

20W Isolated DC to DC Converters - Dual Output

multicomp PRO

20W isolated DC-DC converter in DIP package
Ultra-wide input and regulated dual output

**RoHS
Compliant**



CE Patent Protection

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 90%
- No-load power consumption as low as 0.24W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short circuit,
- over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +105°C
- Industry standard pin-out
- EN62368 approved

These series of isolated 20W DC-DC converter products have an ultra-wide 4:1 input voltage and feature efficiencies of up to 90%, input to output isolation is tested with 1500VDC and the converters safely operate in an ambient temperature of -40°C to +105°C, input under-voltage protection, output over-voltage, over-current, short-circuit adding additional input reverse polarity protection and they are widely used in applications such as industrial control, electric power, instruments and communication fields.

Selection Guide

Part Number	Input Voltage (VDC)		Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF)* Max.
	Nominal (Range)	Max.	Voltage (VDC)	Current (mA) Max./Min.		
MPRA2405YMD-20W	24 (9 to 36)	40	±5	±2000	85/87	2000
MPRA2412YMD-20W			±12	±833	88/90	800
MPRA2415YMD-20W			±15	±667	88/90	600
MPRA2424YMD-20W			±24	±417	87/89	300
MPRA4805YMD-20W	48 (18 to 75)	80	±5	±2000	84/86	2000
MPRA4812YMD-20W			±12	±833	88/90	800
MPRA4815YMD-20W			±15	±667	88/90	600
MPRA4824YMD-20W			±24	±417	88/90	300

Notes:

- 1 Exceeding the maximum input voltage may cause permanent damage;
- 2 Efficiency is measured at nominal input voltage and rated output load;
- 3 The specified maximum capacitive load value for positive and negative output is identical.

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Input Specifications					
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage	-	958/10	--/20	mA
	48VDC nominal input series, nominal input voltage	-	969/5	--/11	
Reflected Ripple Current		-	30	-	
Surge Voltage(1sec. max.)	24VDC nominal input series	-0.7	-	50	V DC
	48VDC nominal input series			100	
Start-up Voltage	24VDC nominal input series	-	-	9	
	48VDC nominal input series			18	
Under-voltage Protection	24VDC nominal input series	5.5	6.5	-	
	48VDC nominal input series	12	15.5		
Start-up Time	Nominal input voltage & constant resistance load	-	10	-	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
Ctrl*	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	-	2	7	mA

Note: : *The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy	5% -100% load	--	±1	±3	%	
Linear Regulation	Input voltage variation from low to high at full load		Vo1	±0.2		±0.5
			Vo2	±0.4		±1
Load Regulation	5% -100% load		±0.5	±1		
Cross Regulation	Vo1 load at 50%, Vo2 load at range of 10%-100%		-	±5		
Transient Recovery Time			All products	300	500	µs
Transient Response Deviation	25% load step change, nominal input voltage		5VDC output	±3	±8	%
			Others	±3	±5	
Temperature Coefficient	Full load		--	±0.03	%/°C	
Ripple & Noise*	20MHz bandwidth, 5% -100% load			100	200	mVp-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo	
Over-current Protection			150	200	%Io	
Short-Circuit Protection			Continuous, self-recovery			

Note: 1. Output voltage accuracy for 0%-5% load is ±4% max;
 2. Load regulation for 0%-100% load is ±5%;
 3. Ripple & Noise at ≤5% load is 5%Vo max. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

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General Specifications					
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max	1500	-	-	VDC
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1000	--	--	
Insulation Resistance	Input-output resistance at 500VDC	1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	-	2000	-	pF
Operating Temperature	See Fig. 1	-40	-	+105	°C
Storage Temperature		-55	-	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	+300	°C
Vibration		10-150Hz, 0.75mm, 5G, 90Min. along X, Y and Z			
Switching Frequency	PWM mode	-	500	-	kHz
MTBF	MIL-HDBK-217F@25°C	1000	-	-	k hours

Note:*Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications		
Case Material	Aluminum alloy	
Dimensions	Horizontal package	25.4mm × 25.4mm × 11.70mm
	A2S chassis mounting	76mm × 31.5mm × 21.2mm
	A4S DIN-rail mounting	76mm × 31.5mm × 25.8mm
Weight	Horizontal package/A2S chassis mounting/A4S DIN-rail mounting	15.0g/35.0g/58.0g (Typ.)
Cooling Method	Free air convection	

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.3-2 for recommended circuit)
	RE	CISPR32/EN55032	CLASS B (see Fig.3-2 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±4KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (see Fig.3-1 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2KV (see Fig.3-1for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-63 Vr.m.s	perf. Criteria A

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Typical Characteristic Curves

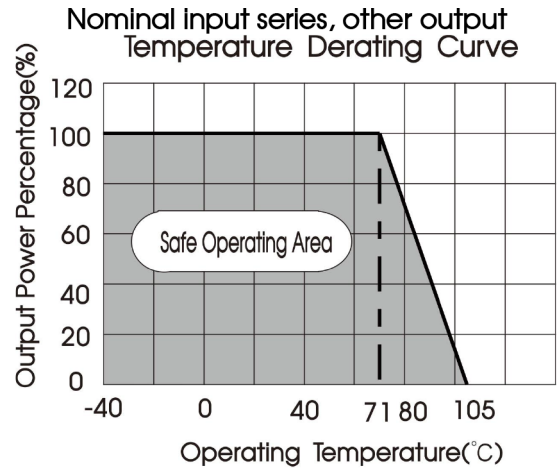
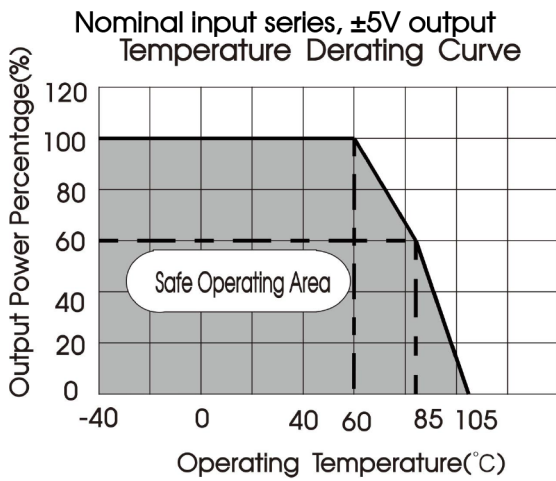
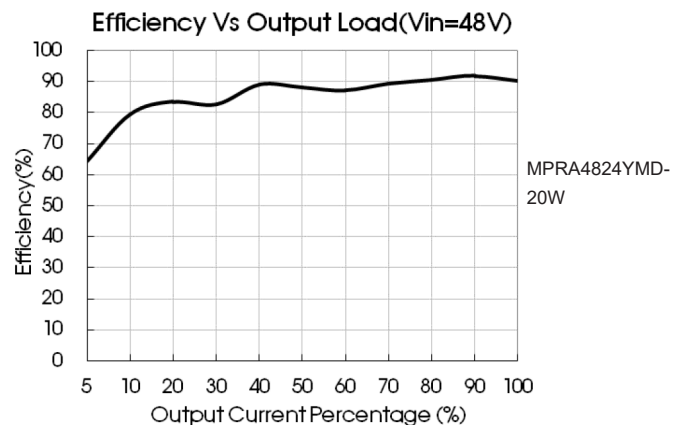
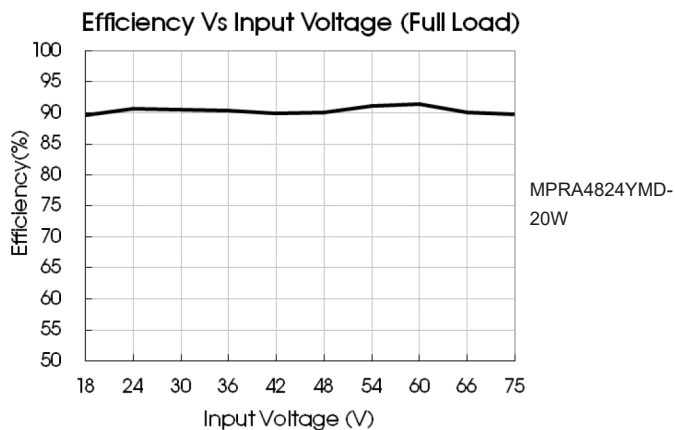
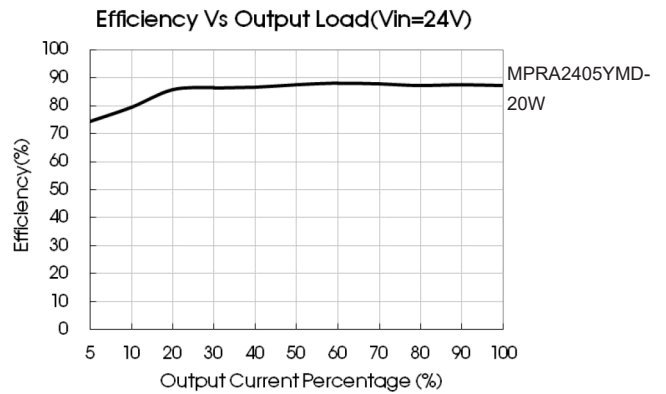
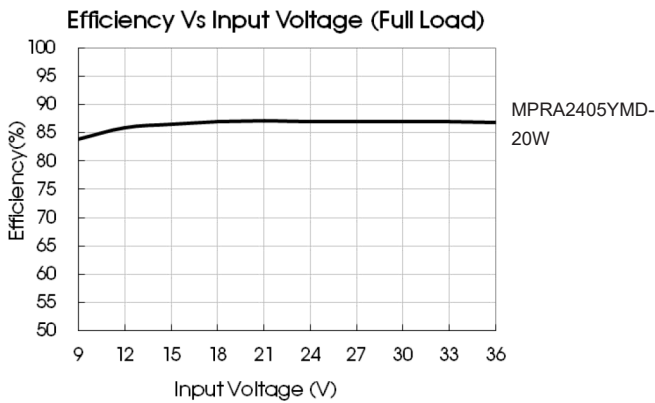


Fig. 1

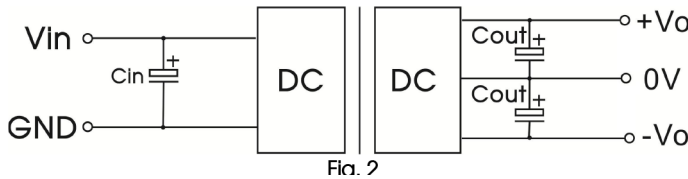


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Design Reference

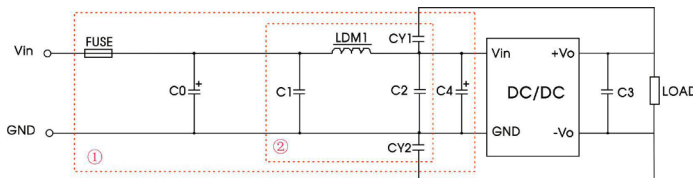
Typical application

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. 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 max. capacitive load value of the product.



V_{in}	24V	48V
C_{in}	100 μ F	10 μ F -47 μ F
C_{out}	10 μ F	

EMC compliance circuit

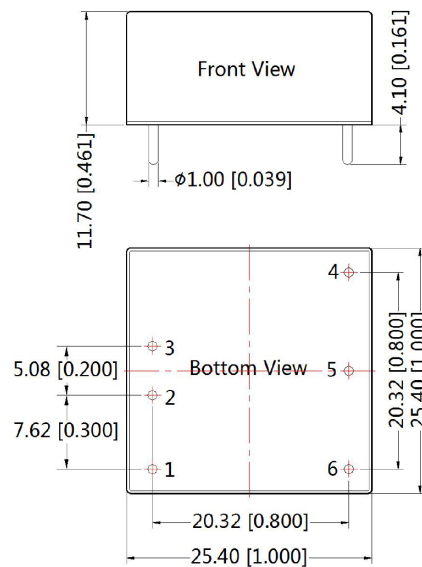


Model	V_{in} :24V	V_{in} :48V
FUSE	Choose according to actual input current	
C0, C4	330 μ F/50V	330 μ F/100V
C1, C2	4.7 μ F/50V	4.7 μ F/100V
C3	Refer to the C_{out} in Fig.2	
LCM1	4.7 μ H	
CY1, CY2	1nF/2KV	

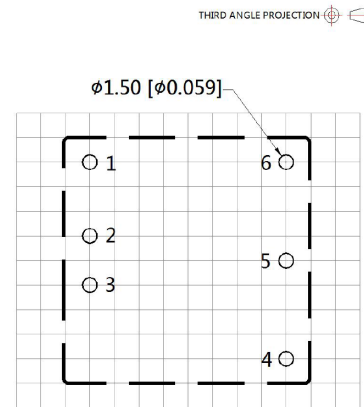
Notes: For EMC tests we use Part 1 in Fig. 3 for immunity and part 2 for emissions test. Selecting based on needs.

The products do not support parallel connection of their output

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$



Pin-Out	
Pin	Dual
1	Ctrl
2	GND
3	V_{in}
4	+ V_o
5	0V
6	- V_o

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Notes:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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