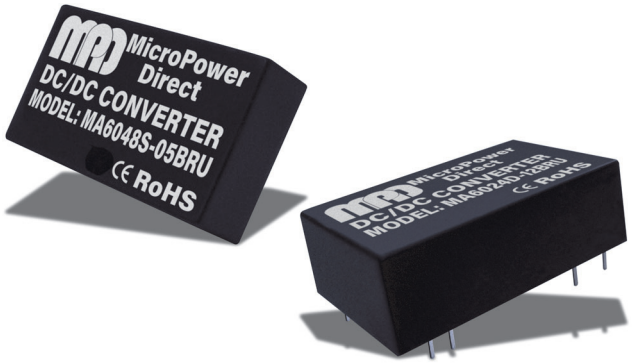
MA600BRU

4:1 Input, Single and Dual Output DC/DC Converters



Key Features:

- Industrial Standard DIP-24 Package
- -40°C to +85°C Operating Temperature Range
- 1500VDC Isolation Voltage
- 4:1 Wide Input Voltage Range
- Efficiency Upto 88%
- Input Under-voltage Protection
- Output Short Circuit Protection
- Over-Current Protection
- Over-Voltage Protection

CE

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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	24	36	VDC
	48 VDC Input	18	48	75	VDC
Input Start Voltage	24 VDC Input	--	--	9	VDC
	48 VDC Input	--	--	18	VDC
Under Voltage Shutdown	24 VDC Input	5.5	6.5	--	VDC
	48 VDC Input	12	15.5	--	VDC
Input Filter		Pi Filter			

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	5%-100% Of Load	--	--	±1	±3.0	%
Line Regulation	Input Voltage From Low to High, Full Load	V01	--	±0.2	±0.5	%
		V02	--	±0.5	±1	
Load Regulation	5%-100% Of Load	V01	--	±0.5	±1	%
		V02	--	±0.5	±1.5	
Ripple & Noise, See Note 2	At 20 MHz Bandwidth		--	--	85	*mVp-p*
Transient Recovery Time	25% Load Step Change		--	300	500	*µs*
Transient Response Deviation	25% Load Step Change		3.3V, 5V ±5V Output	±5	±8	%
			Other Voltage	±3	±5	%
Temperature Coefficient	Full Load		--	--	±0.03	% / °C
Output Over Voltage Protection	--		110	--	160	%Vo
Output Over Current Protection	--		110	140	--	%Io
Output Short Circuit	--		Sustainable, Self-Recovering			

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input-Output, The Test Time is 1 Min, Leakage Current below 1mA	1500	--	--	VDC
Isolation Capacitance	Input-output, 100 KHz / 1V	--	1000	--	pF
Switching Frequency	Full Load, and the Nominal Input Voltage	--	300	--	kHz

Environmental

Parameter	Conditions	Min.	Typ	Max.	Units
Operating Temperature Range	See Temperature Derating Curve (Fig. 1)	-40	--	85	°C
Storage Temperature Range	--	-55	--	125	°C
Cooling	Natural Convection				
Humidity, See Note 5	Non-Condensing	5	--	95	%RH

Physical

Case Size	See Mechanical Diagrams On Page 5				
Case Material	Aluminum Alloy, Black Anodized Coating				
Weight	--	--	0.15(14.3)	--	Oz(g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL-HDBK-217F@25°C		>1000Kh		
Lead Temperature	The Solder Joint is 1.5mm From the Shell, in 10 Seconds	--	--	300	°C

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Model Selection Guide

Model Number	Input				Output			Efficiency (%, Typ)	Reflected Ripple Current (mA Typ)	Capacitive Load (μF, Max) (See Note3)	Fuse Rating Slow-Blow (mA) (See Note7)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MA624S-03BRU	24	9 - 36	302	5	3.3	1500	0.0	77	20.0	1800	1600
MA624S-05BRU	24	9 - 36	302	5	5	1200	0.0	82	20.0	1000	1600
MA624S-09BRU	24	9 - 36	302	5	9	667	0.0	83	20.0	1000	1600
MA624S-12BRU	24	9 - 36	302	5	12	500	0.0	85	20.0	470	1600
MA624S-15BRU	24	9 - 36	302	5	15	400	0.0	86	20.0	220	1600
MA624S-24BRU	24	9 - 36	302	5	24	250	0.0	86	20.0	100	1600
MA624D-05BRU	24	9 - 36	302	5	±5	±600	0.0	82	20.0	680	1600
MA624D-09BRU	24	9 - 36	302	5	±9	±333	0.0	84	20.0	220	1600
MA624D-12BRU	24	9 - 36	302	5	±12	±250	0.0	85	20.0	330	1600
MA624D-15BRU	24	9 - 36	302	5	±15	±200	0.0	88	20.0	220	1600
MA624D-24BRU	24	9 - 36	303	5	±24	±125	0.0	86	20.0	100	1600
MA648S-03BRU	48	18 - 75	156	4	3.3	1500	0.0	80	20.0	1800	800
MA648S-05BRU	48	18 - 75	156	4	5	1200	0.0	84	20.0	1000	800
MA648S-09BRU	48	18 - 75	156	4	9	667	0.0	85	20.0	680	800
MA648S-12BRU	48	18 - 75	156	4	12	500	0.0	87	20.0	470	800
MA648S-15BRU	48	18 - 75	156	4	15	400	0.0	88	20.0	220	800
MA648S-24BRU	48	18 - 75	156	4	24	250	0.0	87	20.0	100	800
MA648D-05BRU	48	18 - 75	156	4	±5	±600	0.0	83	20.0	680	800
MA648D-12BRU	48	18 - 75	156	4	±12	±250	0.0	87	20.0	330	800
MA648D-15BRU	48	18 - 75	156	4	±15	±200	0.0	88	20.0	220	800

Notes:

1. All the DC / DC converters of this series are tested on the recommended test circuit of before leaving the factory.
2. If it is required to further reduce the input and output ripple, the input and output external capacitors Cin 1, Cin 2, Cs, Cout can be increased or the capacitor with small series equivalent impedance value. Cs can be used to reduce the ripple. If the ripple is used to meet the demand, there is no need to add Cs. However, the appropriate filter capacitor should be selected. If the capacitor is too large, it is likely to cause startup problems.
3. For each output, the maximum capacity value of the filter capacitor shall not be greater than the maximum capacity load of the product under the safe and reliable working conditions.
4. The input voltage shall not exceed the specified range value, otherwise it may cause permanent and unrecoverable damage;
5. If not specified, the parameters in this manual are 25°C, humidity 40%~75%, input nominal voltage and output pure resistance mode under full load measurement;
6. All the index test methods are based on the company's enterprise standards.

Typical Characteristic Curves

Temperature Derating Curve

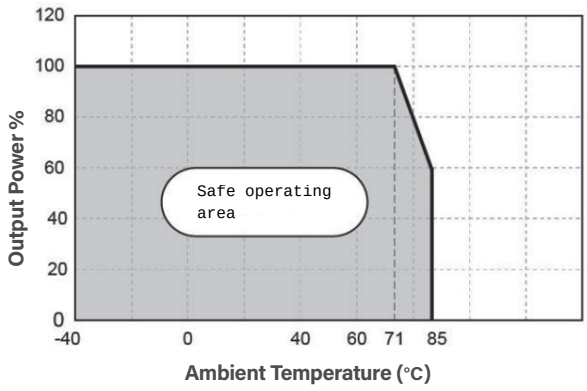


Fig. 1

Notes:

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.
8. These converters are designed to meet the IPC/JEDEC standard J-STD-020D-1 for reflow soldering.

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Efficiency vs Input Voltage: 24 VDC Input

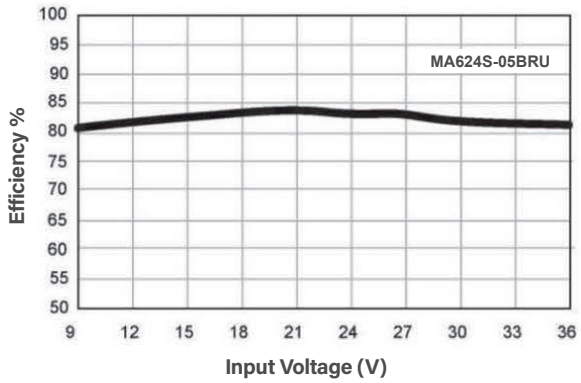


Fig. 2

Efficiency vs Output Load: 24 VDC Input

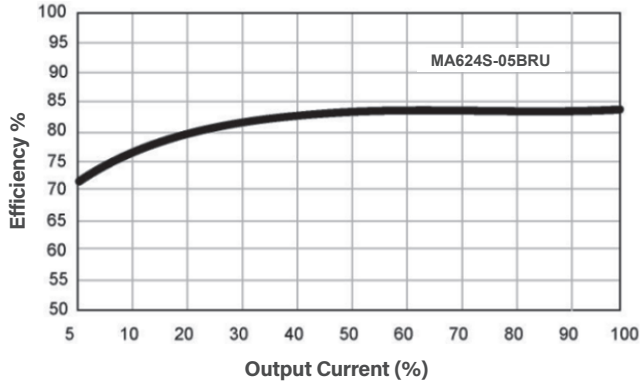


Fig. 3

Efficiency vs Input Voltage: 24 VDC Input

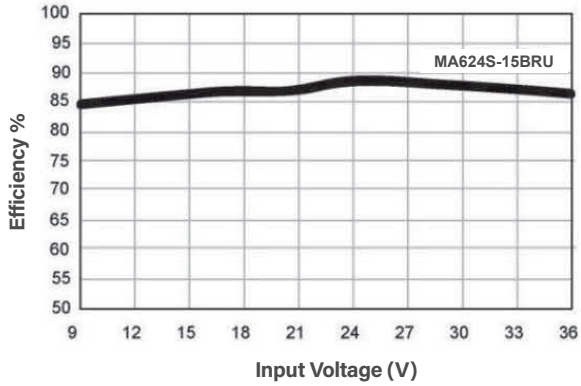


Fig. 4

Efficiency vs Output Load: 24 VDC Input

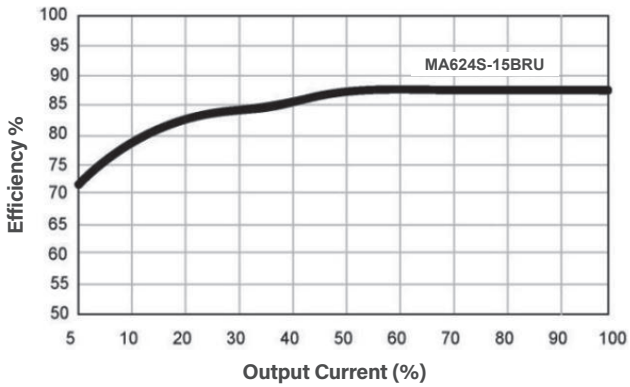


Fig. 5

Application Circuits

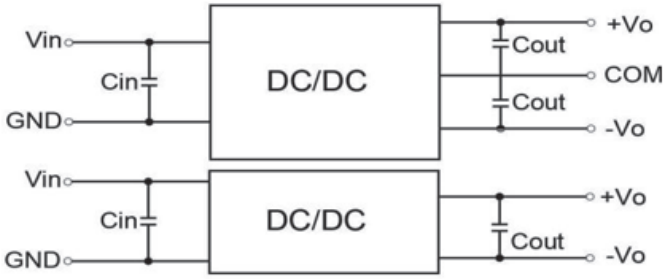


Fig. 6

Recommended Capacibility Load Value Table		
Vin	24V	48V
Cin	100uF	10-47uF
Cout	10uF	10uF

Table. 1

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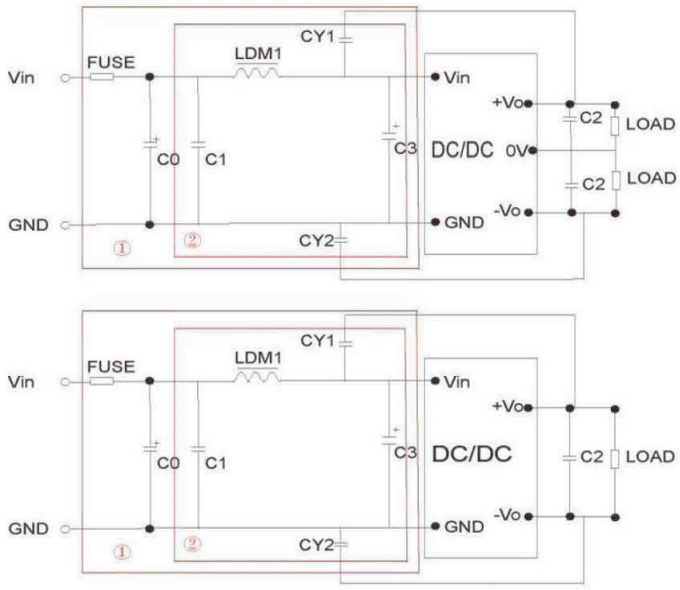


Fig. 7

The EMI Recommended Parameters Table		
Model	Vin: 24V	Vin: 48V
Fuse	Select According To The Actual Input Current Of The Application	
C0, C3	330uF/50V	330uF/100V
C1	1uF/50V	1uF/100V
C2	See the Cout parameter in Figure 6	
Lcm	4.7uH	
Cy1, Cy2	1nF/2KV	

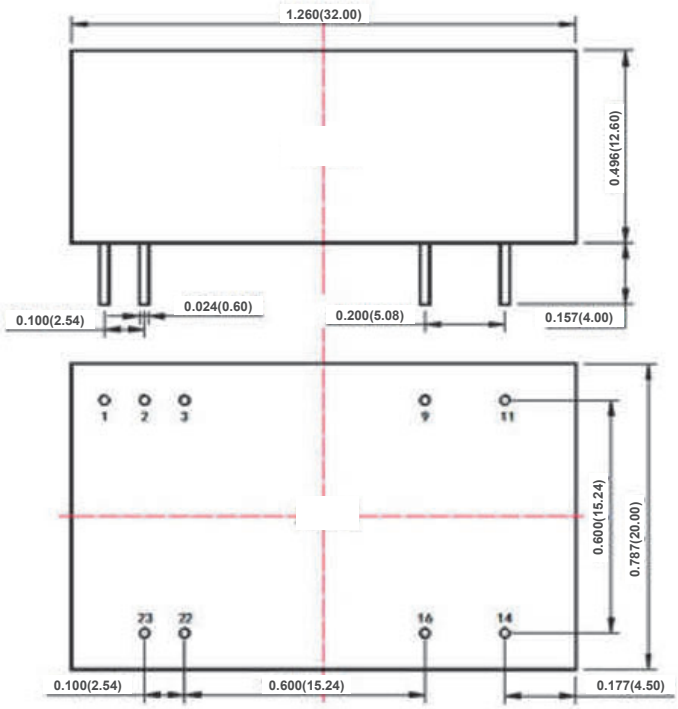
Note:
The first part in Figure 7 is used for the EMS test;
Part 2 is used for EMI filtering and can be selected according to the requirements.

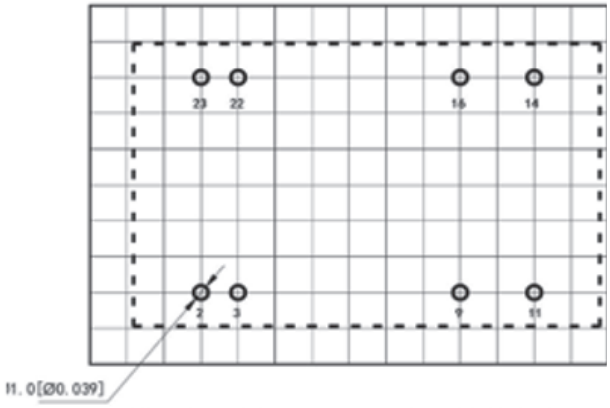
EMC Specifications

Parameter	Standard	Criteria	Level
Radiated Emissions	CISPR32 / EN55032		Class A / Class B (Fig 7)
Conducted Emissions	CISPR32 / EN55032		Class A / Class B (Fig 7)
ESD	IEC/EN61000-4-2	B	±4KV Contact
RS	IEC/EN61000-4-3	A	10V/m
EFT	IEC / EN61000-4-4	B	± 2KV
Surge	IEC / EN61000-4-5	B	line to line± 2KV
CS	IEC/EN61000-4-6	A	3 Vr.m.s

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Mechanical Dimensions





Note: The grid distance dimension is 2.54*2.54mm

Pin Connections

Pin	Single Output
2	GND
3	GND
9	No pin
11	NC
14	+Vo
16	-Vo
22	Vin
23	Vin

Pin	Dual Output
2	GND
3	GND
9	COM
11	-Vo
14	+Vo
16	COM
22	Vin
23	Vin

Note:
- Dimensions in inch(mm)
- Terminal Diameter Tolerance: ±0.004(± 0.10)
- Unmarked tolerances: ± 0.020(± 0.50)

MPD MicroPower Direct

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