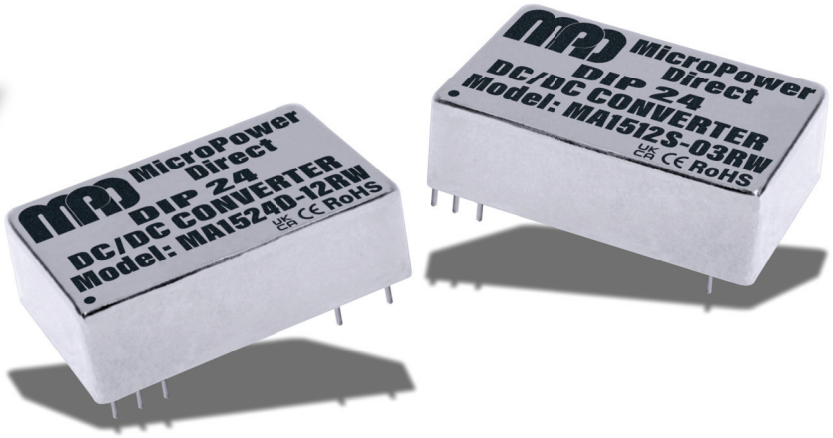
MA1500RW

2:1 Input Range, 15W Single & Dual Output DC/DC Converters



Key Features:

- 15W Output Power
- 2:1 Input Voltage Range
- Compact DIP Case
- 1,600 VDC I/O Isolation
- Meets EN 62368
- Meets EN 55032
- Single & Dual Outputs
- Remote On/Off Control
- No Minimum Load
- Wide Temp Operation
- Overload Protection
- Short Circuit Protection
- Industry Standard Pin-Out
- ***LOW COST***

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	9.0	12.0	18.0	VDC
	24 VDC Input	18.0	24.0	36.0	
	48 VDC Input	36.0	48.0	72.0	
Start Up Time	Nominal VIN & Constant Resistive Load		20		mS
Input Filter	π (Pi) Filter				
Input Reflected Ripple Current			20		mA P - P

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±1.0		%
Line Regulation, VIN = Min to Max	Single Output			±0.2	%
	Dual Output			±0.5	
Load Regulation, See Note 1	Single Output			±0.5	%
	Dual Output			±1.0	
Cross Regulation, Dual Output	See Note 2			±5.0	%
Ripple & Noise (20 MHz)	See Note 3			60	mV P - P
Transient Recovery Time, See Note 4	25% Load Step Change		250		µSec
Transient Response Deviation				±3.0	%
Output Power Protection			150		% I_{OUT}
Temperature Coefficient			±0.02		%/°C
Output Short Circuit Protection	Continuous (Autorecovery)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input/Output, 60 Seconds	1,600			VDC
	Case/Input, Output, 60 Seconds	1,600			
Isolation Resistance	500 VDC	1,000			MV
Isolation Capacitance	100 kHz/1V		2,000		pF
Switching Frequency	See Note 6		330		kHz

Remote On/Off (See Page 2)

Parameter	Conditions	Min.	Typ.	Max.	Units
Supply On	See Note On Page 2	3.0		12	VDC
Supply Off		0.0		1.2	VDC
Standby Input Current			5.0		mA
Control Common	Referenced to -Input (Pins 2, 3)				

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+95	°C
	Case			+105	°C
Storage Temperature Range		-55		+125	°C
Cooling	Natural Convection (30 - 65 LFM)				
Humidity	RH, Non-condensing		95		%

Physical

Case Size, Weight & Material	See Mechanical Diagram (Page 4)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	460			kHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	12 VDC Input			36.0	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.

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Model Number	Input				Output			Over Voltage Protection (VDC)	Max Capacitive Load (μF Max)	Efficiency (%, Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA1512S-03RW	12	9.0 - 18.0	1,279	15	3.3	4,000	0.0	3.9	4,700	86	3,150
MA1512S-051RW	12	9.0 - 18.0	1,449	15	5.1	3,000	0.0	6.2	3,300	88	3,150
MA1512S-12RW	12	9.0 - 18.0	1,404	15	12.0	1,250	0.0	15.0	600	89	3,150
MA1512S-15RW	12	9.0 - 18.0	1,388	15	15.0	1,000	0.0	18.0	400	90	3,150
MA1512D-05RW	12	9.0 - 18.0	1,453	15	±5.0	±1,500	±0.0	±6.2	±1,500	86	3,150
MA1512D-12RW	12	9.0 - 18.0	1,388	15	±12.0	±625	±0.0	±15.0	±288	90	3,150
MA1512D-15RW	12	9.0 - 18.0	1,388	15	±15.0	±500	±0.0	±18.0	±200	90	3,150
MA1524S-03RW	24	18.0 - 36.0	632	10	3.3	4,000	0.0	3.9	4,700	87	1,600
MA1524S-051RW	24	18.0 - 36.0	708	10	5.1	3,000	0.0	6.2	3,300	90	1,600
MA1524S-12RW	24	18.0 - 36.0	702	10	12.0	1,250	0.0	15.0	600	89	1,600
MA1524S-15RW	24	18.0 - 36.0	687	10	15.0	1,000	0.0	18.0	400	91	1,600
MA1524D-05RW	24	18.0 - 36.0	727	10	±5.0	±1,500	±0.0	±6.2	±1,500	86	1,600
MA1524D-12RW	24	18.0 - 36.0	694	10	±12.0	±625	±0.0	±15.0	±288	90	1,600
MA1524D-15RW	24	18.0 - 36.0	687	10	±15.0	±500	±0.0	±18.0	±200	91	1,600
MA1548S-03RW	48	36.0 - 75.0	320	5	3.3	4,000	0.0	3.9	4,700	86	800
MA1548S-051RW	48	36.0 - 75.0	358	5	5.1	3,000	0.0	6.2	3,300	89	800
MA1548S-12RW	48	36.0 - 75.0	351	5	12.0	1,250	0.0	15.0	600	89	800
MA1548S-15RW	48	36.0 - 75.0	351	5	15.0	1,000	0.0	18.0	400	89	800
MA1548D-05RW	48	36.0 - 75.0	368	5	±5.0	±1,500	±0.0	±6.2	±1,500	85	800
MA1548D-12RW	48	36.0 - 75.0	347	5	±12.0	±625	±0.0	±15.0	±288	90	800
MA1548D-15RW	48	36.0 - 75.0	347	5	±15.0	±500	±0.0	±18.0	±200	90	800

Notes:

1. Load regulation is specified for a load change of 0% to 100%. Load regulation for 3.3V output models is ±1.0% max for a load change of 0% to 100%.
2. When measuring cross regulation, the load on one output is varied from 25% to 100% while the other output is held at 100%.
3. Output ripple is measured with a 1.0 F capacitor connected 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 below.
4. Transient recovery is measured to within a 1% error band for a load step change of 75% to 50% to 25%.
5. Operation at no-load will not damage these units. However, they may not meet all specifications.
6. The specified maximum capacitive load is for each output.
7. 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.
8. The unit includes an internal over current protection (OCP) circuit. This circuit will will continue to limit the current as long as the over load condition exists. If the output current exceeds the OCP set point, the unit will shut down (hiccup). After a shutdown, the unit will try to restart. If the overload condition still exists, the unit will shut down again.
9. The unit also includes an internal over voltage protection (OVP) circuit. This circuit monitors the voltage level at the output terminals. If the voltage level exceeds the over voltage set point (see specifications above), the circuit will be activated and the output voltage will be clamped.

Typical Connection

To meet the requirements of EN 61000-4-4 & EN 61000-4-5, the external filter capacitors (C1 & C2) in the diagram above) are required. The recommended value for C1 & C2 is 330 F/100V. A single 680 F/100V capacitor may also be used.

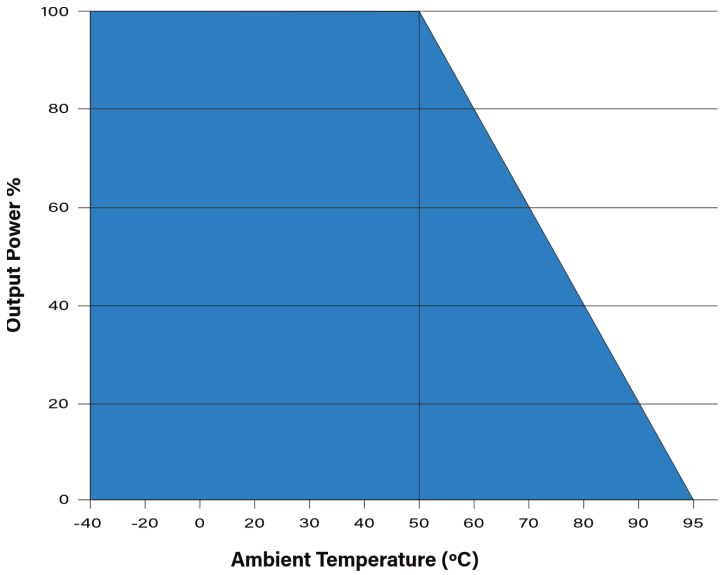
When measuring output ripple, it is recommended that an external 1.0 F ceramic capacitor be placed from the +VOUT pin to the -VOUT pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 F capacitors will reduce the output ripple.

The Remote On/Off circuit is referenced to the minus input of the unit (pins 2 & 3). If the On/Off input (pin 1) is connected to the minus input, the unit is shut off. If pin 1 is left open, the unit operates normally. The OFF idle current is typically 5 mA.

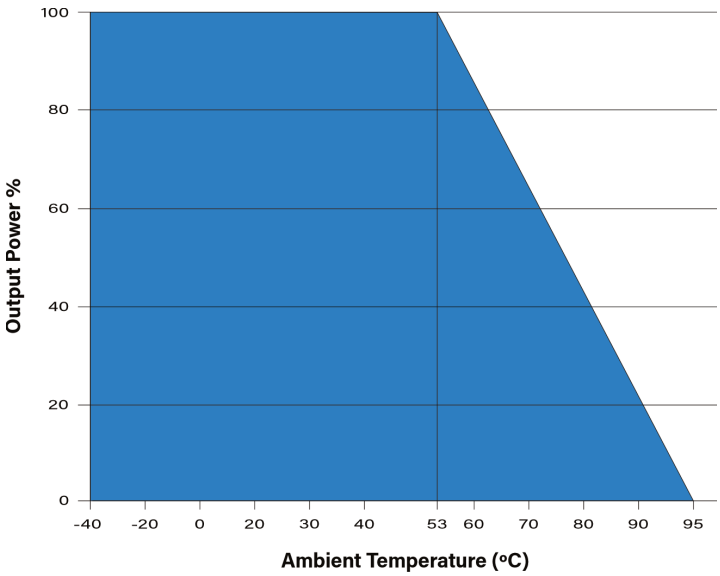
EMI/EMC Characteristics

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

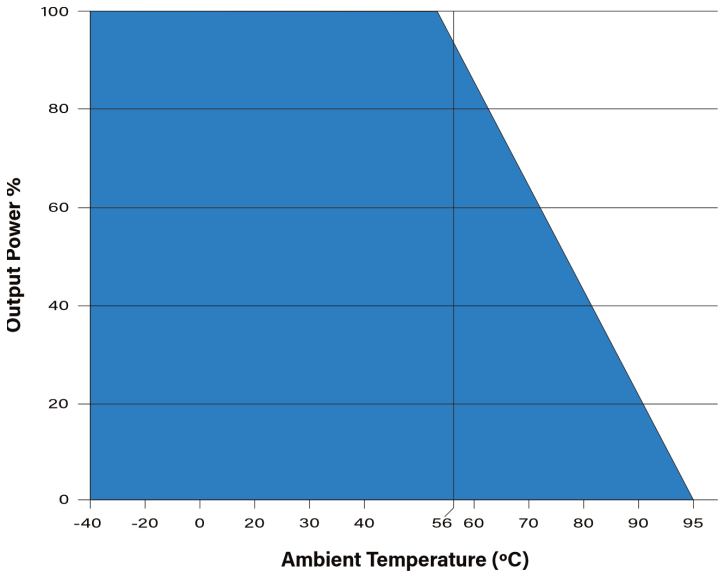
Output Power Derating 1: 85% Efficiancy Models



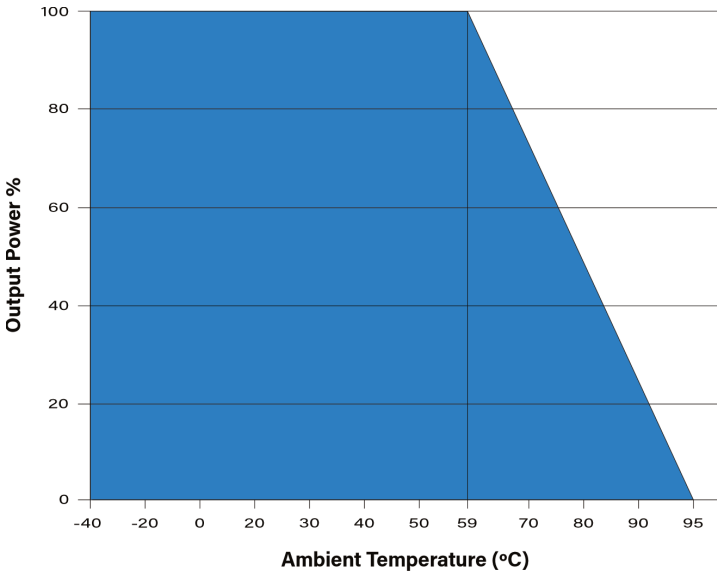
Output Power Derating 2: 86% Efficiancy Models



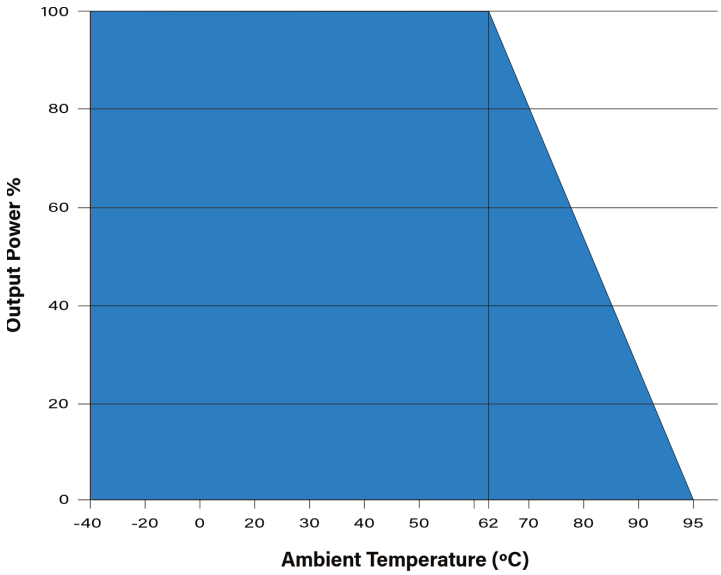
Output Power Derating 3: 3.3Vo & 87% Efficiancy Models



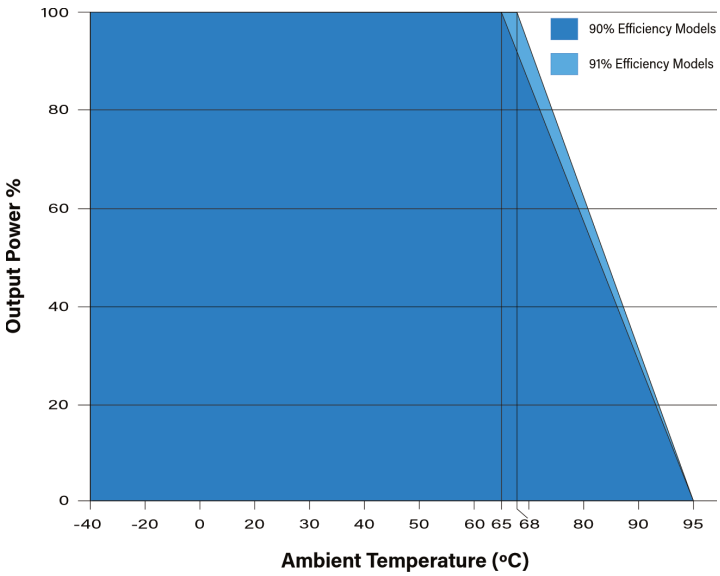
Output Power Derating 4: 88% Efficiancy Models



Output Power Derating 5: 89% Efficiancy Models



Output Power Derating 6: 90% & 91% Efficiancy Models



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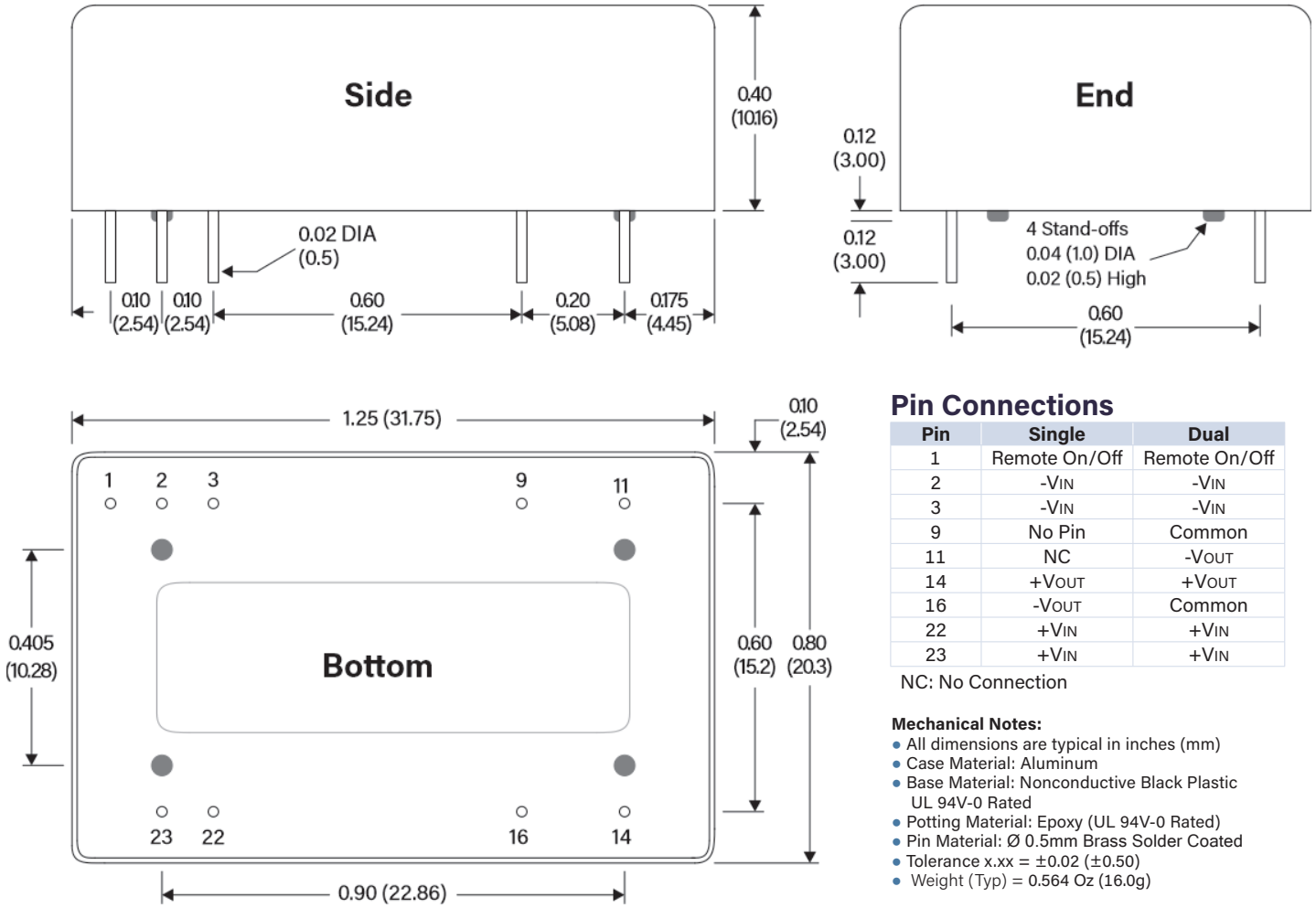
Mechanical Dimensions



Pin Connections

Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-VIN	-VIN
3	-VIN	-VIN
9	No Pin	Common
11	NC	-VOUT
14	+VOUT	+VOUT
16	-VOUT	Common
22	+VIN	+VIN
23	+VIN	+VIN

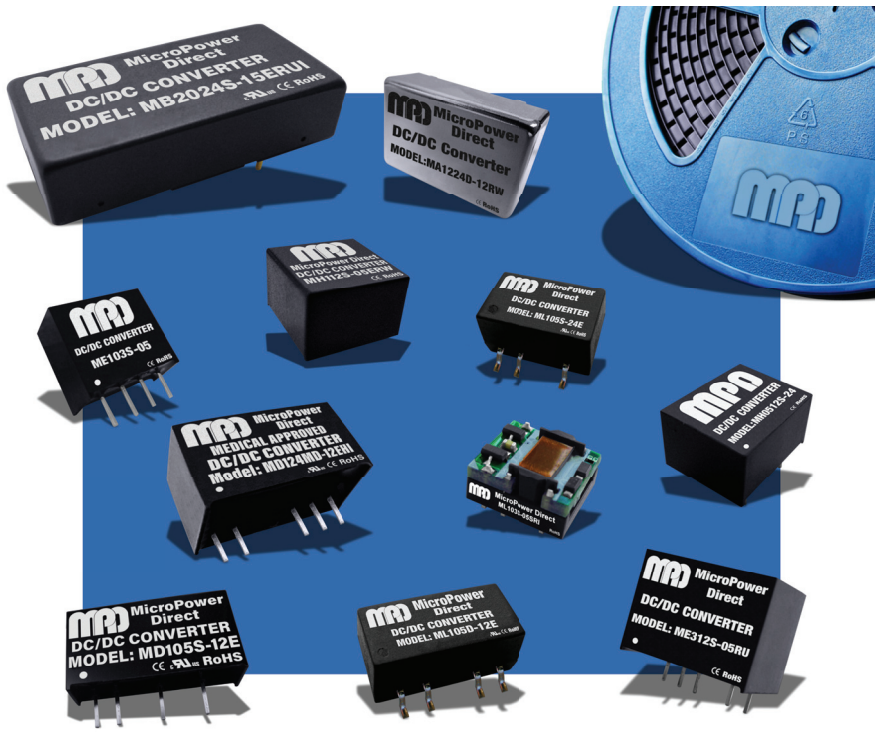
NC: No Connection

Mechanical Notes:

- All dimensions are typical in inches (mm)
- Case Material: Aluminum
- Base Material: Nonconductive Black Plastic UL 94V-0 Rated
- Potting Material: Epoxy (UL 94V-0 Rated)
- Pin Material: Ø 0.5mm Brass Solder Coated
- Tolerance x.xx = ±0.02 (±0.50)
- Weight (Typ) = 0.564 Oz (16.0g)

MPD offers a very wide variety of DC/DC converters. Our standard product line includes SMT, SIP, DIP potted modules, as well as industry standard 1 x 1" & 1 x 2" modules. 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 very wide power range.

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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