

MI3000BRU

30W, Miniature 1"x1" Case, Ultrawide 4:1 Input Range DC/DC Converters



Key Features:

- 30W Output Power
- Miniature 1"x1" Case
- Ultrawide 4:1 Wide Input Range
- -40°C to +105°C Operating Temp Range
- 1500 VDC Isolation
- Efficiency to 90%
- Short Circuit Protection
- Industry Standard Pin-Out
- Over Voltage Protection
- Over Current Protection

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, See Note 3	24 VDC Input	9	24	40	VDC	
	48 VDC Input	18	48	80		
Input Start Voltage	24 VDC Input			9	VDC	
	48 VDC Input			18		
Input Under Voltage Protection	24 VDC Input	5.5	7.5		VDC	
	48 VDC Input	12	15.5			
Reflected Ripple Current	Rated Input Voltage		60			mA
Input Filter					PI Filter	

Output					
Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	5% - 100% Load		±1.0	±3.0	%
Line Regulation	Vin = Min. to Max. @ Full Load		±0.2	±0.5	
Load Regulation	5%-100% Load		±0.5	±1.0	%
Ripple & Noise, See Note 2	20 MHz bandwidth, 5%-100% load		100	200	mVp-p
Transient Recovery Time	25% Load step change		250	500	µs
Transient Response Deviation			±3	±8	%
Temperature Coefficient	Full load		±0.01	±0.02	%/°C
Trim			±10		%
Over Load Protection		110	140		%Io
Output Short Circuit	Continuous, self-recovery				
Over Voltage Protection		110	140		%VOUT

General						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	60 seconds, leakage current < 1 mA	1500			VDC	
Isolation Resistance	500 VDC	1000			MΩ	
Isolation Capacitance	100 KHz /0.1V		2000		pF	
Switching Frequency	Full load, nominal Vin		330		kHz	

Environmental					
Parameter	Conditions	Min.	Typ	Max.	Units
Operating Temperature Range	See Fig 1 & 2	-40		+105	°C
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Humidity, See Note 7	Non condensing			95	%RH

Physical						
Case Size	1.0 x 1.0 x 0.4724 in (See mechanical diagrams on page 5)					
Case Material	Aluminum alloy					
Weight	0.74Oz (21.0g)					

Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL-HDBK-217F@25°C	1.0			MHours	
Lead Temperature	1.5mm from case for 10 seconds			300	°C	

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



RoHS

MicroPower Direct
MPD
MICROPOWER DIRECT

Model Selection Guide

Model Number	Input				Output			Full Load Efficiency (% Typ)	Reflected Ripple Current (mA, Typ)	Capacitive Load (μF, Max) (See Note 2)	Fuse Rating Slow-Blow (mA) (See Note 1)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load (Typ)	No-Load							
MI3024S-03BRU	24	9 - 36	1545	6	3.3	6000	0	84	60	8000	7500
MI3024S-05BRU	24	9 - 36	1454	6	5	6000	0	88	60	6000	7500
MI3024S-12BRU	24	9 - 36	1388	6	12	2500	0	89	60	5000	7500
MI3024S-15BRU	24	9 - 36	1388	6	15	2000	0	89	60	3000	7500
MI3024S-24BRU	24	9 - 36	1388	6	24	1250	0	90	60	1000	7500
MI3048S-03BRU	48	18 - 75	710	8	3.3	6000	0	83	60	8000	3750
MI3048S-05BRU	48	18 - 75	710	8	5	6000	0	87	60	6000	3750
MI3048S-12BRU	48	18 - 75	710	8	12	2500	0	88	60	5000	3750
MI3048S-15BRU	48	18 - 75	710	8	15	2000	0	88	60	3000	3750
MI3048S-24BRU	48	18 - 75	710	8	24	1250	0	89	60	1000	3750

Notes:

- It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection Guide.
- All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 7. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} 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.
- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage.
- 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.
- The maximum capacitive load is tested within the input voltage range and under full load conditions.
- Unless otherwise specified, all indicators in this manual are measured at $T_a=25^\circ\text{C}$, humidity < 75% RH, nominal input voltage, and output rated load.
- Product specifications are subject to change without prior notice.

Temperature Derating: 24VIN, 3.3/5VOUT

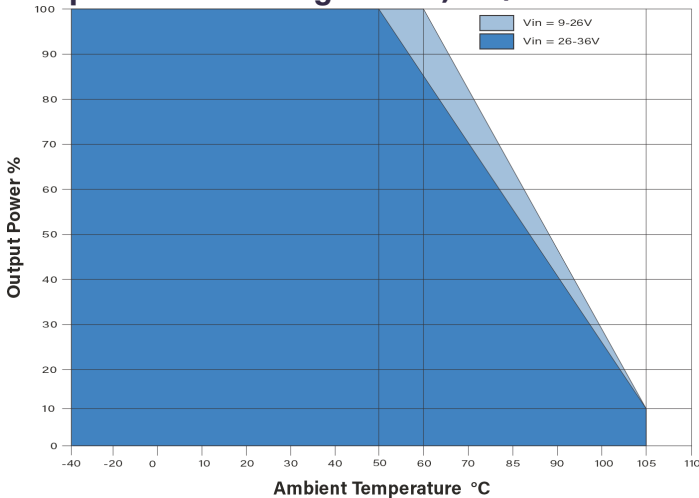


Fig. 1

Temperature Derating: 24VIN, 12/15VOUT

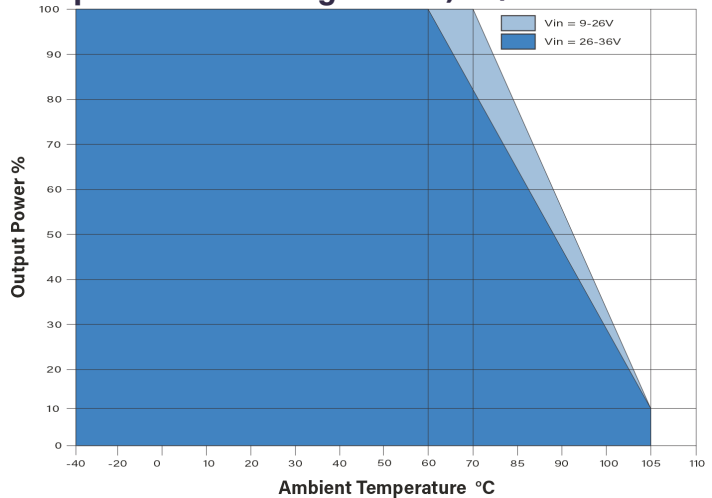


Fig. 2

Temperature Derating: 48VIN, 3.3/5VOUT

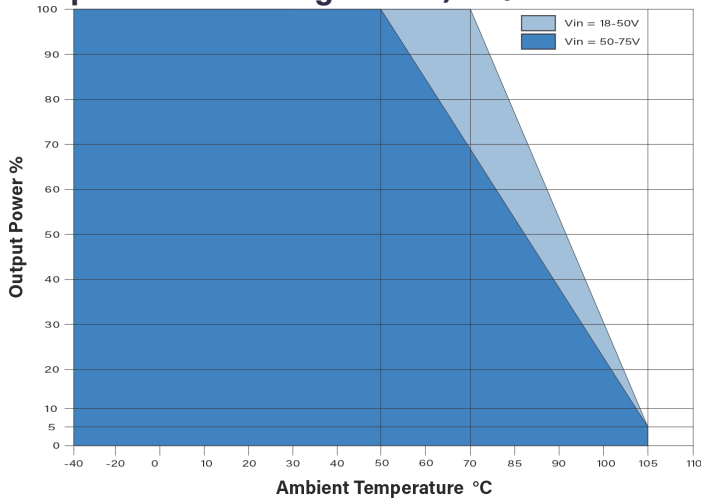


Fig. 3

Temperature Derating: 48VIN, 12/15VOUT

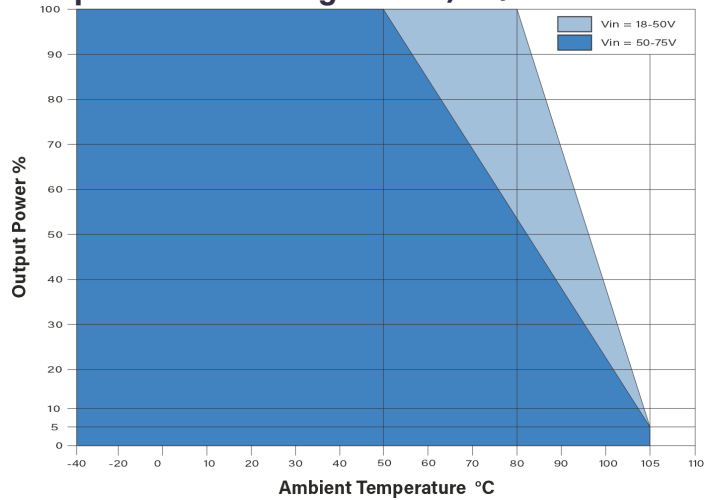


Fig. 4

Load vs VIN: 24VIN Models

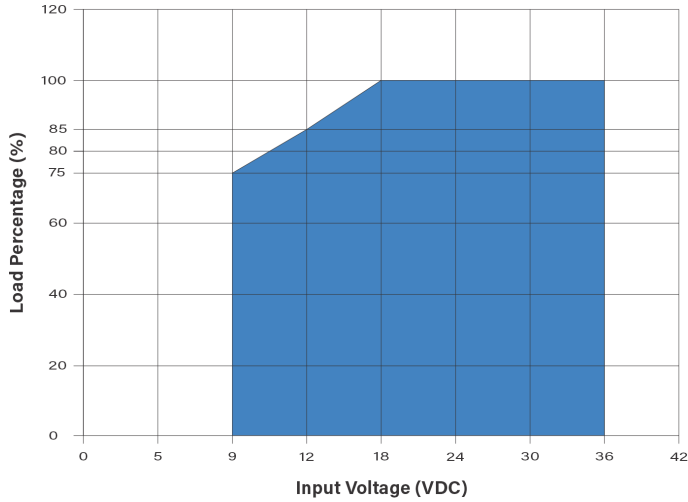


Fig. 5

Load vs VIN: 48VIN Models

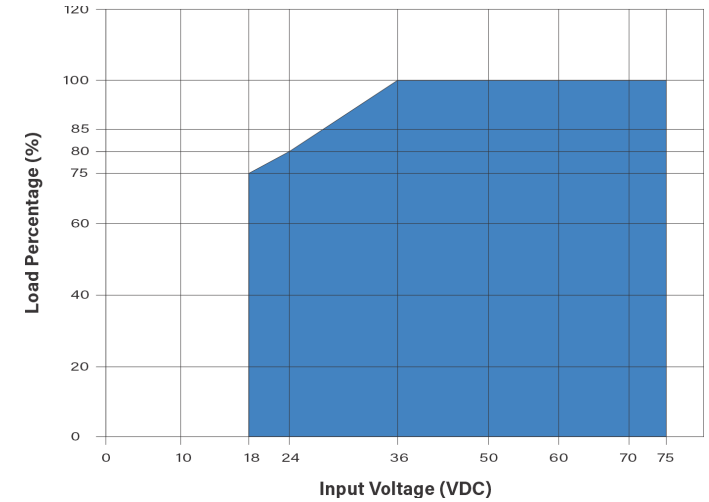


Fig. 6

Application Circuits

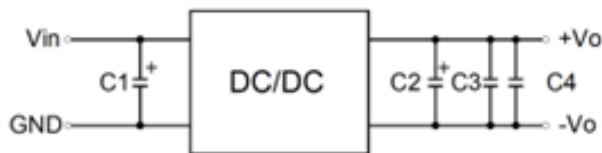


Fig. 7

Recommended Component Parameters

Vin(VDC)	C1 (uF)	C2 (uF)	C3 (uF)	C4 (uF)
24	100	470	10	0.1
48			22	10

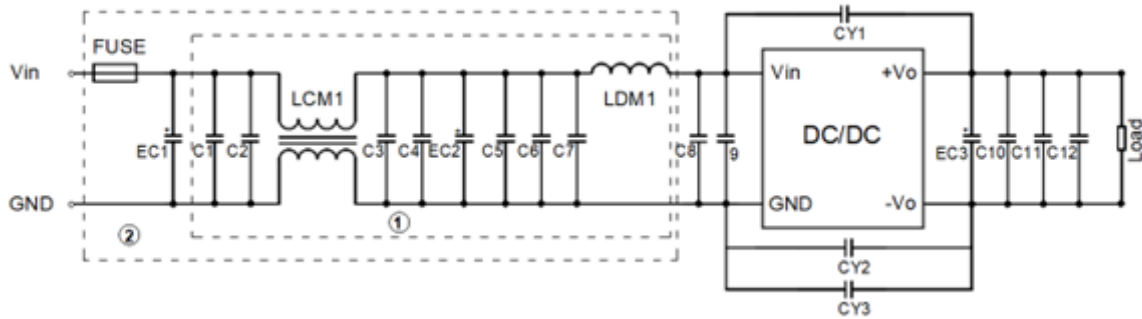
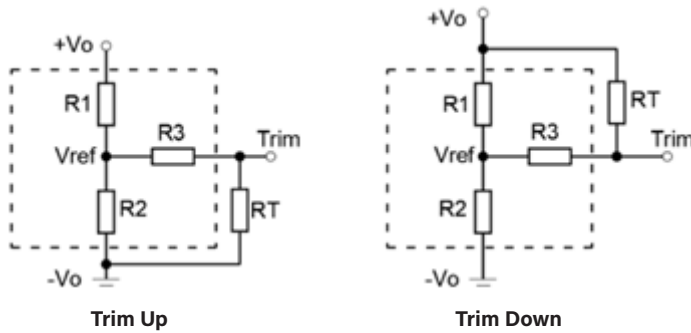


Fig. 8

EMI Recommended Component Parameters

Vin(VDC)	FUSE	CEC1 (uF)	EC2 (uF)	C1, C2, C3, C4, C5 (uF)	LCM1 (mH)	LDM1 (uH)	C8, C9 (uF)	CY2 (pF)	CY1, CY3 (pF)	EC3 (uF)	C10 (uF)	C11, C12 (uF)
24V	Select for Application	1000	220	4.7	0.32	2.2	-	222	2200	470	10	1
48V		680	100	4.7	10	6.8	4.7	102	2200	470	22	10



Trim resistor connections (dashed line shows internal resistor network)

Fig. 9

Trim Recommended component parameters

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	10	6.064	13.622	1.24
5	2.4	2.344	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

$$\text{Up: } R_t = \frac{nR_2}{R_2 - n} \cdot R_3 \quad n = \frac{V_{\text{ref}}}{V_o - V_{\text{ref}}} \cdot R_1$$

$$\text{Down: } R_t = \frac{nR_1}{R_1 - n} \cdot R_3 \quad n = \frac{V_o - V_{\text{ref}}}{V_{\text{ref}}} \cdot R_2$$

EMI Characteristics

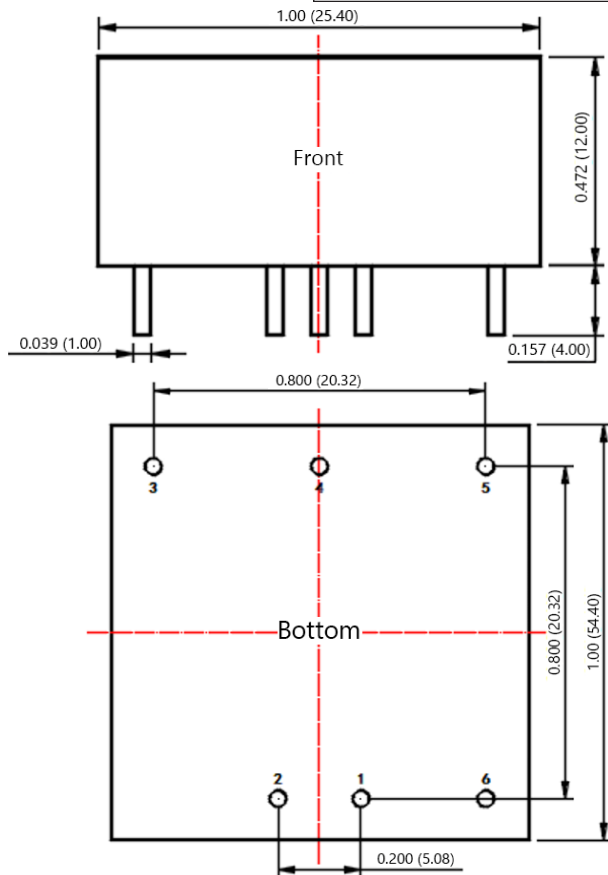
Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32/EN 55032		Class B (See Fig. 8 - 1)
Conducted Emissions	CISPR32/EN 55032		Class B (See Fig. 8 - 1)
ESD	IEC/EN 61000-4-2	B	±6 kV Contact, ±8 kV Air
RS	IEC/EN 61000-4-3	A	10V/m
EFT	IEC/EN 61000-4-4	B	±2 kV (Recommended circuit Fig. 8 - 2)
Input Voltage Surge	IEC/EN 61000-4-5	B	±1 kV line to line (Recommended circuit Fig. 8 - 2)
CS	IEC/EN 61000-4-6	A	3Vr.m.s

Mechanical Dimensions

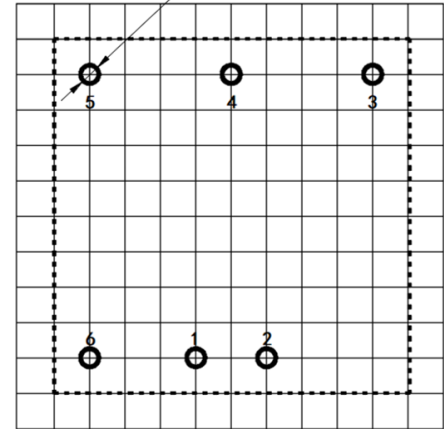
CompuMess Elektronik GmbH

CME

Lise-Meitner-Str. 4 | 85716 Unterschleißheim | ☎ +49 89 321501-0 | 📠 +49 89 321501-11 | ✉ info@compumess.de | www.compumess.de



PCB Layout
Ø0.059 (Ø1.50)



The grid distance is 2.54 x 2.54 mm

Pin Definition Table

Pin	Single
1	GND
2	Vin
3	+Vo
4	Trim
5	-Vo
6	CTRL

Note:

Unit: inches(mm)

Pin section tolerances: ± 0.004 (± 0.10)

General tolerances: ± 0.020 (± 0.50)

Control Pin Conditions

Item	Operating Conditions	Min.	Typ.	Max.	Units
Ctrl	Turn off moduel		Connected GND or (0-1.2V)		
	Turn on moduel		Not Connected or (3.5-12V)		
	Input current when off	--	5	8	mA

MPD has a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.

We have AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.

We also offer a wide variety of DC/DC converters, LED Drivers, POL regulators and IGBT drivers. All products are available with short lead times. Call today for complete information or product samples. Or go to our website:

WWW.MICROPOWERDIRECT.COM



MPD MicroPower Direct

CompuMess Elektronik GmbH

CME

Lise-Meitner-Str. 4 | 85716 Unterschleißheim | ☎ +49 89 321501-0 | 📠 +49 89 321501-11 | ✉ info@compumess.de | www.compumess.de