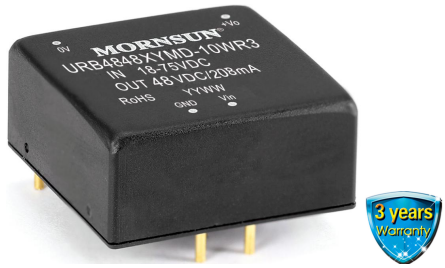
DC/DC Converter

URB4848XYMD-10WR3

MORNSUN®

10W isolated DC-DC converter in DIP package
Ultra-wide input and regulated single output



Patent Protection RoHS

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 voltage1.5K VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40℃ to +85℃
- Meets CISPR32/EN55032 CLASS A, without extra components
- Industry standard pin-out

URB4848XYMD-10WR3 10W DC-DC converter products feature an ultra-wide with 4:1 input voltage with efficiencies of up to 87%, 1500VDC input to output isolation, operating ambient temperature range of -40℃ to +85℃, input under-voltage protection, output over-voltage, over-current, short-circuit protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components, adding additional input reverse polarity protection and they are widely used in applications such as industrial control, electric power, instruments, communication and railway applications.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ②(%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
--	*URB4848XYMD-10WR3	48 (18-75)	80	48	208/0	85/87	100

Notes:
① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency is measured at nominal input voltage and rated output load;
③ Products marked with "*" need an input capacitor in order to meet conducted specifications of CISPR32/EN55032 CLASS A.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	48VDCnominal input voltage	--	251/4	258/8	mA
Reflected Ripple Current	48VDC nominal input voltage	--	30	--	
Surge Voltage (1sec. max.)	48VDC nominal input voltage	-0.7	--	100	VDC
Start-up Voltage	48VDC nominal input voltage	--	--	18	
Input Under-voltage Protection	48VDC nominal input voltage	12	15.5	--	
Start-up Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	0%-100% load	--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation①	5%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise②	20MHz bandwidth, 5%-100% load	--	40	80	mV p-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo
Over-current Protection		110	140	190	%Io
Short-circuit Protection		Continuous, self-recovery			

Note: ①Load regulation for 0%-100% load is ±5%;
②Ripple & 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	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
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	℃
Vibration		IEC/EN61373 - Category 1, Grade B			
Switching Frequency*	PWM mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25℃	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	25.40 x 25.40 x 11.70 mm
Weight	Horizontal package	12.5g(Typ.)
Cooling method	Free air convection	

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.3-② for recommended circuit) CLASS A (Without extra components) (see Fig.4 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 ±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/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70%	perf. Criteria B

Electromagnetic Compatibility (EMC) (EN50155)

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

Typical Characteristic Curves

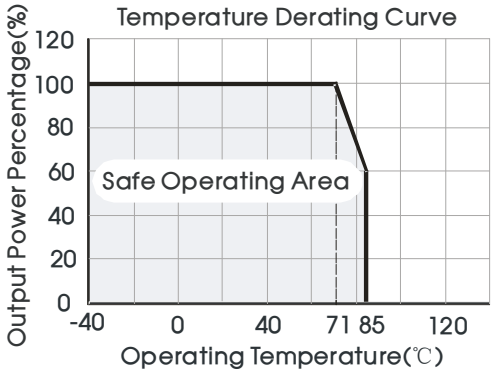


Fig. 1

Design Reference

1. 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 Cin and Cout 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

Vin	48V
Cin	10μF - 47μF/100V
Cout	10μF/100V

2. EMC compliance circuit

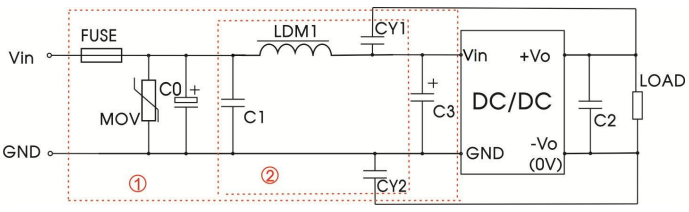


Fig. 3

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:

Model	Vin:48V
FUSE	Choose according to actual input current
MOV	S14K60
C0/C3	330μF/100V
C1	1μF/100V
C2	Refer to the Cout in Fig.2
LDM1	4.7μH
CY1/CY2	1nF/2KV

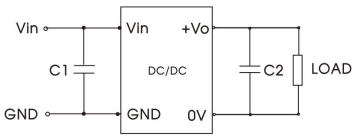


Fig. 4

Note：Products meets CISPR32/EN55032 CLASS A, without extra for CE, seeing Fig 4 for recommended circuit.

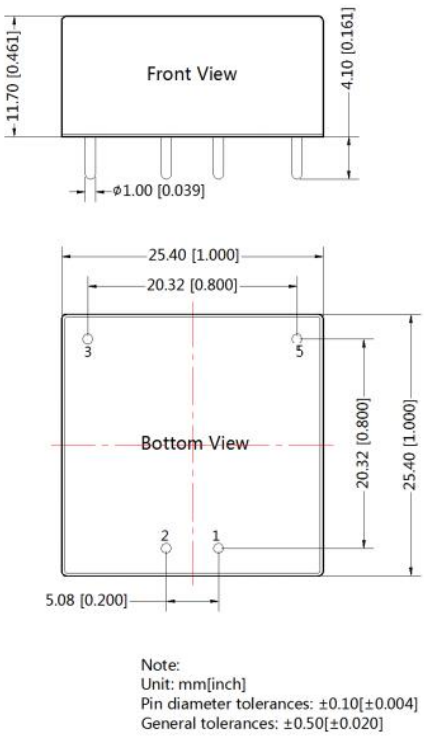
参数说明：

型号	Vin:48V
C1	100μF/100V
C2	参照图 2 中 Cout 参数

3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Pin-Out	
Pin	Single
1	GND
2	Vin
3	+Vo
5	0V

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

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210003;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. 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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