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

Note: 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 Accuracy ①	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	

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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	℃
	Wave soldering,10 seconds	255	260	265	
Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency①	PWM mode	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Note: *The pin resistance temperature is not the actual set temperature of the soldering iron, but the temperature required for a good solder joint. The actual set temperature by the customer needs to be comprehensively set based on the thickness of the PCB, the size of the copper cladding, the power of the soldering iron, and the selection of the soldering iron tip.
①Switching 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

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	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

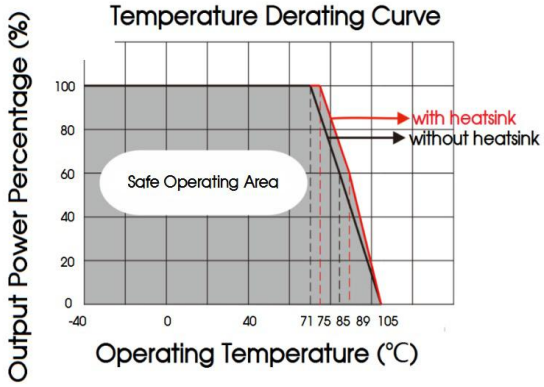
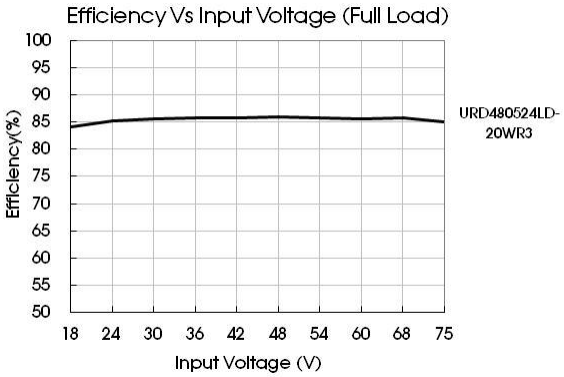
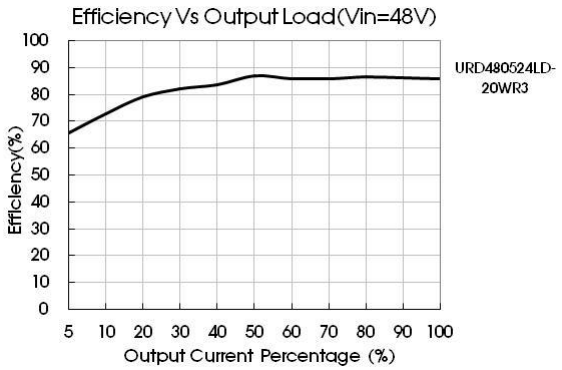


Fig. 1





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.

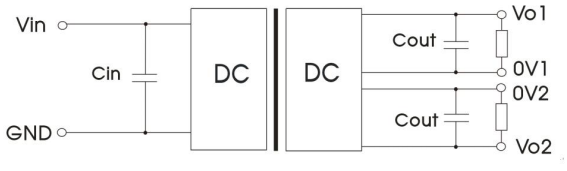


Fig. 2

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

2. EMC compliance circuit

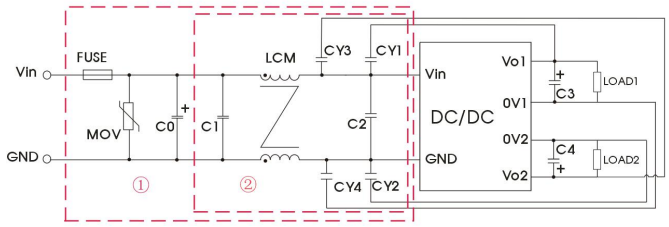


Fig. 3

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

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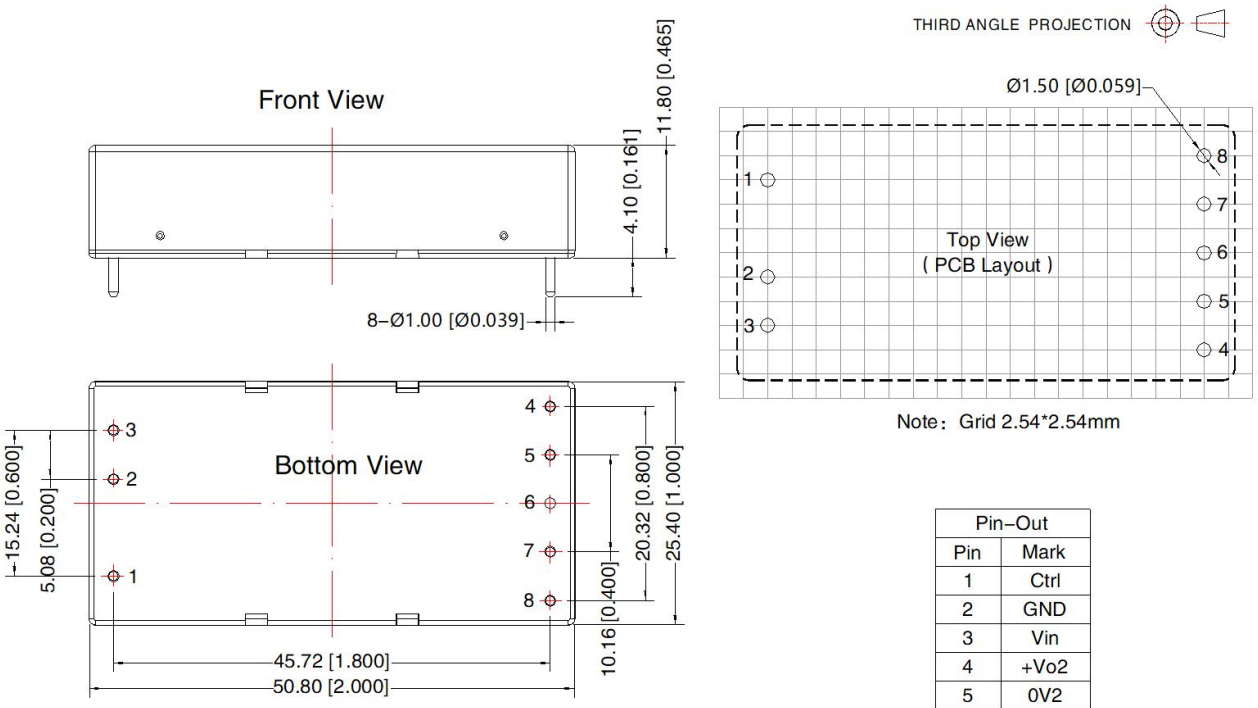
3. The products do not support parallel connection of their output

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]

Note:
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.

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