

60W isolated DC-DC converter in DIP package  
Ultra-wide input and regulated dual output



Patent Protection RoHS

## FEATURES

- Ultra-wide 4:1 input voltage range
- High efficiency up to 91.5%
- No-load power consumption as low as 0.19W
- I/O isolation test voltage 2250 VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +105°C
- Industry standard pin-out

URA24\_LD-60W(H)R3 is isolated 60W DC-DC converter products have an ultra-wide 4:1 input voltage and feature efficiency of up to 91.5%, input to output isolation is tested with 2250VDC and the converters safely operate in an ambient temperature of -40°C to +105°C, input under-voltage protection, output over-voltage, over-current, short-circuit protection. they are widely used in applications such as industrial control, electric power, instruments, communication.

## Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency <sup>②</sup> (%) Min./Typ.	Capacitive Load (μF) <sup>③</sup> Max.
		Nominal (Range)	Max. <sup>①</sup>	Voltage (VDC)	Current (mA) Max./Min.		
--	URA2412LD-60W(H)R3	24 (9-36)	40	±12	±2500/0	89/90.5	3000
	URA2415LD-60W(H)R3			±15	±2000/0	89/91.5	2000
	URA2424LD-60W(H)R3			±24	±1250/0	89/91	1000

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	±12V output	--	2763/8	2809/20	mA
		±15V output	--	2733/8	2809/20	
		±24V output	--	2748/8	2809/20	
Reflected Ripple Current	nominal input voltage, 100%load	--	100	--	VDC	
Surge Voltage (1sec. max.)		-0.7	--	50		
Start-up Voltage		--	--	9		
Input Filter		PI filter				
Hot Plug		Unavailable				
Ctrl* <sup>①</sup>	Module open	Ctrl pin open or TTL pulled high (3-12VDC)				
	Module shutdown	Ctrl pin pulled GND or pulled low (0-1.2VDC)				

Notes: ①The voltage of Ctrl pin is relative to input pin GND.

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy <sup>①</sup>	5%-100% load	--	±1	±2	%	
	0%-5% load	--	±2	±5		
Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	%
		Vo2	--	±0.5	±1.5	
Load Regulation <sup>②</sup>	5%-100% load	Vo1	--	±0.5	±1	

		Vo2	--	±0.5	±1.5	
Transient Recovery Time	25% load step change, input voltage range		--	300	500	μs
Transient Response Deviation	25% load step change, nominal input voltage		--	±3	±5	%
Ripple & Noise <sup>③</sup>	20MHz bandwidth, 5%-100% load	±12V/±15V output	--	70	--	mVp-p
		±24V output	--	90	--	
Over-voltage Protection	Input voltage range		110	140	160	%Vo
Over-current Protection			110	140	200	%Io
Short-circuit Protection			Continuous, self-recovery			

Notes:  
 ①When the test condition is 0%~100% load regulation ratio is ±5%, Vo1 is positive output, and Vo2 is negative output.  
 ②The "Tip and barrel method" is used for ripple and noise test, please refer to Figure 2 for the recommended circuits. Ripple & noise value less than 5% Vo when with 0%~5% load.  
 ③For dual output models, when short circuit test is performed on one output, the other output should be at least with 5% load.

## 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.	2250	--	--	VDC
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1300	--	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		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency*	PWM mode	--	370	--	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	Without heat sink	Horizontal package	50.80 x 25.40 x 11.80 mm		
	With heat sink		51.40 x 26.20 x 16.50 mm		
Weight	Without heat sink		41.0g		
	With heat sink		50.8g		
Cooling Method	Free air convection				

## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (see Fig.3-①) / CLASS B (see Fig.3-②)		
	RE	CISPR32/EN55032	CLASS A (see Fig.3-①) / CLASS B (see Fig.3-②)		
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV		perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m		perf. Criteria A
	EFT	IEC/EN61000-4-4	100KHz ±2KV (see Fig.3-②)		perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig.3-②)		perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s		perf. Criteria A

Typical Characteristic Curve

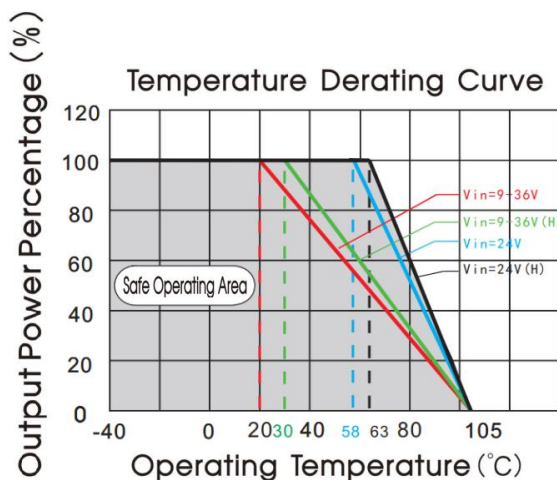


Fig. 1

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.



Vout (VDC)	Cin	Cout
$\pm 12/\pm 15$	100 $\mu$ F/50V	220 $\mu$ F/50V
$\pm 24$		100 $\mu$ F/50V

Fig. 2

2. EMC compliance circuit

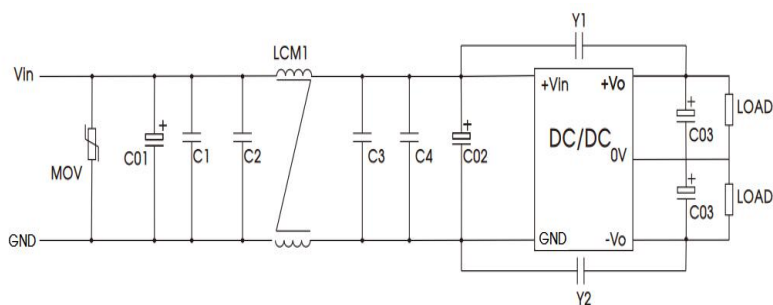


Fig.3-①

Parameter description:

Model	Parameter
C1/C2	4.7 $\mu$ F/50V
C3/C4	10 $\mu$ F/50V
C01	680 $\mu$ F/50V
C02	330 $\mu$ F/50V
C03	100 $\mu$ F/50V
Y1/Y2	2.2nF/Y1
LCM1	10.0mH (Min.)/180m $\Omega$ (Max.)
MOV	14D470

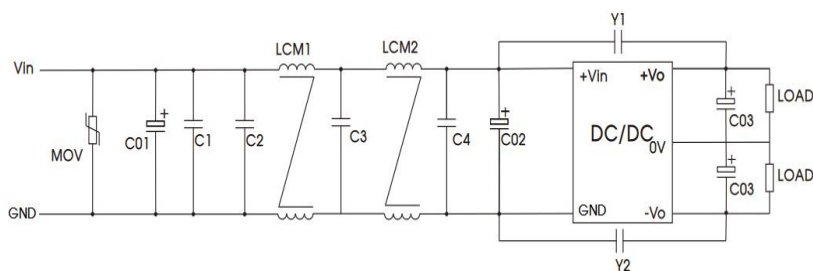


Fig.3-②

Parameter description:

Model	Parameter
C1/C2	4.7uF/50V
C3	10uF/50V
C4	47uF/50V
C01	680uF/50V
C02	330uF/50V
C03	100uF/50V
Y1/Y2	2.2nF/Y1
LCM1/LCM2	10.0mH (Min.)/180mΩ (Max.)
MOV	14D470

### 3. Recommended scheme for thermal testing

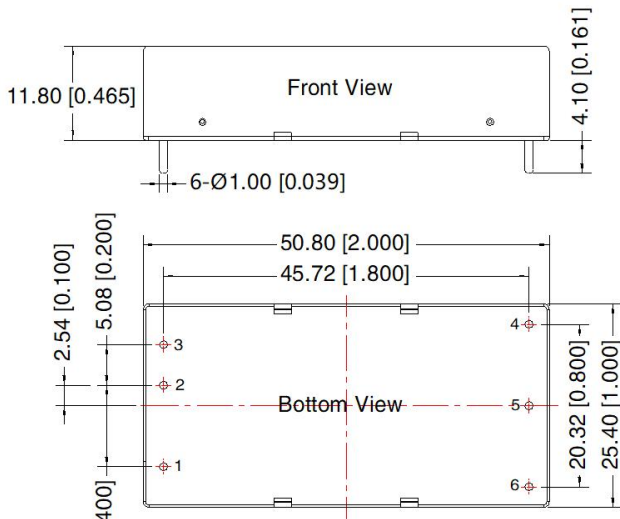
In the application process, the thermal design of the product can be evaluated with the product temperature derating curve; or by testing the temperature of point A in Fig.4 to determine the stable working range of the product, when the temperature of point A is lower than 100°C, it is the stable working range of the product.



Fig.4

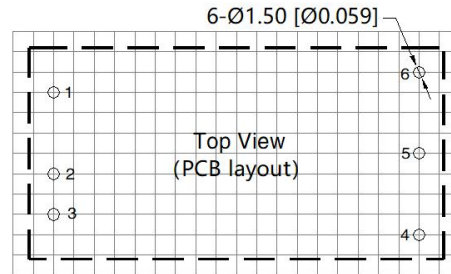
4. The products do not support parallel connection of their output
5. For additional information please refer to DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

URA24\_LD-60WR3 Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]

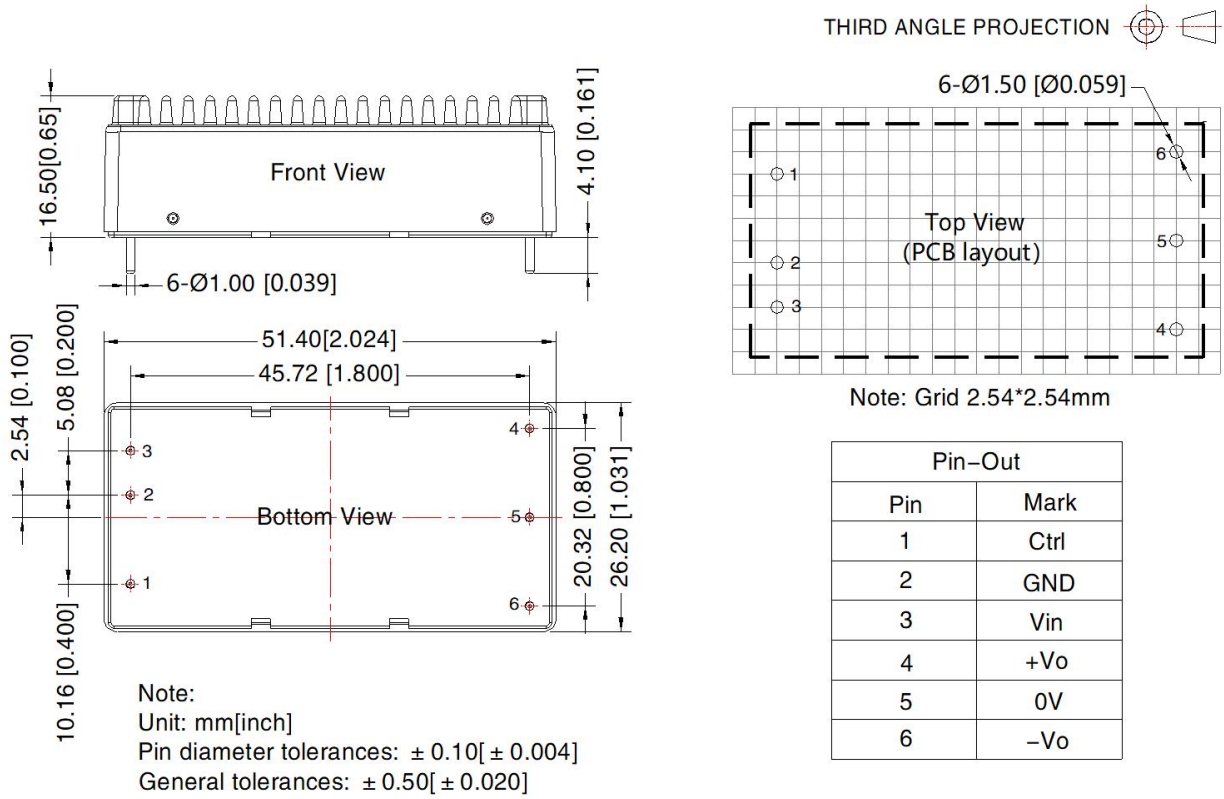
THIRD ANGLE PROJECTION



Note: Grid 2.54\*2.54mm

Pin-Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V
6	-Vo

URA24\_LD-60WHR3 Dimensions and Recommended Layout



Note:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200035(Without heat sink), 58200051(With heat sink);
- It is recommended to use more than 5% load, if less than 5% load, the ripple index of product may exceed the specification, but does not affect the reliability of the product;
- If the product works under the minimum required load, it is not guaranteed that the product performance meets all the performance indicators in this manual;
- 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  $T_a=25^{\circ}\text{C}$ , 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)