DC/DC Converter
URA2412LD-30WR3G

MORNSUN®

30W isolated DC-DC converter
Ultra-wide input and regulated dual output

Patent Protection RoHS

FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 89% with full load
- No-load power consumption as low as 0.14W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-voltage, over-current protection
- Operating ambient temperature range: -40℃ to +80℃
- Meets CISPR32/EN55032 CLASS A without extra components
- Six-sided metal shielded package

URA2412LD-30WR3G of isolated 30W DC-DC converter products with an ultra-wide 4:1 input voltage and feature efficiencies of up to 89%, input to output isolation is tested with 1500VDC and the converters safely operate ambient temperature of -40℃ to +80℃, input under-voltage protection, output short-circuit, over-voltage, over-current protection. They meet CLASS A of CISPR32/EN55032 EMI standards without external components, they are widely used in applications such as data transmission device, battery power supply device, telecommunication device, distributed power supply system, hybrid module system, remote control system, industrial robot and railway fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load③ (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
--	URA2412LD-30WR3G	24 (9-36)	40	±12	±1250/0	87/89	1250

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load;
③The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	--	1405/6	1437/16	mA
Reflected Ripple Current	Nominal input voltage	--	40	--	
Surge Voltage (1sec. max.)		-0.7	--	50	VDC
Start-up Voltage		--	--	9	
Input Under-voltage Protection		5.5	6.5	--	
Start-up Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			
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	--	5	8	mA

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

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	5%-100% load		--	±1	±3	%
	0%-5% load		--	±1	±5	
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
		Vo2		±0.5	±1	
Load Regulation①	5%-100% load	Vo1	--	±0.5	±1	
		Vo2	--	±0.5	±1.5	
Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 10%-100%		--	--	±5	%

Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs
Transient Response Deviation	25% load step change, nominal input voltage	--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise②	20MHz bandwidth, nominal input voltage, 100% load	--	50	150	mVp-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo
Over-current Protection		110	--	190	%Io
Short-circuit Protection		Hiccup, continuous, self-recovery			

Note:
①Load regulation for 0%-100% load is ±5%;
②The "parallel cable" method is used for ripple and noise test, please refer to *DC-DC Converter Application Notes* for specific information.

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.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC/60sec	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig. 1	-40	--	+80	℃
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		IEC/EN61373 - Category 1, Grade B			
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	27.8g(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	10Vr.m.s perf. Criteria A

Electromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2	150kHz-500kHz 99dBμV (see Fig.3-② for recommended circuit)
		EN55016-2-1	500kHz-30MHz 93dBμV (see Fig.3-② for recommended circuit)
	RE	EN50121-3-2	30MHz-230MHz 40dBμV/m at 10m (see Fig.3-② for recommended circuit)
		EN55016-2-1	230MHz-1GHz 47dBμV/m at 10m (see Fig.3-② for recommended circuit)
Immunity	ESD	EN50121-3-2	Contact ±6kV/Air ±8kV perf. Criteria A
	RS	EN50121-3-2	20V/m perf. Criteria A
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz (see Fig.3-① for recommended circuit) perf. Criteria A
	Surge	EN50121-3-2	line to line ±1kV (42Ω, 0.5μF) (see Fig.3-① for recommended circuit) perf. Criteria A
	CS	EN50121-3-2	0.15MHz-80MHz 10V r.m.s perf. Criteria A

Typical Characteristic Curves

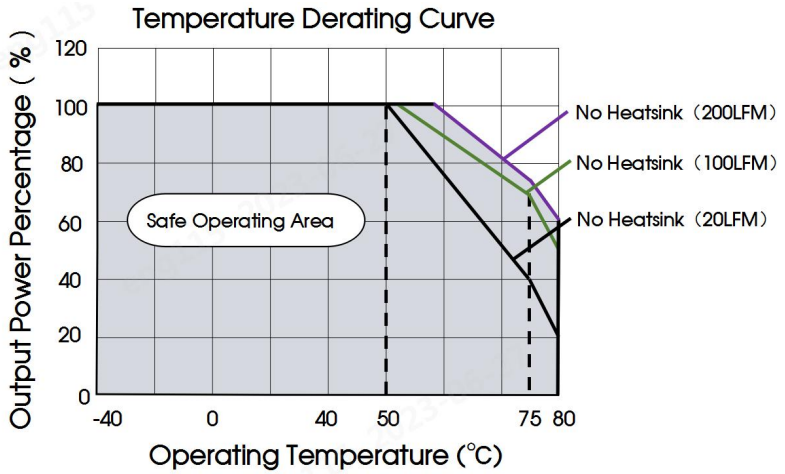


Fig. 1

Design Reference

1. Typical application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 5.
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

Vout (VDC)	Cin	Cout
±12	100μF/50V	220μF/25V

2. EMC compliance circuit

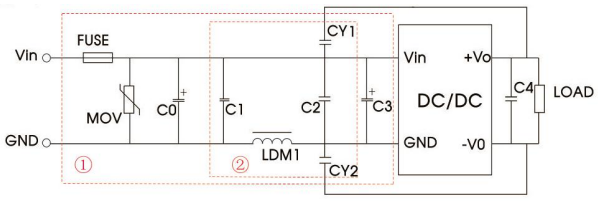


Fig.3

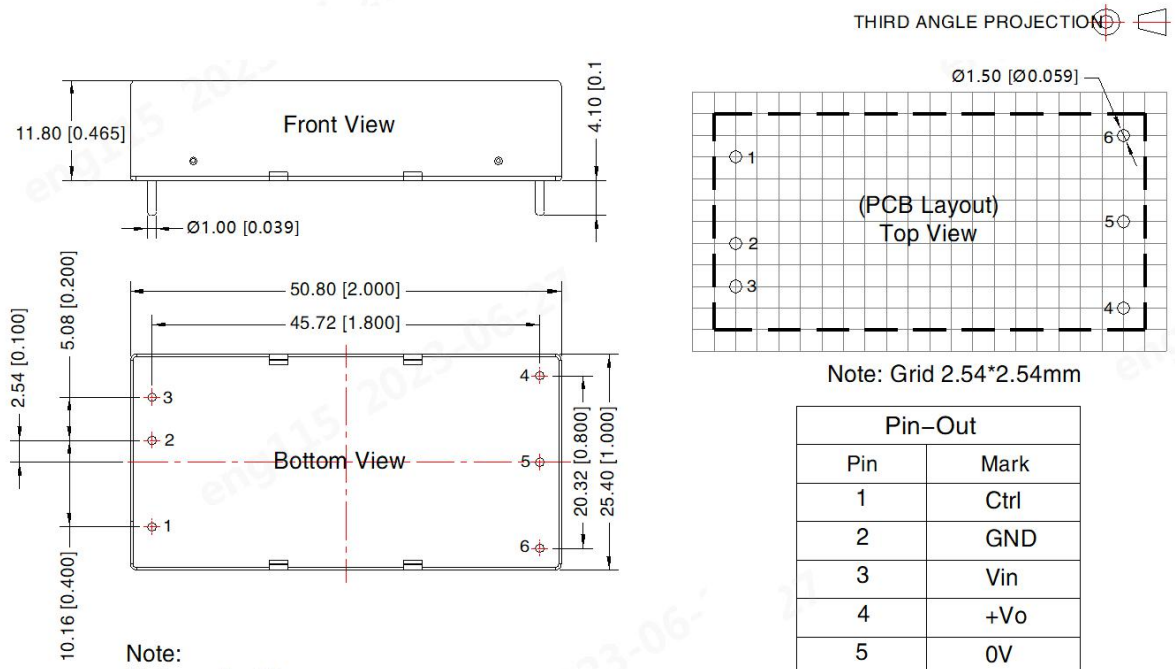
Notes: We use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Model	Vin:24VDC
FUSE	Choose according to actual input current
MOV	S20K30
C0	680μF/50V
C1/C2	2.2μF/50V
C3	330μF/50V
C4	220μF
LDM1	3.3μH
CY1/CY2	2.2nF/400VAC Safety Y Capacitor

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

5. 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	+Vo
5	0V
6	–Vo

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. 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.

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