

# MI1000RW Series

## Compact, 1 x 1 Inch 10W, 2:1 Input Range DC/DC Converters



### Key Features:

- 10W Output Power
- 2:1 Input Voltage Range
- Compact 1 x 1 Inch Case
- 1,500 VDC Isolation
- 21 Standard Models
- High Efficiency
- Wide Temp Operation
- Industry Standard Pin-Out

### 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 Start Voltage	12 VDC Input			9.0	VDC	
	24 VDC Input			18.0		
	48 VDC Input			36.0		
Undervoltage Shutdown	12 VDC Input			8.5	VDC	
	24 VDC Input			17		
	48 VDC Input			34		
Input Filter	π (Pi) Filter					
Output						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Output Voltage Accuracy				±2.0	%	
Output Voltage Balance	Dual Output, Balanced Loads			±2.0	%	
Line Regulation, V <sub>IN</sub> = Min to Max				±1.0	%	
Load Regulation, Min Load to Full Load	Single Output			±0.5	%	
	Dual Output			±1.0		
Ripple & Noise, See Note 2	3.3 & 5.0 V <sub>OUT</sub>		80		mV P - P	
	Other Outputs		100			
	Transient Recovery Time, See Note 3	25% Load Step Change		300		
Transient Response Deviation			±3.0	±5.0	%	
Temperature Coefficient			±0.01	±0.02	%/°C	
Output Power Protection	See Note 4	110	150		%	
Output Short Circuit, See Note 5	Continuous (Autorecovery)					
General						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	60 Seconds	1,500			VDC	
	1 Second	1,800				
Isolation Resistance	500 VDC	1,000			MΩ	
Isolation Capacitance	100 kHz, 1V			2,000	pF	
Switching Frequency			330		kHz	
EMI Characteristics						
Parameter	Standard	Criteria	Level			
Conducted Emissions	EN 55032		Class A			
ESD	EN 61000-4-2	A	±8 kV Air			
		A	±6 kV Contact			
RS	EN 61000-4-3	A	10V/m			
EFT, See Note 6	EN 61000-4-4	A	±2 kV			
Surge, See Note 6	EN 61000-4-5	A	±1 kV			
CS	EN 61000-4-6	A	10 Vrms			
PFMF	EN 61000-4-8	A	3A/m			
Environmental						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Operating Temperature Range	See Page 4 Case	-40	+25	+80	°C	
				+100		
Storage Temperature Range		-50		+125	°C	
Cooling	Free Air Convection					
Humidity	RH, Non-condensing			95	%	
Physical						
Case Size	See Mechanical Diagrams (Page 3)					
Case Material	Metal with Non-Conductive Base					
Weight	Without Heatsink			0.58 Oz (16.5g)		
	With Heatsink			0.65 Oz (18.5g)		
Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.596			MHours	
Absolute Maximum Ratings						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Voltage Surge (1 Sec)	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			260.0	°C	

RoHS



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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, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
MI1012S-03RW(-H)	12	9.0 - 18.0	838	15	3.3	2,500	0.0	82	4,700	2,000
MI1012S-05RW(-H)	12	9.0 - 18.0	980	15	5.0	2,000	0.0	85	2,200	2,000
MI1012S-12RW(-H)	12	9.0 - 18.0	954	15	12.0	830	0.0	87	330	2,000
MI1012S-15RW(-H)	12	9.0 - 18.0	952	15	15.0	670	0.0	88	220	2,000
MI1012D-05RW(-H)	12	9.0 - 18.0	992	15	±5.0	±1,000	0.0	84	1,000	2,000
MI1012D-12RW(-H)	12	9.0 - 18.0	956	15	±12.0	±416	0.0	87	150	2,000
MI1012D-15RW(-H)	12	9.0 - 18.0	957	15	±15.0	±333	0.0	87	100	2,000
MI1024S-03RW(-H)	24	18.0 - 36.0	414	12	3.3	2,500	0.0	83	4,700	1,000
MI1024S-05RW(-H)	24	18.0 - 36.0	490	12	5.0	2,000	0.0	85	2,200	1,000
MI1024S-12RW(-H)	24	18.0 - 36.0	472	12	12.0	830	0.0	88	330	1,000
MI1024S-15RW(-H)	24	18.0 - 36.0	471	12	15.0	670	0.0	89	220	1,000
MI1024D-05RW(-H)	24	18.0 - 36.0	490	12	±5.0	±1,000	0.0	85	1,000	1,000
MI1024D-12RW(-H)	24	18.0 - 36.0	473	12	±12.0	±416	0.0	88	150	1,000
MI1024D-15RW(-H)	24	18.0 - 36.0	468	12	±15.0	±333	0.0	89	100	1,000
MI1048S-03RW(-H)	48	36.0 - 75.0	207	10	3.3	2,500	0.0	83	4,700	500
MI1048S-05RW(-H)	48	36.0 - 75.0	242	10	5.0	2,000	0.0	86	2,200	500
MI1048S-12RW(-H)	48	36.0 - 75.0	233	10	12.0	830	0.0	89	330	500
MI1048S-15RW(-H)	48	36.0 - 75.0	235	10	15.0	670	0.0	89	220	500
MI1048D-05RW(-H)	48	36.0 - 75.0	242	10	±5.0	±1,000	0.0	86	1,000	500
MI1048D-12RW(-H)	48	36.0 - 75.0	239	10	±12.0	±416	0.0	87	150	500
MI1048D-15RW(-H)	48	36.0 - 75.0	237	10	±15.0	±333	0.0	88	100	500

Notes:

- The specified maximum capacitive load is for each output.
- When measuring output ripple, it is recommended that an external 0.47 µF ceramic capacitor be connected in parallel from the +V<sub>OUT</sub> to the -V<sub>OUT</sub> pin for single output units; or from each output to common for dual output units.
- Transient recovery is measured to within a 1% error band for a load step change of 25%.
- Over Power protection is provided by a "hiccup mode" current limiting circuit.
- Short circuit protection is provided by a "hiccup mode" circuit.
- To meet the requirements of EN 61000-4-4 and EN 61000-4-5, an external capacitor must be placed across the input to the unit. The recommended value for all models is 330 µF/80V.
- On dual output models, the cross regulation for asymmetrical loads (25%/100%) is ±5% max.
- The output over voltage protection circuit is independent of the primary regulation loop. It provides redundant protection against any possible overvoltage.
- Operation at no-load will not damage these units.
- 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.

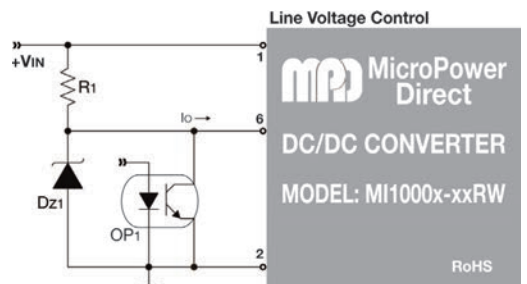
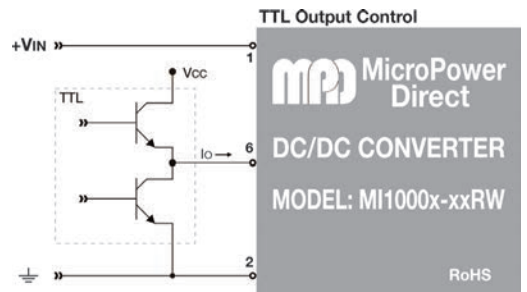
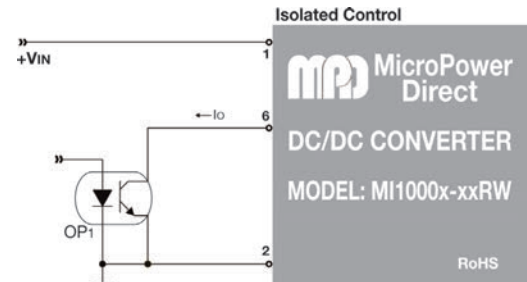
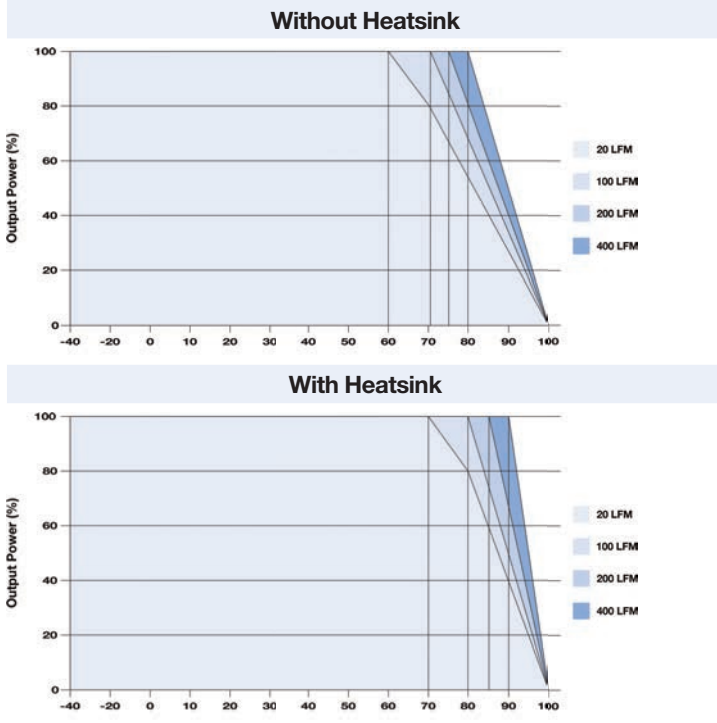
Remote On/Off

All models of the MI1000xRW series can be turned on/off remotely by applying a positive logic signal to pin 6. The specifications for the ON/OFF function are given in the table below. The maximum sink current at the control pin (pin 6) during a logic low is -500 µA. The maximum allowable leakage current of a switch connected to the control pin during a logic high is 10 mA.

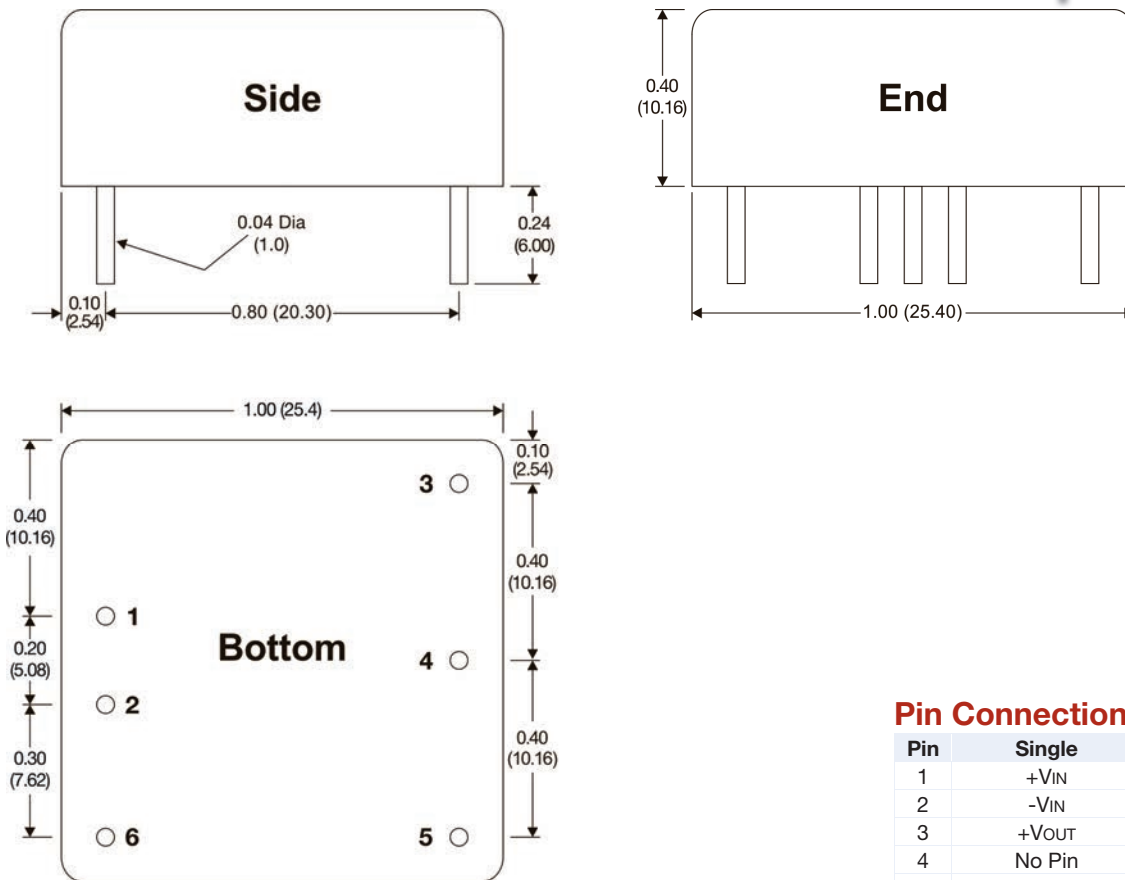
Parameter	Min	Typ	Max	Units
Supply On	3.5		12.0	VDC
Supply Off	0.0		1.2	VDC
Standby Input Current		5.0		mA
Control Common	Referenced to Negative Input (pin 2)			
Control Input Current (ON)			0.5	mA
Control Input Current (OFF)			-0.5	mA

The switch used can be an open collector transistor, FET or optocoupler. Three possible connections are illustrated in the diagrams below and at right. For more information, please contact the factory.

Derating Curves



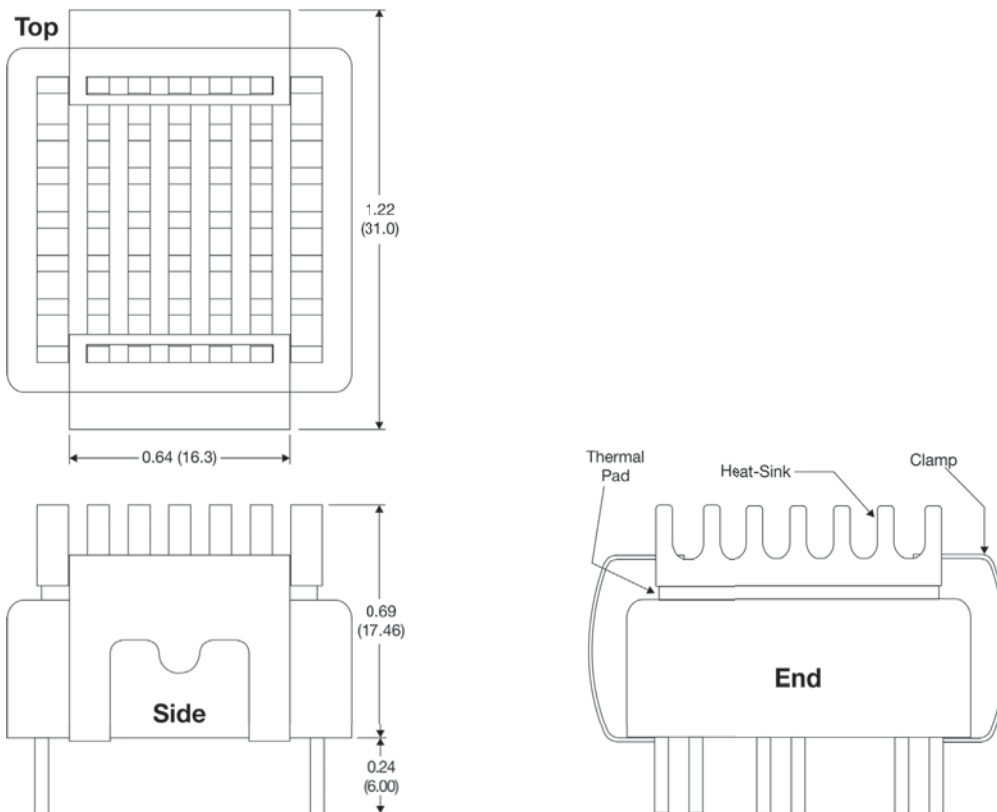
## Mechanical Dimensions



## Pin Connections

Pin	Single	Pin	Dual
1	+VIN	1	+VIN
2	-VIN	2	-VIN
3	+VOUT	3	+VOUT
4	No Pin	4	Common
5	-VOUT	5	-VOUT
6	Remote On/Off	6	Remote On/Off

## Mechanical Dimensions: With Optional Heatsink



For the heatsink option, add suffix "H" to the model number (i.e. **MI1024S-12RW-H**)

### Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Heatsink is black, anodized aluminum



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