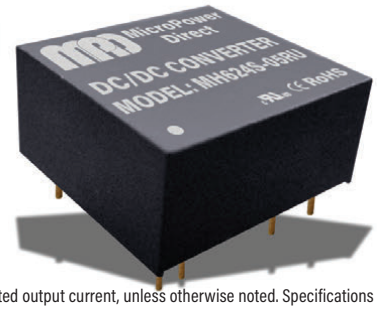
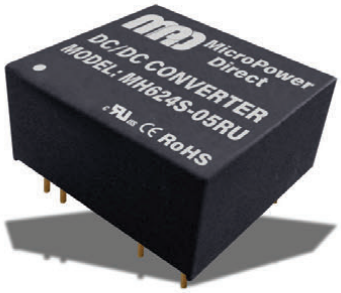
MH600RU Series

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





Key Features:

- 6W Output Power
- Miniature 0.80 x 0.85" Case
- UL 62368 Approval
- Meets EN 55022 Class A
- Wide 4:1 Input Range
- Single & Dual Outputs
- 1,500 VDC Isolation
- >350 kHour MTBF
- -40°C to +80°C Operation
- 16 Standard Models

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	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				

Output

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_{IN} = M_{IN} to M_{AX}		±0.5	±1.0	%
Load Regulation	I_{OUT} = 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)				

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

EMI Characteristics

Parameter	Standard	Criterea	Level
Conducted Emissions	EN 55022		Class A

Environmental

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	%

Physical

Case Size	See Mechanical Diagram (Page 3)
Case Material	Non-Conductive Black Plastic (UL-94V0)
Weight	See Mechanical Diagram (Page 3)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	350			kHours
Safety Standards	UL/cUL 62368 recognition (UL certificate)				

Absolute Maximum Ratings

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.

MicroPower Direct
292 Page Street
Suite D
Stoughton, MA 02072
USA

T: (781) 344-8226
F: (781) 344-8481
E: sales@micropowerdirect.com
W: www.micropowerdirect.com

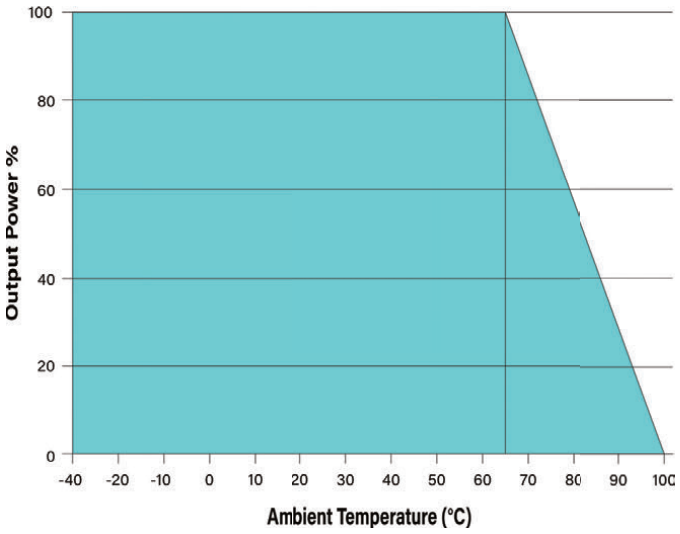
Model Selection Guide

Model Number	Input				Output			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						
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	±5.0	±600.0	±90.0	100	82	1,500
MH624D-12RU	24	9.0 - 36.0	301	30	±12.0	±250.0	±38.0	100	83	1,500
MH624D-15RU	24	9.0 - 36.0	301	30	±15.0	±200.0	±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	±5.0	±600.0	±90.0	100	82	750
MH648D-12RU	48	18.0 - 75.0	151	20	±12.0	±250.0	±38.0	100	83	750
MH648D-15RU	48	18.0 - 75.0	151	10	±15.0	±200.0	±30.0	100	83	750

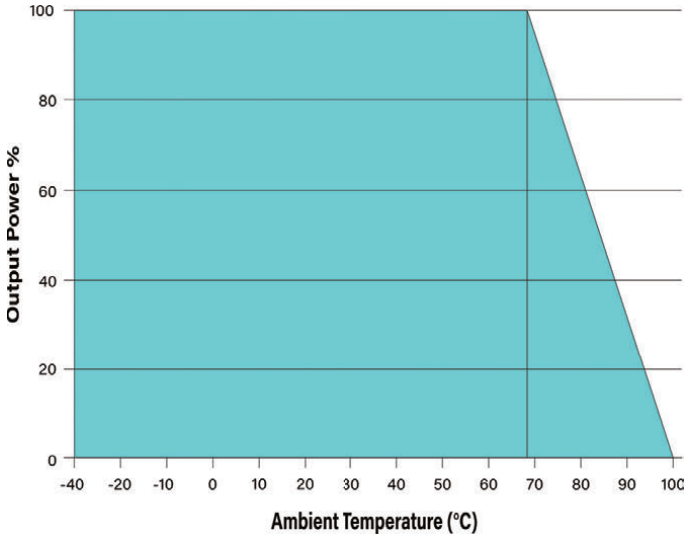
Notes:

1. The specified maximum capacitive load is for each output.
2. When measuring output ripple, it is recommended that an external 0.47 µF ceramic capacitor is connected from the +VOUT to the -VOUT pins. If the application is noise sensitive; connecting a low ESR 3.3 µF capcitor should be mounted as close to the converter as possible.
3. Transient recovery is measured to within a 1% error band for a load step change of 25%.
4. Output overload protection is provided by a fold back current limiting circuit with auto-recovery. A long-term overload could damage the unit.
5. Operation at no load will not damage these units.
6. 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.

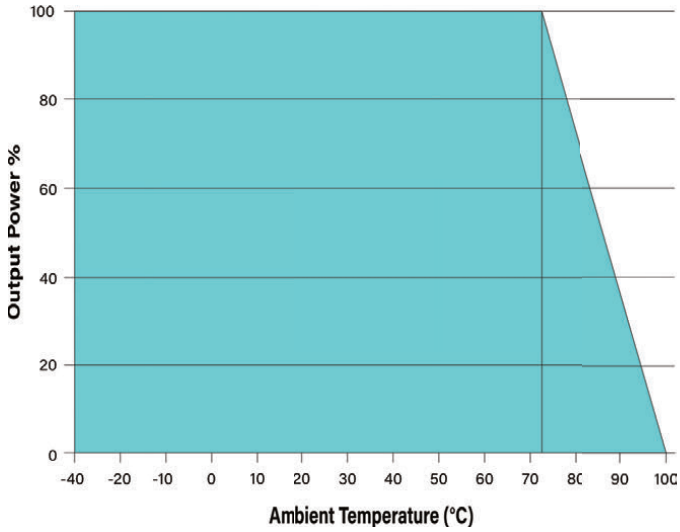
Temperature Derating Curve, 50 LFM



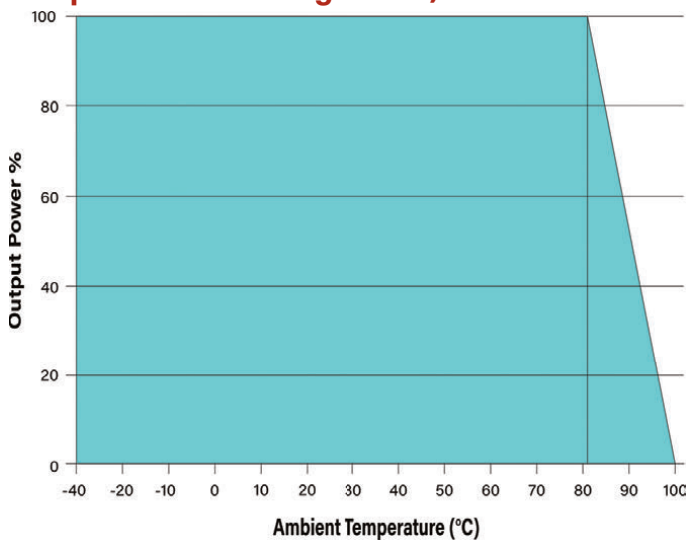
Temperature Derating Curve, 100 LFM



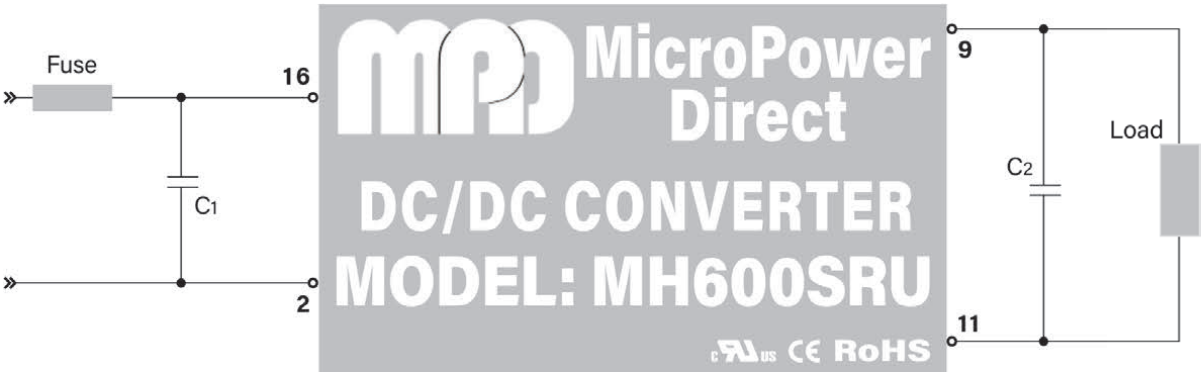
Temperature Derating Curve, 200 LFM



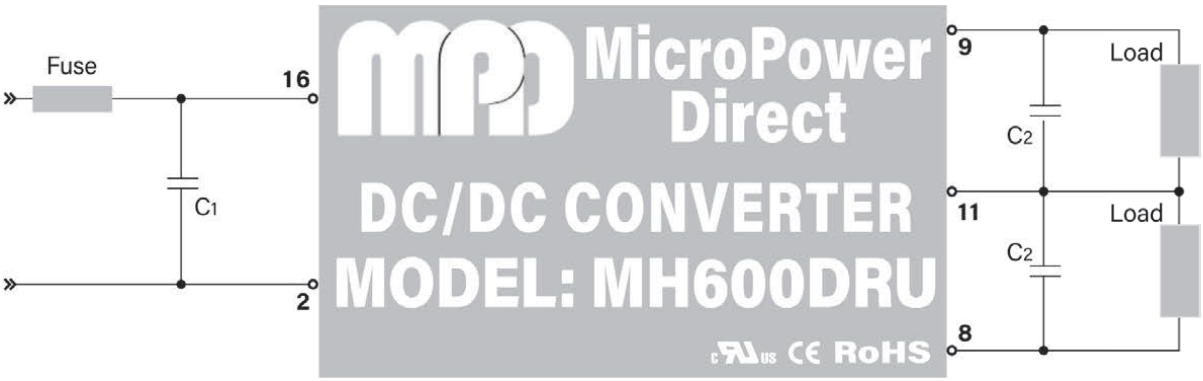
Temperature Derating Curve, 400 LFM



Typical Connection: Single Ouput



Typical Connection: Dual Ouput



These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors, as shown in the typical connection diagrams above, will enhance stability and reduce output ripple. These simple connections include a low ESR (<1Ω at 100 kHz) capacitor connected across the input. It is recommended that a 4.7 μF be used for 24V input models, and a 2.2 μF for 48V models.

To improve the output ripple performance, a 3.3 μF is connected across the output. For dual output units, a 3.3 μF capacitor should be connected from each output to common.

Remote On/Off

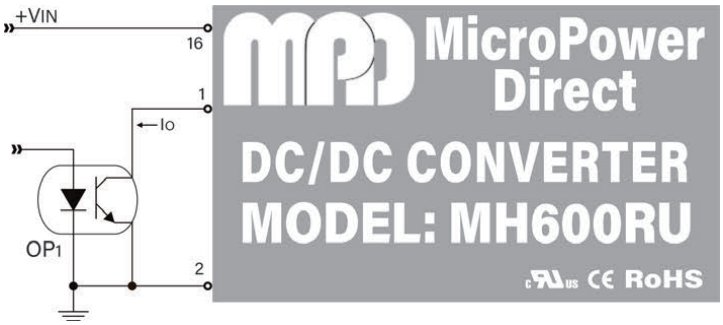
All models of the **MH6000RU** series can be turned on/off remotely by applying by applying a positive logic signal to pin 1. The specifications for the ON/OFF function are given in the table below.

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_{CTRL} = 5V			500	μA
Control Input Current, OFF	V_{CTRL} = 0V			-500	μA
Control Common	Referenced to -V_{IN} (Pin 2)				
Standby Input Current				10.0	mA

The maximum sink current at the control pin (pin 1) 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 500 μA.

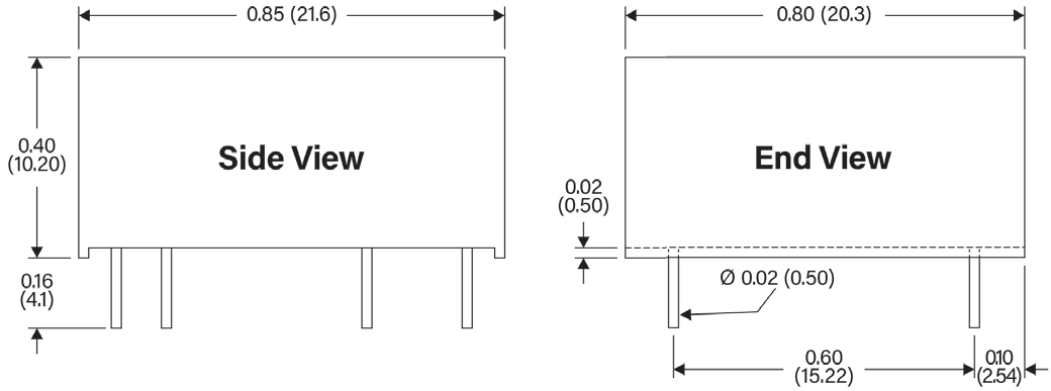
The switch used can be an open collector transistor, FET or optocoupler. Two possible connections are illustrated in the diagrams at right. For more information, please contact the factory.

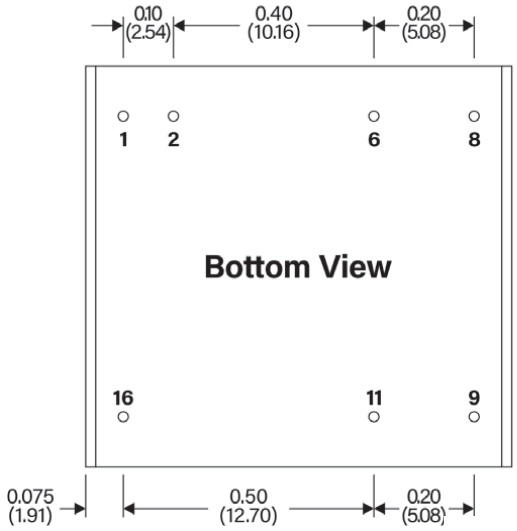
Isolated Control



TTL Control

Mechanical Dimensions





Pin Connections

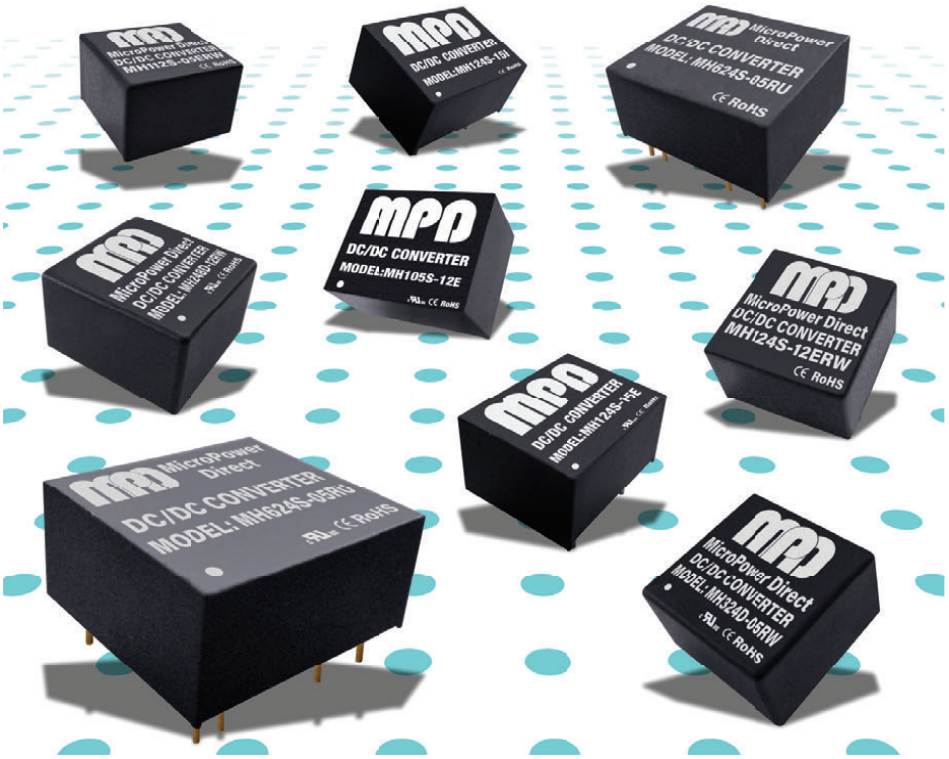
Pin	Single
1	Remote On/Off
2	-Vin
6	No Connection
8	No Connection
9	+Vout
11	-Vout
16	+Vin

Pin	Dual
1	Remote On/Off
2	-Vin
6	Common
8	-Vout
9	+Vout
11	Common
16	+Vin

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance = ±0.010 (±0.25)
- Pin Tolerance = ±0.002 (±0.05)
- Recommended pin hole size (on the application PC Board) is Ø 0.039 (Ø1.00)
- Pin 1 is marked by a "dot" or indentation on the unit
- Weight: 0.32 Oz (9.1g)

MPD offers a wide range of small DC/DC converters. These include a full line of products in very small "MicroDIP" packages (also called a "DIP-8" case). Models range from 0.25W to 6W and offer a variety of input/output voltage combinations, I/O isolation levels and wide temperature operation. Many models meet international EMC/EMI standards and some are approved to EN 62368 or EN 60950. For full information, go to our website or contact the factory.



MicroPower Direct
We Power Your Success - For Less!
292 Page Street Ste D Stoughton, MA 02072 ▪ TEL: (781) 344-8226 ▪ FAX: (781) 344-8481 ▪ E-Mail: sales@micropowerdirect.com