

6W Isolated DC to DC Converters - Single Output

multicomp PRO

6W isolated DC-DC converter in SIP package Ultra-wide input and regulated single output

**RoHS
Compliant**



Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 87%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.6k VDC
- Input under-voltage protection, output shortcircuit, over-current protection
- Operating ambient temperature range: -40°C to +105°C
- Compact SIP package
- 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 87%, 1600VDC input to output isolation, operating ambient temperature range of -40°C to +105°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.		
MPRB2403S-6W	24 (9 to 36)	40	3.3	1350/0	76/78	1800
MPRB2405S-6W			5	1200/0	80/82	1000
MPRB2409S-6W			9	667/0	82/84	470
MPRB2412S-6W			12	500/0	84/86	470
MPRB2415S-6W			15	400/0	85/87	220
MPRB2424S-6W			24	250/0	83/85	100

Note: 1. Exceeding the maximum input voltage may cause permanent damage;
2. Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Current (full load / no-load)	3.3V output	--	238/5	245/12	mA
	5V output	--	305/5	313/12	
	Others	--	305/10	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: *The Ctrl pin voltage is referenced to input GND.

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	5% -100% load		-	±1	±2	%
Linear Regulation	Input voltage variation from low to high at full load			±0.5	±1	
Load Regulation	5% -100% load			±0.5	±1.5	
Transient Recovery Time				300	500	µs
Transient Response Deviation	25% load step change, nominal input voltage	3.3V/5V output		±0.5	±8	%
		Others		±3	±5	
Temperature Coefficient	Full load			--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth, 5% -100% load				50	100
Over-current Protection	Input voltage range		110	160	230	%/°C
Short-Circuit Protection			Continuous, self-recovery			

Note: 1. At 0%-5% load, the Max. output voltage accuracy is ±3%;
 2. Load regulation for 0%-100% load is ±3%
 3. Ripple & Noise at ≤ 5% load is no more than 150mV. 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.	1600	-	-	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	-	1000	-	pF
Operating Temperature	See Fig. 1	-40	-	+105	°C
Storage Humidity	Without condensation	5	-	95	%RH
Storage Temperature		-55	-	+125	°C
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.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	22mm × 9.5mm × 12mm
Weight	4.6g (Typ.)
Cooling Method	Free air convection

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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 $\pm 4\text{KV}$	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	3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

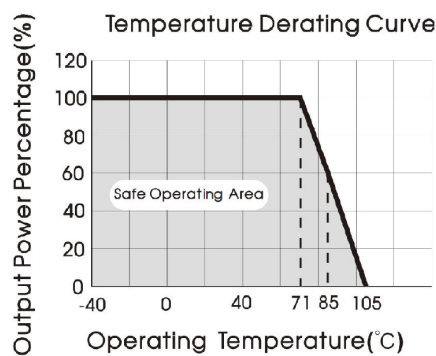
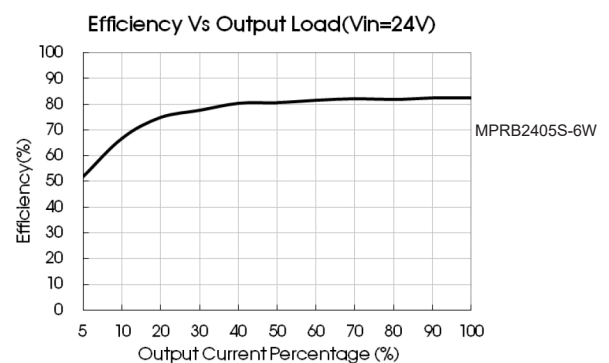
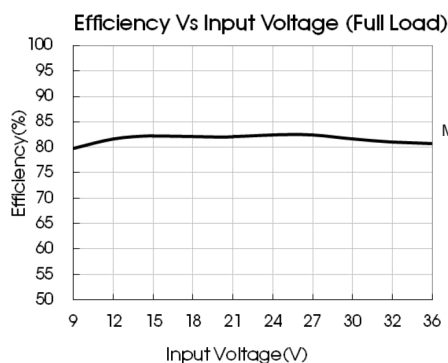


Fig. 1



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}	V_o (VDC)	C_{out}
100 μ F/100V	3.3/5/9	22 μ F/16V
	12/15	22 μ F/25V
	24	22 μ F/50V

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EMC compliance circuit

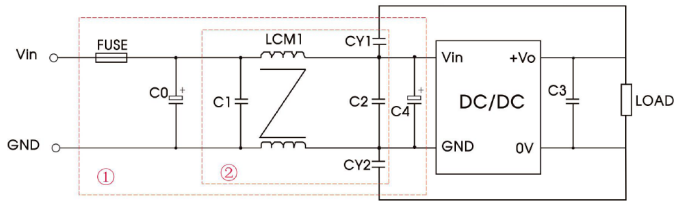


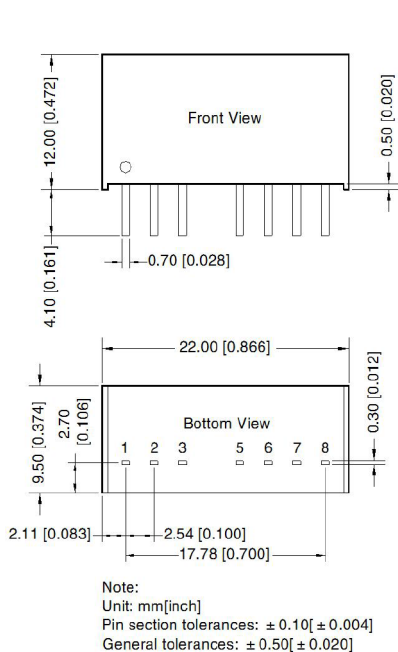
Fig. 3

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

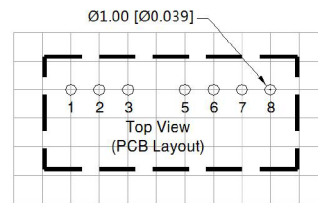
Parameter description:

Components	Vin:12V
FUSE	Choose according to actual input current
C0/C4	330μF/50V
C1/C2	10μF/50V
C3	22μF/50V
LCM1	470μH, recommended to use MORNSUN's FL2D-13-471R3
CY1/CY2	1nF/400VAC

Dimensions and Recommended Layout



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Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	NC

NC: Pin to be isolated from circuitry

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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