

# 25 to 50 Watt 2.28x2.40 Inch Package M 2:1 Input Range



- o Efficiency up to 86%
- o 300 kHz Switching Frequency
- o 2:1 Input Range
- o Regulated Single Output
- o Continuous Short Circuit Protection
- o Half Brick Size Meet Industrial Standard



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		%EFF
				NO LOAD	FULL LOAD	
50MRS12W2.5LC	9-18 VDC	2.5 VDC	10 A	50 mA	2740 mA	76
50MRS12W3.3LC		3.3 VDC	10 A		3525 mA	78
50MRS12W5LC		5 VDC	10 A		5145 mA	81
50MRS12W12LC		12 VDC	4.16 A		4950 mA	84
50MRS12W15LC		15 VDC	3.33 A			
50MRS12W24LC		24 VDC	2.08 A			
50MRS24W2.5LC	18-36 VDC	2.5 VDC	10 A	50 mA	1353 mA	77
50MRS24W3.3LC		3.3 VDC	10 A		1740 mA	79
50MRS24W5LC		5 VDC	10 A		2540 mA	82
50MRS24W12LC		12 VDC	4.16 A		2450 mA	85
50MRS24W15LC		15 VDC	3.33 A			
50MRS24W24LC		24 VDC	2.08 A			
50MRS48W2.5LC	36-75 VDC	2.5 VDC	10 A	50 mA	676 mA	77
50MRS48W3.3LC		3.3 VDC	10 A		870 mA	79
50MRS48W5LC		5 VDC	10 A		1250 mA	83
50MRS48W12LC		12 VDC	4.16 A		1220 mA	85
50MRS48W15LC		15 VDC	3.33 A			
50MRS48W24LC		24 VDC	2.08 A			

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

**INPUT SPECIFICATIONS**

Input Voltage Range			2:1
Undervoltage lockout	12 Vin power up	8.8 V	
	12 Vin power down	8 V	
	24 Vin power up	17 V	
	24 Vin power down	16 V	
	48 Vin power up	34 V	
	48 Vin power down	32.5 V	
Positiv Logic Remote ON/OFF <sup>3)</sup>	Logic compatibility Module ON Module OFF	Open Collector Ref. to -Input Open Circuit <0.8 VDC	
Input Filter			Pi Type

**OUTPUT SPECIFICATIONS**

Voltage Accuracy			±1% max.
Transient Response	25% Step Load Change	<500µ sec.	
External Trim Adj. Range			±10%
Ripple and Noise at 20 MHz BW	2.5V, 3.3V, 5V	20 mV RMS max. 75 mV p-p max.	
	12V, 15V	30 mV RMS max. 100 mV p-p max.	
	24V	100 mV RMS max. 240 mV p-p max.	
Temperature Coefficient			±0.03%/°C
Short Circuit Protection			Continuous
Line Regulation <sup>1)</sup>			±0.2% max.
Load Regulation <sup>2)</sup>			±0.2% max.
Over Voltage Protection trip Range, % Vo nom.			115-140%
Current Limit			110% ~ 150% Nominal Output

## NOTE:

1. Measured from High Line to Low Line.
2. Measured from Full Load to Zero Load.
3. Add Suffix "N" to the Model Number for Negative Logic Remote ON/OFF

**GENERAL SPECIFICATION**

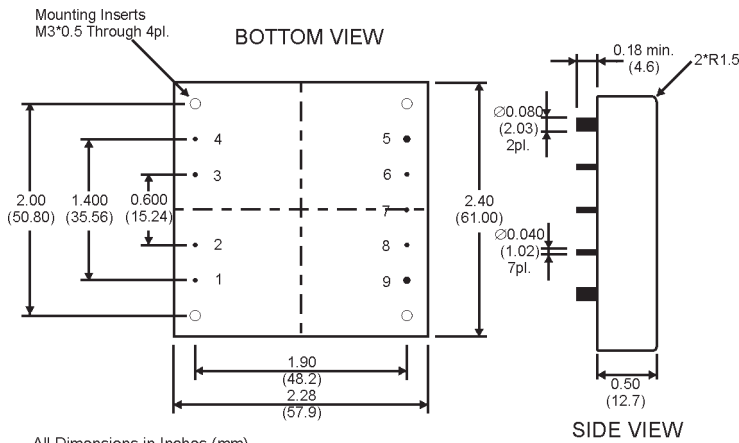
Efficiency			see table
Isolation Voltage	Input / Output	1500 VDC min.	
	Input / Case	1500 VDC min.	
	Output / Case	1500 VDC min.	
Isolation Resistance			10 MOhms min.
Switching Frequency	12/24 Vin	400 kHz	
	48 Vin	300 kHz	
Operating Case Temperature Range			-40°C to +100°C
Storage Temperature Range			-55°C to +105°C
Thermal Shut down, Case Temp.			+100°C
Case Material			Aluminium
Dimensions			2.28 x 2.40 x 0.5 Inches (57.9 x 61.0 x 12.7 mm)

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**MECHANICAL SPECIFICATIONS**

**Case "M"**



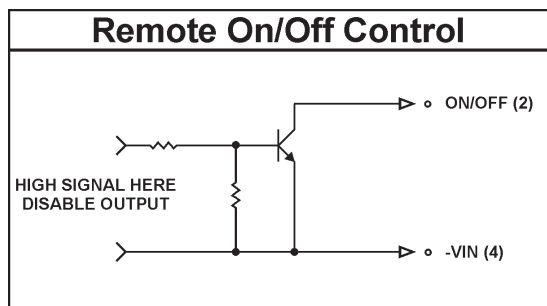
All Dimensions in Inches (mm).  
Tolerance: x.xx=±0.02, x.xxx=±0.010 Inches  
(x.x=±0.5, x.xx=±0.250 mm)

PIN CONNECTIONS	
1	+INPUT
2	REMOTE CONTROL
3	CASE
4	-INPUT
5	-OUTPUT
6	-SENSE
7	TRIM
8	+SENSE
9	+VOUT

**APPLICATION NOTES**

**Remote ON/OFF Control**

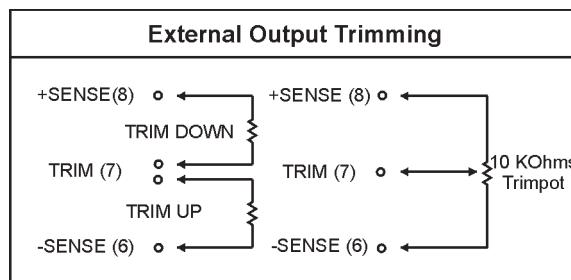
The 50MRS allows the user to switch the module on and off electronically by remote on/off feature. The 50MRS are available in "positive logic" or "negative logic" (option) versions for remote on/off.



Logic State (PIN2)	Negative Logic	Positive Logic
Logic Low-Switch Closed	Module on	Module off
Logic High-Switch Open	Module off	Module on

**External Output Trimming**

Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.



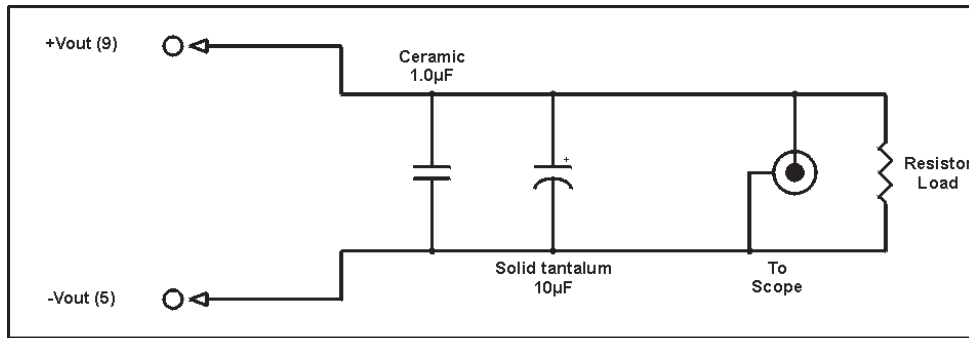
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**APPLICATION NOTES**

**Output Noise**

The output noise is measured with 10µF tantalum capacitor and 1.0µF ceramic capacitor across output.

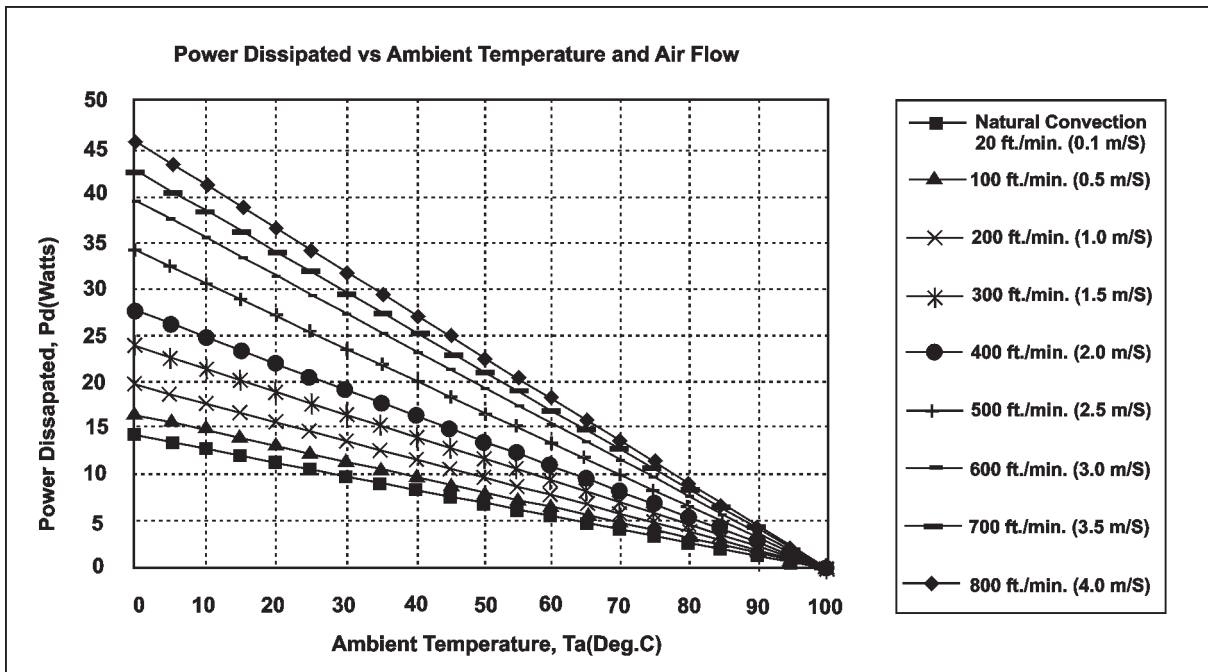


Output Noise Test Circuit schematic

**Derating**

The operating case temperature range of 50MRS... series is -40°C to +100°C. When operating the 50MRS..., proper derating or cooling is needed.

The following curve is the derating curve of 50MRS... without heat sink.



Forced Convection Power Derating without Heat Sink

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**APPLICATION NOTES**

Where:

The power dissipation (Pd):

$$Pd = Pi - Po = Po (1 - \eta) / \eta$$

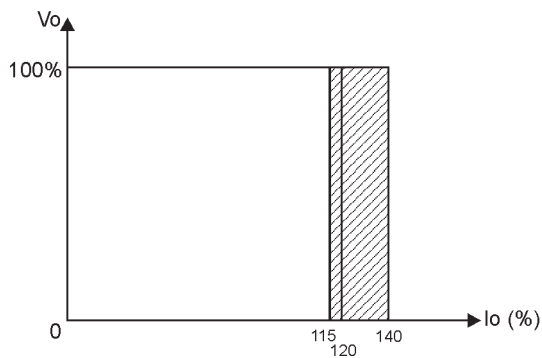
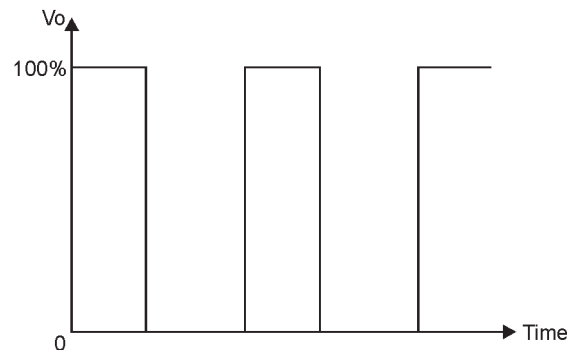
The thermal resistance are list below:

Chart of Thermal Resistance vs Air Flow:

AIR FLOW RATE	TYPICAL Rca
Natural Convection 20 ft./min. (0.1 m/s)	7.12°C/W
100 ft./min. (0.5 m/s)	6.21°C/W
200 ft./min. (1.0 m/s)	5.17°C/W
300 ft./min. (1.5 m/s)	4.29°C/W
400 ft./min. (2.0 m/s)	3.64°C/W
500 ft./min. (2.5 m/s)	2.96°C/W
600 ft./min. (3.0 m/s)	2.53°C/W
700 ft./min. (3.5 m/s)	2.37°C/W
800 ft./min. (4.0 m/s)	2.19°C/W

The temperature rise ( $\Delta T$ ):

$$\Delta T = \Delta Pd * Rca$$

**Current Limit Curve****Output Short, Vo Characteristics****NOTICE:**

The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies! Specifications can be changed without notice. The latest and most complete information can be found on our website.