MD100BRU

1W, 4:1 Input Range, Compact SIP DC/DC Converters

Key Features:

- 1W Output Power
- Compact SIP Case
- 4:1 Wide Input Range
- -40°C to +105°C Operating Temperature Range
- 1500VDC Isolation Voltage
- 24 Standard Models
- Single & Dual Outputs
- Short Circuit Protected
- Low Ripple & Noise

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	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	--	30	--	mA
	24 VDC Input	--	40	--	mA
	48 VDC Input	--	55	--	mA
Input Filter	Capacitor				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	10% - 100% Load	--	±1.0	±3.0	
Line Regulation	Full Load	--	±0.2	±0.5	%
Load Regulation	10%-100% Of Load	--	±0.4	±0.75	%
Ripple & Noise	12 VDC Input	--	100	150	mVp-p
	24 VDC Input	--	70	100	
	48 VDC Input	--	100	150	
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	1000	--	--	MΩ
Isolation Capacitance	100 KHz /0. 1V	--	120	--	pF
Switching Frequency	Full load, nominal input voltage	300	330	360	kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Derating when operating temperature >85°C	-40	--	+105	°C
Storage Temperature Range	--	-55	--	+105	°C
Cooling	Free air convection				
Humidity, See Note 3	Non condensing	--	--	95	%RH

Physical

Case Size	(See mechanical diagrams on page 4)
Case Material	Black plastic; flame retardant and heat resistant (UL94V-0 rated)
Weight	0.134 oz (3.8 gms) 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)	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.

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Model Selection Guide

Model Number	Input				Output			Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA) (See Note1)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MD112S-03BRU	12	4.5 – 18.0	281	40	3.3	303	15	75	30.0	2700	600
MD112S-05BRU	12	4.5 – 18.0	281	40	5.0	200	10	76	30.0	2200	600
MD112S-09BRU	12	4.5 – 18.0	281	40	9.0	111	6	80	30.0	1000	600
MD112S-12BRU	12	4.5 – 18.0	281	40	12.0	83	4	82	30.0	680	600
MD112S-15BRU	12	4.5 – 18.0	281	40	15.0	67	3	83	30.0	471	600
MD112S-24BRU	12	4.5 – 18.0	281	40	24.0	42	2	81	30.0	330	600
MD112D-05BRU	12	4.5 – 18.0	281	40	±5.0	±100	±5	78	30.0	1000	600
MD112D-12BRU	12	4.5 – 18.0	281	40	±12.0	±42	±2	79	30.0	470	600
MD112D-15BRU	12	4.5 – 18.0	281	40	±15.0	±33	±2	80	30.0	330	600
MD124S-03BRU	24	9.0 – 36.0	111	15	3.3	303	15	74	40.0	2700	300
MD124S-05BRU	24	9.0 – 36.0	111	15	5.0	200	10	81	40.0	2200	300
MD124S-12BRU	24	9.0 – 36.0	111	15	12.0	83	4	83	40.0	680	300
MD124S-15BRU	24	9.0 – 36.0	111	15	15.0	67	3	83	40.0	470	300
MD124S-24BRU	24	9.0 – 36.0	111	15	24.0	42	2	83	40.0	330	300
MD124D-05BRU	24	9.0 – 36.0	111	15	±5.0	±100	±5	79	40.0	1000	300
MD124D-12BRU	24	9.0 – 36.0	111	15	±12.0	±42	±2	83	40.0	470	300
MD124D-15BRU	24	9.0 – 36.0	111	15	±15.0	±33	±2	83	40.0	330	300
MD148S-03BRU	48	18.0 – 75.0	55	6	3.3	303	15	75	55.0	2700	150
MD148S-05BRU	48	18.0 – 75.0	55	6	5.0	200	10	76	55.0	2200	150
MD148S-12BRU	48	18.0 – 75.0	55	6	12.0	83	4	80	55.0	680	150
MD148S-15BRU	48	18.0 – 75.0	55	6	15.0	67	3	84	55.0	470	150
MD148D-05BRU	48	18.0 – 75.0	55	6	±5.0	±100	±5	79	55.0	1000	150
MD148D-12BRU	48	18.0 – 75.0	55	6	±12.0	±42	±2	82	55.0	470	150
MD148D-15BRU	48	18.0 – 75.0	55	6	±15.0	±33	±2	82	55.0	330	150

Typical Characteristic Curves

Temperature Derating Curve

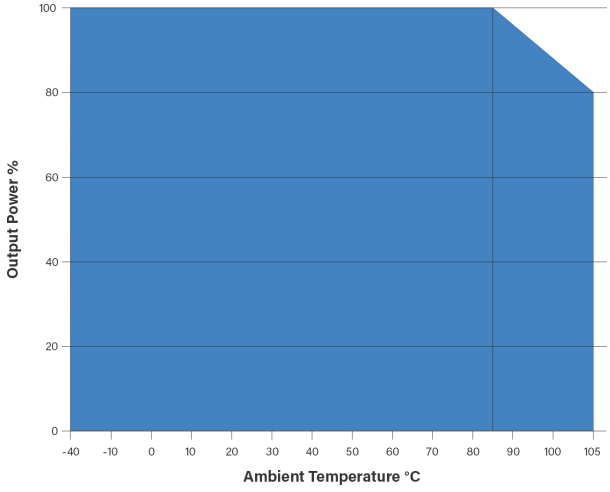


Fig. 1

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 cannot exceed the specified range value, otherwise permanent and irreparable damage may be caused.
3. Unless otherwise specified,the parameters in this datasheet were measured at 25°C , humidity 40%~75%, input nominal voltage and output pure resistance mode under full load.
4. All index test methods are based on our company's enterprise standards.

Efficiency VS Input Voltage (Full Load)

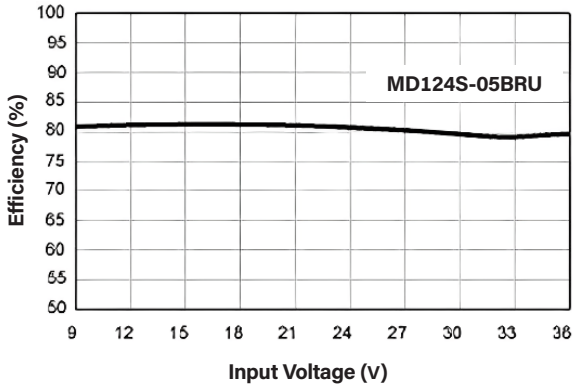


Fig. 2

Efficiency VS Output Load (Vin=24V)

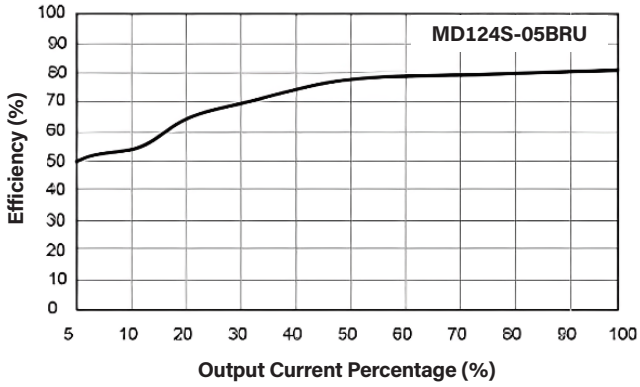


Fig. 3

Efficiency VS Input Voltage (full load)

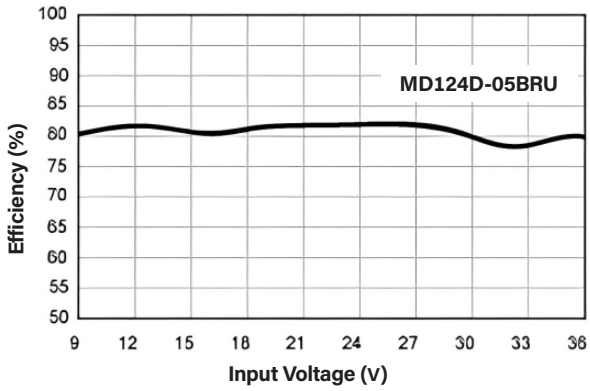


Fig. 4

Efficiency VS Output Load (Vin=24V)

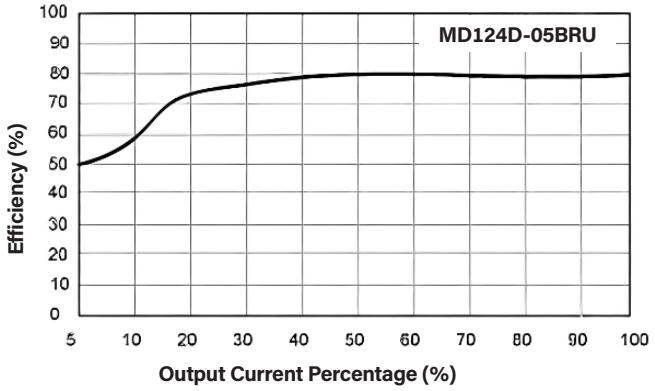


Fig. 5

Application Circuits

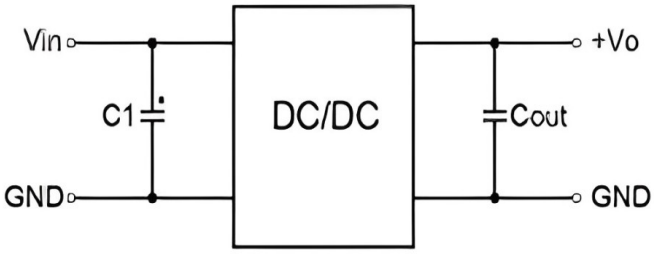


Fig. 6

Recommended Capacitive Load Value Table	
Cin(μF)	Cout(μF)
100	10

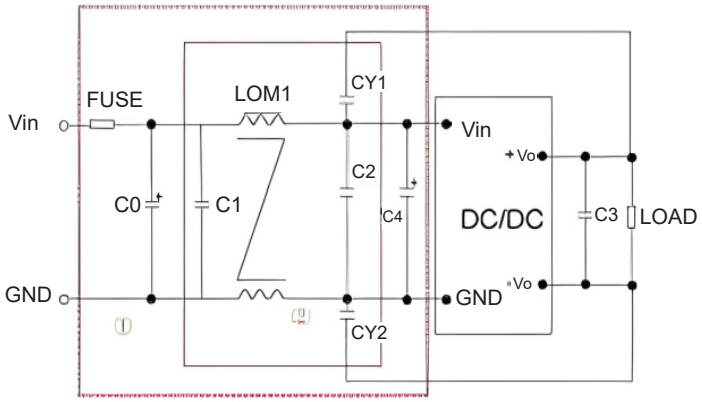


Fig. 7

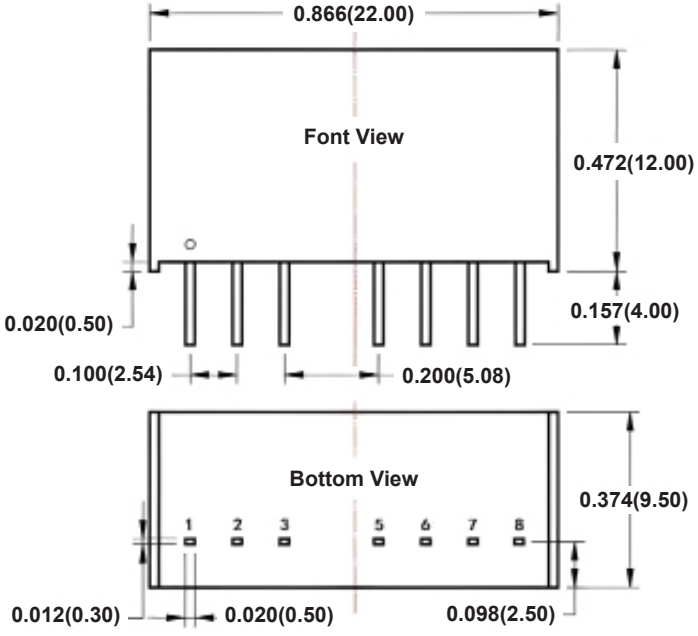
EMI Recommended Parameter Table			
Model	Vin:12V	Vin:24V	Vin:48V
FUSE	Select according to the actual input current of the application		
C0 , C4	330uF/35V	330uF/50V	330uF/50V
C1, C2	10μF/50V		
LCM1	1.4-1.7mH		
C3	22μF/50V		
CY1, CY2	1nF/400VAC		

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

EMI Characteristics

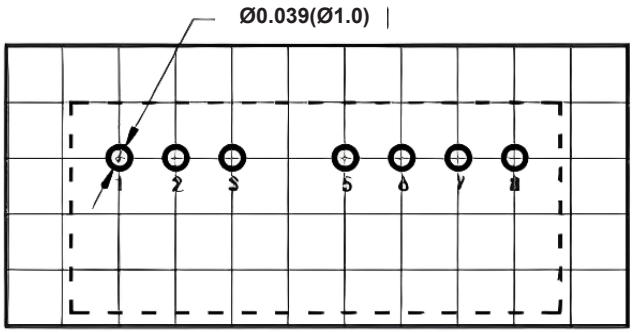
Parameter	Standard		Criteria	Level
Radiated Emissions	CISPR32/EN 55032		--	Class B
Conducted Emissions	CISPR32/EN 55032		--	Class B
ESD	EN 61000-4-2		B	±4 kV Contact
EFT	See Fig 3	IEC/EN61000-4-4	B	±2 kV
Surge	See Fig 3	IEC/EN61000-4-5	B	±2 kV L-L
CS	IEC/EN61000-4-6		A	3 Vrms

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

Reliability Specifications

Pin	Function (single)	Function (double)
1	GND	GND
2	V in	V in
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	-Vo	COM
8	NC	-Vo
NC: Pin to be isolated from circuity		