

DCWA24_LD-60W Series



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
- 3 Years Warranty

DESCRIPTION

DC-DC Module Power Supply, Wide Voltage Input, Power 60W, Isolated, Regulated, Single Output, DIP Packaging.

MODEL NUMBERING

DCWA24xxLD-60W



SELECTION GUIDE

Product Model	Input Voltage Standard Value(range)	Output Voltage (Vdc)	Output Current(mA) Max./Min.	Efficiency % (Min./Typ.)	Maximum capacitive load (μF)
DCWA2412LD-60W	24VDC (9-36)	±12	±2500/0	89/90.5	3000
DCWA2415LD-60W		±15	±2000/0	89/91.5	2000
DCWA2424LD-60W		±24	±1250/0	89/91	1000

Note:

1. Exceeding the maximum input voltage may cause permanent damage;
2. Efficiency is measured at nominal input voltage and rated output load;
3. Use suffix "H" for Heatsink Mounting.

INPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Input Current (Rated load)	Nominal input voltage	--	2733	2809	mA
Input Current (No-load)	Nominal input voltage	--	8	20	mA
Reflected Ripple Current	nominal input voltage, 100%load	--	100	--	mA
Surge Voltage (1sec. max.)		-0.7	--	50	VDC
Start-up Voltage		--	--	9	VDC
Input Filter		Pi filter			
Ctrl*	Module on	Ctrl pin open or TTL pulled high(3-12VDC)			
	Module off	Ctrl pin pulled GND or pulled low(0-1.2VDC)			

Remarks: This product does not support hot plug Note: *The Ctrl pin voltage is referenced to input GND

OUTPUT CHARACTERISTICS

Parameter	Operating Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	5%-100% load		--	±1	±2	%
	0%-5% load		--	±2	±5	%
Linear Regulation Rate	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	%
		Vo2	--	±0.5	±1.5	%
Load Regulation Rate	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	20MHz bandwidth, 5%-100% load	±12V/±15V output	--	70	--	mVp-p
		±24V output	--	90	--	mVp-p

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Output Overvoltage Protection	Full voltage range input	110	140	160	%Vo
Output Overcurrent Protection	Full voltage range input	110	140	200	%Io
Short-Circuit Protection	Full voltage range input	Sustainable, Self-healing			

Note:

1. When the test condition is 0%~100% load regulation ratio is $\pm 5\%$, Vo1 is positive output, and Vo2 is negative output.
2. The "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.
3. For dual output models, when short circuit test is performed on one output, the other output should be at least with 5% load.

GENERAL CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	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	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	1300	--	pF
Working Temperature	See Fig. 1	-40	--	+105	°C
Storage Temperature		-55	--	+125	°C
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Temperature Resistance Of Pins	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	°C
	Wave soldering, 10 seconds	255	260	265	°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	--	--	Khours

Note: ① Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement

PHYSICAL CHARACTERISTICS

Parameter	Conditions	
Housing Material	Aluminum alloy	
Dimensions	Without heatsink	50.80 × 25.40 × 11.80 mm
	With heatsink	51.40 × 26.20 × 16.50 mm
Weight	Without heatsink	41.0g
	With heatsink	50.8g
Cooling Method	Natural Air Cooling	

EMC CHARACTERISTICS

Parameter	Category		Content	
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

PRODUCT CHARACTERISTIC CURVE

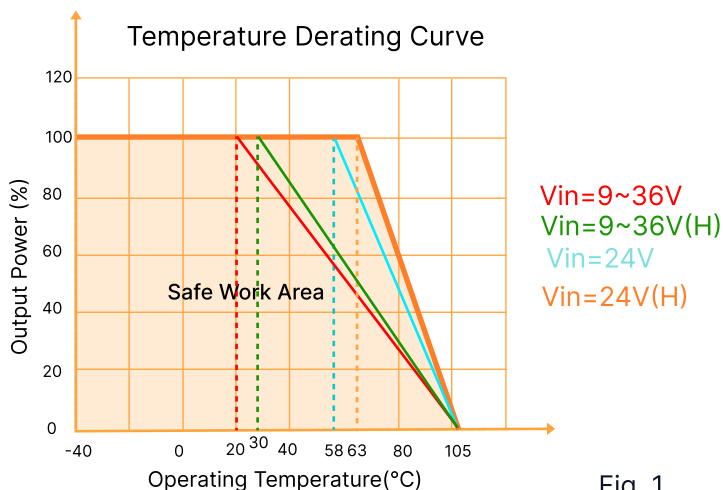


Fig. 1

CIRCUIT DESIGN AND APPLICATION

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.

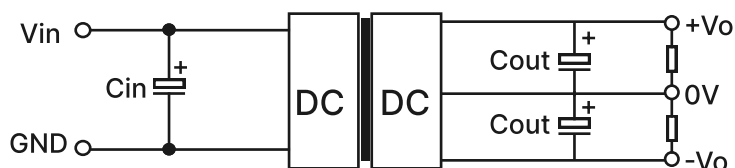


Fig. 2

Vin(VDC)	Cin	Cout
$\pm 12/\pm 15$	100 μ F/50V	220 μ F/50V
± 24		100 μ F/50V

2. EMC compliance circuit

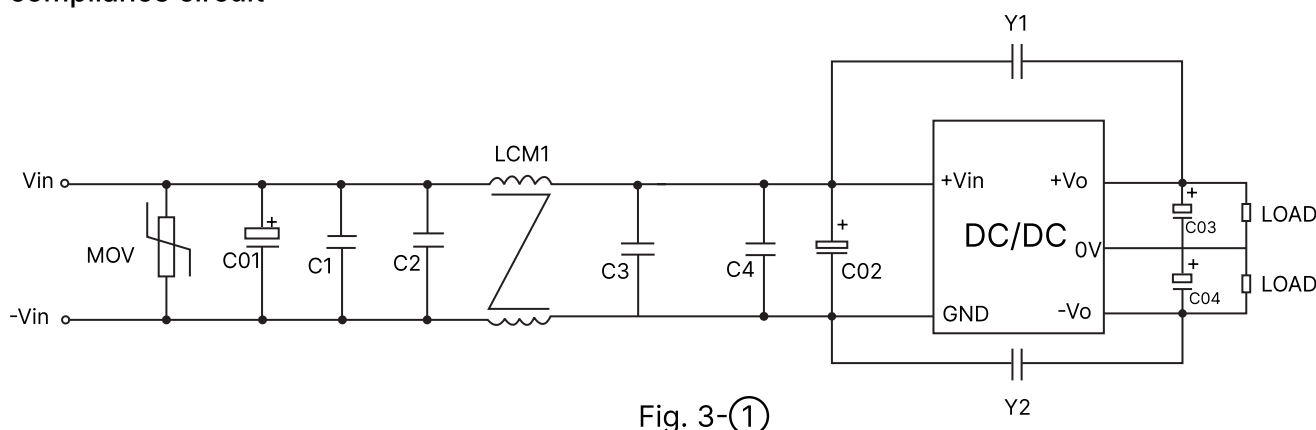


Fig. 3-①

Table 2 : recommended component parameters

Model	Parameter
C1/C2	4.7 μ F/50V
C3/C4	10 μ F/50V
C01	680 μ F/50V
C02	330 μ F/50V
C03/C04	100 μ F/50V
Y1/Y2	2.2nF/Y1
LCM1	10.0mH (Min.)/ 180m Ω (Max.)
MOV	14D470

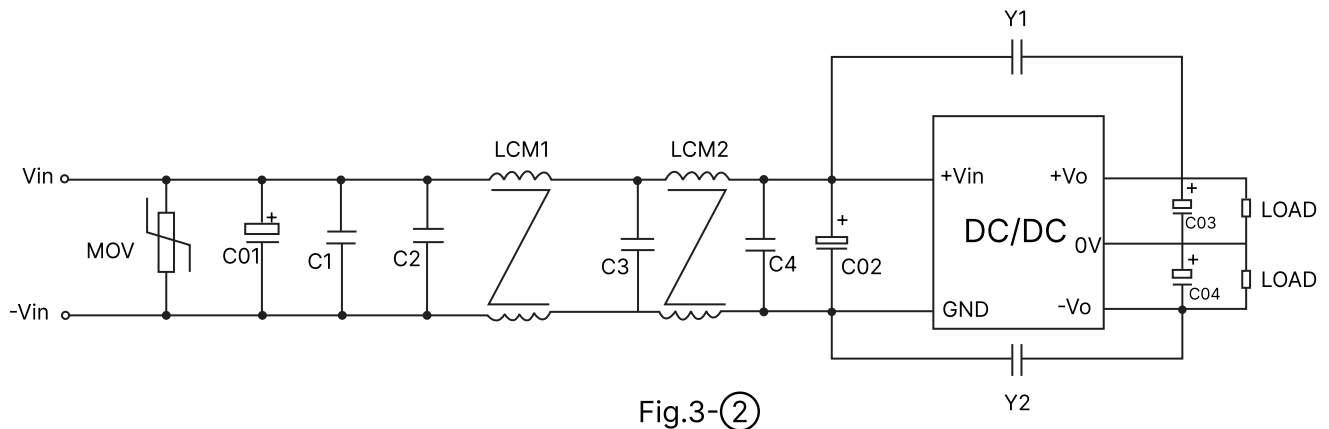


Fig.3-②

Table 2 : recommended component parameters

Model	Parameter
C1/C2	4.7uF/50V
C3	10uF/50V
C4	47uF/50V
C01	680uF/50V
C02	330uF/50V
C03/C04	100uF/50V
Y1/Y2	2.2nF/Y1
LCM1/LCM2	10.0mH (Min.)/180mΩ(Max.)
MOV	14D470

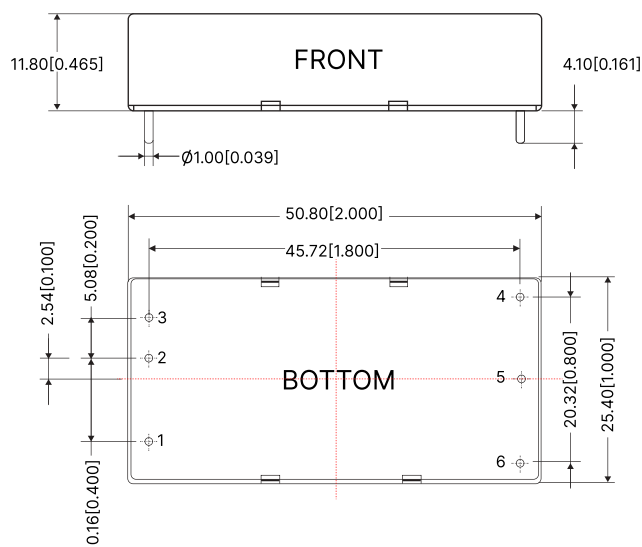
3. Recommended solution for thermal testing

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.



OVERALL DIMENSIONS AND PIN FUNCTIONS

DCWA24_LD-60W (without heatsink)



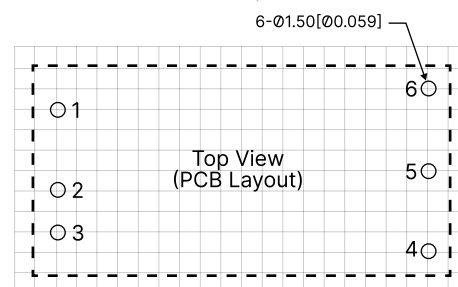
Note:

Unit: mm[inch]

Pin diameter tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

THIRD ANGLE PROJECTION

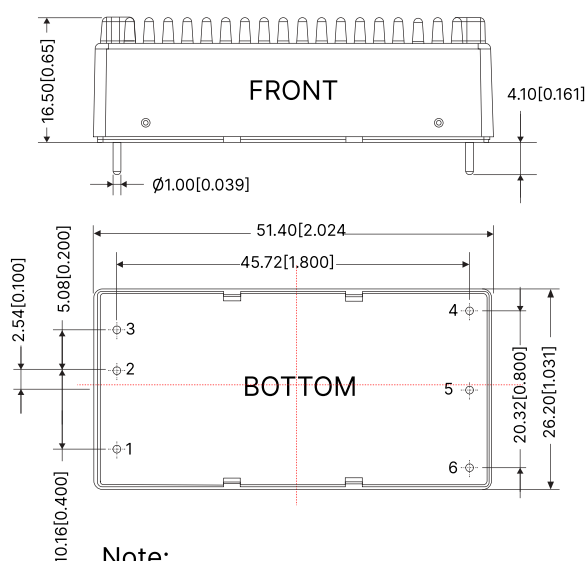


Note: Grid 2.54*2.54

Table 1: Pin Function Table

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

DCWA24_LD-60WH (with heatsink)



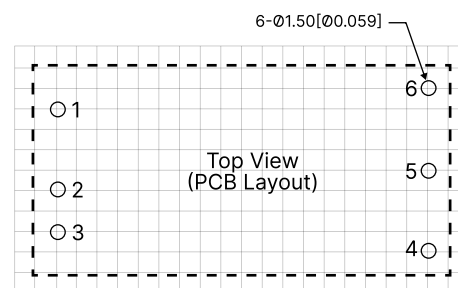
Note:

Unit: mm[inch]

Pin diameter tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54

Table 2: Pin Function Table

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

NOTES

1. For additional information on Product Packaging please refer to www.rhenxv.com
2. Recommended used in more than 10% load, if the load is lower than 10%, then the ripple index of the product may exceed the specification, but does not affect the reliability of the product;
3. 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;
4. The maximum capacitive load offered were tested at input voltage range and full load;
5. 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;
6. All index testing methods in this datasheet are based on company corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. The products do not support parallel connection of their output.