

3W Dual isolated DC-DC converter in SIP package
Ultra-wide input and regulated dual output



FEATURES

- Ultra-wide 4:1 input voltage range
- No-load power consumption as low as 0.2W
- I/O isolation test voltage: 3k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +85°C

URD_S-3WR3 series of isolated 3W DC-DC converter products with an ultra-wide 4:1 input voltage, input to output isolation is tested with 3000VDC and the converters safely operate ambient temperature of -40°C to +85°C, input under-voltage protection, output short-circuit, over-current protection. They meet CLASS B of CISPR32/EN55032 EMI standards without extra components, which make them widely applied in data transmission device, tele-communication device, distributed power supply system, hybrid module system, remote control system fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output(Vo1/Vo2)			Full Load Efficiency ^② (%) Min./Typ.	Capacitive Load (μF)Max. (Vo1/Vo2)
		Nominal (Range)	Max. ①	Voltage(VDC)	Current (mA) Max.	Current (mA) Min.		
EN/BS EN	URD480505S-3WR3	48 (18-75)	80	5/5	300/300	0/0	76/78	680/680
	URD480512S-3WR3			5/12	300/125	0/0	76/78	680/330
	URD480524S-3WR3			5/24	300/63	0/0	76/78	680/220

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

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	--	81/5	83/12	mA
Reflected Ripple Current		--	30	--	
Surge Voltage (1sec. max.)		-0.7	--	100	VDC
Start-up Voltage		--	--	18	
Shut-down Voltage		12	15	--	
Start-up Time	Nominal input & constant resistance load	--	10	--	ms
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy	10% -100% load	Vo1	--	±1	±3	
		Vo2	--	±3	±5	
	5% -10% load	Vo1	--	±2	±4	
		Vo2	--	±4	±6	
Linear Regulation ^①	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	%
		Vo2	--	±0.5	±1	
Load Regulation	10% -100% load	Vo1	--	±0.5	±1	
		Vo2	--	±1	±2	
Cross Regulation	Vo1 load at 50%, Vo2 load at range of 25%-100%	--	--	±8		

Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs	
Transient Response Deviation ^②		--	±5	±8	%	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise ^③	20MHz bandwidth, nominal input, full load	Vo1	--	70	150	mV p-p
		Vo2	--	100	150	
Over-current Protection ^④	Input voltage range	110	--	250	%Io	
Short-circuit Protection ^⑤		Hiccup, continuous, self-recovery				

Note:

- ① Load regulation for 0%-100% load is ±5%;
- ② Dynamic load only refer to Vo1;
- ③ The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information;
- ④ Dual output with balanced-load;
- ⑤ Both Vo1/Vo2 go into hiccup protection when one of them short circuit; Vo2 is allowed to be short circuit only under condition of Vo1 with load range from 10%-100%; Vo1 could be short circuit if Vo2 with load range from 0%-100%.

General Specification

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.	3000	--	--	VDC
	Output-output Electric Strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	
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	°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, 5G, 0.75mm. along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	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.

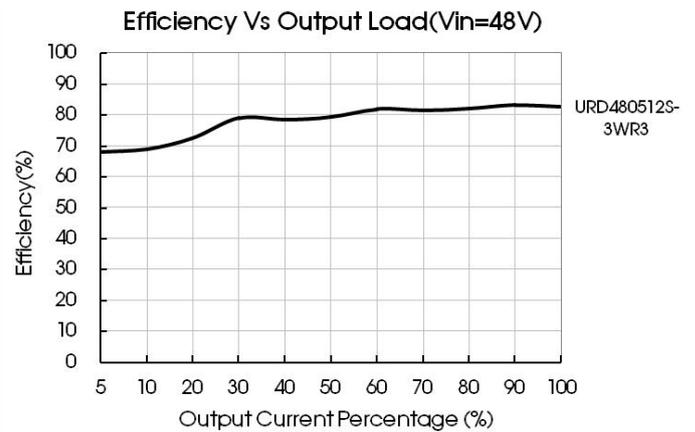
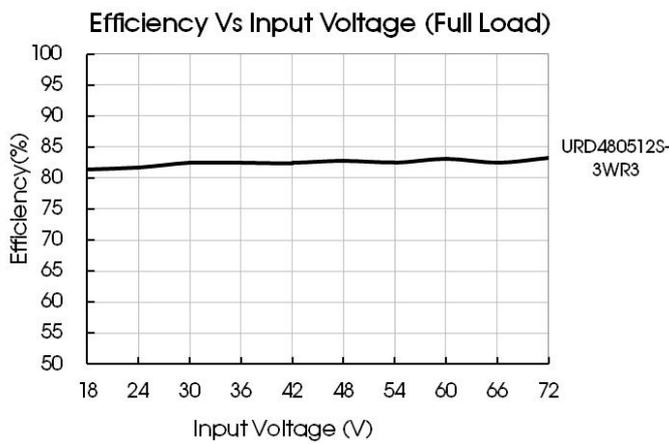
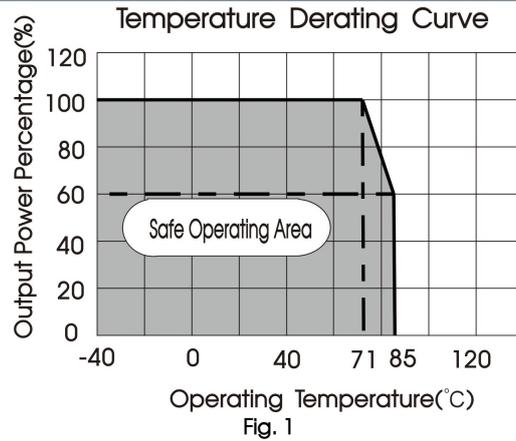
Mechanical Specifications

Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	27.40 x 9.50 x 12.00mm
Weight	5.4g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility(EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.3-① for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.3-① 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.3-② for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.3-② for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

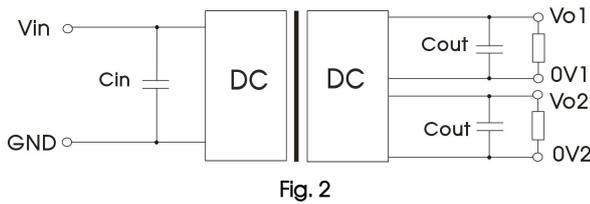
Typical Characteristic Curves



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 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.



Vout (VDC)	Cout	Cin
5	47 μ F/16V	100 μ F/100V
12	22 μ F/25V	
24	22 μ F/50V	

Note:
①CS Pin: By connecting a low ESR capacitor between this terminal and the pin-7, the output ripple and noise may be further improved. Generally, the capacitance is no greater than 47 μ F.

2. EMC compliance circuit

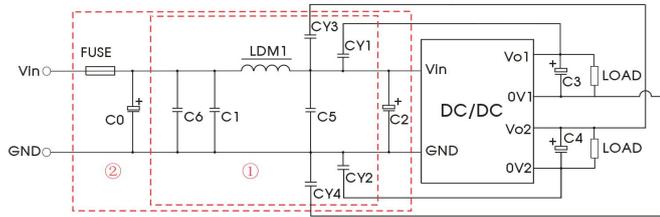


Fig. 3

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

Parameter description

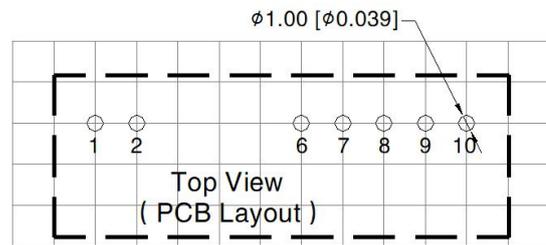
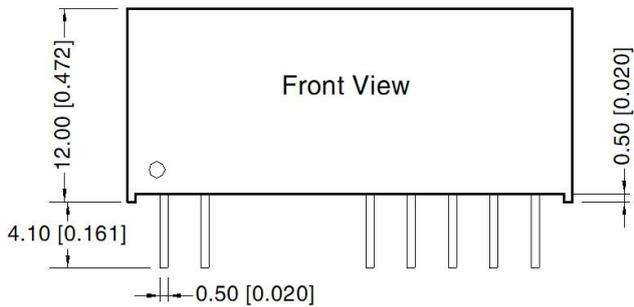
Model	Vin: 48V
FUSE	Choose according to actual input current
C0	680μF/100V
C1/C5/C6	4.7μF/100V
C2	330μF/100V
C3/C4	Refer to the Cout in Fig.2
LDM1	22μH/0.6A
CY1/CY2/CY4	1nF/3kV
CY3	2.2nF/3kV

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

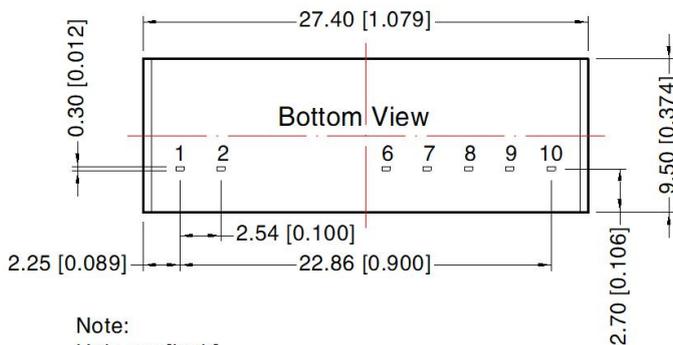
4. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Mark
1	GND
2	Vin
6	+Vo1
7	0V1
8	CS
9	0V2
10	+Vo2

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

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200015;
2. The maximum capacitor 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 $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on 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.

Mornsun Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com