

6W Isolated DC to DC Converters - Dual Output

multicomp PRO

6W isolated DC-DC converter in SIP package
Wide input and regulated dual output

**RoHS
Compliant**



CE Patent Protection

Features

- Wide 4:1 input voltage range
- High efficiency up to 83%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.5K VDC
- Input under-voltage protection, output short circuit, over-current protection
- Operating ambient temperature range: -40°C to +85°C
- Industry standard pin-out
- EN62368 approved

These series of isolated 6W DC-DC products with a 4:1 input voltage range. They feature efficiencies of up to 83%, 1500VDC input to output isolation, operating ambient temperature range of -40°C to +85°C, input under-voltage protection, output over-current, short circuit protection and they are widely used in applications such as medical care, 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.		
MPRA2405S-6W	24 (9 to 36)	40	±5	±600	78/80	470
MPRA2412S-6W			±12	±250	81/83	120
MPRA2415S-6W			±15	±200	81/83	100
MPRA2424S-6W			±24	±125	80/82	68

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 for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	±5V output	-	312/12	320/16	mA
	±9V/±12V/±15V output	-	301/12	309/16	
	±24V output	-	305/12	313/16	
Reflected Ripple Current		-	50	-	V DC
Surge Voltage(1sec. max.)		-0.7	-	50	
Start-up Voltage		-	-	9	
Input Under-voltage Protection		5.5	6.5	-	
Input Filter		Capacitance 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: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	5% -100% load	Vo1	--	±1.5	±2	%
		Vo2		±2	±3	
Linear Regulation	Input voltage variation from low to high at full load	Vo1		±0.5	±1	
		Vo2		±1	±1.5	
Load Regulation	5% -100% load	Vo1		±0.8	±1.5	%
		Vo2		±1.2	±2	
Cross Regulation	25% load step change, nominal input voltage			-	±5	
Transient Recovery Time	25% load step change, nominal input voltage			450	500	µs
Transient Response Deviation	25% load step change, nominal input voltage	±5V output		±5	±8	%
		Others		±3	±5	
Temperature Coefficient	Full load		-	±0.03	%/°C	
Ripple & Noise*	20MHz bandwidth, 5% -100% load			120	150	mVp-p
Over-current Protection	Input voltage range		110	160	230	%Io
Short-Circuit Protection	Input voltage range		Continuous, self-recovery			
Note: 1. At 0%~5% load, the Vo1 Max. output voltage accuracy is ±3%, the Vo2 Max. output voltage accuracy is ±5%. 2. At 0%~100% load, the Vo1 regulation for 0%-100% load is ±4%, the Vo2 regulation for 0%-100% load is ±4.5%. 3. Ripple & Noise at ≤ 5% load is no more than 180mV. 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 insulation at 500VDC	1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	-	20	-	pF
Operating Temperature	See Fig. 1	-40	-	105	°C
Storage Humidity	Without condensation	5	-	125	
Storage Temperature		-55	25	-	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	300	
Vibration		10-150Hz, 5G, 0.75mm. 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.					

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Mechanical Specifications	
Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	22 × 9.5 × 12 mm
Weight	4.6g (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.3-1 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

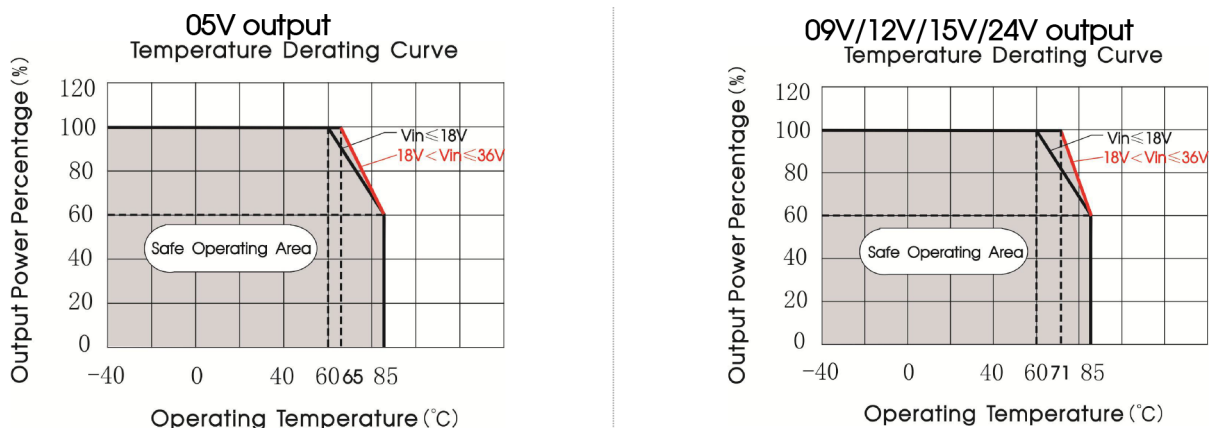


Fig. 1

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 specified max. capacitive load value of the product.



Fig. 2

$C_{in}(\mu F)$	$C_{out}(\mu F)$
100	22

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EMC compliance circuit

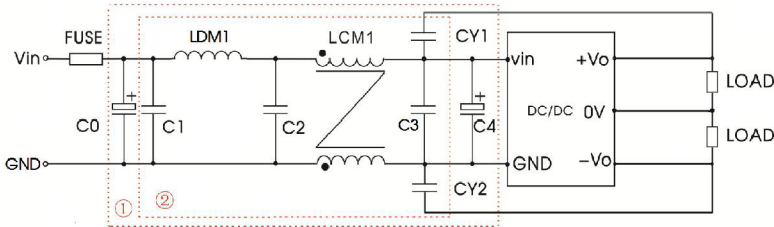


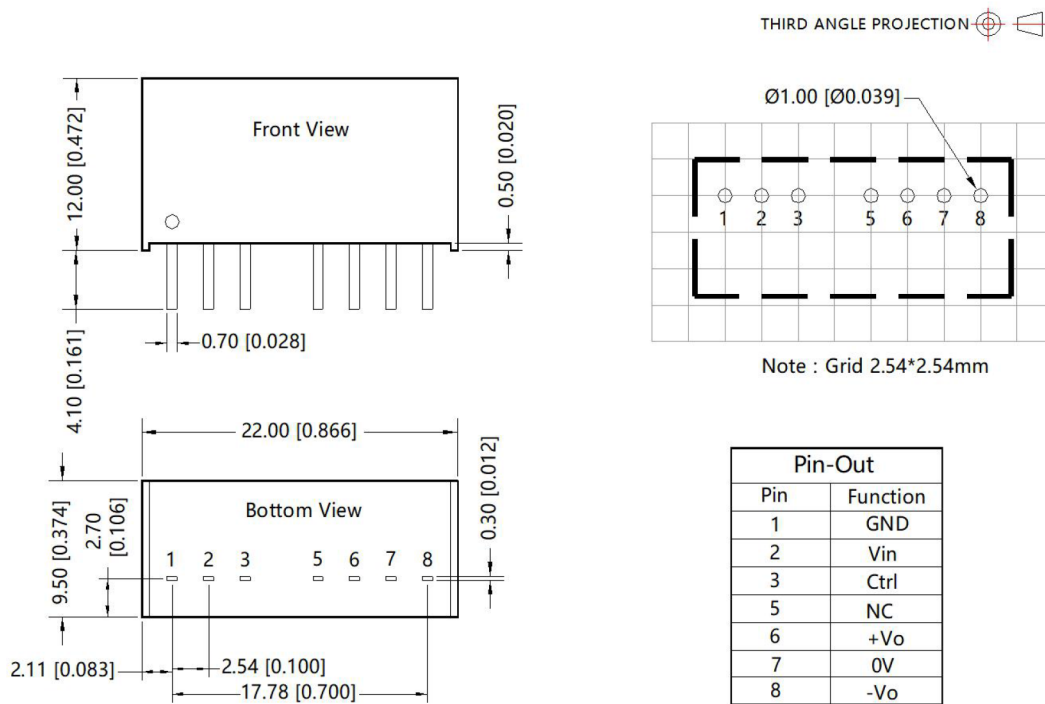
Fig. 3

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

Components	Vin:24V
FUSE	Choose according to actual input current
C0, C4	330μF/100V
C1, C2, C3	10μF/50V
LDM1	10uH
LCM1	1.4-1.7mH (TN150P-RH12.7*12.7*7.9)
CY1, CY2	1nF/2KV

The products do not support parallel connection of their output

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

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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";
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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