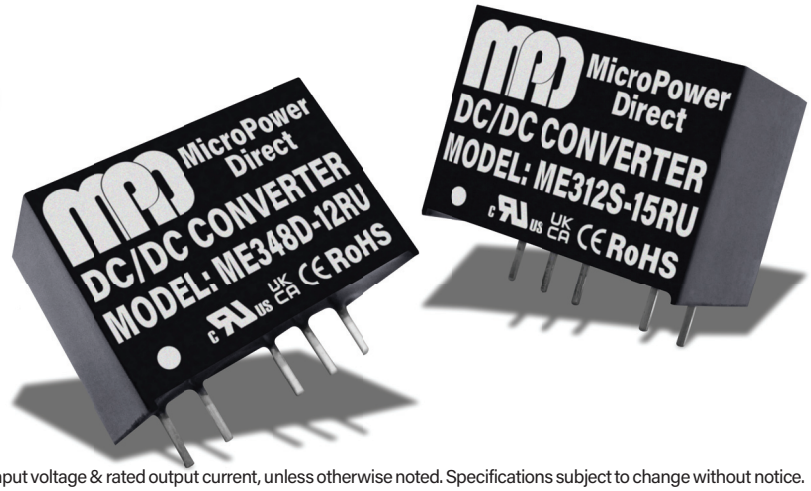
ME300RU

Wide 4:1 Input, 3W Ultra-Miniature SIP DC/DC Converters



Key Features:

- 3W Output Power
- Ultra-Miniature SIP Case
- Single & Dual Outputs
- Tight Line/Load Regulation
- Wide 4:1 Input Range
- Short Circuit Protected
- 21 Standard Models
- 1,600 VDC Isolation
- >956 kHour MTBF
- Meets EN 55032
- -40°C to +76°C Operation

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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	12 VDC Input	4.5	12.0	18.0	VDC
	24 VDC Input	9.0	24.0	36.0	
	48 VDC Input	18.0	48.0	75.0	
Input Reflected Ripple Current	See Note 2		20		mA P - P
Start Up Time	See Note 3		30		mS
Input Filter	Internal Capacitor				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
Line Regulation	VIN = Min to Max			±0.2	%
Load Regulation	IOUT = 0% to 100%			±1.0	%
Cross Regulation, Dual Output	See Note 4		±5.0		%
Ripple & Noise, See Note 5	Single Output			150	mV P - P
	Dual Output			100	
Transient Recovery Time	See Note 6		500		µSec
Transient Response Deviation	ME3xxS-03RU, ME3xxS-05RU		±5.0		%
	All Other Models		±3.0		
Temperature Coefficient			±0.02		%/°C
Output Short Circuit	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	1,600			VDC
Isolation Resistance		1,000			MΩ
Isolation Capacitance				40	pF
Switching Frequency		100			kHz

Remote On/Off (See Page 2)

Parameter	Conditions	Min.	Typ.	Max.	Units
Supply On		Open or High Impedance			
Supply Off	Via 1 kΩ	2.0		4.0	mA
Standby Input Current	Nominal Input			2.5	mA
Control Common	Referenced to -Input (Pin 1)				

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+76	°C
	Case			+100	
Storage Temperature Range		-55		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Pages 3 & 4)
Case Material	Non-Conductive Black Plastic (UL-94V0)
Weight	See Mechanical Diagram (Pages 3 & 4)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	956			kHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (100 mSec)	12 VDC Input			25.0	VDC
	24 VDC Input			50.0	
	48 VDC Input			100.0	
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.

Model Selection Guide

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.			
ME312S-03RU	12	4.5 - 18.0	257	45	3.3	700	0.0	75	3,300	1,600
ME312S-05RU	12	4.5 - 18.0	309	45	5.0	600	0.0	81	1,680	1,600
ME312S-12RU	12	4.5 - 18.0	301	50	12.0	250	0.0	83	820	1,600
ME312S-15RU	12	4.5 - 18.0	301	55	15.0	200	0.0	83	680	1,600
ME312D-05RU	12	4.5 - 18.0	313	40	±5.0	±300	±0.0	80	1,000	1,600
ME312D-12RU	12	4.5 - 18.0	305	50	±12.0	±125	±0.0	82	470	1,600
ME312D-15RU	12	4.5 - 18.0	301	60	±15.0	±100	±0.0	83	330	1,600
ME324S-03RU	24	9.0 - 36.0	127	25	3.3	700	0.0	76	3,300	800
ME324S-05RU	24	9.0 - 36.0	152	25	5.0	600	0.0	82	1,680	800
ME324S-12RU	24	9.0 - 36.0	149	35	12.0	250	0.0	84	820	800
ME324S-15RU	24	9.0 - 36.0	149	35	15.0	200	0.0	84	680	800
ME324D-05RU	24	9.0 - 36.0	154	30	±5.0	±300	±0.0	81	1,000	800
ME324D-12RU	24	9.0 - 36.0	151	35	±12.0	±125	±0.0	83	470	800
ME324D-15RU	24	9.0 - 36.0	149	40	±15.0	±100	±0.0	84	330	800
ME348S-03RU	48	18.0 - 75.0	65	15	3.3	700	0.0	74	3,300	500
ME348S-05RU	48	18.0 - 75.0	77	15	5.0	600	0.0	81	1,680	500
ME348S-12RU	48	18.0 - 75.0	77	15	12.0	250	0.0	81	820	500
ME348S-15RU	48	18.0 - 75.0	76	20	15.0	200	0.0	82	680	500
ME348D-05RU	48	18.0 - 75.0	79	15	±5.0	±300	±0.0	79	1,000	500
ME348D-12RU	48	18.0 - 75.0	78	20	±12.0	±125	±0.0	80	470	500
ME348D-15RU	48	18.0 - 75.0	78	30	±15.0	±100	±0.0	80	330	500

Notes:
1. The specified maximum capacitive load is for each output.
2. Reflected ripple current is measured with a simulated source inductance (LIN) of 27 µH and a source capacitor (CIN) of 47 µF. The source capacitor has an ESR that is less than 1Ω at 100 kHz. Measurement is made with the unit at full load and nominal input.
3. Start up time is specified at a nominal input level and constant resistive load.
4. Cross regulation is measured with one output at 100% load while the second output is varied from 25% to 100%.
5. Output ripple is measured with a 10 µF electrolytic capacitor connected in parallel with a 0.1 µF ceramic capacitor connected in parallel from the +VOUT to the -VOUT pins for single output units and from each output to common for dual output models. See the typical connection diagram & notes on page 3.
6. Transient recovery is measured to within a 1% error band for a load step change of 100% to 25% in 25% increments.
7. Operation at no-load will not damage these units. However, they may not meet all specifications.
8. It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

MPD offers a wide variety of miniature DC/DC converters in SIP and DIP packages. Available products range from 0.25W to 15W and offer features such as tight regulation, wide input ranges, high isolation levels, industry standard pin-outs, safety approvals and operation over wide temperature ranges. Call today for full information or go to:
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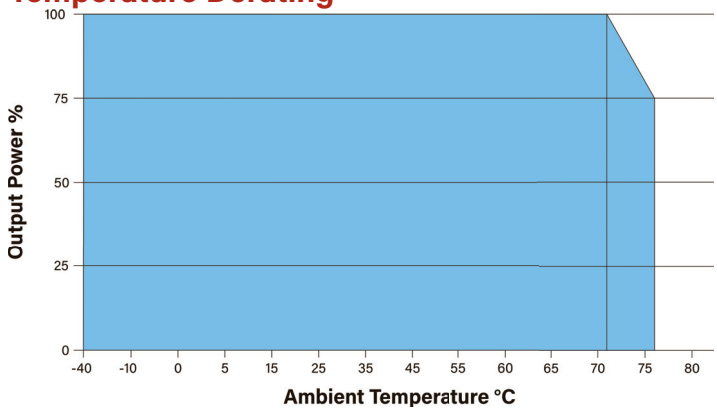
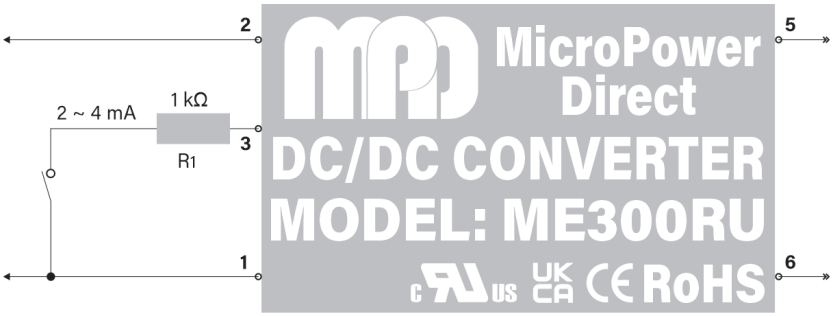
Temperature Derating



Remote ON/OFF Control



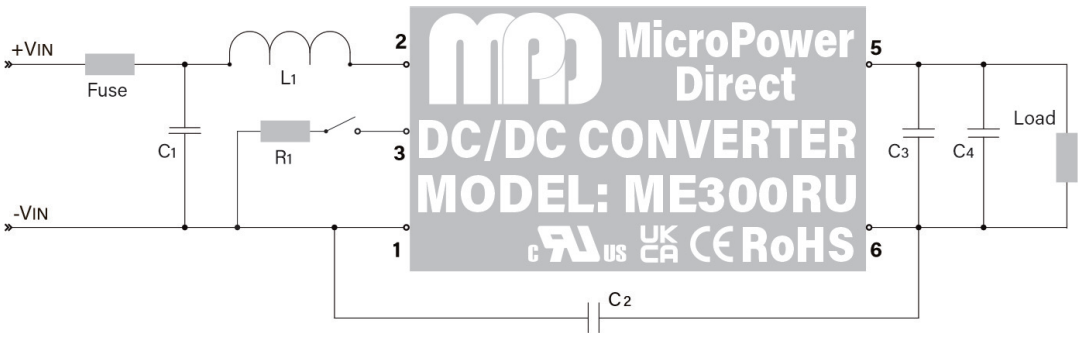
The **ME300SRU** (single output models only) may be started or shutdown by the control pin input (pin 3). This input is current controlled. The unit operates when this input is left open. When the input is "high" (current is flowing into the pin), the converter shuts down. The input current to this pin must be kept between 2 mA to 4 mA.

The diagram at right shows a simple input circuit for the control pin. Closing the switch causes 2 - 4 mA to flow through the 1 kΩ resister, shutting the unit off.

EMI/EMC Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See note 2	EN 55032		Class A
Conducted Emissions, See note 2	EN 55032		Class A
ESD	EN 61000-4-2	A	±6 kV Contact
			±8 kV Air
RS	EN 61000-4-3	A	10V/m
EFT, See Note 3	EN 61000-4-4	A	±2 kV
Surge, See Note 4	EN 61000-4-5	A	±2 kV
CS	EN 61000-4-6	A	10 Vrms
PFMF	EN 61000-4-8	A	100 A/m

Typical Connection



The recommended component values are:

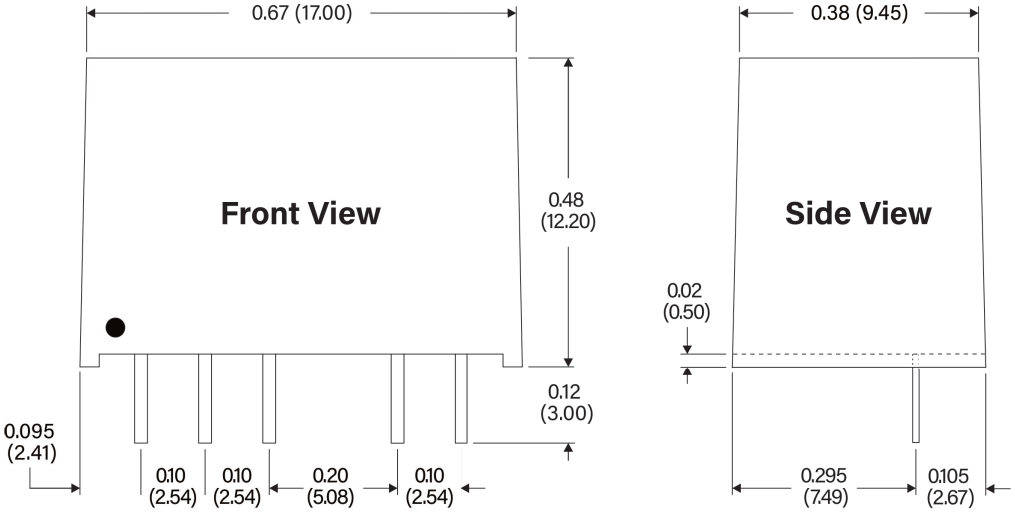
Input V	Fuse	C1	L1	C2	C3	C4
12 VIN	1,600 mA (Slow Blow)	1210, 10 µF/35V	2.2 µH	1206, 100 pF/2kV	10 µF to 100 µF	4.7 µF to 10 µF
24 VIN	800 mA (Slow Blow)	1210, 2.2 µF/100V	10 µH	1206, 100 pF/2kV	10 µF to 100 µF	4.7 µF to 10 µF
48 VIN	500 mA (Slow Blow)	1210, 4.7 µF/100V	18 µH	1206, 100 pF/2kV	10 µF to 100 µF	4.7 µF to 10 µF

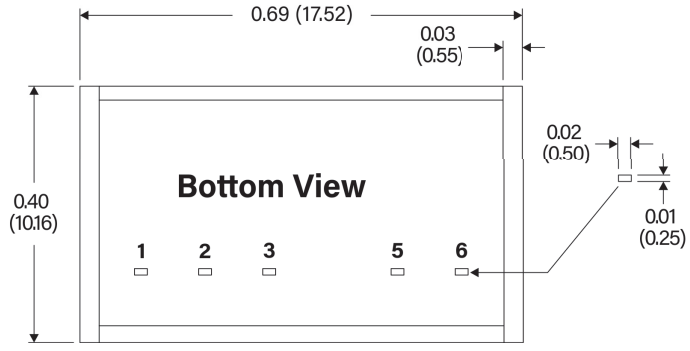
Notes:

1. All input/output filtering capacitors should have a low equivalent impedance. Voltage derating of all capacitors should be 60% or greater. All components should be mounted as close to the converter as possible.
2. To meet the requirements of EN 55032, the external components C1, L1, and C2 are required. This is illustrated in the typical connection diagram below. Values for these components are given in the table below. Contact the factory for more information.
3. A larger external input capacitor is needed to meet the requirements of EN 61000-4-4. In this case, the value of capacitor C1 should be changed to 220 µF/100V. Contact the factory for more information.
4. A larger external input capacitor is needed to meet the requirements of EN 61000-4-5. In this case, the value of capacitor C1 should be changed to 220 µF/100V. Contact the factory for more information.
5. For noise sensitive applications, it is recommended that the external capacitors C3 and C4 be placed from the +VOUT pin to the -VOUT pin for single output units and from each output to ground for dual output units. Recommended values are given in the table.

   Care must be taken in choosing capacitors not to exceed the capacitive load specification for the unit.

Mechanical Dimensions, Single Output Models





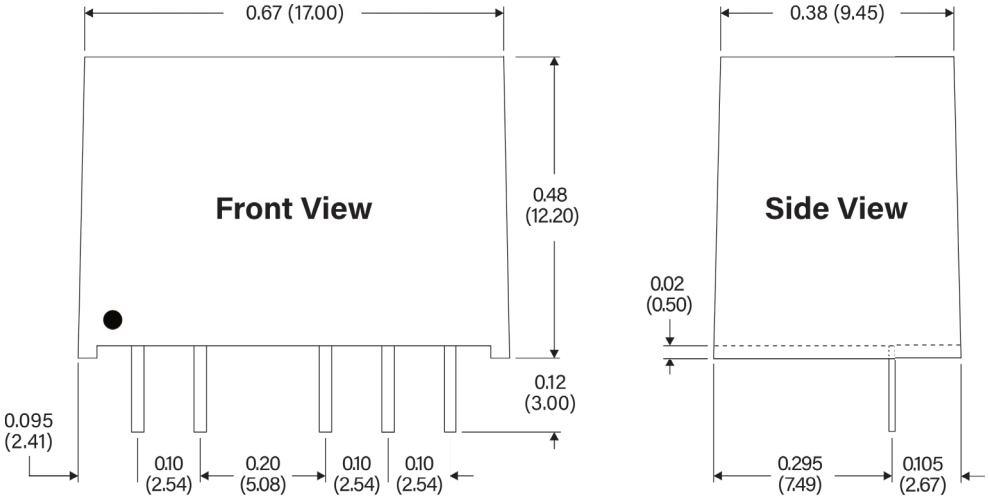
Pin Connections

Pin	Description
1	-VIN
2	+VIN
3	Remote On/Off
5	+VOUT
6	-VOUT

Notes:

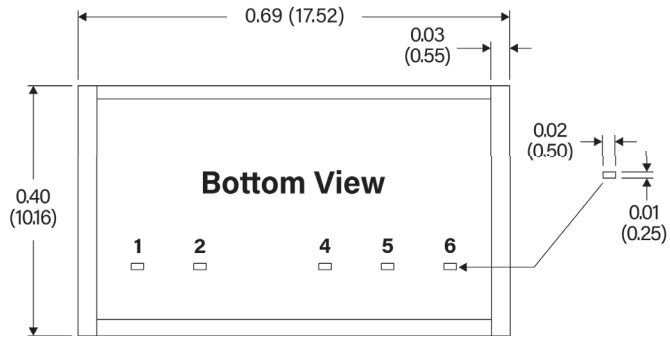
- All dimensions are typical in inches (mm)
- Pin 1 is marked by a "dot" or indentation on the unit
- General Tolerance = ±0.02 (±0.50)
- Pin Tolerance = ±0.002 (±0.05)
- Recommended pin hole size (on the application PC Board) is Ø 0.03 (Ø0.80)
- Weight (Typ) = 0.132 Oz (3.85g)

Mechanical Dimensions, Dual Output Models



Pin Connections

Pin	Description
1	-VIN
2	+VIN
4	+VOUT
5	Common
6	-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 Ø 0.03 (Ø0.80)
- Weight (Typ) = 0.132 Oz (3.85g)

MPD offers a wide range of miniature DC/DC converters in Single-In-Line (SIP) packages. Range from 0.25W to 3W, these space saving converters offer wide temperature operation, wide input ranges, single/dual outputs, and I/O isolation. Most meet international EMC/EMI standards and many are approved to EN 62368. For full information, go to our website or contact the factory.

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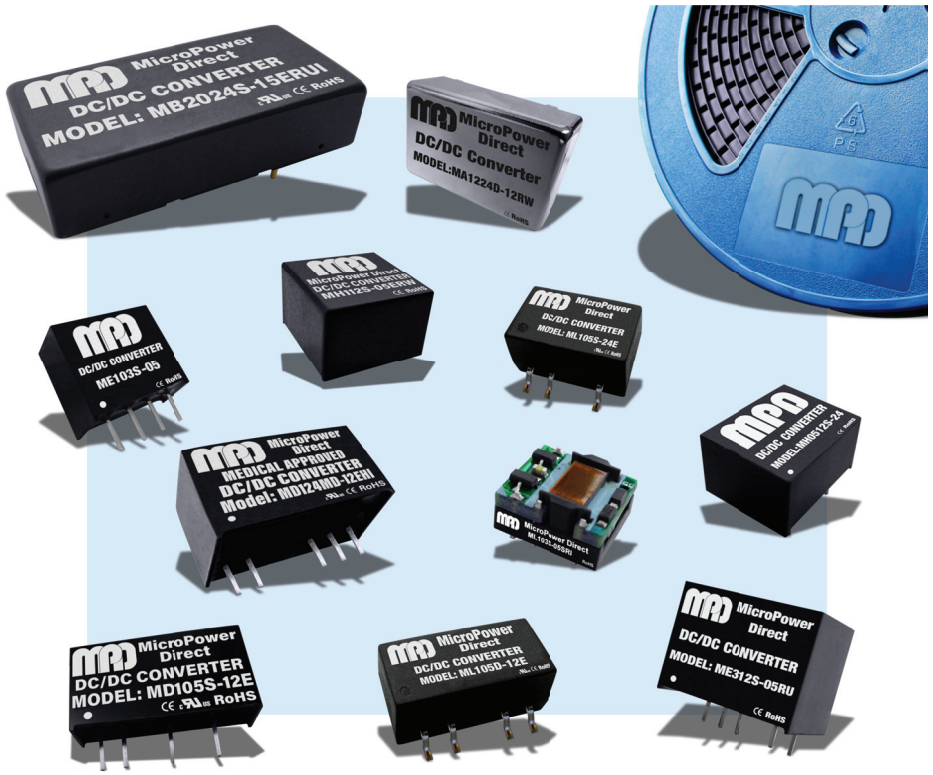

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