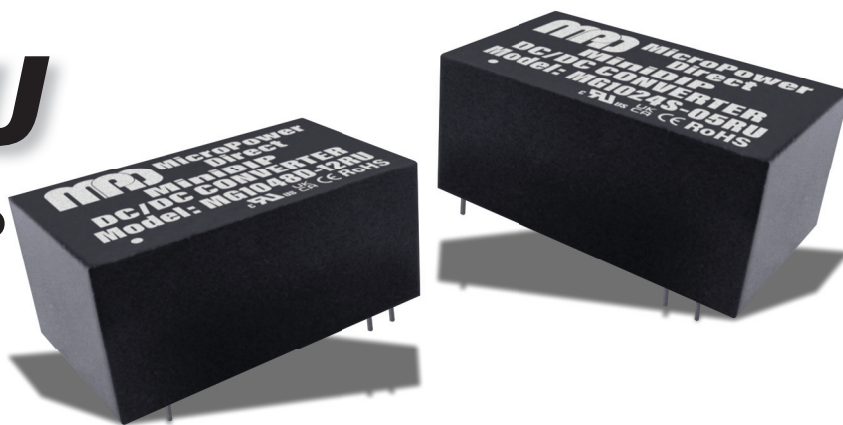


MG1000RU

Compact 10W MiniDIP Ultra Wide 4:1 Input DC/DC Converters



Key Features:

- 10W Output Power
- Compact MiniDIP Case
- EN 62368 Approved
- Ultra-Wide 4:1 Input Range
- High Efficiency
- 1,500 VDC Isolation
- Single and Dual Outputs
- >2.53 MHour MTBF
- -40°C to +88°C Operation
- **LOW COST**



MicroPower Direct



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	3.3, 5 V _{OUT} Models		60		mV P - P
	All Other Models		80		
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			M Ω	
Isolation Capacitance	100 kHz, 1V			1,500	pF	
Switching Frequency			420		kHz	

Environmental						
Parameter	Conditions		Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient		-40	+25	+88	°C
	Case				+105	
Storage Temperature Range			-50		+125	°C
Cooling	Free Air Convection					
Humidity	RH, Non-condensing				95	%

Physical						
Case Size and Weight	See Mechanical Diagram (Page 6)					
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

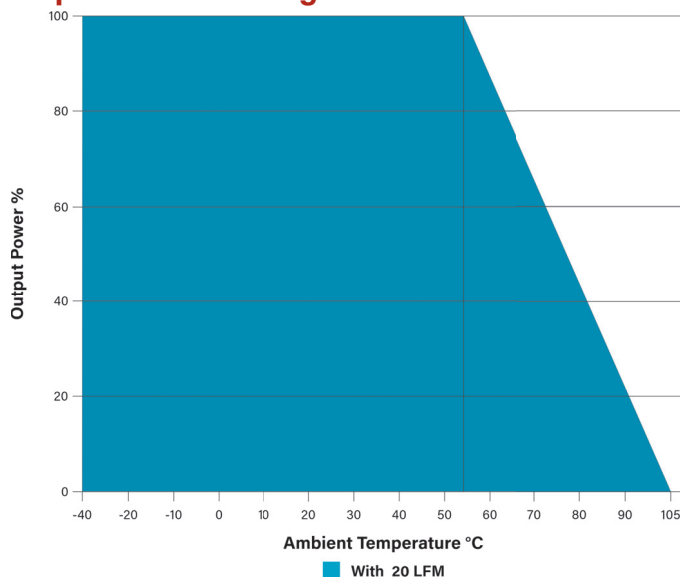
CompuMess Elektronik GmbH · Lise-Meitner-Straße 4 · D-85716 Unterschleißheim
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Model Number	Input				Output			Output Capacitive Load (μF Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (A)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full-Load	No-Load						
MG1024S-03RU	24	9.0 - 36.0	464	10	3.3	2,700	0.0	2,600	80	2.00
MG1024S-05RU	24	9.0 - 36.0	502	10	5.0	2,000	0.0	1,300	83	2.00
MG1024S-051RU	24	9.0 - 36.0	512	10	5.1	2,000	0.0	1,300	83	2.00
MG1024S-12RU	24	9.0 - 36.0	479	10	12.0	833	0.0	560	87	2.00
MG1024S-15RU	24	9.0 - 36.0	473	10	15.0	666	0.0	560	88	2.00
MG1024S-24RU	24	9.0 - 36.0	473	10	24.0	416	0.0	200	88	2.00
MG1024D-12RU	24	9.0 - 36.0	478	10	±12.0	±416	±0.0	390	87	2.00
MG1024D-15RU	24	9.0 - 36.0	478	10	±15.0	±333	±0.0	200	87	2.00
MG1048S-03RU	48	18.0 - 75.0	232	7	3.3	2,700	0.0	2,600	80	1.00
MG1048S-05RU	48	18.0 - 75.0	251	7	5.0	2,000	0.0	1,300	83	1.00
MG1048S-051RU	48	18.0 - 75.0	256	7	5.1	2,000	0.0	1,300	83	1.00
MG1048S-12RU	48	18.0 - 75.0	239	7	12.0	833	0.0	560	87	1.00
MG1048S-15RU	48	18.0 - 75.0	237	7	15.0	666	0.0	560	88	1.00
MG1048S-24RU	48	18.0 - 75.0	236	7	24.0	416	0.0	200	88	1.00
MG1048D-12RU	48	18.0 - 75.0	239	7	±12.0	±416	±0.0	390	87	1.00
MG1048D-15RU	48	18.0 - 75.0	239	7	±15.0	±333	±0.0	200	87	1.00

Notes:

1. The specified maximum capacitive load is for each output.
2. When measuring output ripple, it is recommended that an external 0.47 μ F 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.

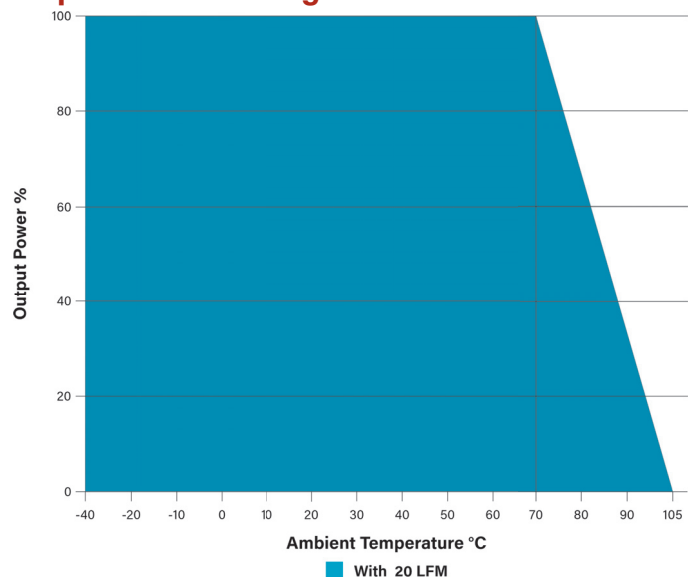
Temperature Derating Curve



For Models:

MG1024S-03RU, MG1024S-05RU, MG1024S-051RU
MG1048S-03RU, MG1048S-05RU, MG1024S-051RU

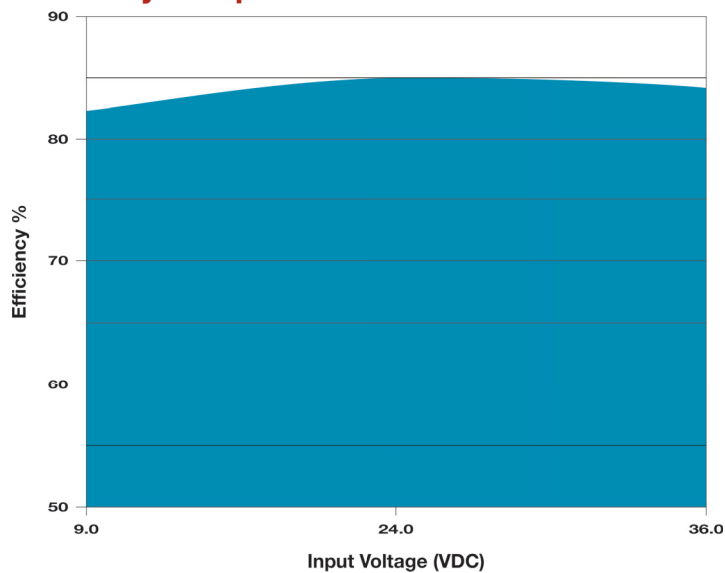
Temperature Derating Curve



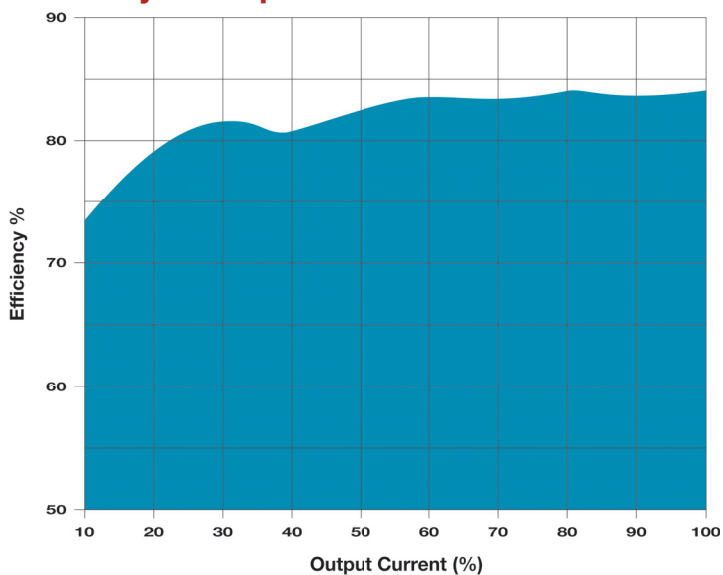
For Models:

MG1024S-12RU, MG1024S-15RU, MG1024S-24RU
MG1048S-12RU, MG1048S-15RU, MG1024S-24RU
MG1024D-12RU, MG1024D-15RU, MG1048D-12RU, MG1048D-15RU

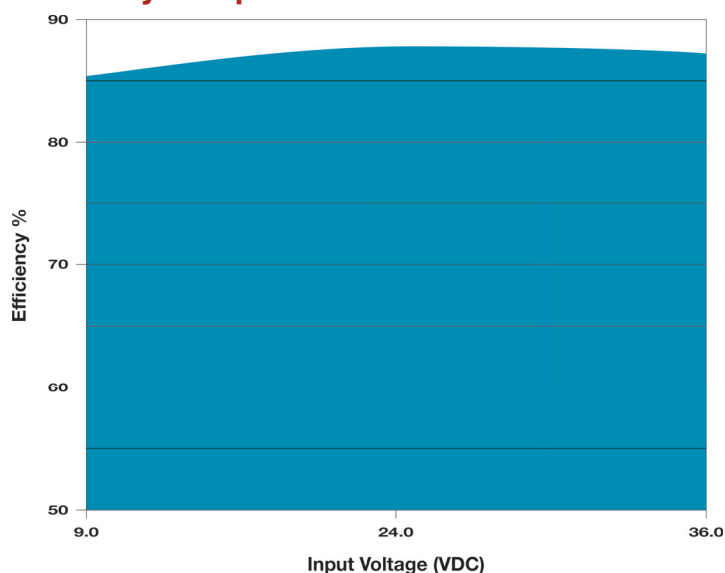
Efficiency vs Input: MG1024S-05RU



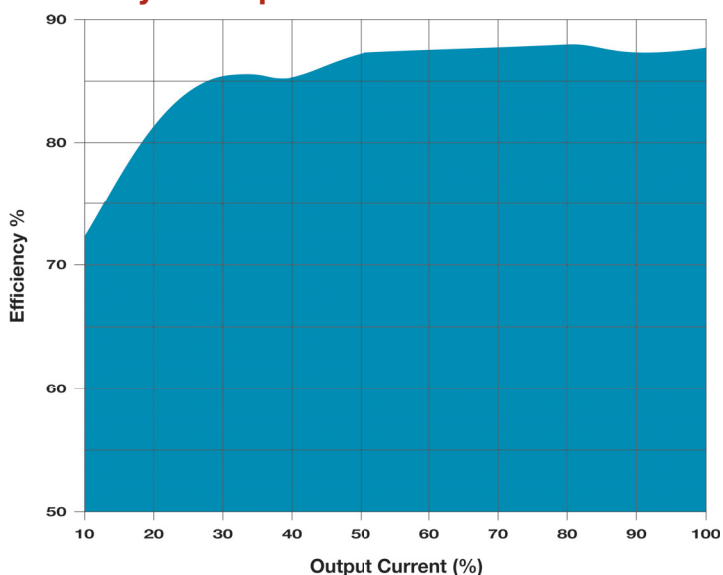
Efficiency vs Output Load: MG1024S-05RU



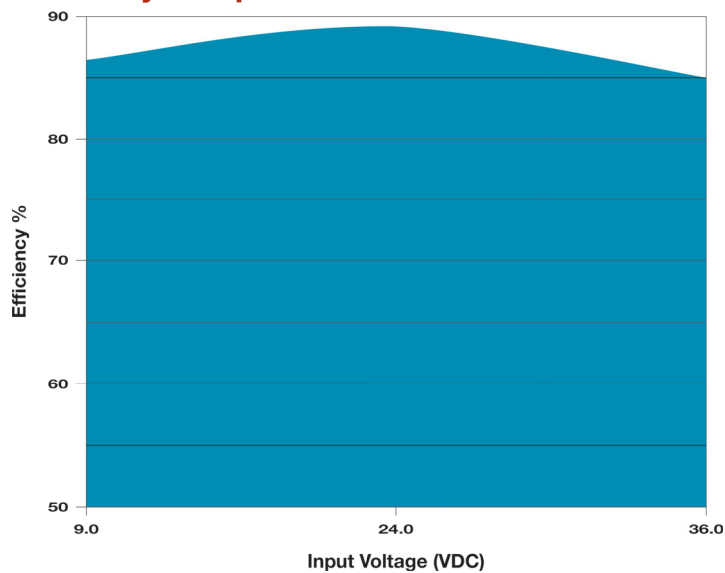
Efficiency vs Input: MG1024S-12RU



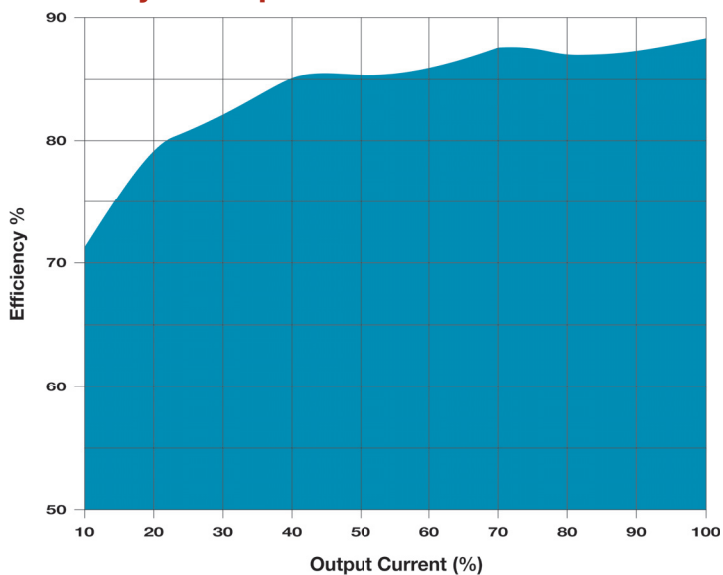
Efficiency vs Output Load: MG1024S-12RU



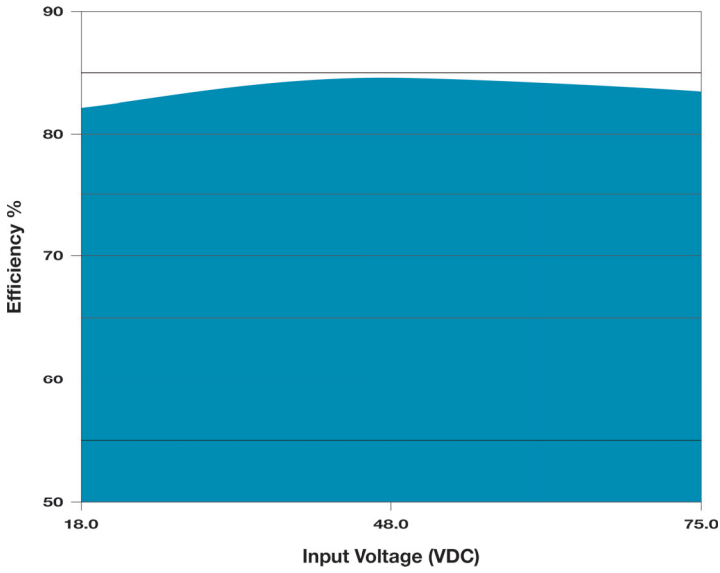
Efficiency vs Input: MG1024S-24RU



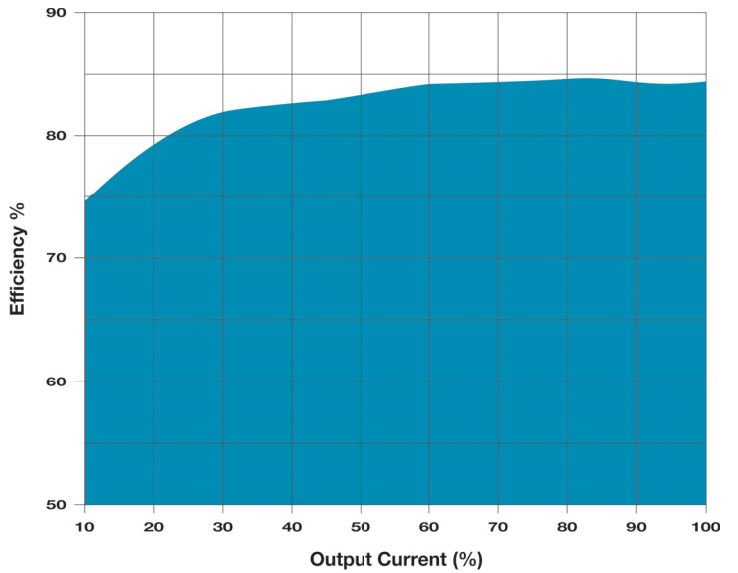
Efficiency vs Output Load: MG1024S-24RU



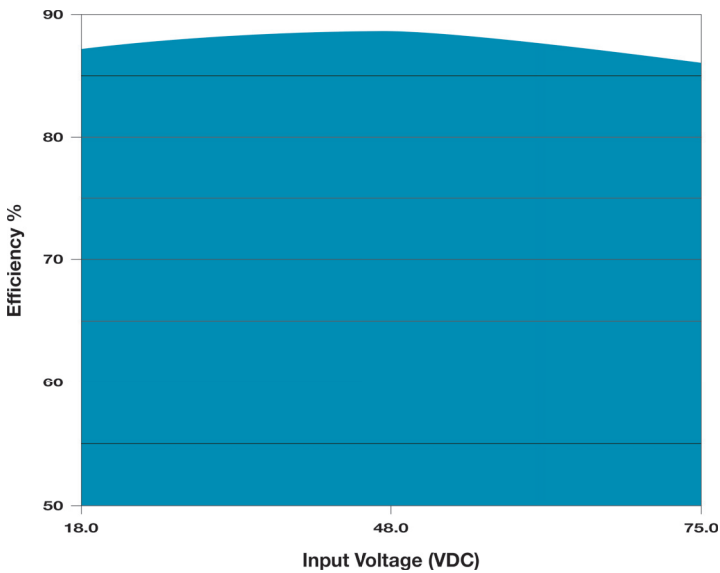
Efficiency vs Input: MG1048S-05RU



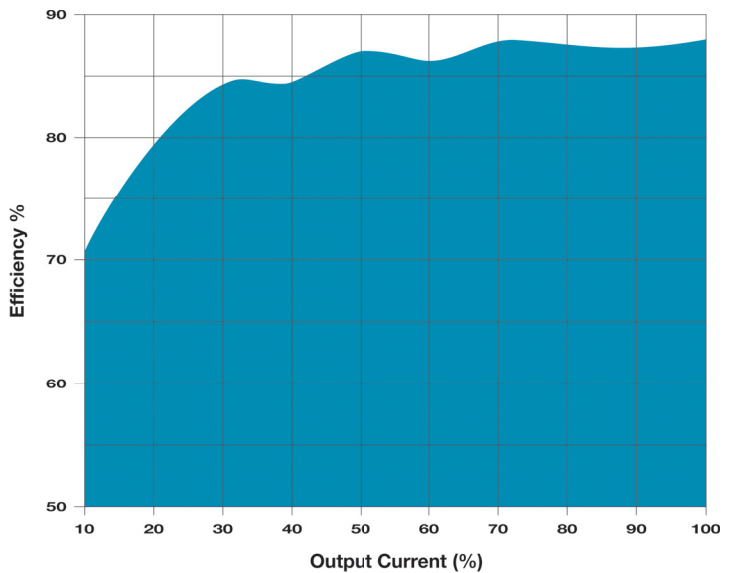
Efficiency vs Output Load: MG1048S-05RU



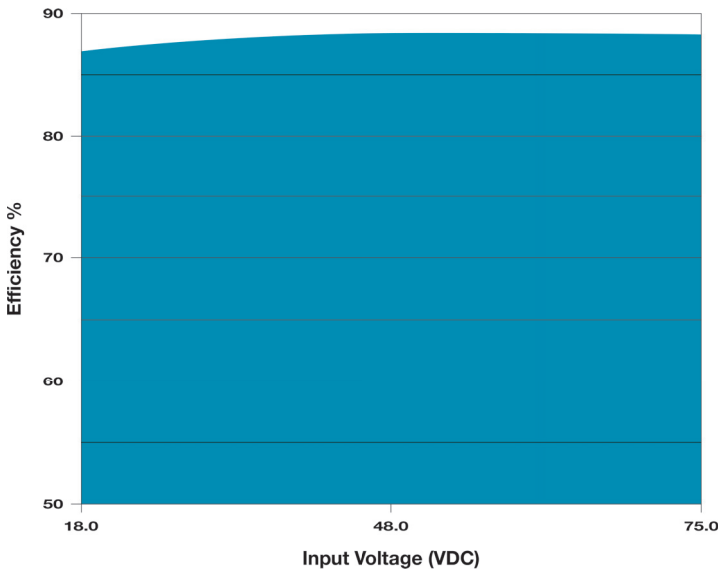
Efficiency vs Input: MG1048S-12RU



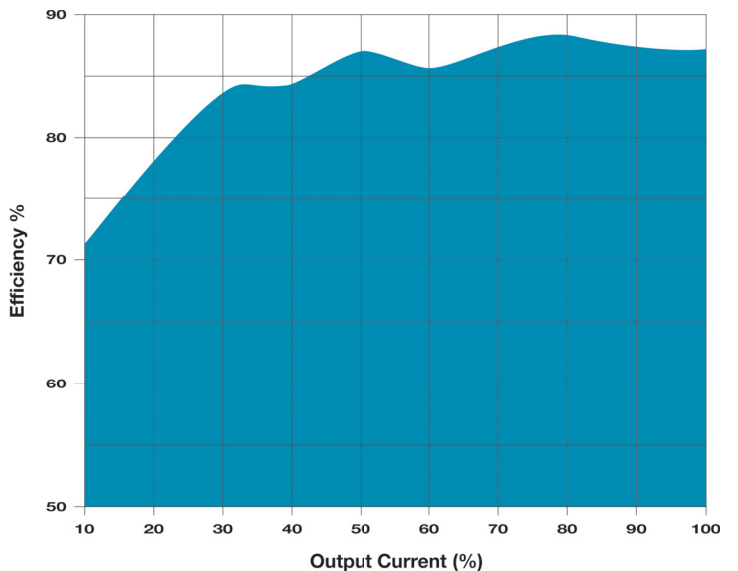
Efficiency vs Output Load: MG1048S-12RU



Efficiency vs Input: MG1048S-24RU



Efficiency vs Output Load: MG1048S-24RU



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Model	C1	C2
MG1024SRU	2.2 μ F/50V	3.3 μ F/50V
MG1048SRU	2.2 μ F/100V	3.3 μ F/50V

The diagram above illustrates a typical connection of the **MG1000SRU**. 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.

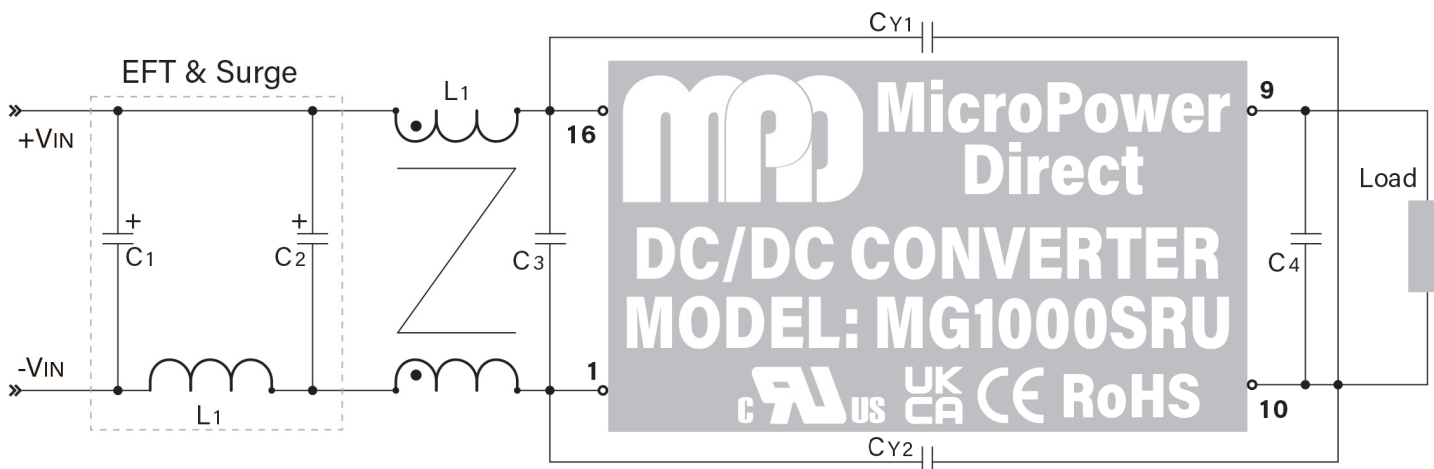
EMI/EMC Characteristics

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 emissions without external components. To meet EN 55032 Class A radiated emissions, the external components L2, CY1 and CY2 are required (see the connection diagram below). For Class A or Class B conducted emissions with the addition of external filtering components.

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

EMI Connection: Class A, Single Output

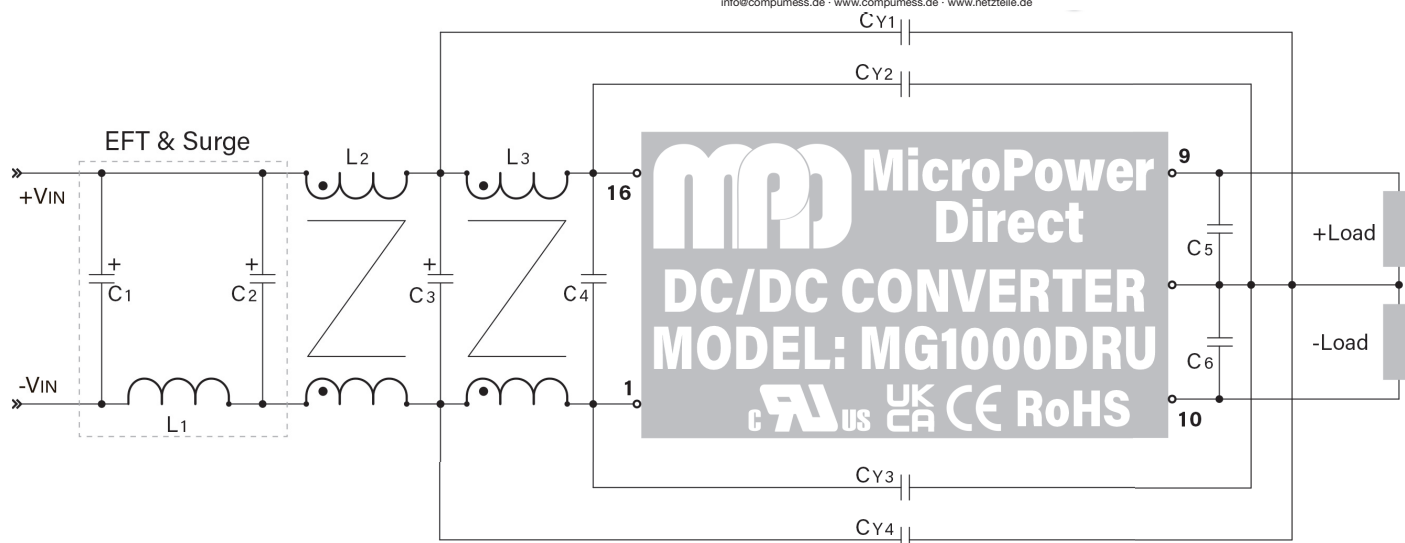


Model	C1	L1	C2	L2	C3	CY1, CY2	C4
MG1024SRU	560 μ F/50V CHEMI-CON KY Series	10 μ H/50V 74477410	560 μ F/50V CHEMI-CON KY Series	30 μ H/1.4A 744273222	2.2 μ F/50V	100 pF/2 kV 1808	3.3 μ F/50V
MG1048SRU	----	----	560 μ F/100V CHEMI-CON KY Series	30 μ H/1.4A 744273222	2.2 μ F/100V	100 pF/2 kV 1808	3.3 μ F/50V

To meet the requirements of EN 55032 class A with the **MG1000SRU**, additional external components are required. The single output connection shown above illustrates an external circuit (L2, CY1 & CY2) 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

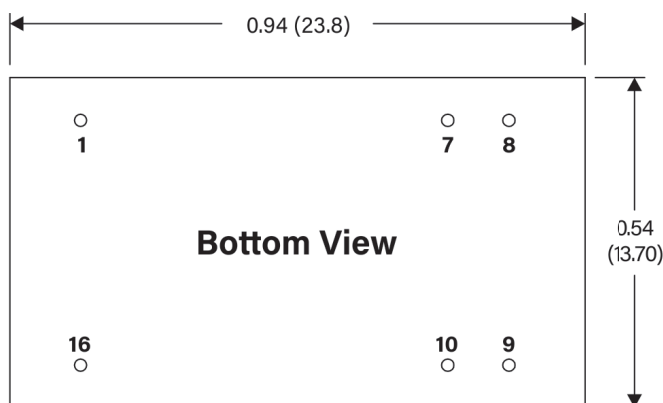


To meet EN 55032 class B requires more robust external filtering. The dual output, **MG1000DRU**, connection shown above illustrates an external circuit (L2, L3, C3, CY1, CY2, CY3 & CY4) that will typically meet these requirements.

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

Model	C1	L1	C2	L2	C3	L3	C4	CY1, CY4	CY2, CY3	C5, C6
MG1024DRU	560 μ F/50V CHEMI-CON KY Series	10 μ H/50V 74477410	560 μ F/50V CHEMI-CON KY Series	1 mH/2.5A 7448012501	2.2 μ F/100V 1206	0.4 mH/4.5A 7448014501	2.2pF 50V	100 pF/2 kV 1808	470 pF/2 kV 1808	3.3 pF 50V
MG1048DRU	----	----	560 μ F/100V CHEMI-CON KY Series	1 mH/2.5A 7448012501	2.2 μ F/100V 1206	0.4 mH/4.5A 7448014501	2.2 pF 100V	100 pF/2 kV 1808	470 pF/2 kV 1808	3.3 pF 50V

Mechanical Dimensions



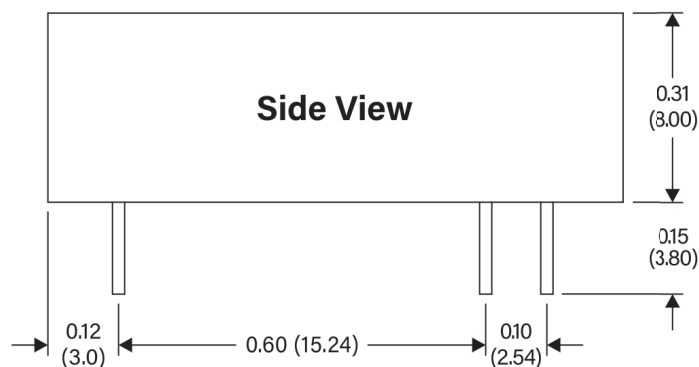
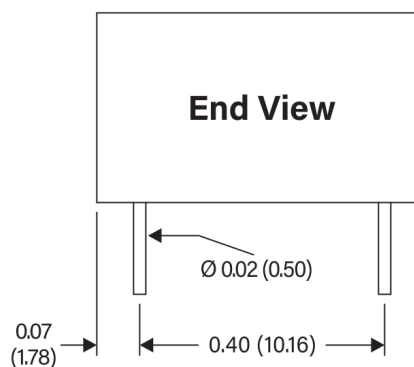
Pin Connections

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)
- 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 $\varnothing 0.03$ ($\varnothing 0.80$)
- Weight (Typ) = 0.215 Oz (6.1g)



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