DC/DC Converter

URD_LD-20WR3 Series

MORNSUN®

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

CE Patent Protection RoHS

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℃ ~ +105℃
- EN62368 approved
- 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.	Max. Capacitive Load(μF) (Vo1 /Vo2)
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max.	Current (mA) Min.		
CE	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
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	--	±3	±5	
	0%-5% load	Vo1	--	±1	±3	
		Vo2	--	±3	±5	
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 with Positive output at 50% load and Negative output from 25%-100% load			--	--	±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/Vo2 should be the same;
②Load regulation for 0%-100% load is ±5%;
③Ripple & 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;
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		2G, 10-55Hz, 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 11.80mm
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	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

Typical Characteristic Curves

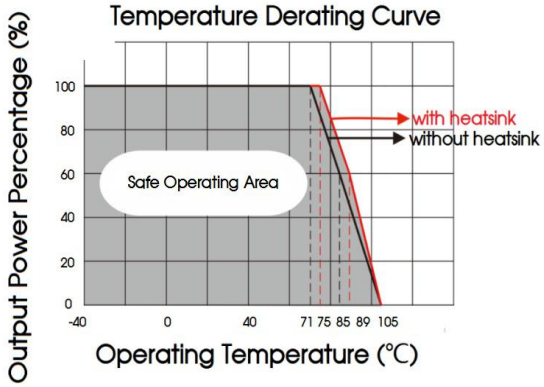
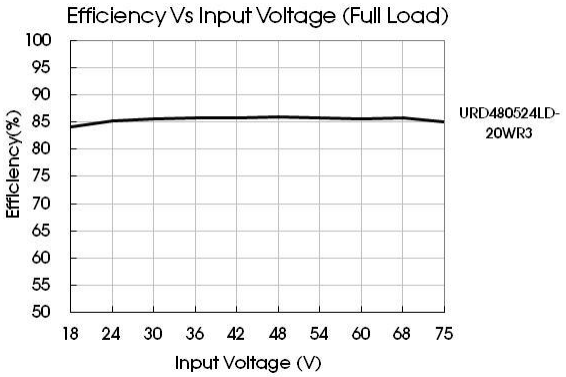
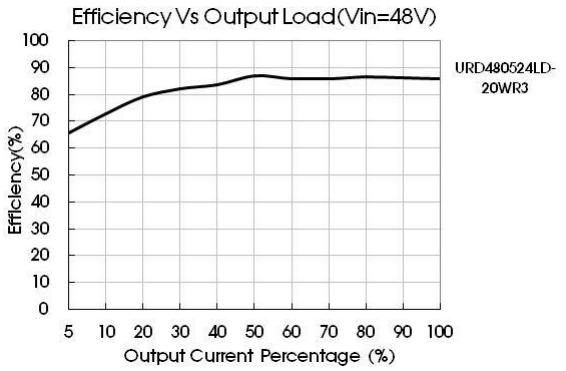


Fig. 1





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 (μF)	Cin (μF)
5	47	100
12	22	
24	22	

2. EMC compliance circuit

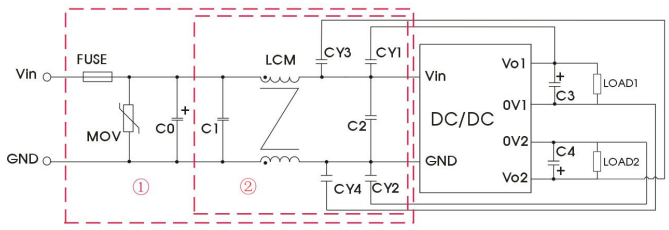


Fig. 3

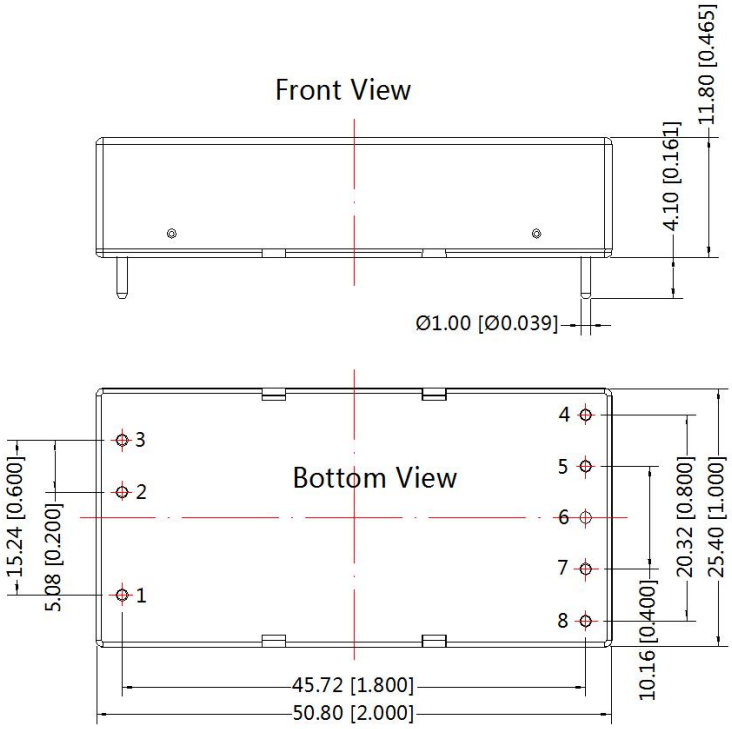
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs

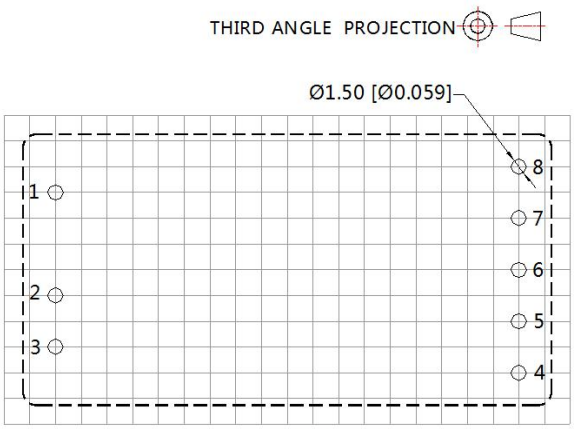
Parameter description

Model	Vin:48V
FUSE	Choose according to actual input current
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





Note : Grid: 2.54*2.54mm

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

Note :
Unit: mm[inch]
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. The Packaging bag number: 58200035;
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 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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