DC/DC Converter
URD_LD-20WR3 Series

MORNSUN®

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

CE Report EN62368-1 | UKCA Report BS EN62368-1 | Patent Protection | RoHS | 3 years Warranty

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℃ to +105℃
- Meets IEC62368, UL62368 standards

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℃ to +105℃, 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-comunication device, distributed power supply system, hybrid module system, remote control system.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output (Vo1 /Vo2)			Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max. (Vo1 /Vo2)
		Nominal (Range)	Max.①	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: ①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency 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	--	
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	--	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 Accuracy①	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 Regulation②	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	%/℃
Ripple & Noise③	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 Protection④			Hiccup, continuous, self-recovery			

Note: ① The load of Vo1 and Vo2 should be the same;
②Load regulation for 0%-100% load is ±5%;
③Under 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;
④If 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℃, 75%RH	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	2200	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	℃
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		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	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	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.3-①for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s (Bare pager)	perf. Criteria A

Typical Characteristic Curves

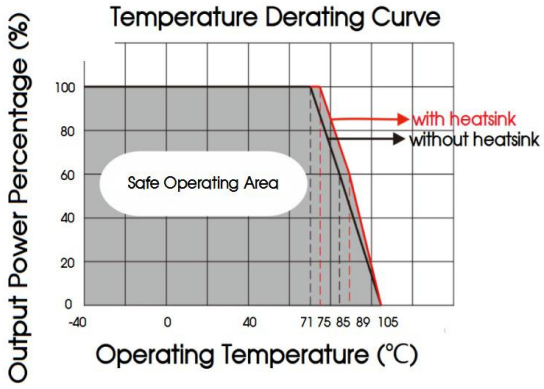
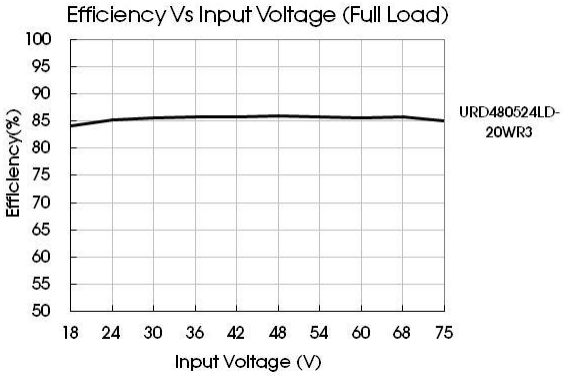
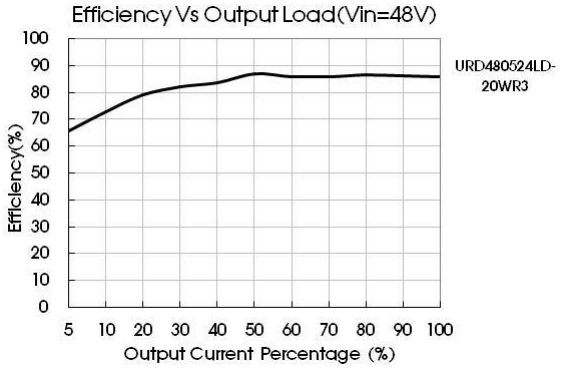


Fig. 1





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 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

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

2. EMC compliance circuit

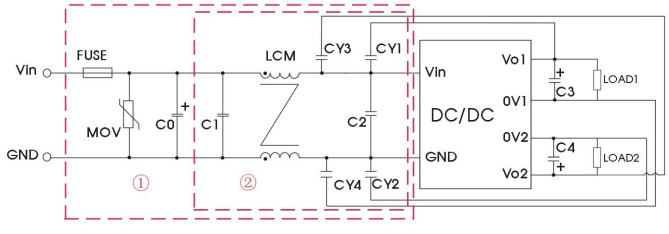


Fig. 3

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

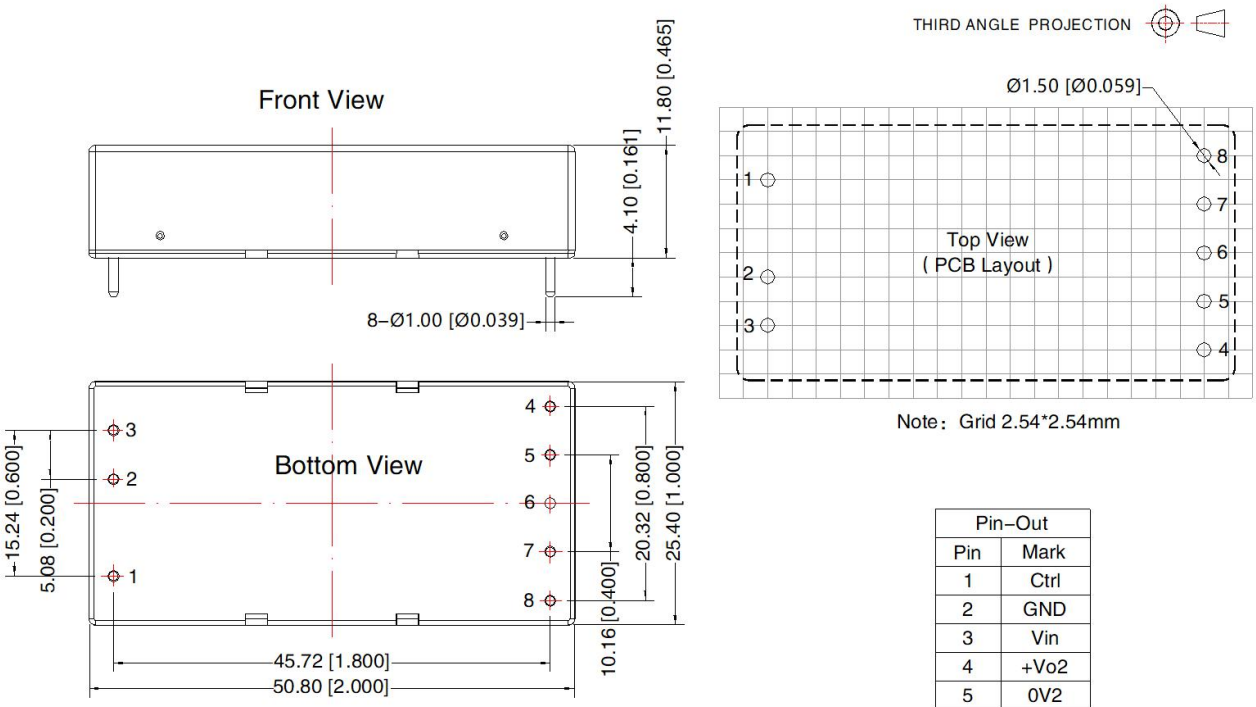
Parameter description

Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0	680μF/100V
C1 / C2	4.7μF/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

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: ϕ1.0mm
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number 58200035;
2. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. 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

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