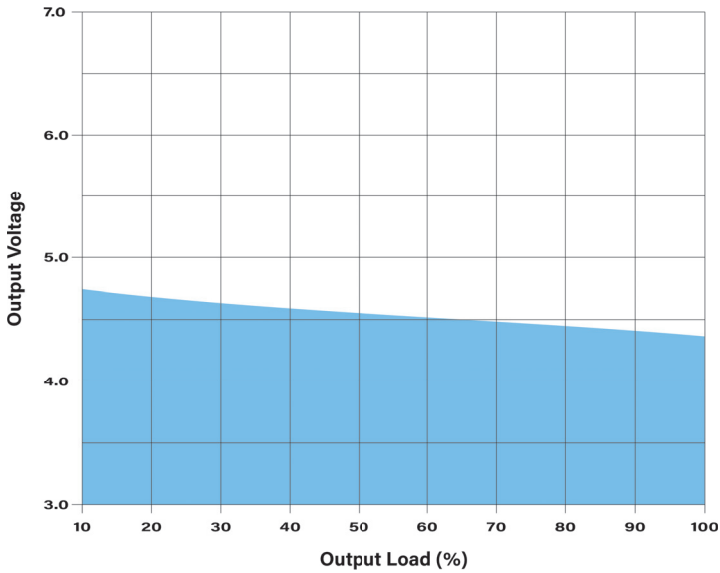
Output Load vs Output Voltage: ME205, High Line



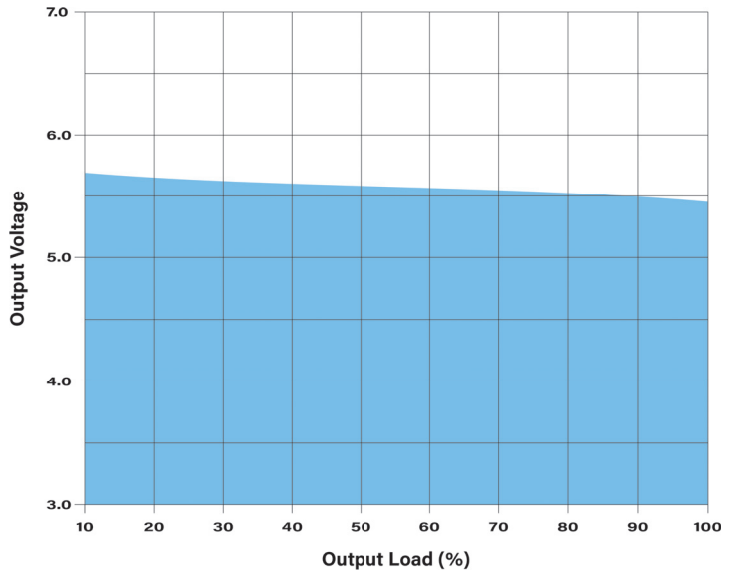
Output Load vs Output Voltage: ME205, Nom Line



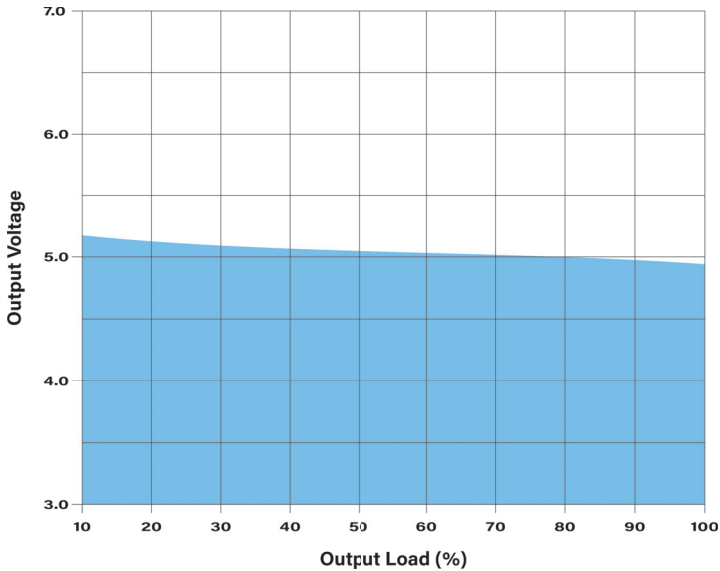
Output Load vs Output Voltage: ME205, Low Line



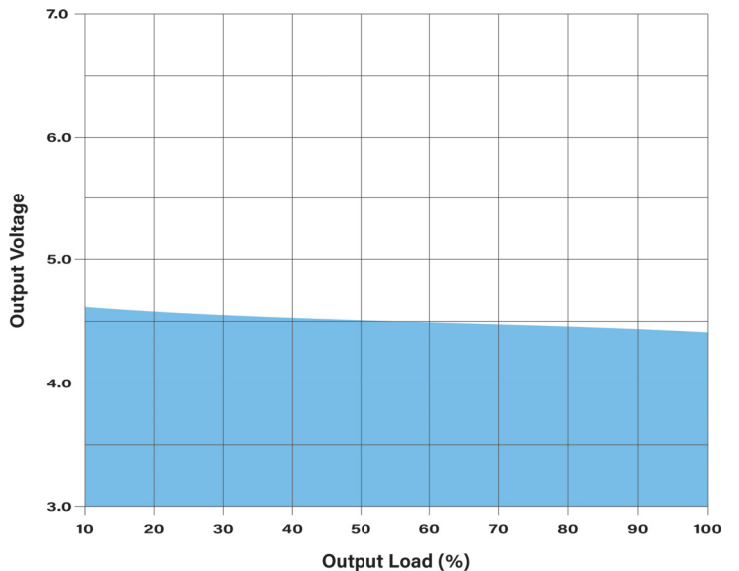
Output Load vs Output Voltage: ME212, High Line



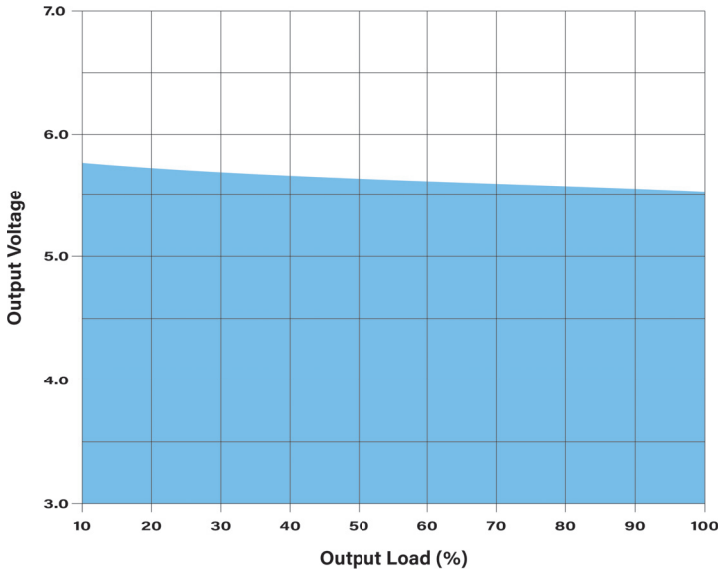
Output Load vs Output Voltage: ME212, Nom Line



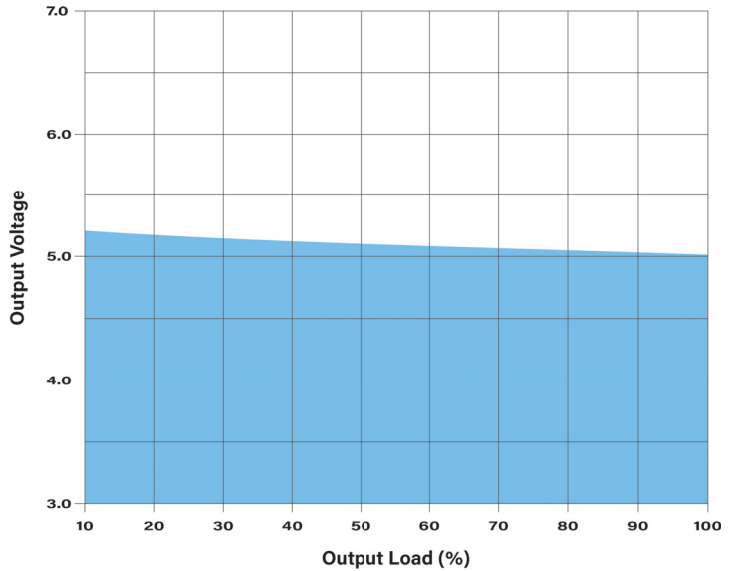
Output Load vs Output Voltage: ME212, Low Line



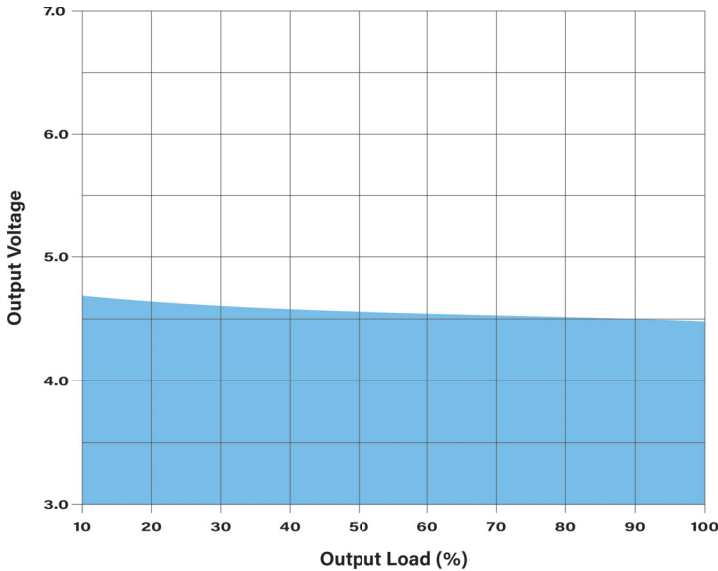
Output Load vs Output Voltage: ME224, High Line



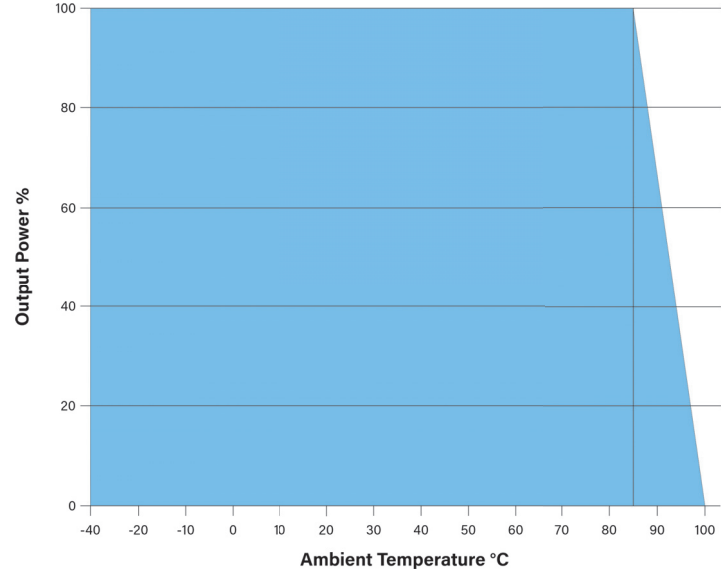
Output Load vs Output Voltage: ME224, Nom Line



Output Load vs Output Voltage: ME224, Low Line



Temperature Derating Curve

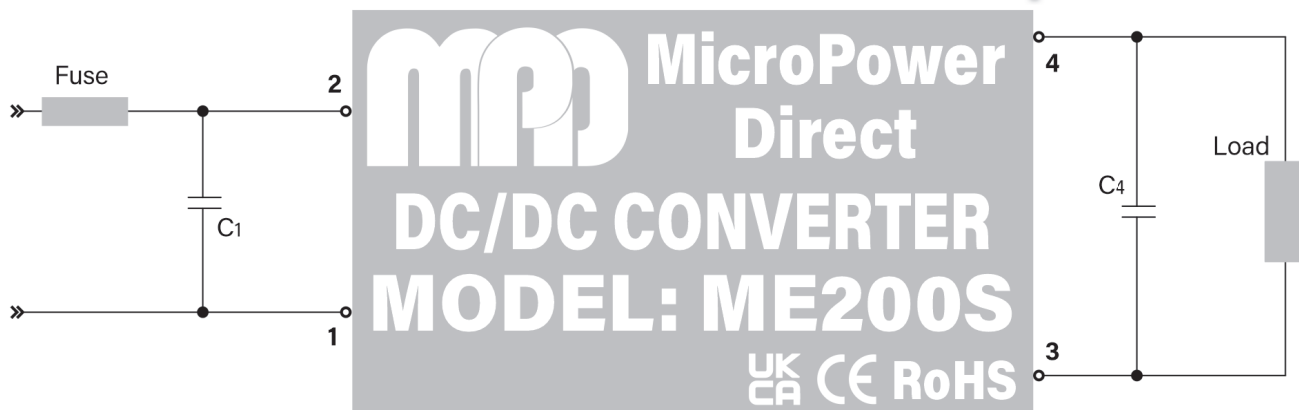


EMI/EMC Characteristics

Parameter		Standard	Criteria	Level
Radiated Emissions		EN 55032		Class B
Conducted Emissions	See Note 1	EN 55032		Class B
ESD		EN 61000-4-2	A	±6 kV Contact
			A	±8kV Air
RS		EN 61000-4-3	A	10V/m
EFT	See Note 2	EN 61000-4-4	A	±2 kV
Surge	See Note 2	EN 61000-4-5	A	±0.5 kV
CS		EN 61000-4-6	A	10 Vrms
PFMF		EN 61000-4-8	A	1A/m

Notes:

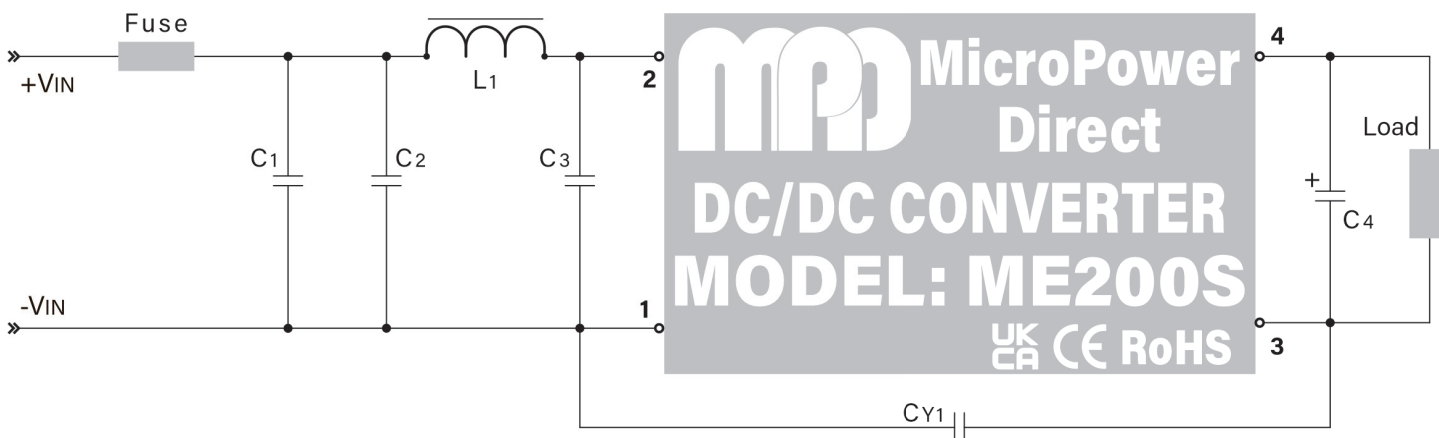
1. These converters will operate without external components. However, to meet the specified EMI limits, a simple external input filter is required. See page 5 for more information.
2. To meet the specified EN 61000-4-4 and EN 61000-4-5 limits, an external input capacitor must be connected across the input pins of the unit. See page 5 for more information.



The diagram above illustrates a typical connection of the **ME200S**. 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.

V _{IN}	C ₁	V _{OUT}	C ₄
5 VDC	5.0 μ F/25V	3.3 VDC	10 μ F/16V
12 VDC	7.5 μ F/25V	5 VDC	10 μ F/16V
15 VDC	7.5 μ F/50V	7.2 VDC	10 μ F/16V
24 VDC	10 μ F/50V	9 VDC	10 μ F/16V
		12 VDC	10 μ F/25V
		15 VDC	10 μ F/25V
		24 VDC	10 μ F/50V

EMI Connection



The diagram above illustrates a connection of the **ME200S** for an application that requires compliance to EMI/EMC standards EN 55032 and EN 61000-4 (as specified on page 4). Some notes on these components are:

1. An external fuse is recommended to protect the unit in the event a fault occurs on the input line. A recommended value is given in the model selection table on page 2.
2. The output filtering capacitor (C4) 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.

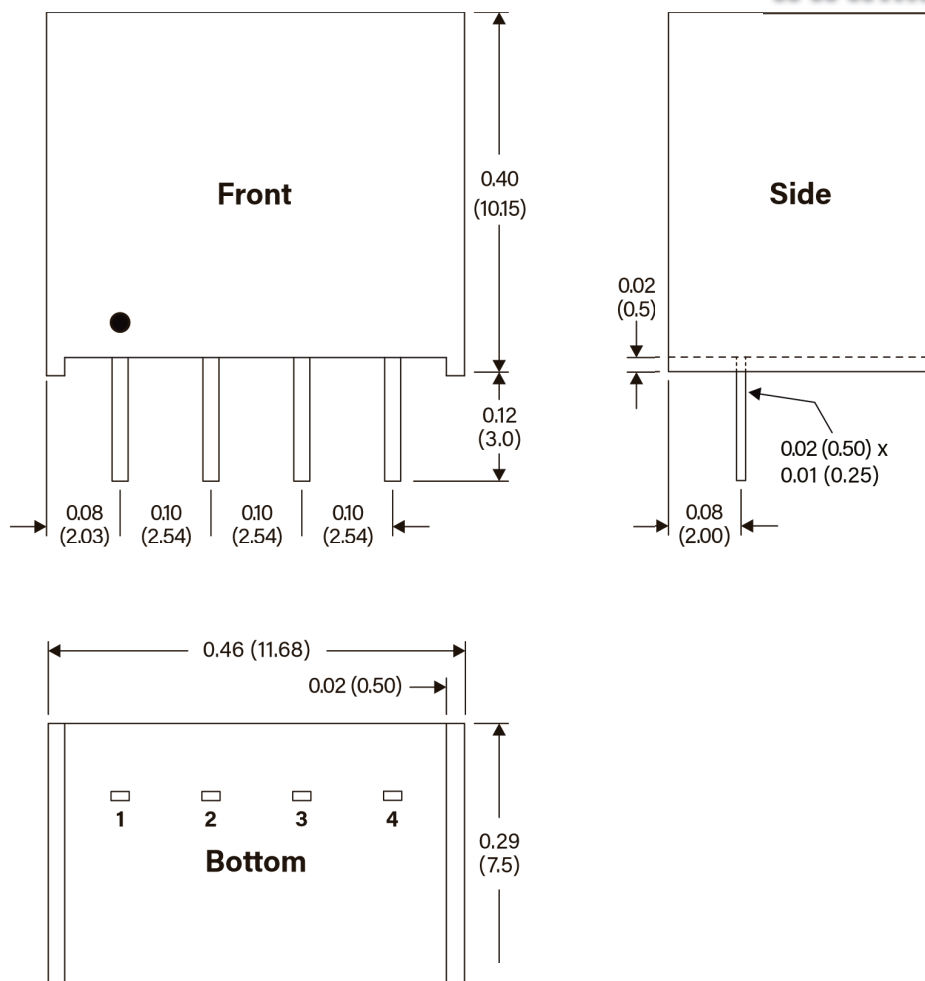
3. Recommended component values for all external input components are given in the table below.
4. In many applications, simply adding input/output capacitors will enhance the input surge protection & and reduce output ripple sufficiently. In this case, capacitors could be connected as shown in the typical connection at the top of the page, without the other filter components.

Suggested component values are:

V _{IN}	C ₁	C ₂	L ₁	C ₃	CY ₁
3.3 VDC	Nippon Chemi-Con KY Series 470 μ F/100V	MLCC 2.2 μ F/100V	18 μ H	Not Required	Not Required
5 VDC					
12 VDC					
15 VDC					
24 VDC				MLCC 2.2 μ F/100V	MLCC 470 pF/3 kV

Mechanical Dimensions

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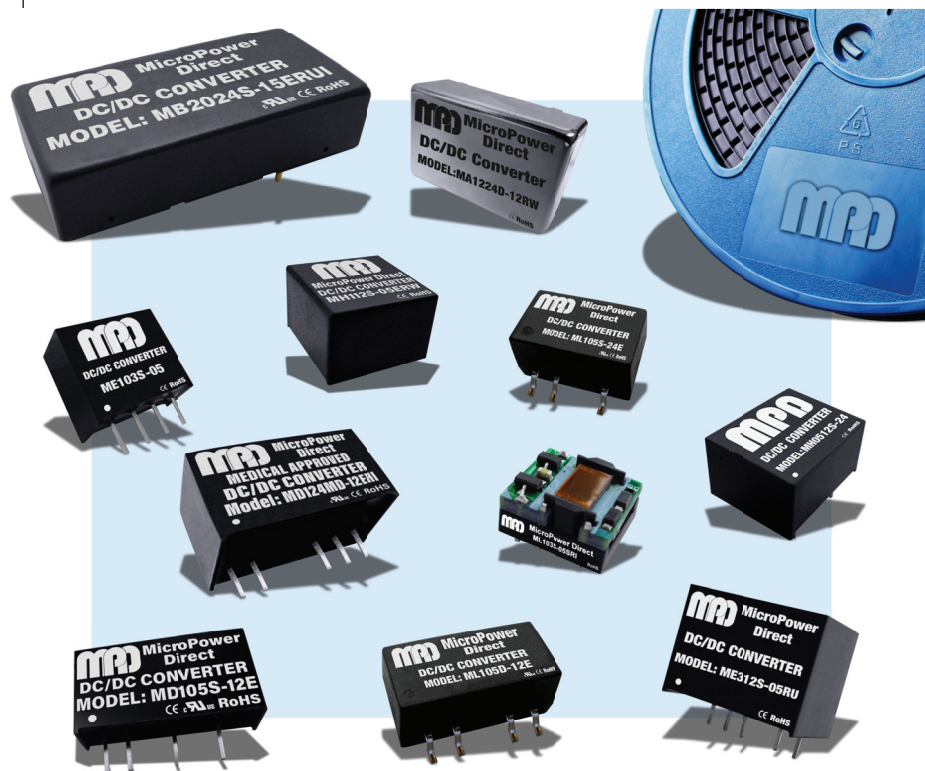
Pin Connections

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

Notes:

- All dimensions are typical in inches (mm)
- Pin 1 is marked by a "dot" or indentation on the unit
- General Tolerance = ± 0.02 (± 0.50)
- Pin Tolerance = ± 0.002 (± 0.05)
- Recommended pin hole size (on the application PC Board) is $\varnothing 0.039$ ($\varnothing 1.00$)
- Weight (Typ) = 0.067 Oz (1.9g)

MPD offers a very wide variety of DC/DC converters. Our standard product line includes SMT, SIP, and DIP potted modules, industry standard 1 x 1" & 1 x 2" modules, as well as new models in an ultra miniature DFN package. Our units are used in applications ranging from high speed gate drive circuits to instrumentation to industrial equipment and medical equipment/instrumentation. Units are available over a power range of 0.25 to 60W. Most models meet international EMC/EMI standards and many are fully approved to EN 62368. Call today, or go to our website to find the right DC/DC power module for your application.



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