

20W isolated DC-DC converter in DIP package  
Ultra-wide input, regulated dual output



## FEATURES

- Ultra-wide 4:1 input voltage range
- I/O isolation test voltage 3.0k VDC
- Output-output isolation test voltage 1.5k VDC
- Input under-voltage, output short-circuit, over-current protection
- Operating ambient temperature range: -40°C to +105°C
- Meets IEC62368, UL62368 standards

 Report EN62368-1
  Report BS EN62368-1
 Patent Protection
 


URD\_LD-20WR3 series of isolated 20W DC-DC products with a 4:1 input voltage range. 3000VDC input to output isolation, operating ambient temperature range of -40°C to +105°C, Input under-voltage protection, output short circuit, over-current protection and EMI meets CISPR32/EN55032 CLASS B, which make them widely used in regulated dual output areas, such as data transmission device, tele-communication device, distributed power supply system, hybrid module system, remote control system.

## Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output (Vo1 /Vo2)			Full Load Efficiency <sup>2</sup> (%) Min./Typ.	Capacitive Load (μF)Max. (Vo1 /Vo2)
		Nominal (Range)	Max. <sup>1</sup>	Voltage (VDC)	Current (mA) Max.	Current (mA) Min.		
EN/BS EN	URD480505LD-20WR3	48 (18-75)	80	5/5	2000/2000	0/0	82/84	2000/2000
	URD480512LD-20WR3			5/12	2000/833	0/0	82/84	2000/680
	URD480524LD-20WR3			5/24	2000/417	0/0	82/84	2000/220

Notes: 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
Input Current (full load / no-load)	Nominal input voltage	--	496/6	509/12	mA
Maximum input current		--	--	600	
Reflected Ripple Current	Nominal input voltage	--	40	--	VDC
Surge Voltage (1sec. max.)		-0.7	--	100	
Start-up Voltage		--	--	18	
Shut-down Voltage		12	15	--	
Start-up Time	Nominal input & constant resistance load	--	20	50	ms
Input Filter		PI filter			
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	--	2	7	mA
Hot Plug		Unavailable			

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

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy <sup>1</sup>	5%-100% load	Vo1	--	±1	±3	%
		Vo2	--	±4	±6	
	0%-5% load	Vo1	--	±1	±3	
		Vo2	--	±4	±6	
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.5	±1	
		Vo2	--	±2	±3	

Load Regulation <sup>①</sup>	5%-100% load	Vo1	--	±0.5	±1	%
		Vo2	--	±1.5	±3	
	0%-5% load	Vo1	--	±3	±4	
		Vo2	--	±3	±5	
Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 25%-100%	--	--	±10		
Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs	
Transient Response Deviation		--	±4	±8	%	
Temperature Coefficient	Full load	--	--	±0.03	%/°C	
Ripple & Noise <sup>③</sup>	20MHz bandwidth, 5%-100% load	Vo1	--	50	100	mVp-p
		Vo2	--	50	100	
Over-current Protection	Input voltage range	120	--	210	%Io	
Over-voltage Protection		110	--	160	%Vo	
Short-circuit Protection <sup>④</sup>		Hiccup, continuous, self-recovery				
Note: ① The load of Vo1 and Vo2 should be the same; ② Load regulation for 0%-100% load is ±5%; ③ Under 0% - 5% load conditions, ripple & noise does not exceed 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; ④ If Vo2 in short, the load of Vo1 at least >5%.						

## 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.	3000	--	--	VDC
	Output-output Electric Strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	
	Input/output-case Electric Strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	
Insulation Resistance	Input-output insulation at 500VDC/1min, @25°C, 75%RH	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	2200	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	°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		10-55Hz, 2G, 30 Min. 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	Aluminum alloy
Dimensions	50.80 x 25.40 x 11.80 mm
Weight	28.0g (Typ.)
Cooling Method	Free air convection

## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without external components) CLASS B (see Fig.3-② for recommended circuit)
	RE	CISPR32/EN55032	CLASS A (without external 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 (Bare pager) 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 (Bare pager) perf. Criteria A

Typical Characteristic Curves

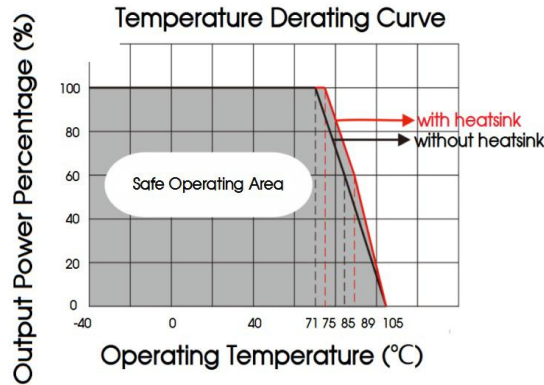
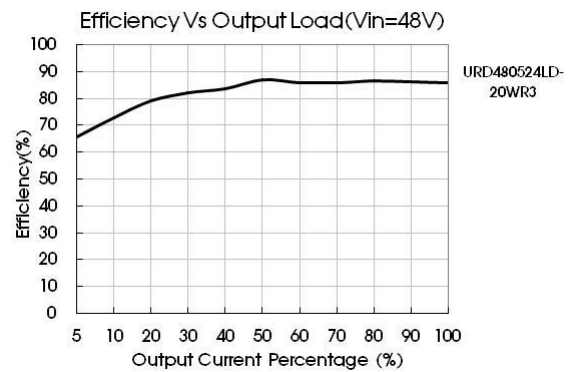
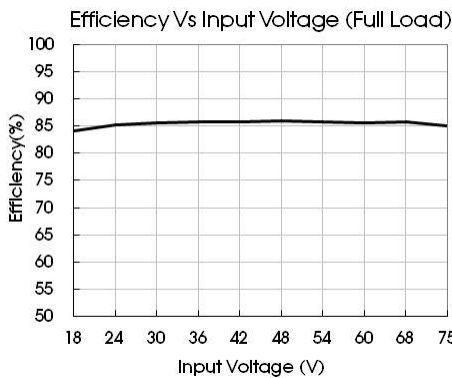


Fig. 1



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  $C_{in}$  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

Single Vout (VDC)	Cout	Cin
5	47 $\mu$ F/16V	100 $\mu$ F/100V
12	22 $\mu$ F/25V	
24	22 $\mu$ F/50V	

2. EMC compliance circuit

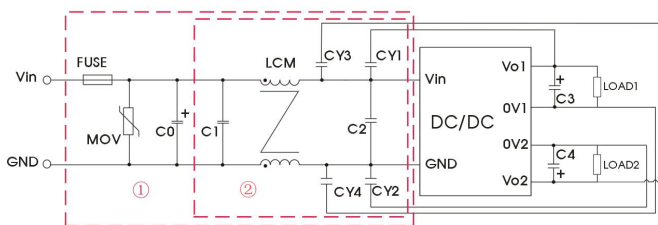


Fig. 3

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

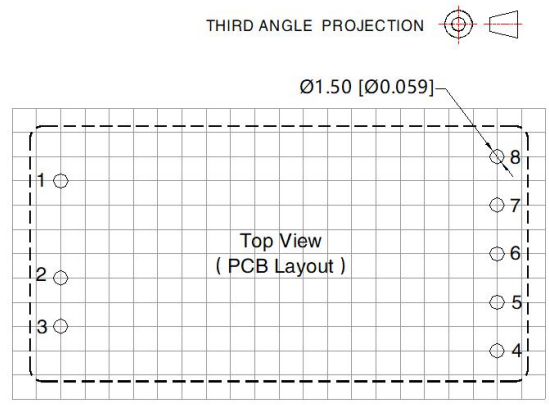
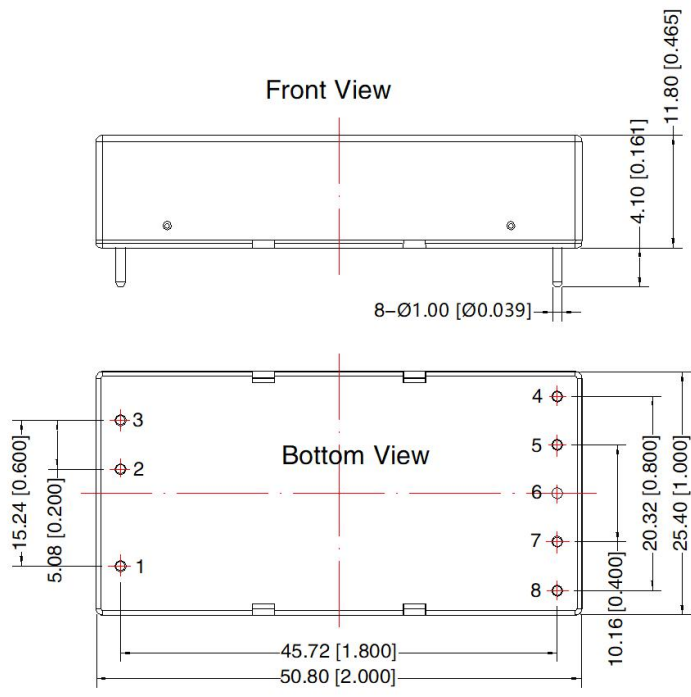
Parameter description

Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0	680 $\mu$ F/100V
C1 / C2	4.7 $\mu$ F/100V
MOV	S14K60
C3 / C4	Refer to the Cout in Fig.2
LCM	1mH(FL2D-30-102)
CY1 /CY2 /CY3 /CY4	Y1/102M/400VAC

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](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Pin-Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo2
5	0V2
6	No Pin
7	0V1
8	+Vo1

Note:  
Unit: mm[inch]  
PIN1/2/3/4/5/6/7/8: φ 1.0mm  
Pin diameter tolerances: ± 0.10 [± 0.004]  
General tolerances: ± 0.50 [± 0.020]

Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number 58200035;
- If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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;
- All index testing methods in this datasheet are based on company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)



MORNSUN Guangzhou Science & Technology Co., Ltd.