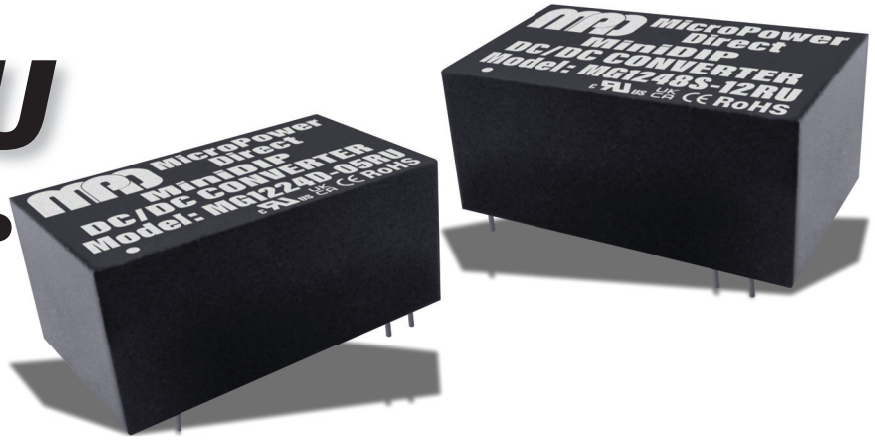
MG1200RU

Compact 12W MiniDIP Ultra Wide 4:1 Input DC/DC Converters



Key Features:

- 12W Output Power
- Compact MiniDIP Case
- EN 62368 Approved
- Ultra-Wide 4:1 Input Range
- High Efficiency
- 1,500 VDC Isolation
- Single and Dual Outputs
- Under Voltage Protection
- Overload Protection
- -40°C to +88°C Operation
- ***LOW COST***

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

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		
Start Up Time			30		mS
Input Filter	π (Pi) Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
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%			±1.0	%
Cross Regulation	Asymetrical Load (25%/100%)			±5.0	%
Ripple & Noise (20 MHz)	See Note 2		70		mV P - P
Transient Recovery Time	See Note 3			500	µSec
Transient Response Deviation			±3.0	±5.0	%
Overload Protection	See Note 4		160		%
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			
	Input/Output to Case	1,000			
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V			2,200	pF
Switching Frequency			480		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient, 5VOUT and 5.1VOUT Models	-40	+25	+50	°C
	Ambient, All Other Models	-40	+25	+65	
Case Temperature				+105	°C
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size and Weight	See Mechanical Diagram (Page 7)
Case Material	Aluminum Alloy, Black Anodized Coating (UL-94V0)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	2.538			MHours
Safety Standards	UL/cUL 62368-1 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.

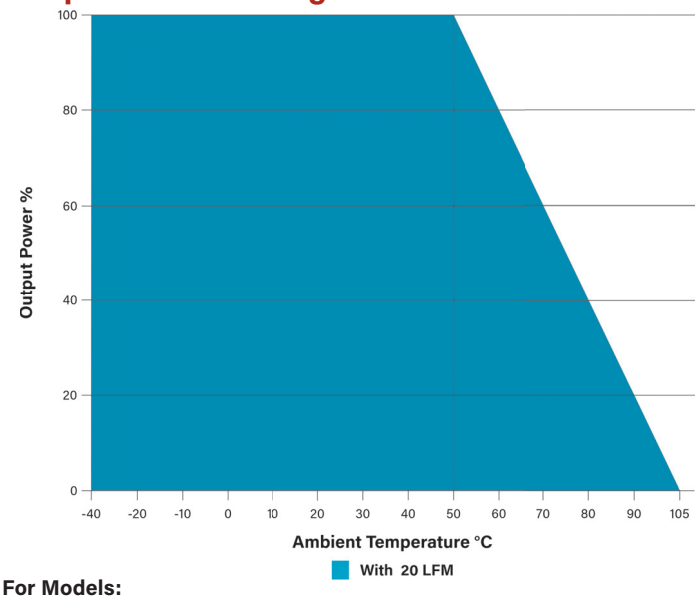
Model Selection Guide

Model Number	Input				Output			Output Capacitive Load (µF Max)	Efficiency (%, Typ)	Fuse Rating Slow-Blow (A)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
MG1224S-05RU	24	9.0 - 36.0	602	10	5.0	2,400	0.0	1,500	83	2.00
MG1224S-051RU	24	9.0 - 36.0	614	10	5.1	2,400	0.0	1,500	83	2.00
MG1224S-12RU	24	9.0 - 36.0	575	10	12.0	1,000	0.0	680	87	2.00
MG1224S-15RU	24	9.0 - 36.0	568	10	15.0	800	0.0	680	88	2.00
MG1224S-24RU	24	9.0 - 36.0	568	10	24.0	500	0.0	220	88	2.00
MG1224D-12RU	24	9.0 - 36.0	575	10	±12.0	±500	±0.0	470	87	2.00
MG1224D-15RU	24	9.0 - 36.0	575	10	±15.0	±400	±0.0	220	87	2.00
MG1248S-05RU	48	18.0 - 75.0	301	7	5.0	2,400	0.0	1,500	83	1.50
MG1248S-051RU	48	18.0 - 75.0	307	7	5.1	2,400	0.0	1,500	83	1.50
MG1248S-12RU	48	18.0 - 75.0	287	7	12.0	1,000	0.0	680	87	1.50
MG1248S-15RU	48	18.0 - 75.0	284	7	15.0	800	0.0	680	88	1.50
MG1248S-24RU	48	18.0 - 75.0	284	7	24.0	500	0.0	220	88	1.50
MG1248D-12RU	48	18.0 - 75.0	287	7	±12.0	±500	±0.0	470	87	1.50
MG1248D-15RU	48	18.0 - 75.0	287	7	±15.0	±400	±0.0	220	87	1.50

Notes:

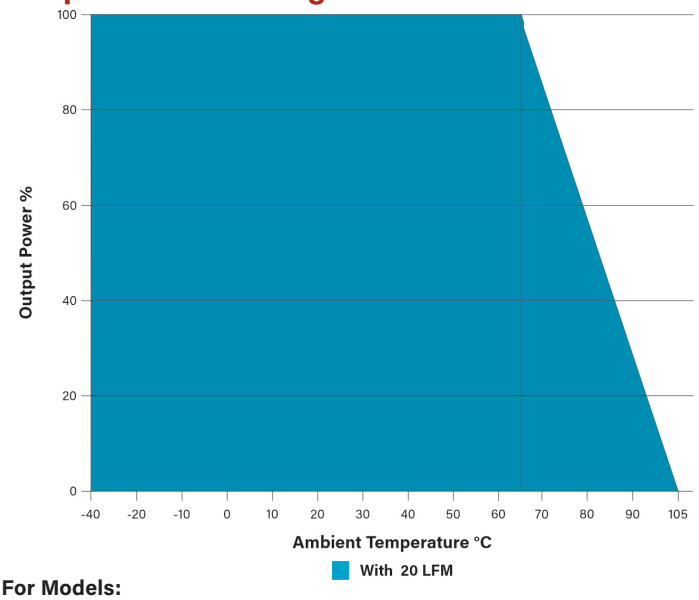
1. The specified maximum capacitive load is for each output.
2. When measuring output ripple, it is recommended that an external 2.2 µF ceramic capacitor be placed in parallel from the +VOUT pin to the -VOUT pin for single output models, or from each output to common for dual output models.
3. Transient 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.

Temperature Derating Curve



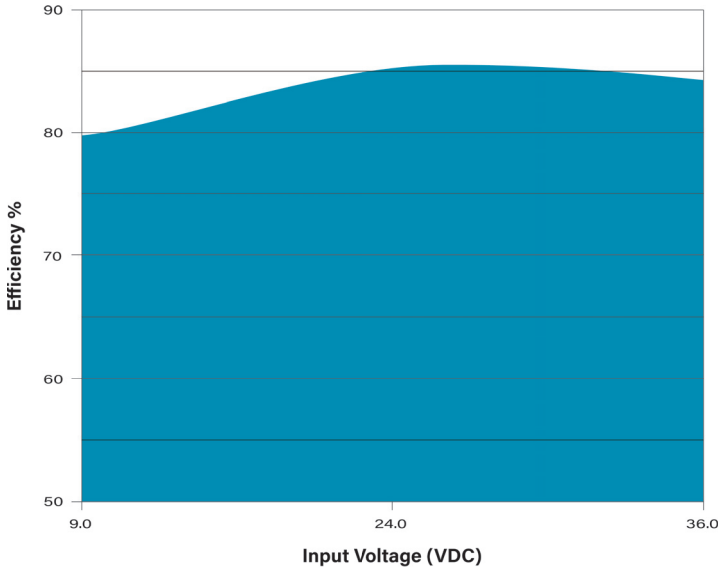
For Models:
MG1224S-05RU, MG1224S-051RU
MG1248S-05RU, MG1248S-051RU

Temperature Derating Curve

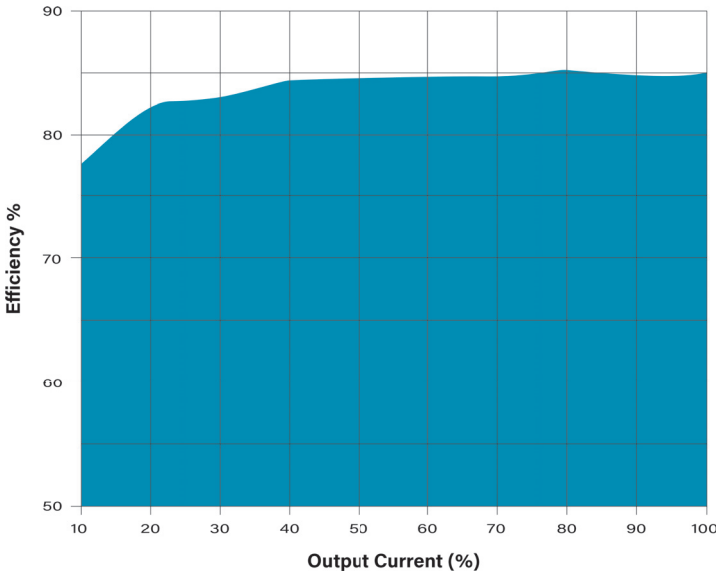


For Models:
All Other Models

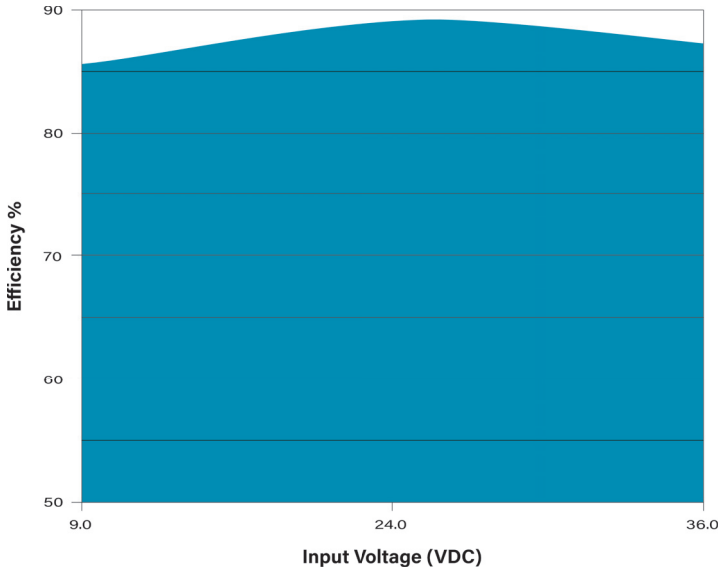
Efficiency vs Input: MG1224S-05RU



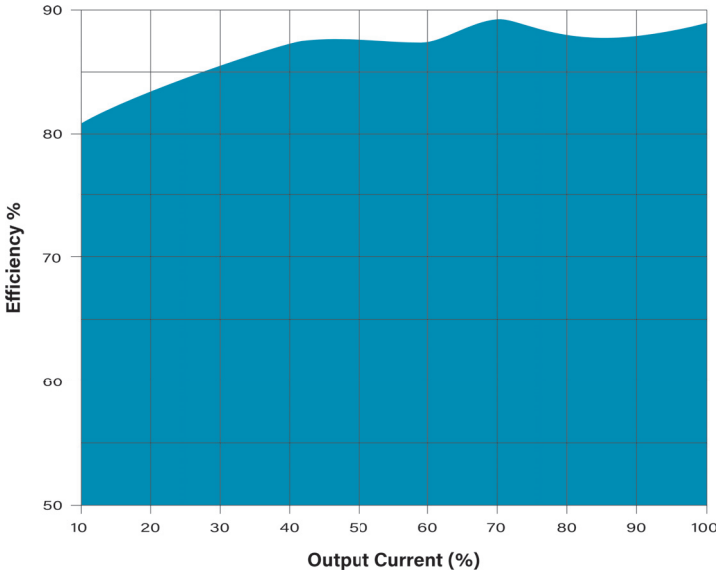
Efficiency vs Output Load: MG1224S-05RU



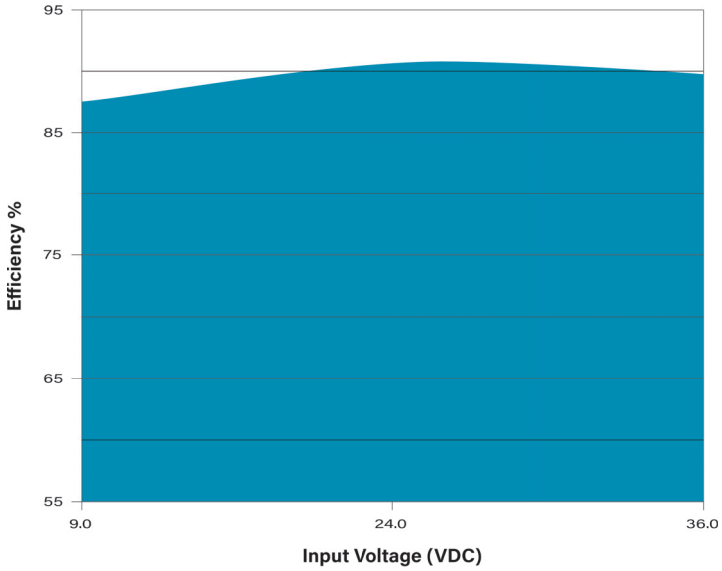
Efficiency vs Input: MG1224S-12RU



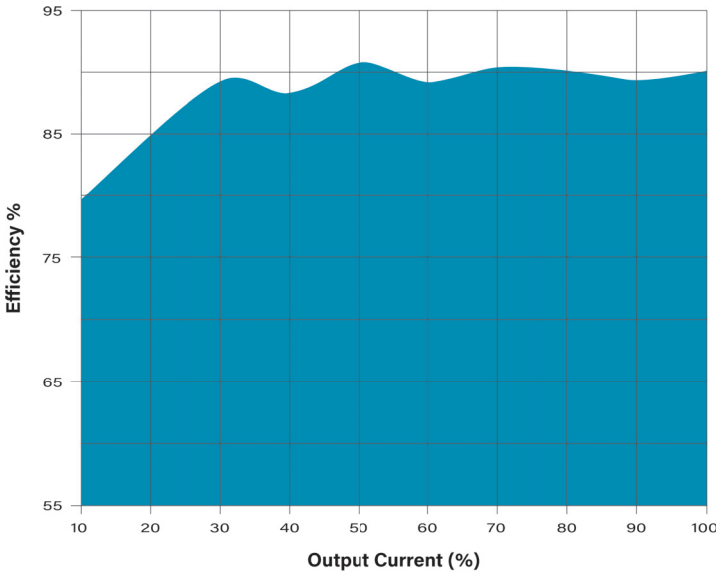
Efficiency vs Output Load: MG1224S-12RU



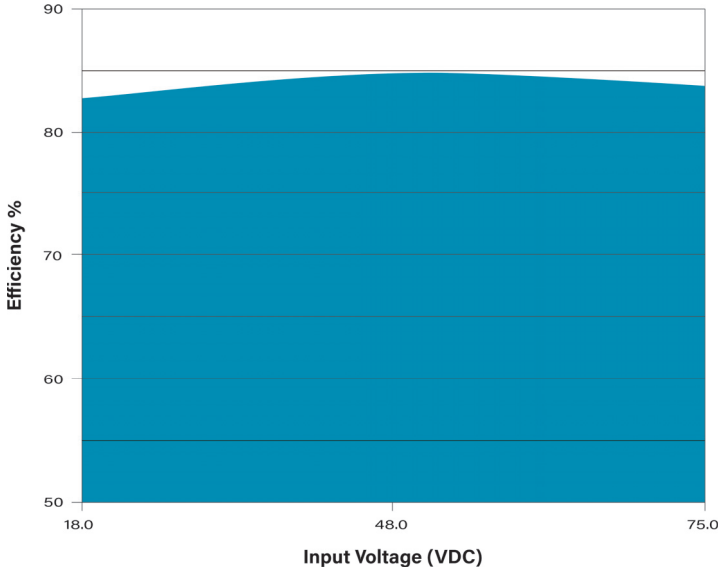
Efficiency vs Input: MG1224S-24RU



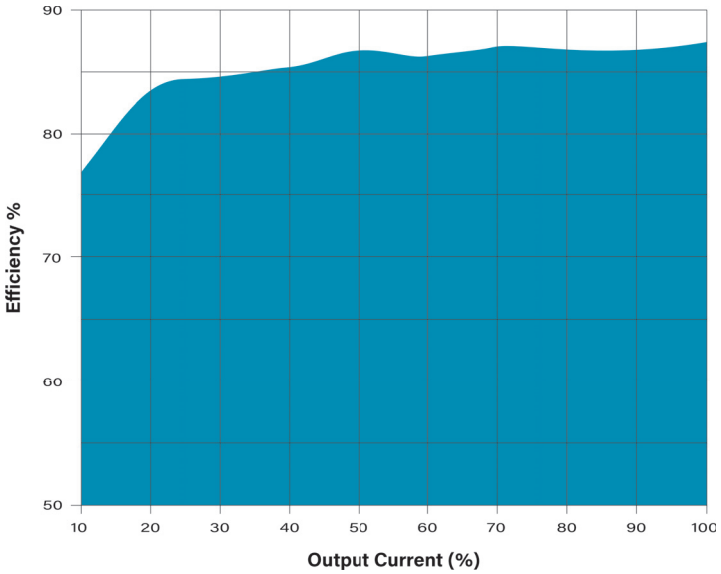
Efficiency vs Output Load: MG1224S-24RU



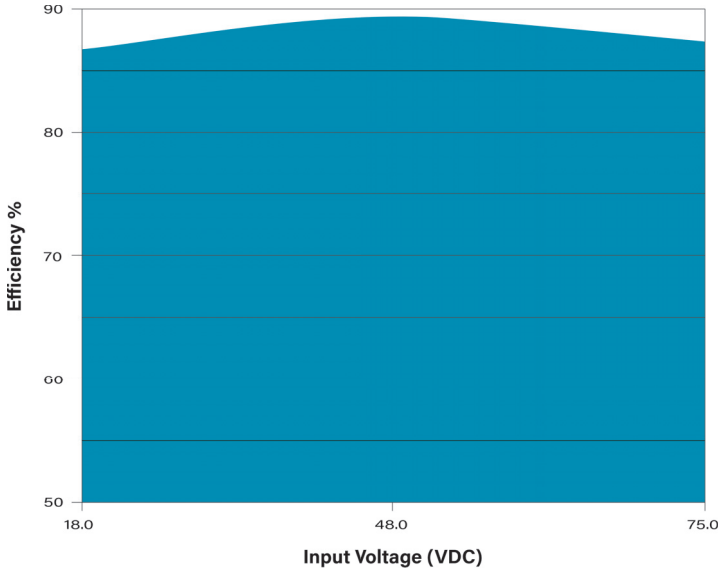
Efficiency vs Input: MG1248S-05RU



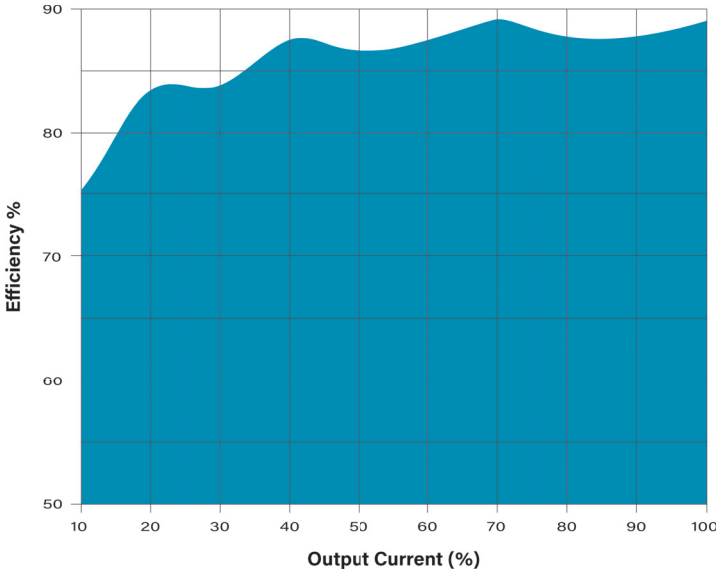
Efficiency vs Output Load: MG1248S-05RU



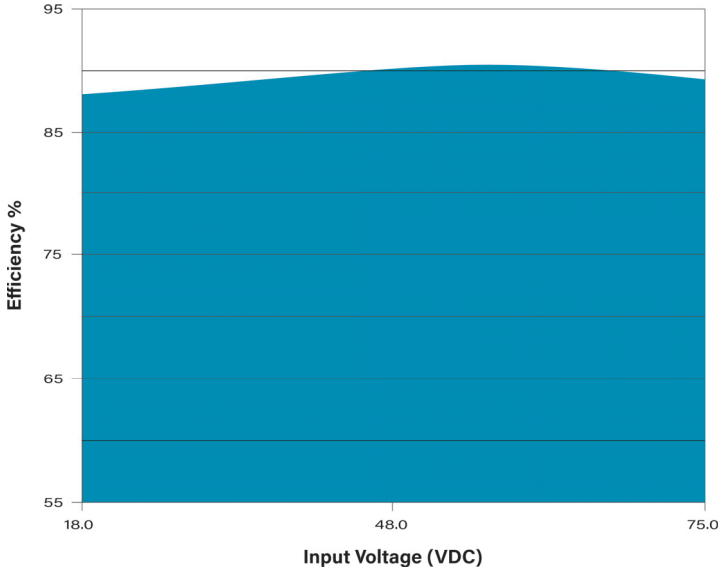
Efficiency vs Input: MG1248S-12RU



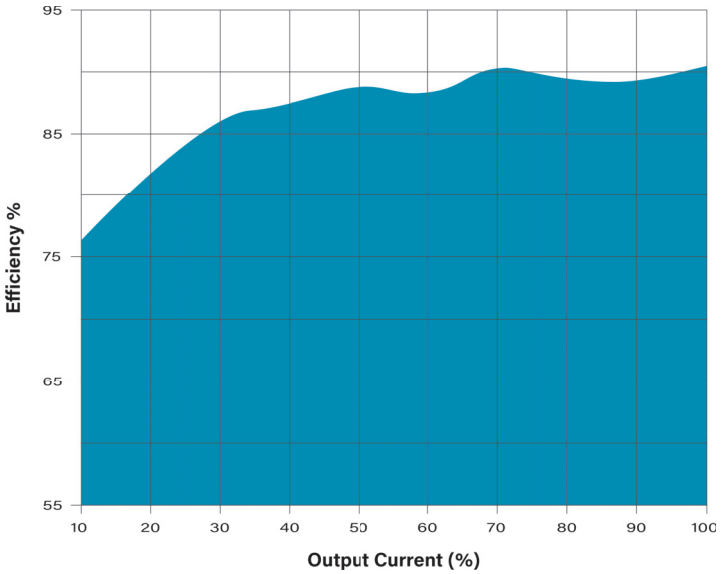
Efficiency vs Output Load: MG1248S-12RU



Efficiency vs Input: MG1248S-24RU



Efficiency vs Output Load: MG1248S-24RU



Typical Connection: Single Output

Model	C1	C2
MG1224SRU	2.2 µF/50V	2.2 µF/50V
MG1248SRU	2.2 µF/100V	2.2 µF/50V

The diagram above illustrates a typical connection of the **MG1200SRU**. For applications that do not require the circuit to meet EMI/EMC specifications, the capacitors C1 and C2 will reduce input/output ripple and improve the converter stability over time and temperature. The recommended component values are given in the table at left.

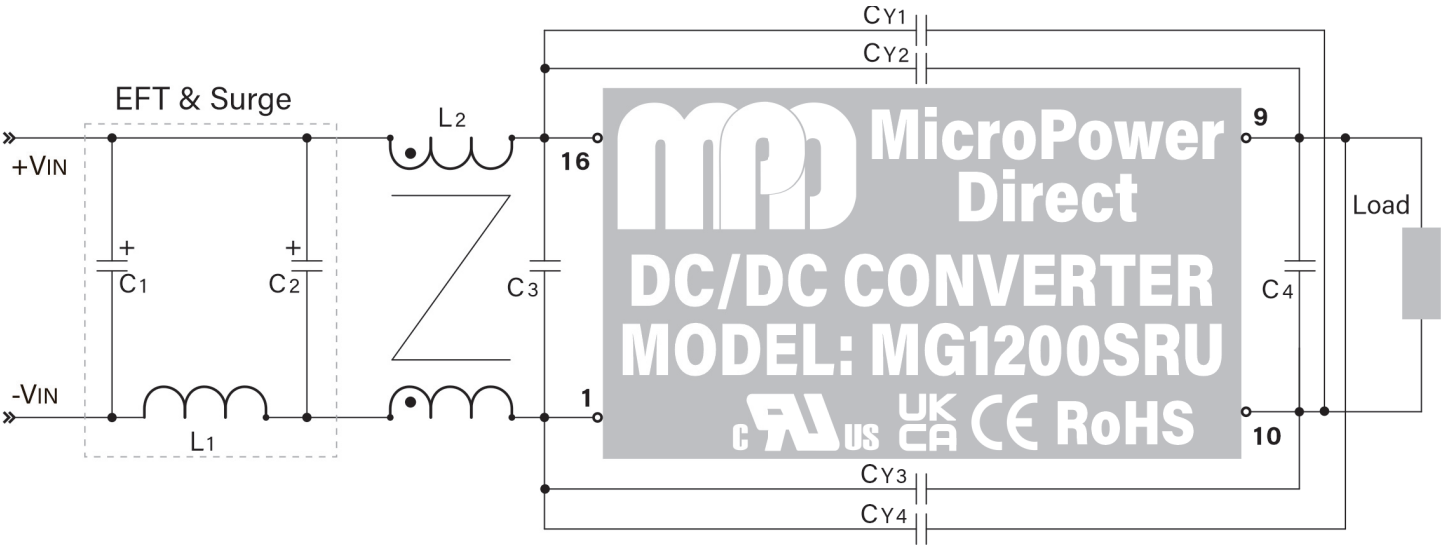
EMI/EMC Characteristics

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	20V/m
EFT, See note at left	EN 61000-4-4	A	±2 kV
Surge, See note at left	EN 61000-4-5	A	±2 kV
CS	EN 61000-4-6	A	10 Vrms
PFMF	EN 61000-4-8	A	100 A/m, 1,000 A/m (1s)

These converters will meet the requirements of EN 55032, Class A conducted emmisions without external components. To meet EN 55032 Class A or B radiated emmisions, external compnents are required. The connection diagram below shows a suggested connection for Class A, and on page 6 there is a suggested connection for Class B. Contact the factory for more information.

External input components are required to meet EN 61000-4-4 (EFT) and EN61000-4-5 (Surge). These are illustrated below and on page 6.

EMI Connection: Class A, Single Output

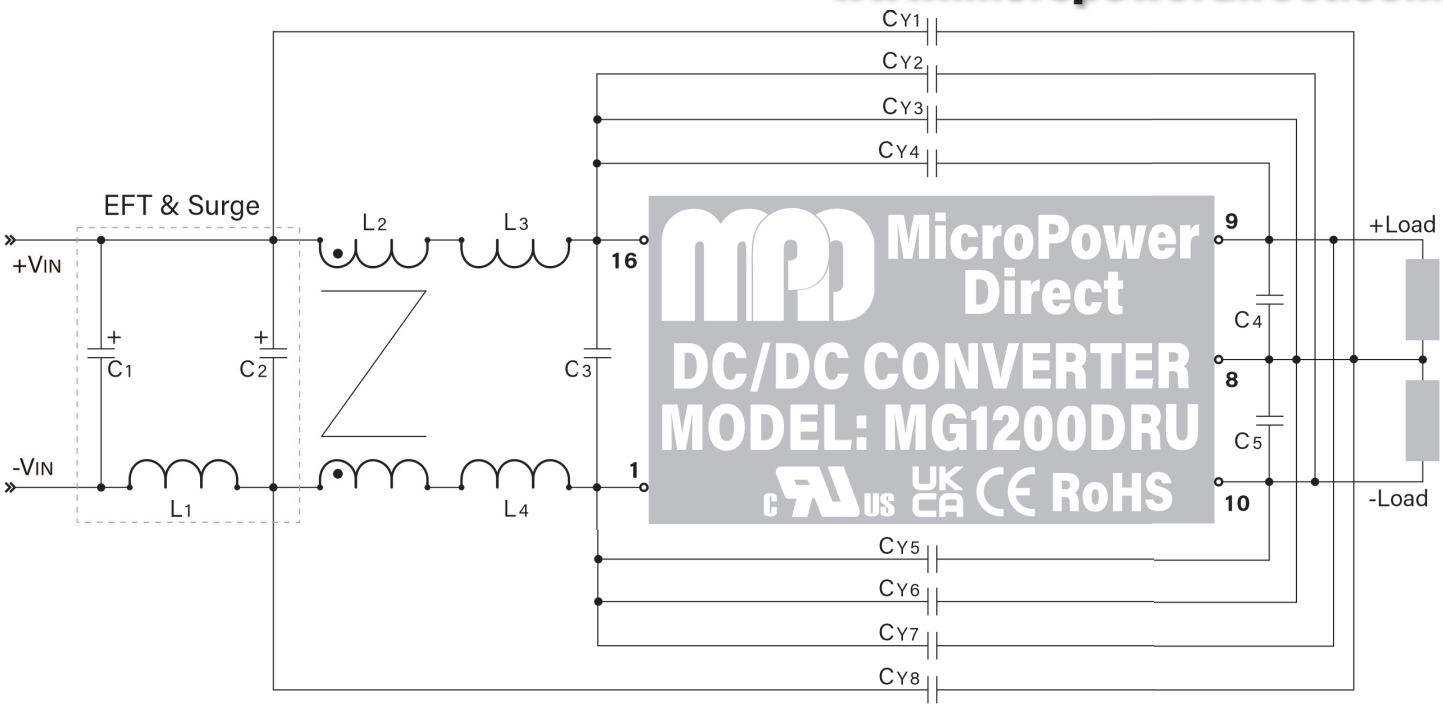


Model	C1	L1	C2	L2	C3	CY1, CY3	CY2, CY4	C4
MG1224SRU	470 µF/50V CHEMI-CON KY Series	10 µH/2.2A 74477410	470 µF/50V CHEMI-CON KY Series	----	2.2 µF/50V	1000 pF/2 kV 1808 X7R	---	2.2 µF/50V
MG1248SRU	150 µF/100V CHEMI-CON KY Series	56 µH/0.77A 744774156	150 µF/100V CHEMI-CON KY Series	30 µH/1.4A 744273222	2.2 µF/100V	1000 pF/2 kV 1808 X7R	680 pF/2 kV 1808 X7R	2.2 µF/50V

To meet the requirements of EN 55032 class A with the **MG1200SRU**, additional external components are required. The single output connection shown above illustrates an external circuit (L2, CY1 to CY4) that will typically meet these requirements.

The external input components C1, C2 and L1 are required to meet EN 61000-4-4 (EFT) and EN61000-4-5 (Surge).

EMI Connection: Class B, Dual Output



Model	C1	L1	C2	L2	L3	L4	C3
MG1224SRU	470 µF/50V CHEMI-CON KY Series	74477410	470 µF/50V CHEMI-CON KY Series	----	74279252	74279252	2.2 µF/50V
MG1224DRU	470 µF/50V CHEMI-CON KY Series	74477410	470 µF/50V CHEMI-CON KY Series	----	----	----	2.2 µF/50V
MG1248SRU	150 µF/100V CHEMI-CON KY Series	744774156	150 µF/100V CHEMI-CON KY Series	744273222	74279218	74279218	2.2 µF/100V
MG1248DRU	150 µF/100V CHEMI-CON KY Series	744774156	150 µF/100V CHEMI-CON KY Series	744273222	74279218	74279218	2.2 µF/100V

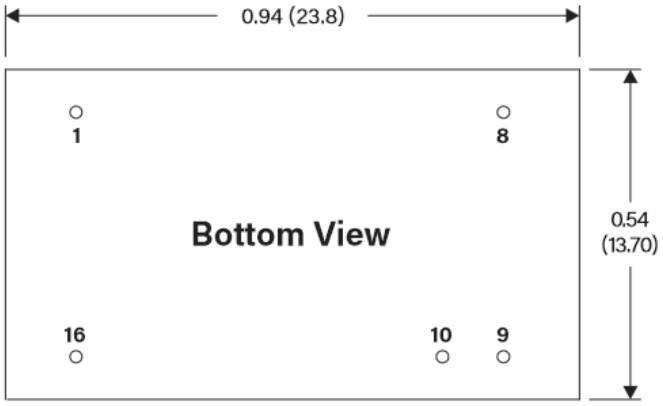
Model	CY1	CY2	CY3	CY4	CY5	CY6	CY7	CY8	C4/C5
MG1224SRU	100 pF/2kV 1808 NPO	220 pF/2kV 1808 X7R	680 pF/2 kV 1808 X7R	680 pF/2 kV 1808 X7R	220 pF/2 kV 1808 X7R	100 pF/2 kV 1808 NPO	----	----	2.2pF 50V
MG1224DRU	----	220 pF/2kV 1808 X7R	470 pF/2 kV 1808 X7R	470 pF/2kV 1808 X7R	470 pF/2 kV 1808 X7R	470 pF/2 kV 1808 X7R	220 pF/2 kV 1808 X7R	----	2.2pF 50V
MG1248SRU	100 pF/2kV 1808 NPO	220 pF/2kV 1808 X7R	470 PF/2 kV 1808 X7R	100 pF/2 kV 1808 X7R	220 pF/2 kV 1808 X7R	100 pF/2 kV 1808 NPO	----	----	2.2pF 50V
MG1248DRU	100 pF/2kV 1808 NPO	220 pF/2kV 1808 X7R	100 pF/2 kV 1808 NPO	470 pF/2 kV 1808 NPO	470 pF/2 kV 1808 NPO	100 pF/2 kV 1808 NPO	220 pF/2 kV 1808 VR7	100 pF/2 kV 1808 NPO	2.2pF 50V

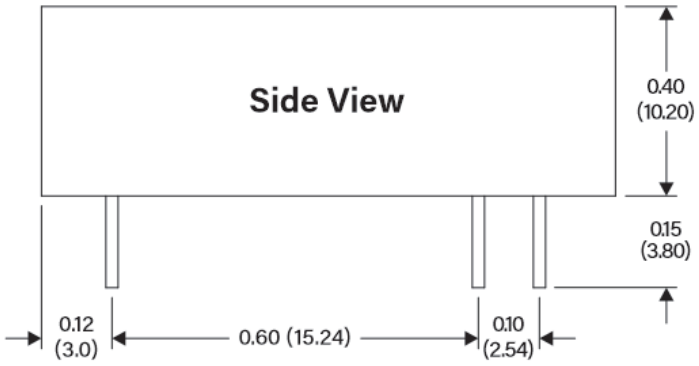
To meet EN 55032 class B requires more robust external filtering. The dual output, **MG1200DRU**,connection shown above illustrates an external circuit (L2, L3, C3 & , CY1 to CY8) that will typically meet these requirements.

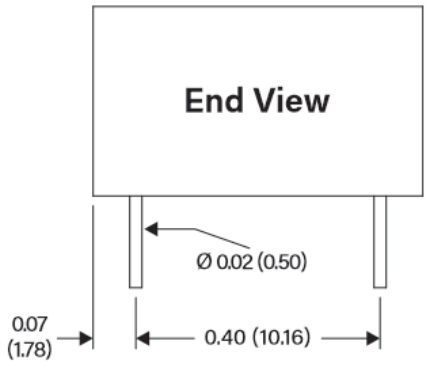
The external input components C1, C2 and L1 are required to meet EN 61000-4-4 (EFT) and EN61000-4-5 (Surge).

Contact the factory for more information.

Mechanical Dimensions







Pin Connections

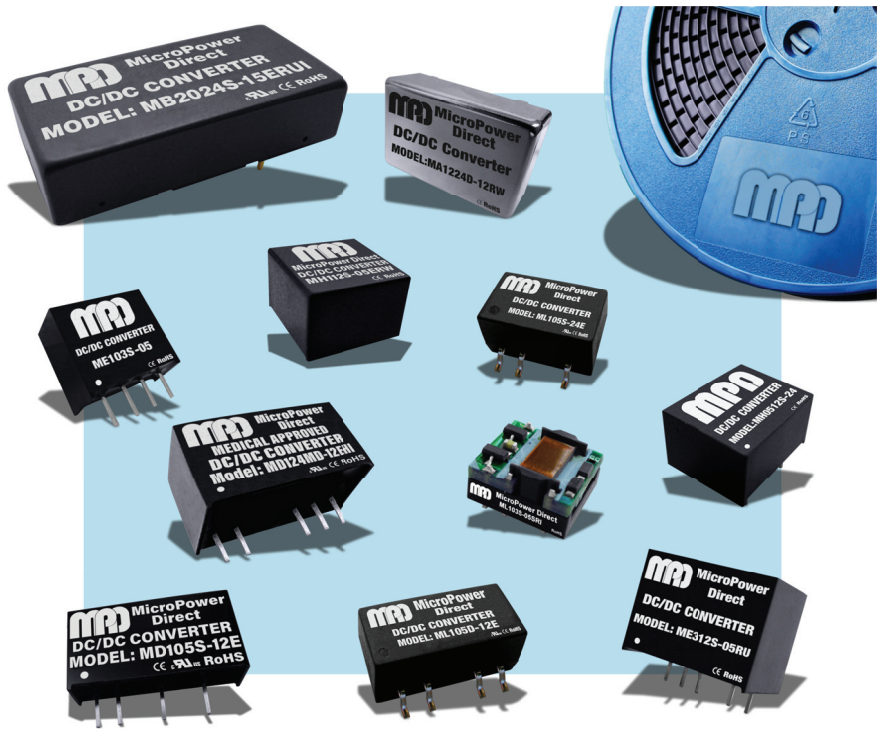
Pin	Single	Dual
1	-VIN	-VIN
8	NC	Common
9	+VOUT	+VOUT
10	-VOUT	-VOUT
16	+VIN	+VIN

NC = No Connection

Notes:

- All dimensions are typical in inches (mm)
- Pin 1 is marked by a "dot" or indentation on the unit
- General Tolerance = ±0.01 (±0.25)
- Pin Tolerance = ±0.02 (±0.05)
- Recommended pin hole size (on the application PC Board) is Ø 0.03 (Ø 0.80)
- Weight (Typ) = 0.303 Oz (8.6g)

MPD offers a very wide variety of DC/DC converters. Our standard product line includes SMT, SIP, and DIP potted modules, industry standard 1 x 1" & 1 x 2" modules, as well as new models in an ultra miniature DFN package. Our units are used in applications ranging from high speed gate drive circuits to instrumentation to industrial equipment and medical equipment/instrumentation. Units are available over a power range of 0.25 to 60W. Most models meet international EMC/EMI standards and many are fully approved to EN 62368. Call today, or go to our website to find the right DC/DC power module for your application.



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