

# MH600RU Series



## Wide 4:1 Input Ultra-Miniature, 6W DC/DC Converters

### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

### Key Features:

- 6W Output Power
- Miniature 0.80 x 0.85" Case
- Wide 4:1 Input Range
- Single & Dual Outputs
- 1,500 VDC Isolation
- >350 kHour MTBF
- -40°C to +80°C Operation
- 16 Standard Models

RoHS



Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	24 VDC Input	9.0	24.0	36.0	VDC
	48 VDC Input	18.0	48.0	75.0	
Input Start Voltage	24 VDC Input			9.0	VDC
	48 VDC Input			18.0	
Under Voltage Shutdown	24 VDC Input			8.5	VDC
	48 VDC Input			17.0	
Short Circuit Input Power				3.0	W
Input Filter	Internal Capacitor				

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±1.0		%
Line Regulation	V <sub>IN</sub> = MIN to MAX		±0.5	±1.0	%
Load Regulation	I <sub>OUT</sub> = 15% to 100%		±0.5	±1.2	%
Ripple & Noise (20 MHz)	See Note 2		60	100	mV P - P
Temperature Coefficient			±0.01	±0.02	%/°C
Transient Recovery Time	See Note 3		300	600	µSec
Transient Response Deviation			±3.0		%
Overload Protection	See Note 4	110	150		%
Output Short Circuit	Continuous (Autorecovery)				

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, 1.0V		1,200	1,500	pF
Switching Frequency			330		kHz

Parameter	Standard	Criterea	Level
Conducted Emissions	EN 55022		Class A

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+85	°C
	Case			+105	
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Parameter	Conditions	Min.	Typ.	Max.	Units
Case Size	See Mechanical Diagram (Page 2)				
Case Material	Non-Conductive Black Plastic (UL-94V0)				
Weight	0.32 Oz (9.1g)				

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	350			kHours

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	24 VDC Input			50.0	VDC
	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

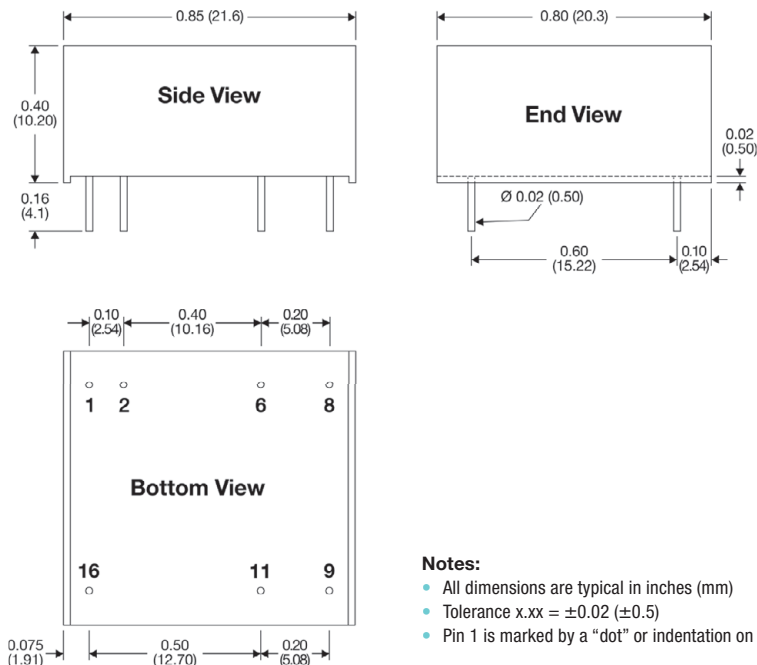
Model Number	Input				Output			Capacitive Load ( $\mu\text{F}$ Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
MH624S-03RU	24	9.0 - 36.0	262	30	3.3	1,450.0	218.0	330	76	1,500
MH624S-05RU	24	9.0 - 36.0	316	30	5.0	1200.0	180.0	330	79	1,500
MH624S-12RU	24	9.0 - 36.0	301	30	12.0	500.0	75.0	100	83	1,500
MH624S-15RU	24	9.0 - 36.0	301	30	15.0	400.0	60.0	100	83	1,500
MH624S-24RU	24	9.0 - 36.0	301	30	24.0	250.0	38.0	100	83	1,500
MH624D-05RU	24	9.0 - 36.0	301	30	$\pm 5.0$	$\pm 600.0$	$\pm 90.0$	100	82	1,500
MH624D-12RU	24	9.0 - 36.0	301	30	$\pm 12.0$	$\pm 250.0$	$\pm 38.0$	100	83	1,500
MH624D-15RU	24	9.0 - 36.0	301	30	$\pm 15.0$	$\pm 200.0$	$\pm 30.0$	100	83	1,500
MH648S-03RU	48	18.0 - 75.0	131	20	3.3	1,450.0	218.0	330	76	750
MH648S-05RU	48	18.0 - 75.0	158	20	5.0	1200.0	180.0	330	79	750
MH648S-12RU	48	18.0 - 75.0	151	20	12.0	500.0	75.0	100	83	750
MH648S-15RU	48	18.0 - 75.0	151	20	15.0	400.0	60.0	100	83	750
MH648S-24RU	48	18.0 - 75.0	151	20	24.0	250.0	38.0	100	83	750
MH648D-05RU	48	18.0 - 75.0	151	20	$\pm 5.0$	$\pm 600.0$	$\pm 90.0$	100	82	750
MH648D-12RU	48	18.0 - 75.0	151	20	$\pm 12.0$	$\pm 250.0$	$\pm 38.0$	100	83	750
MH648D-15RU	48	18.0 - 75.0	151	10	$\pm 15.0$	$\pm 200.0$	$\pm 30.0$	100	83	750

- Notes:
- The specified maximum capacitive load is for each output.
  - When measuring output ripple, it is recommended that an external 0.47  $\mu\text{F}$  ceramic capacitor is connected from the +Vout to the -Vout pins. If the application is noise sensitive; connecting a low ESR 3.3  $\mu\text{F}$  capacitor should be used. This capacitor should be mounted as close to the converter as possible.
  - Transient recovery is measured to within a 1% error band for a load step change of 25%.
  - Output overload protection is provided by a fold back current limiting circuit with auto-recovery. A long-term overload could damage the unit.
  - 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

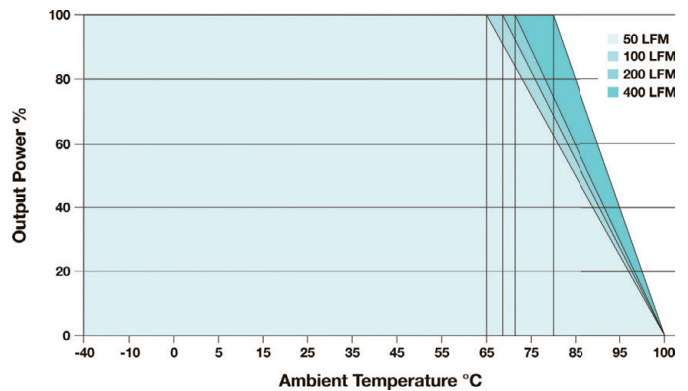
Parameter	Conditions	Min.	Typ.	Max.	Units
Unit On	2.5 VDC - 50.0 VDC or Open Circuit				
Unit Off	0.7 VDC - 0.8 VDC or Short Circuit				
Control Input Current, ON	V <sub>CTRL</sub> = 5V			500	$\mu\text{A}$
Control Input Current, OFF	V <sub>CTRL</sub> = 0V			-500	$\mu\text{A}$
Control Common	Referenced to -VIN (Pin 2)				
Standby Input Current				10.0	mA

## Mechanical Dimensions



- Notes:
- All dimensions are typical in inches (mm)
  - Tolerance x.xx =  $\pm 0.02$  ( $\pm 0.5$ )
  - Pin 1 is marked by a "dot" or indentation on the unit

## Derating Curve



## Pin Connections

Pin	Single	Pin	Dual
1	Remote On/Off	1	Remote On/Off
2	-VIN	2	-VIN
6	No Connection	6	Common
8	No Connection	8	-VOUT
9	+VOUT	9	+VOUT
11	-VOUT	11	Common
16	+VIN	16	+VIN