

10W Isolated DC to DC Converters

Single and Dual Output

multicomp PRO

10W isolated DC-DC converter in DIP package
Ultra-wide input, regulated single or dual output

**RoHS
Compliant**



Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.5k VDC
- Operating ambient temperature range: -40°C to +85°C
- Input under-voltage protection, output short-circuit, over-current and over-voltage protection
- Meet CISPR32/EN55032 CLASS A, without extra components
- Industry standard pin-out
- EN62368 approved
- Meets EN50155 standards

CE Patent Protection

These series are isolated 10W DC-DC converter products with an extremely wide voltage input range of 9-36VDC or 18-75VDC, input to output isolation voltage of 1500VDC, output over-voltage and output short-circuit protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components and they are widely used in applications such as industrial controls, electric power, instrumentation, communications and railway.

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.		
MPRA2405ZP-10W	24 (9-36)	40	±5	±1000/0	81/83	1000
MPRA2412ZP-10W			±12	±416/0	85/87	470
MPRA2415ZP-10W			±15	±333/0	85/87	330
MPRB2403ZP-10W			3.3	2400/0	85/87	1200
MPRB2405ZP-10W			5	2000/0	86/88	1000
MPRB2412ZP-10W			12	833/0	85/87	470
MPRB2415ZP-10W			15	667/0	85/87	330
MPRB2424ZP-10W			24	416/0	86/88	100
MPRA4805ZP-10W	48 (18-75)	80	±5	±1000/0	81/83	1000
MPRA4812ZP-10W			±12	±416/0	85/87	470
MPRA4815ZP-10W			±15	±333/0	85/87	330
MPRB4803ZP-10W			3.3	2400/0	84/86	1200
MPRB4805ZP-10W			5	2000/0	85/87	1000
MPRB4812ZP-10W			12	833/0	85/87	470
MPRB4815ZP-10W			15	667/0	85/87	330
MPRB4824ZP-10W			24	416/0	86/88	100

Notes:

- 1 Use "A2S" suffix for chassis mounting and "A4S" suffix for DIN-Rail mounting;
- 2 Minimum input voltage and start-up voltage are increased by 1VDC for all models with A2S (wiring) and A4S (rail) suffixes because of the input reverse polarity function;
- 3 Exceeding the maximum input voltage may cause permanent damage;
- 4 Efficiency is measured at nominal input voltage and rated output load; efficiencies for A2S and A4S Model's is decreased by 2% due to the input reverse polarity protection circuit;
- 5 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	3.3VDC single output	--	379/12	388/25	mA
		5VDC single output	--	473/6	484/15	
		others	--	502/5	515/12	
	48VDC nominal input series, nominal input voltage	3.3VDC single output	--	192/5	197/20	
		5VDC single output	--	239/6	245/15	
		others	--	251/4	258/8	
Reflected Ripple Current	24VDC nominal input series, nominal input voltage		--	40	--	
	48VDC nominal input series, nominal input voltage		--	30	--	
Surge Voltage(1sec. max.)	24VDC nominal input series		-0.7	--	50	V DC
	48VDC nominal input series		-0.7	--	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	--	
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		-	6	10	mA

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

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit		
Voltage Accuracy	0%-100% load	3.3VDC/5VDC single output	--	± 0.5	± 2			
		Others		±1	±3			
Linear Regulation	Input voltage variation from low to high at full load	Vo1		±0.2	±0.5			
		Vo2			±1			
Load Regulation	5% -100% load	Vo1		±0.5	±1			
		Vo2			±1.5			
Cross Regulation	Dual outputs, Vo1 load at 50%, Vo2 load at range of 25%-100%				-		±5	
Transient Recovery Time					300		500	µs
Transient Response Deviation	25% load step change, nominal input voltage	3.3VDC/5VDC single output			±5		±8	%
		Others			±3		±5	
Temperature Coefficient	Full load			--	±0.03	%/°C		
Ripple & Noise*	20MHz bandwidth			40	80	mVp-p		

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Item	Operating Conditions		Min.	Typ.	Max.	Unit
Over-voltage Protection	Input voltage range		110	--	160	%Vo
Over-current Protection	Input voltage range	3.3VDC/5VDC single output		160	230	%Vo
		Others		140	290	
Short-circuit Protection	Input voltage range		Continuous, self-recovery			

Note: 1. At 0% - 5% load, the Max. output voltage accuracy of ± 5 VDC output converter is $\pm 5\%$, the Max. output voltage accuracy of 3.3VDC/5VDC output converter is $\pm 3\%$;
 2. Load regulation for 0% - 100% load increases to $\pm 5\%$;
 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.

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
Insulation Resistance	Input-output resistance at 500VDC	1000	-	-	M Ω
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	-	2000	-	pF
Operating Temperature	See Fig. 1	-40	-	+85	°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(EN62368)		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Vibration(EN50155)		IEC/EN61373 - Category 1, Grade B			
Switching Frequency*	PWM mode	-	350	-	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	32mm x 20mm x 10.8mm
Weight	12g(Typ.)
Cooling Method	Free air convection

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Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (see Fig.3-2 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (see Fig.3-2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 4\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 $\pm 2\text{KV}$ (see Fig.3-1 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{KV}$ (see Fig.3-1 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-29 0%, 70%	perf. Criteria B

Electromagnetic Compatibility (EMC) (EN50155)

EMI	CE	EN50121-3-2 150kHz-500kHz 99dBuV(see Fig.3-2 for recommended circuit) EN55016-2-1 500kHz-30MHz 93dBuV(see Fig.3-2 for recommended circuit)	
	RE	EN50121-3-2 30MHz-230MHz 40dBuV/m at 10m(see Fig.3-2 for recommended circuit) EN55016-2-1 230MHz-1GHz 47dBuV/m at 10m(see Fig.3-2 for recommended circuit)	
EMS	ESD	EN50121-3-2 Contact $\pm 6\text{KV}/\text{Air } \pm 8\text{KV}$	perf. Criteria B
	RS	EN50121-3-2 20V/m	perf. Criteria A
	EFT	EN50121-3-2 $\pm 2\text{kV}$ 5/50ns 5kHz(see Fig.3-1 for recommended circuit)	perf. Criteria A
	Surge	EN50121-3-2 line to line $\pm 1\text{KV}$, (42 Ω , 0.5 μF) (see Fig.3-1 for recommended circuit)	perf. Criteria A
	CS	EN50121-3-2 0.15MHz-80MHz 10 Vr.m.s	perf. Criteria A

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Typical Characteristic Curves

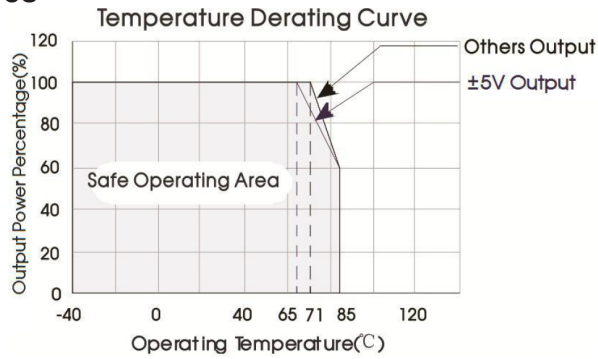
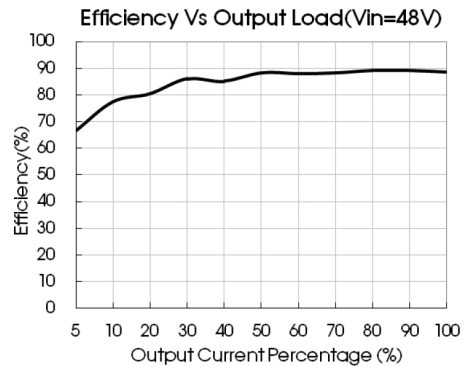
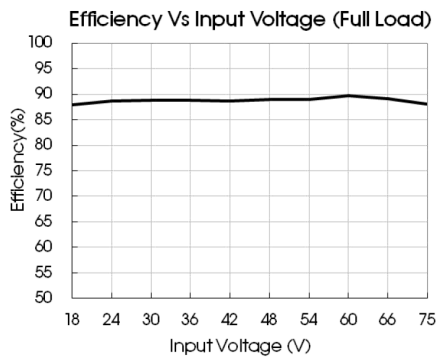
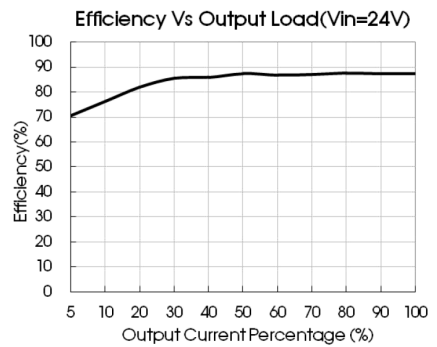
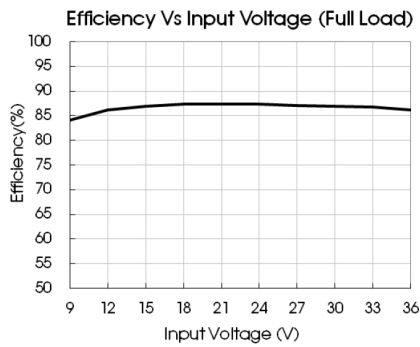
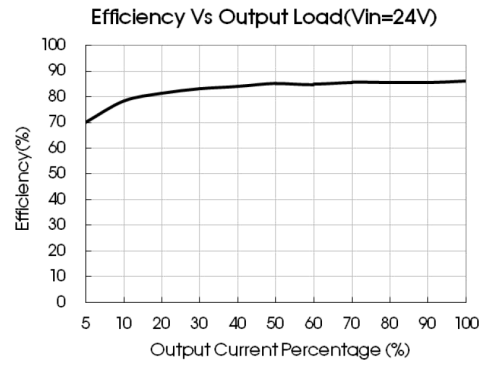
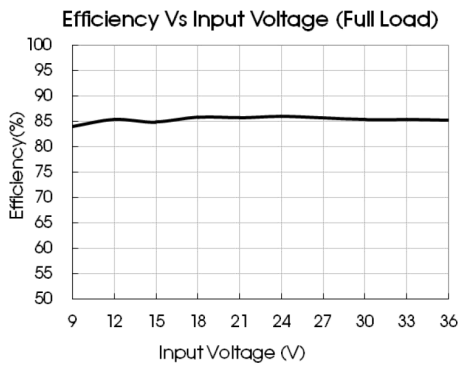


Fig. 1



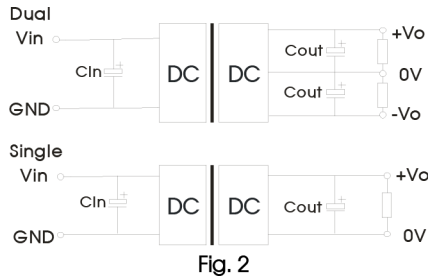
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Design Reference

Typical application

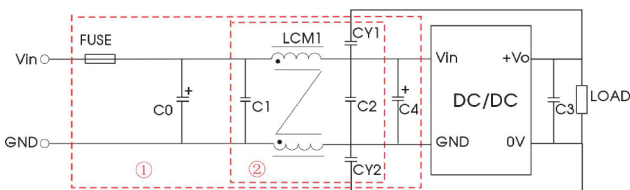
All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.



Vin(VDC)	Cin	Cout
24	100 μ F	10 μ F
48	10 μ F -47 μ F	10 μ F

EMC compliance circuit

3.3VDC/5VDC single output:



Others:

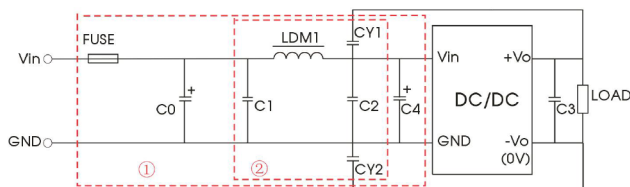


Fig. 3

Note: Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test, chose according to the demand.

Parameter description:

Model	Vin:24V	Vin:48V
FUSE	Select FUSE value according to actual input current	
C0, C4	330 μ F/50V	330 μ F/100V
C1, C2	10 μ F/50V	10 μ F/100V
LDM1	10 μ H	
LCM1	1.4-1.7mH (TN150P-RH12.7*12.7*7.9)	
C3	Refer to the Cout in Fig.2	
CY1, CY2	1nF/2KV	

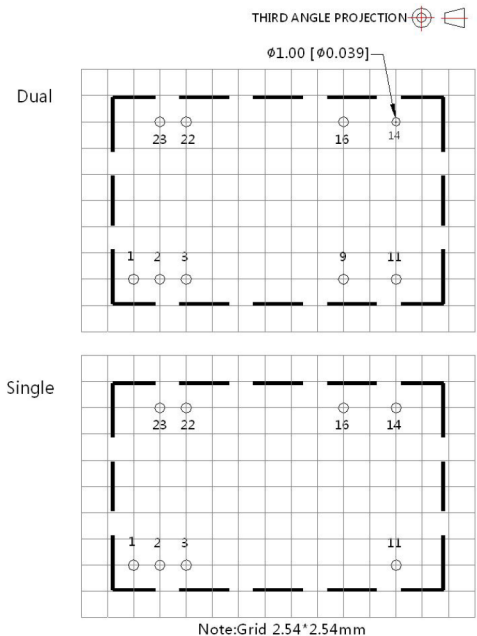
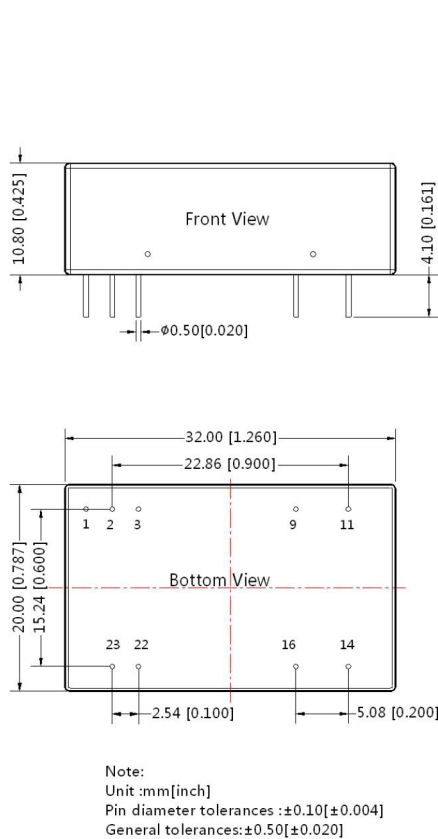
The products do not support parallel connection of their output

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Dimensions and Recommended Layout



Pin	Pin-Out	
	Single	Dual
1	Ctrl	Ctrl
2,3	GND	GND
9	No Pin	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: Pin to be isolated from circuit

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 $T_a=25^\circ\text{C}$, 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";
6. 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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