MI1000BRU

10W, Miniautre 1"x1" Case, 4:1 Input Range DC/DC Converters

Key Features:

- 10W Output Power
- Miniature 1"x1" Case
- Wide 4:1 Input Range
- -40°C - +85°C Operating Temp Range
- 1500VDC Isolation
- Single & Dual Outputs
- Over Voltage Protection
- Industry Standard Pin-Out

CE

RoHS

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	36.0	VDC
	48 VDC Input	18.0	48	75.0	VDC
Reflected Ripple Current	24 VDC Input		40		mA
	48 VDC Input		30		mA
Input Filter			Pi Filter		

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	0% - 100% Load			±1.0	±3.0	%
Line Regulation	Full Load LL⟶HL Low Line⟶High line	Vo1	-	±0.2	±0.5	%
		Vo2	-	±0.5	±1.0	
Load Regulation	5%-100% Load	Vo1	-	±0.5	±1.0	%
		Vo2	-	±0.5	±1.5	
Ripple & Noise, See Note 7	20 MHz bandwidth, 5%-100% load		-	40	80	mVp-p
Temperature Coefficient	Full load		-		±0.03	%/°C
Output Short Circuit	Continuous, self-recovery					

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 seconds	1500	-	-	VDC
Isolation Resistance	500 VDC	1000			MΩ
Isolation Capacitance	100 KHz /0. 1V	-	2000	-	pF
Switching Frequency	PWM		300		kHz

Environmental

Parameter	Conditions	Min.	Typ	Max.	Units
Operating Temperature Range	See Fig 1	-40	-	+85	°C
Storage Temperature Range		-55	-	+125	°C
Cooling	Free Air Convection				
Humidity, See Note 6	Non condensing	5	-	95	%RH

Physical

Case Size	(See mechanical diagrams on page 4)
Case Material	Alluminum alloy, black anodized coating
Weight	0.529Oz(14.99g) Typ.

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C	1.0			MHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	24 VDC Input	-0.7		50	VDC
	48 VDC Input	-0.7		100	VDC

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32/EN 55032	See Fig.7	Class A without components
Conducted Emissions	CISPR32/EN 55032	See Fig.7	Class A without components
ESD	EN 61000-4-2	B	±6 kV Air
			±4 kV Contact

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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MPD
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Model Selection Guide

Model Number	Input				Output			Full Load Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (µF Max) See Note 5	Fuse Rating Slow-Blow (mA) See Note 1
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MI1024S-03BRU	24	9.0 – 36.0	423	5	3.3	2400	0.0	78	40.0	2200	2500
MI1024S-05BRU	24	9.0 – 36.0	502	5	5.0	2000	0.0	83	40.0	2200	2500
MI1024S-09BRU	24	9.0 – 36.0	502	5	9.0	1111	0.0	85	40.0	680	2500
MI1024S-12BRU	24	9.0 – 36.0	502	5	12.0	833	0.0	86	40.0	470	2500
MI1024S-15BRU	24	9.0 – 36.0	502	5	15.0	667	0.0	86	40.0	330	2500
MI1024S-24BRU	24	9.0 – 36.0	502	5	24.0	416	0.0	88	40.0	100	2500
MI1024D-05BRU	24	9.0 – 36.0	502	5	±5.0	±1000	±0.0	83	40.0	1000	2500
MI1024D-09BRU	24	9.0 – 36.0	502	5	±9.0	±555	±0.0	86	40.0	680	2500
MI1024D-12BRU	24	9.0 – 36.0	502	5	±12.0	±416	±0.0	87	40.0	470	2500
MI1024D-15BRU	24	9.0 – 36.0	502	5	±15.0	±333	±0.0	87	40.0	330	2500
MI1024D-24BRU	24	9.0 – 36.0	502	5	±24.0	±208	±0.0	87	40.0	100	2500
MI1048S-03BRU	48	18.0 – 75.0	190	4	3.3	2400	0.0	79	30.0	2200	1250
MI1048S-05BRU	48	18.0 – 75.0	251	4	5.0	2000	0.0	83	30.0	2200	1250
MI1048S-12BRU	48	18.0 – 75.0	251	4	12.0	833	0.0	87	30.0	470	1250
MI1048S-15BRU	48	18.0 – 75.0	251	4	15.0	667	0.0	87	30.0	330	1250
MI1048S-24BRU	48	18.0 – 75.0	251	4	24.0	416	0.0	88	30.0	100	1250
MI1048D-05BRU	48	18.0 – 75.0	251	4	±5.0	±1000	±0.0	83	30.0	1000	1250
MI1048D-12BRU	48	18.0 – 75.0	251	4	±12.0	±416	±0.0	87	30.0	470	1250
MI1048D-15BRU	48	18.0 – 75.0	251	4	±15.0	±333	±0.0	87	30.0	330	1250
MI1048D-24BRU	48	18.0 – 75.0	251	4	±24.0	±208	±0.0	87	30.0	100	1250

Typical Characteristic Curves

Temperature Derating Curve

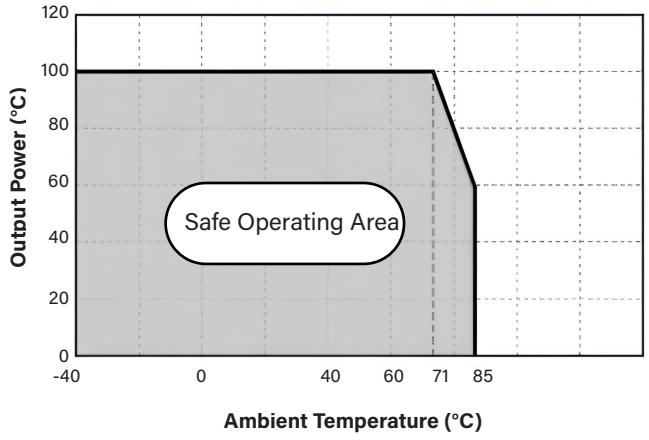
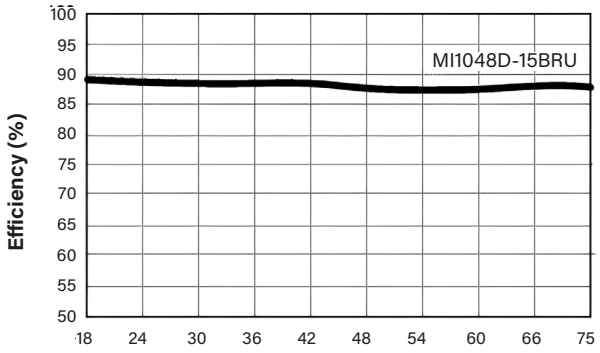


Fig. 1

Notes:

1. 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.
2. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage.
3. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product.
4. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this manual.
5. The maximum capacitive load is tested within the input voltage range and under full load conditions.
6. Unless otherwise specified, all indicators in this manual are measured at Ta=25 °C, humidity<75% RH, nominal input voltage, and output rated load.
7. All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 6. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.
8. All indicator testing methods in this manual are based on our company's corporate standards.
9. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel.
10. Product specifications are subject to change without prior notice.

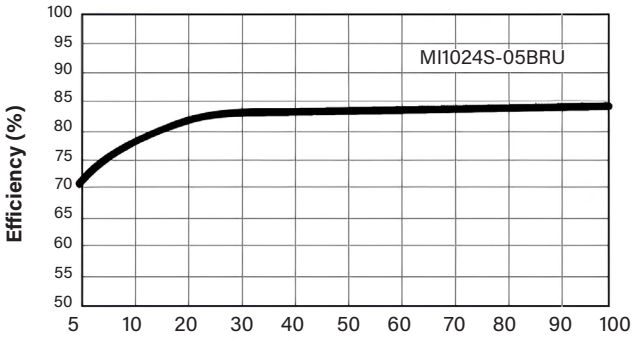
Efficiency VS Input Voltage (Full Load)



Input Voltage (VDC)

Fig. 2

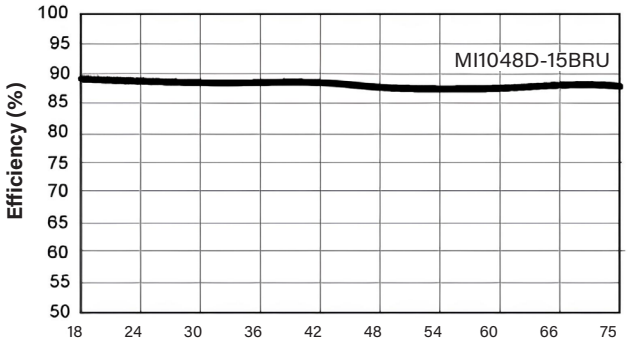
Efficiency Vs Output Load (Vin=24V)



Output Current (%)

Fig. 3

Efficiency Vs Output Load (Vin=48V)



Output Current (%)

Fig. 4

Circuit Design and Application

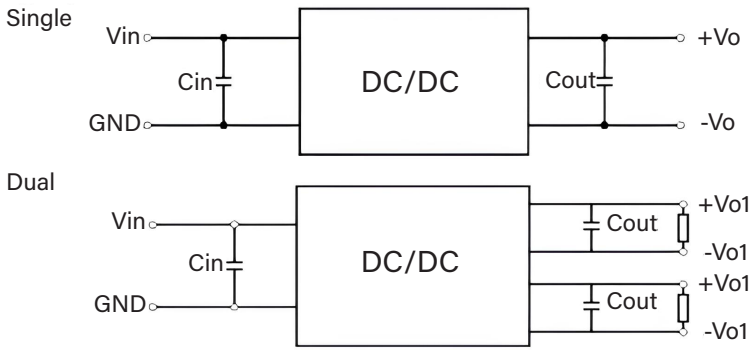


Fig.5

Recommended component parameters		
Vout(VDC)	Cin(uF)	Cout(uF)
3.3/5/12/15	100uF	100uF
24	100uF	47uF

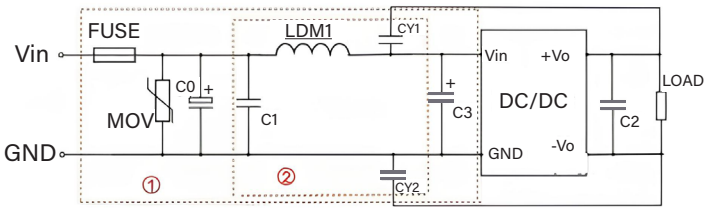
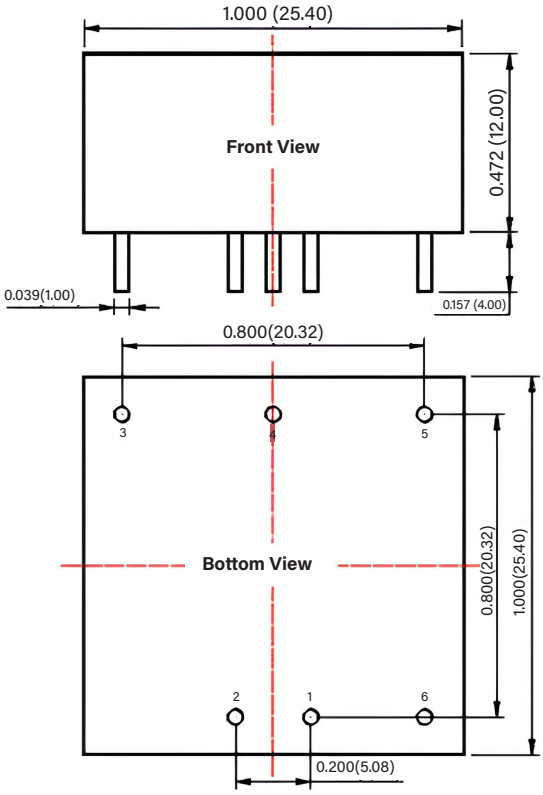


Fig. 6

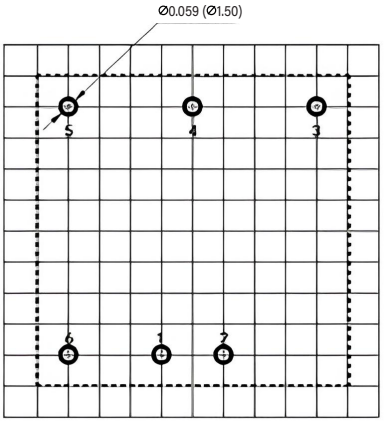
Note:
Part 1 of Figure 6 is used for EMS testing; Part 2 is used for EMI filtering and can be selected according to requirements.

EMI Recommended component parameters		
Vin(VDC)	24VDC	48VDC
FUSE	Choose according to actual input current	
MOV	20D470K	14D101K
C0/C3	330uF/50V	330uF/100V
C1	1uF/50V	1uF/100V
C2	Refer to the Cout in Fig.5	
LDM1	4.7uH	
CY1,CY2	1nF/2KV	

Mechanical Dimensions



PCB Layout



The grid distance is 2.54 x 2.54 mm

Note:
Unit: inches(mm)
Pin section tolerances: ±0.004 (±0.10)
General tolerances: ±0.020 (±0.50)

Pin Definition Table

Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	COM
5	-Vo	-Vo
6	Remote On/Off Instructions	

Remote On/Off instructions		
Unit	Min	Max
On	3.5V	12.0V
Off	0V	1.2V