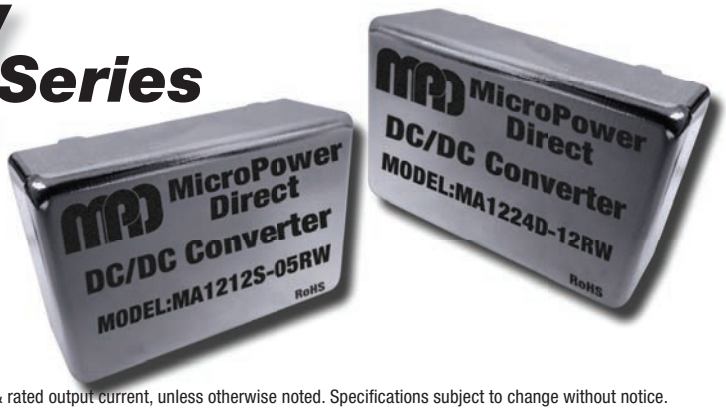
MA1200RW Series

2:1 Input Range, 12W Single & Dual Output DC/DC Converters



Key Features:

- 12W Output Power
- 2:1 Input Voltage Range
- Compact DIP Case
- 1,600 VDC I/O Isolation
- Meets EN 55032 "A"
- Single & Dual Outputs
- Remote On/Off Control
- Wide Temperature Operation
- Industry Standard Pin-Out

RoHS

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			20.0		mA P - P

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±1.2		%
Line Regulation	VIN = Min to Max			±0.5	%
Load Regulation, See Note 2	Single Output			±0.5	%
	Dual Output			±1.0	
Cross Regulation, Dual Output	See Note 3		±5.0		%
Ripple & Noise (20 MHz)	See Note 4			85	mV P - P
Transient Recovery Time, See Note 5	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		MΩ
Isolation Capacitance	100 kHz/1V		1,200		pF
Switching Frequency			330		kHz

Remote On/Off (See Page 3)

Parameter	Conditions	Min.	Typ.	Max.	Units
Supply On	See Note On Page 3	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		+85	°C
	Case			+100	°C
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing		95		%

Physical

Case Size	See Mechanical Diagram (Page 3)
Case Material	Copper With Nickel Coating (UL94V-0)
Weight	0.63 Oz (18g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.0			MHours

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 Selection Guide

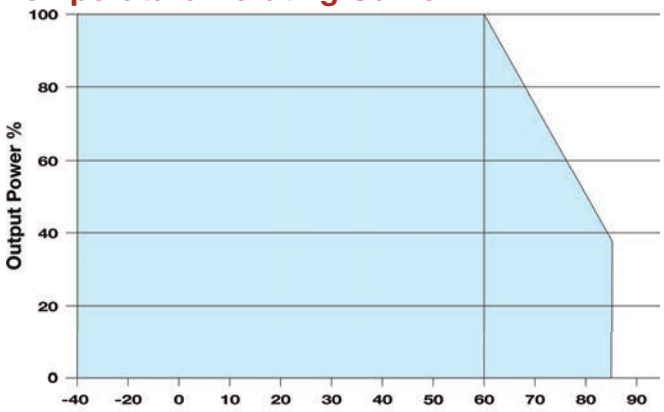
Model Number	Input				Output			Over Voltage Protection (VDC)	Max Capacitive Load (µF Max)	Efficiency (%, Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA1212S-02RW	12	9.0 - 18.0	889	10	2.5	3,500	0.0	3.9	2,000	85	2,500
MA1212S-03RW	12	9.0 - 18.0	1,146	10	3.3	3,500	0.0	3.9	2,000	87	2,500
MA1212S-05RW	12	9.0 - 18.0	1,163	10	5.0	2,400	0.0	6.2	2,000	89	2,500
MA1212S-12RW	12	9.0 - 18.0	1,149	10	12.0	1,000	0.0	15.0	430	90	2,500
MA1212S-15RW	12	9.0 - 18.0	1,149	10	15.0	800	0.0	18.0	300	90	2,500
MA1212D-12RW	12	9.0 - 18.0	1,149	10	±12.0	±500	±0.0	±15.0	200	90	2,500
MA1212D-15RW	12	9.0 - 18.0	1,136	10	±15.0	±400	±0.0	±18.0	120	91	2,500
MA1224S-02RW	24	18.0 - 36.0	445	10	2.5	3,500	0.0	3.9	2,000	85	1,200
MA1224S-03RW	24	18.0 - 36.0	573	10	3.3	3,500	0.0	3.9	2,000	87	1,200
MA1224S-05RW	24	18.0 - 36.0	581	10	5.0	2,400	0.0	6.2	2,000	89	1,200
MA1224S-12RW	24	18.0 - 36.0	575	10	12.0	1,000	0.0	15.0	430	90	1,200
MA1224S-15RW	24	18.0 - 36.0	575	10	15.0	800	0.0	18.0	300	90	1,200
MA1224D-12RW	24	18.0 - 36.0	575	10	±12.0	±500	±0.0	±15.0	200	90	1,200
MA1224D-15RW	24	18.0 - 36.0	562	10	±15.0	±400	±0.0	±18.0	120	91	1,200
MA1248S-02RW	48	36.0 - 75.0	225	10	2.5	3,500	0.0	3.9	2,000	84	750
MA1248S-03RW	48	36.0 - 75.0	283	10	3.3	3,500	0.0	3.9	2,000	88	750
MA1248S-05RW	48	36.0 - 75.0	291	10	5.0	2,400	0.0	6.2	2,000	89	750
MA1248S-12RW	48	36.0 - 75.0	294	10	12.0	1,000	0.0	15.0	430	88	750
MA1248S-15RW	48	36.0 - 75.0	291	10	15.0	800	0.0	18.0	300	89	750
MA1248D-12RW	48	36.0 - 75.0	294	10	±12.0	±500	±0.0	±15.0	200	88	750
MA1248D-15RW	48	36.0 - 75.0	291	10	±15.0	±400	±0.0	±18.0	120	89	750

Notes:

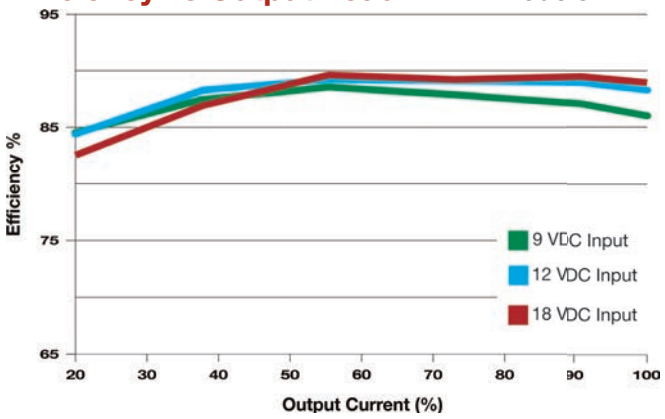
1. The specified maximum capacitive load is for each output.
2. Load regulation is specified for a load change of 0% to 100%. Load regulation for 3.3V output models is ±1.0% max for a load change of 0% to 100%.
3. When measuring cross regulation, the load on one output is varied from 25% to 100% while the other output is held at 100%.
4. Output ripple is measured with a 1.0 µF 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 on page 3.
5. Transient recovery is measured to within a 1% error band for a load step change of 75% to 50% to 25%.
6. Operation at no-load will not damage these units. However, they may not meet all specifications.
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.

MPD offers a wide range of DC/DC converters in the standard 24 pin DIP package. Models range from 1W to 15W and offer wide input ranges, high isolation & tight regulation. Many are approved to EN 60950. For full information, go to our website or contact the factory.

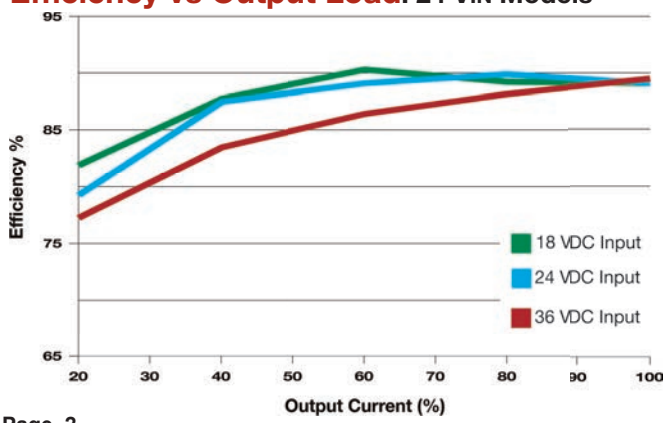
Temperature Derating Curve



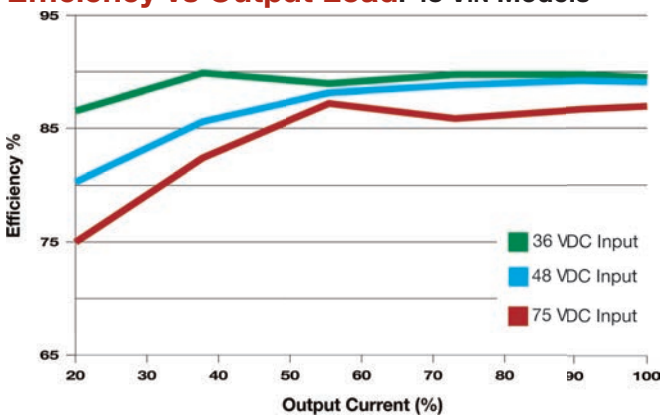
Efficiency vs Output Load: 12 VIN Models



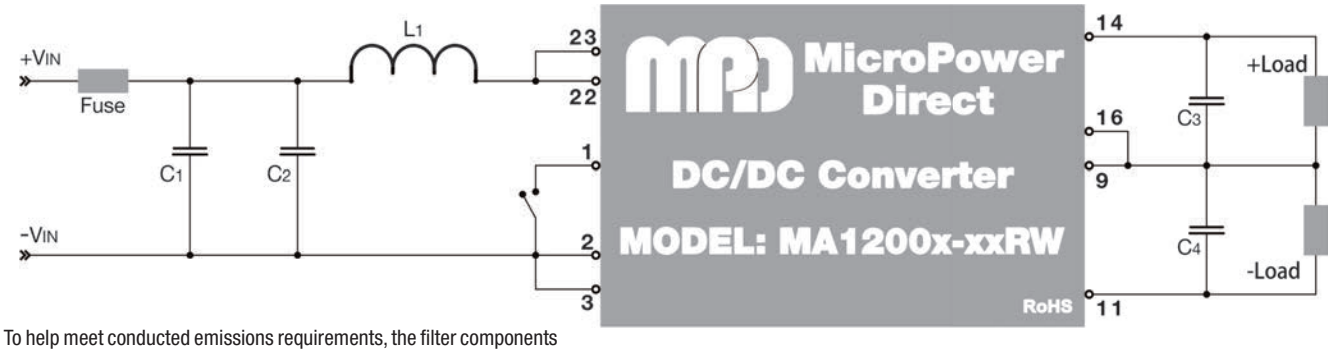
Efficiency vs Output Load: 24 VIN Models



Efficiency vs Output Load: 48 VIN Models



Typical Connection



To help meet conducted emissions requirements, the filter components (C_2, & L_1) in the diagram above should be used. The recommended values are 100 µF/100V for C_2 and 12 µH for L_1. These components should be mounted as close to the module as possible. To meet the requirements of EN 61000-4-5, an external filter capacitor (C_1 in the diagram above) is required. The recommended value for C_1 is 330 µF/100V.

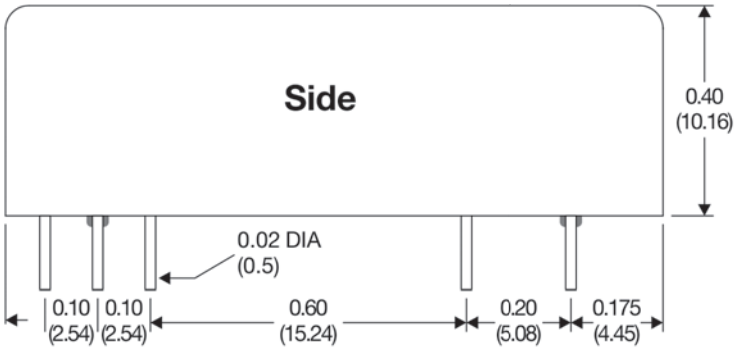
When measuring output ripple, it is recommended that an external 1.0 µF ceramic capacitor be placed from the +VOUT pin to the -VOUT pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3 µF capacitors will reduce the output ripple.

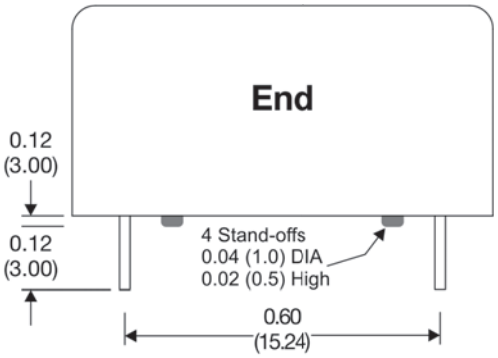
The Remote On/Off circuit is referenced to the minus input of the unit (pins 2 & 3). If the On/Off input (pin 1) is connected to the minus input, the unit is shut off. If pin 1 is left open, the unit operates normally.

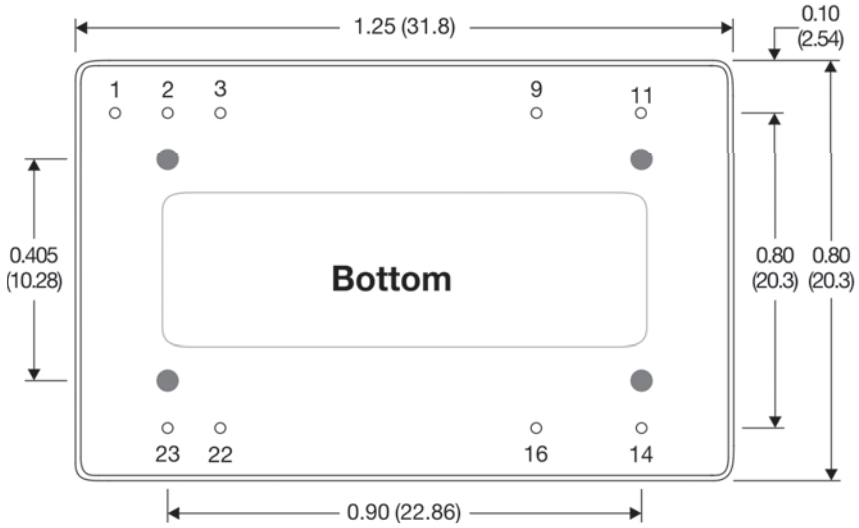
EMI Characteristics

Parameter	Standard	Criteria/Level
Radiated Emissions	EN 55032	Class A
Conducted Emissions	EN 55032	Class A
ESD	EN 61000-4-2	B
RS	EN 61000-4-3	A
EFT	EN 61000-4-4	A
Surge	EN 61000-4-5	A
CS	EN 61000-4-6	A
PFM	EN 61000-4-8	A

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)
- Tolerance x.xx = ±0.02 (±0.50)