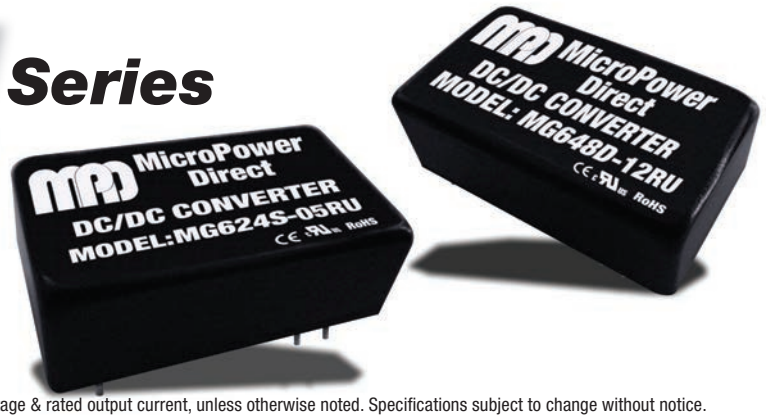
MG600RU Series

Compact DIP, 6W Single & Dual Output DC/DC Converters



Key Features:

- 6W Output Power
- Compact DIP Case
- EN 60950 Approved
- Wide 4:1 Input Range
- High Efficiency
- 1,500 VDC Isolation
- Single and Dual Outputs
- >2.95 MHour MTBF
- -40°C to +90°C Operation
- LOW COST

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-up Threshold	24 VDC Input			9.0	VDC
	48 VDC Input			18.0	
Under Voltage Shutdown	24 VDC Input		8.0		VDC
	48 VDC Input		16.0		
Input Filter	π (Pi) Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±1.0	±2.0	%
Line Regulation	V_{IN} = Min To Max		±0.2	±0.8	%
Load Regulation	I_{OUT} = 0% To 100%		±0.5	±1.0	%
Ripple & Noise (20 MHz)	See Note 2			55	mV P - P
Transient Recovery Time	See Note 3			500	µSec
Transient Response Deviation			±3.0	±5.0	%
Overload Protection	See Note 4		150		%
Temperature Coefficient			±0.01	±0.02	%/°C
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		500		pF
Switching Frequency			370		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+90	°C
Max Case Temperature				+105	°C
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	Aluminum Alloy, Black Anodized Coating (UL-94V0)
Weight	0.20 Oz (6.1g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.95			MHours
Safety Standards	UL/cUL 60950-1 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.

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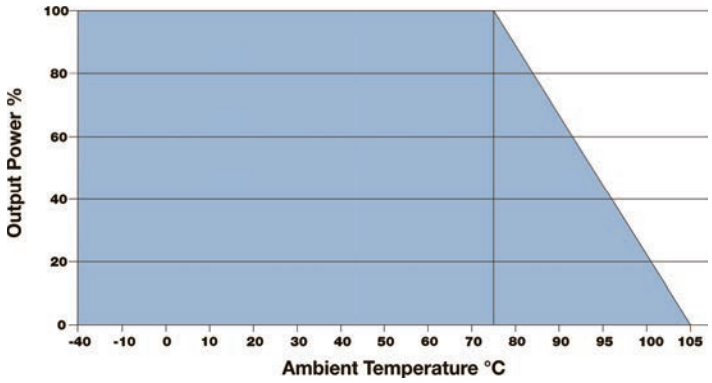
Model Selection Guide

Model Number	Input				Output			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						
MG624S-03RU	24	9.0 - 36.0	264	10	3.3	1,500	0.0	680	78	600
MG624S-05RU	24	9.0 - 36.0	305	10	5.0	1,200	0.0	680	82	750
MG624S-12RU	24	9.0 - 36.0	294	10	12.0	500	0.0	330	85	750
MG624S-15RU	24	9.0 - 36.0	294	10	15.0	400	0.0	330	85	750
MG624S-24RU	24	9.0 - 36.0	291	10	24.0	250	0.0	150	86	750
MG624D-12RU	24	9.0 - 36.0	294	10	±12.0	±250	±0.0	150	85	750
MG624D-15RU	24	9.0 - 36.0	291	10	±15.0	±200	±0.0	150	86	750
MG648S-03RU	48	18.0 - 75.0	132	8	3.3	1,500	0.0	680	78	300
MG648S-05RU	48	18.0 - 75.0	154	8	5.0	1,200	0.0	680	81	300
MG648S-12RU	48	18.0 - 75.0	147	8	12.0	500	0.0	330	85	300
MG648S-15RU	48	18.0 - 75.0	147	8	15.0	400	0.0	330	85	300
MG648S-24RU	48	18.0 - 75.0	145	8	24.0	250	0.0	150	86	300
MG648D-12RU	48	18.0 - 75.0	145	8	±12.0	±250	±0.0	150	86	300
MG648D-15RU	48	18.0 - 75.0	145	8	±15.0	±200	±0.0	150	86	300

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 be placed in parallel from the +Vout pin to the -Vout pin for single output models, or from each output to common for dual output models.
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 Hiccup circuit with auto-recovery.
5. Output short circuit protection is provided by a Hiccup circuit with auto-recovery.
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 Model Selection table above for the correct rating.

Derating Curve



Typical Connection

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 diagram at right, will enhance stability and reduce output ripple. This simple connection includes a low ESR (<1Ω at 100 kHz) capacitor connected across the input. It is recommended that a 2.2 µF be used.

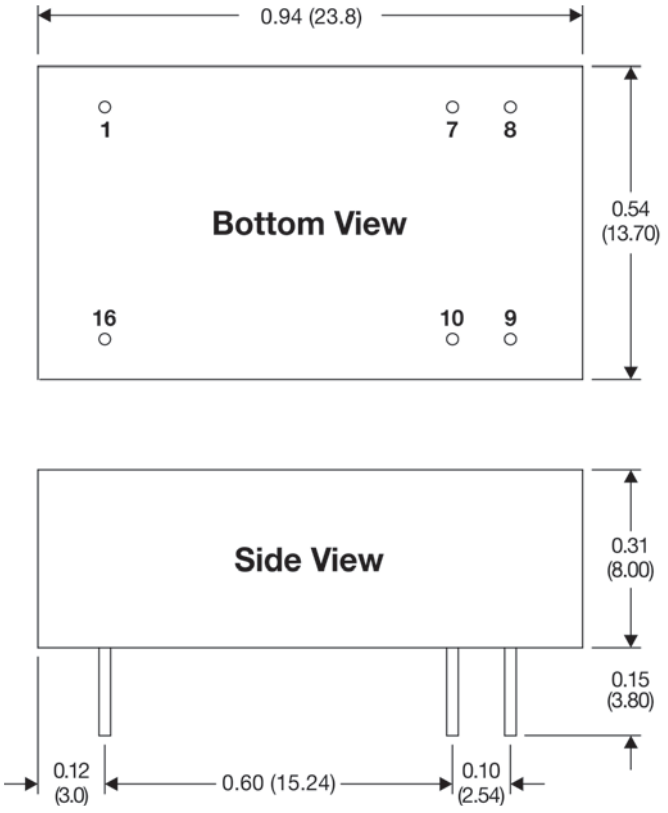
To improve the output ripple performance, a 3.3 µF is connected across the output. For dual output units (as shown), a 3.3 µF capacitor should be connected from each output to common.

EMI/EMC Characteristics

To meet the specified EN 61000-4-4 and EN 61000-4-5 limits, an external capacitor must be connected across the input pins of the module (C_1). A 220 µF/100V capacitor is recommended. This capacitor should be mounted as close to the module as possible.

Parameter	Standard	Criteria	Level
Radiated Emissions	EN 55032		Class A
Conducted Emissions	EN 55032		Class A
ESD	EN 61000-4-2	A	±6 kV Contact
			±8kV Air
RS	EN 61000-4-3	A	10V/m
EFT, See note at left	EN 61000-4-4	A	±2 kV
Surge, See note at left	EN 61000-4-5	A	±1 kV
CS	EN 61000-4-6	A	10 Vrms
PFMF	EN 61000-4-8	A	1,000 A/m (1s)

Mechanical Dimensions



Pin Connections

Pin	Single	Dual
1	-VIN	-VIN
7	NC	NC
8	NC	Common
9	+VOUT	+VOUT
10	-VOUT	-VOUT
16	+VIN	+VIN

NC = No Connection

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)
- Pin 1 is marked by a "dot" or indentation on the unit

MPD offers a very wide range of DC/DC converters in the small, 16 pin DIP package. Models range from 1W to 10W and offer wide input ranges, tight regulation, single/dual outputs, and I/O isolation. All models meet international EMC/EMI standards and many are approved to EN 60950. For full information, go to our website or contact the factory.

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