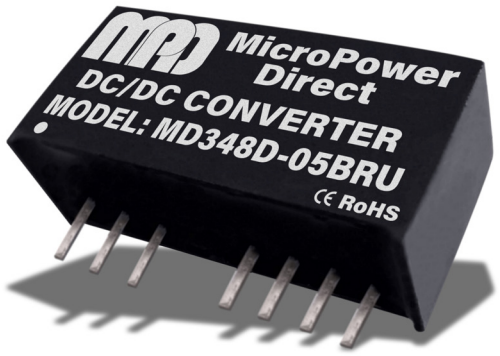
MD300BRU

3W, 4:1 Input Range, Single & Dual Output DC/DC Converters



Key Features:

- 3W Output Power
- Miniature SIP Case
- 4:1 Wide Input Range
- -40°C to +85°C Operating Temperature Range
- 1500VDC Isolation Voltage
- 24 Standard Models
- Single & Dual Outputs
- Short Circuit Protected
- Industry Standard Pin-Out

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, See Note 2	12 VDC Input	4.5	12	18.0	VDC
	24 VDC Input	9.0	24	36.0	VDC
	48 VDC Input	18.0	48	75.0	VDC
Reflected Ripple Current	12 VDC Input	--	15	--	mA
	24 VDC Input	--	15	--	mA
	48 VDC Input	--	15	--	mA
Input Filter	Capacitor				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	0% - 100% Load	--	±2.0	--	--
Line Regulation	Full Load, Low Line to High Line	--	±0.3	±0.5	%
Load Regulation	10%-100% Of Load	--	±0.5	±1.0	%
Ripple & Noise, See Note 3	20MHZ Bandwidth	--	50	150	mVp-p
Temperature Coefficient	Full load		±0.02	±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	100	--	--	MΩ
Isolation Capacitance	100 KHz /0. 1V	--	1000	--	pF
Switching Frequency	Full load, nominal input voltage	--	330	--	kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Derating when operating temperature >85°C	-40	-	+85	°C
Storage Temperature Range	--	-55	--	+105	°C
Cooling	Free air convection				
Humidity, See Note 6	Non condensing	--	--	95	%RH

Physical

Case Size	0.87 in x 0.37 in x 0.47 in (See mechanical diagrams on page 4)
Case Material	Black plastic; flame retardant and heat resistant (UL94V-0 rated)
Weight	0.17 oz (4.8g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C	3.5	--	--	MHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	12 VDC Input	-0.7	--	25	VDC
	24 VDC Input	-0.7	--	50	VDC
	48 VDC Input	-0.7	--	100	VDC
Lead Temperature	1.5 mm from Case for 10 Sec.	--	--	300	°C

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

RoHS

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MICROPOWER DIRECT

Model Selection Guide

Model Number	Input				Output		Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (μF, Max) (See Note5)	Fuse Rating Slow-Blow (mA) (See Note1)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)				
	Nominal	Range	Full-Load	No-Load						
MD312S-03BRU	12	4.5 – 18.0	306	60	3.3	700	74	15.0	1760	2000
MD312S-05BRU	12	4.5 – 18.0	306	60	5.0	600	78	15.0	100	2000
MD312S-12BRU	12	4.5 – 18.0	306	60	12.0	250	80	15.0	170	2000
MD312S-15BRU	12	4.5 – 18.0	306	60	15.0	200	80	15.0	110	2000
MD312D-05BRU	12	4.5 – 18.0	306	60	±5.0	±300	80	15.0	470	2000
MD312D-12BRU	12	4.5 – 18.0	306	60	±12.0	±125	80	15.0	100	2000
MD312D-15BRU	12	4.5 – 18.0	306	60	±15.0	±100	80	15.0	47	2000
MD324S-03BRU	24	9.0 – 36.0	140	25	3.3	700	75	15.0	1760	1000
MD324S-05BRU	24	9.0 – 36.0	140	25	5.0	600	80	15.0	1000	1000
MD324S-09BRU	24	9.0 – 36.0	140	25	9.0	333	81	15.0	1000	1000
MD324S-12BRU	24	9.0 – 36.0	140	25	12.0	250	81	15.0	170	1000
MD324S-15BRU	24	9.0 – 36.0	140	25	15.0	200	81	15.0	110	1000
MD324S-24BRU	24	9.0 – 36.0	140	25	24.0	125	83	15.0	110	1000
MD324D-05BRU	24	9.0 – 36.0	140	25	±5.0	±300	79	15.0	470	1000
MD324D-12BRU	24	9.0 – 36.0	140	25	±12.0	±125	80	15.0	100	1000
MD324D-15BRU	24	9.0 – 36.0	140	25	±15.0	±100	81	15.0	47	1000
MD348S-03BRU	48	18.0 – 75.0	82	15	3.3	700	74	15.0	1760	500
MD348S-05BRU	48	18.0 – 75.0	82	15	5.0	600	79	15.0	1000	500
MD348S-12BRU	48	18.0 – 75.0	82	15	12.0	250	79	15.0	170	500
MD348S-15BRU	48	18.0 – 75.0	82	15	15.0	200	79	15.0	110	500
MD348S-24BRU	48	18.0 – 75.0	82	15	24.0	125	80	15.0	68	500
MD348D-05BRU	48	18.0 – 75.0	82	15	±5.0	±300	79	15.0	470	500
MD348D-12BRU	48	18.0 – 75.0	82	15	±12.0	±125	79	15.0	100	500
MD348D-15BRU	48	18.0 – 75.0	82	15	±15.0	±100	80	15.0	47	500

Typical Characteristic Curves

Temperature Derating Curve

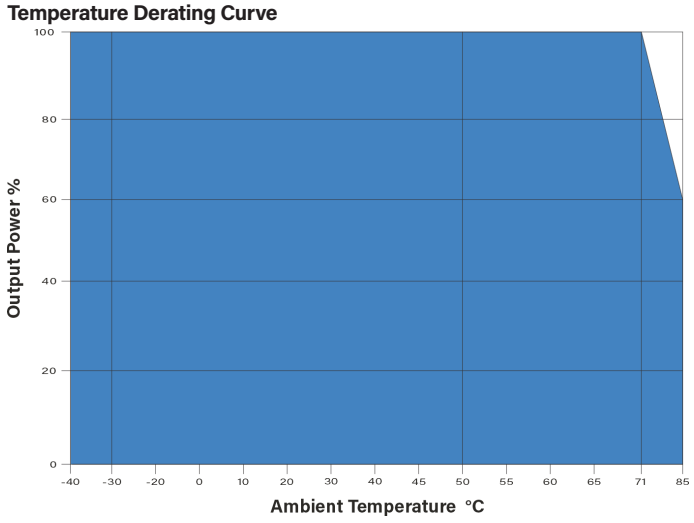


Fig. 1

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 indicator testing methods in this manual are based on our company's corporate standards.
8. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel.
9. Product specifications are subject to change without prior notice.

Efficiency VS Input Voltage (Full Load)

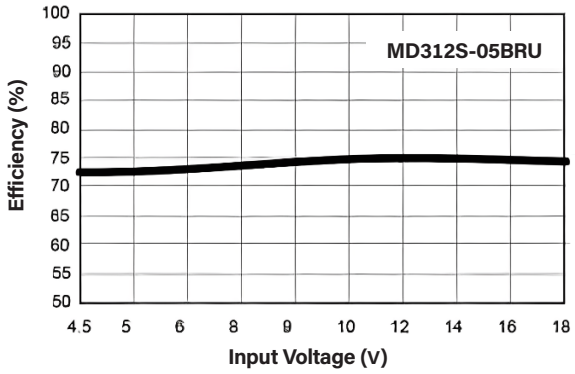


Fig. 2

Efficiency VS Output Load (Vin=12V)

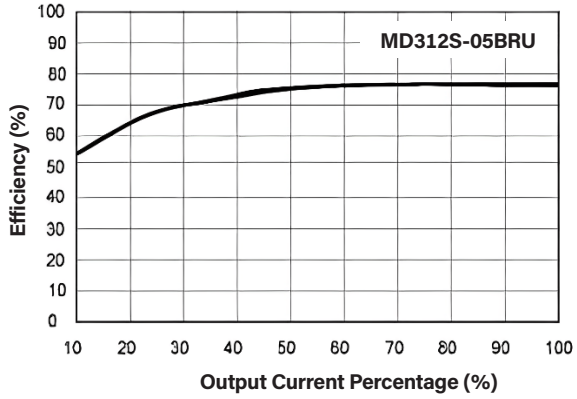


Fig. 3

Efficiency VS Input Voltage (Full Load)

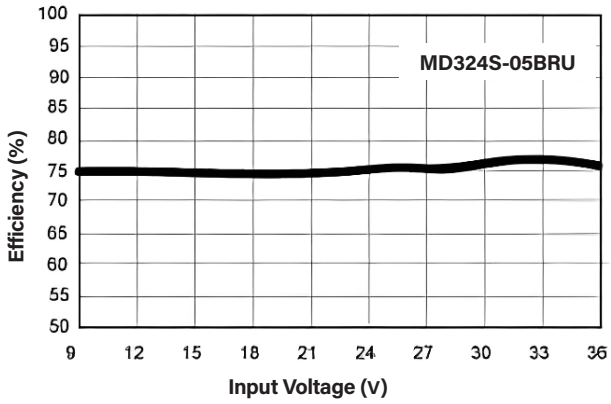


Fig. 4

Efficiency VS Output Load (Vin=24V)

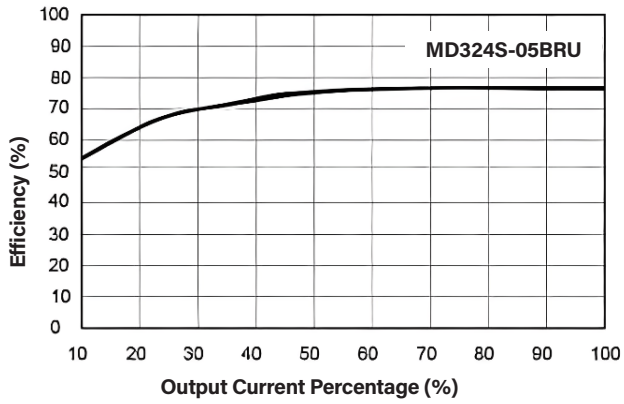


Fig. 5

Application Circuits

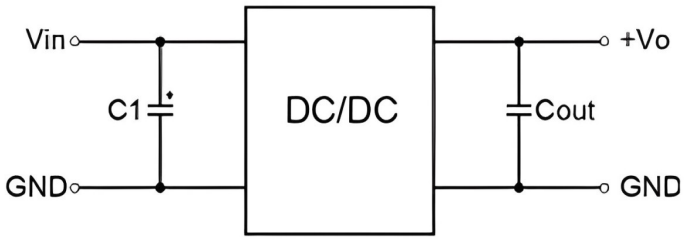
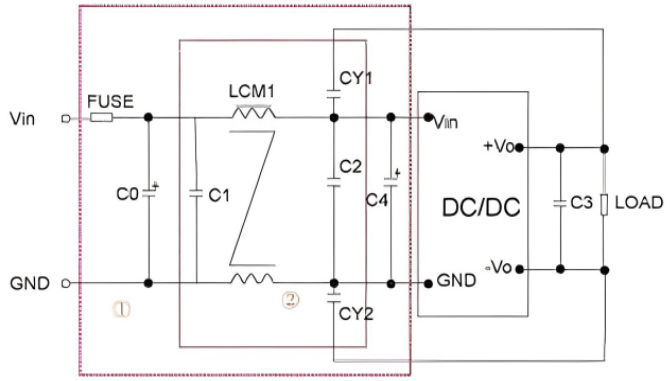


Fig. 6

Recommended Capacitive Load Value Table	
Cin(μF)	Cout(μF)
100	22

Application Circuit



Note: Part 1 in Figure 7 is for EMC testing. The part 2 is used for EMI filtering, which can be selected according to the demand.

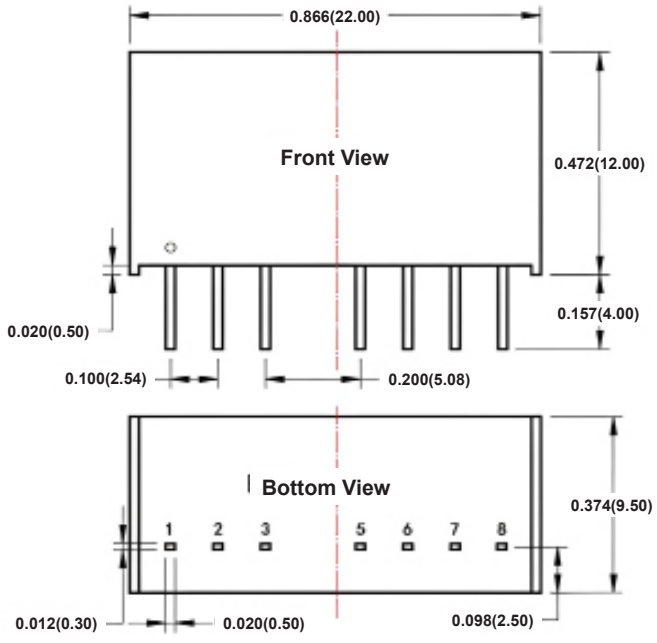
Fig. 7

EMI Recommended Parameter Table			
Model	Vin: 12V	Vin: 24V	Vin: 48V
FUSE	Select according to the actual input current of the application		
C0, C4	470uF/25V	330uF/50V	100uF/100V
C1, C2	10uF/50V		10uF/100V
LCM1	1.4-1.7mH		
C3	22μF/50V		
CY1, CY2	1nF/400VAC		

EMI Characteristics

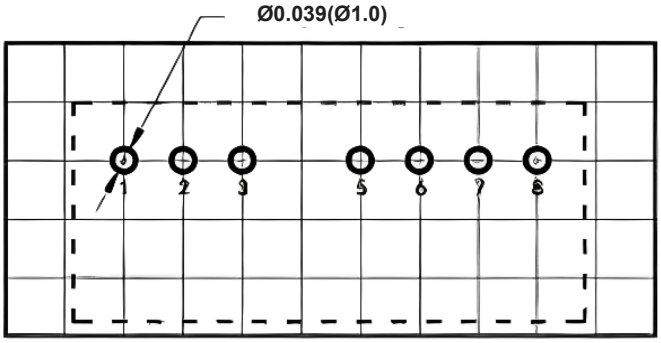
Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32/EN 55032 (See Fig. 7)	--	Class B
Conducted Emissions	CISPR32/EN 55032 (See Fig. 7)	--	Class B
ESD	EN 61000-4-2	B	±8 kV Contact

Mechanical Dimensions



Note:
Unit: Inches(mm)
Pin Section Tolerances: ±0.004(±0.10)
General Tolerances: ±0.020(±0.50)

PCB Layout



Note: The grid distance is 2.54mm*2.54mm

Pin Definition Table

Pin	Function (single)	Function (double)
1	GND	GND
2	Vin	Vin
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	-Vo	COM
8	NC	-Vo

NC: Pin to be Isolated from Circuity