

DCWB24_LD-40W Series



FEATURES

- Wide input voltage range (4:1)
- Operating temperature range: -40°C To +105°C
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- High efficiency up to 93%
- Metal shielding package
- Isolation voltage : 1.5K VDC
- Industry standard pin-out
- 3 Years warranty

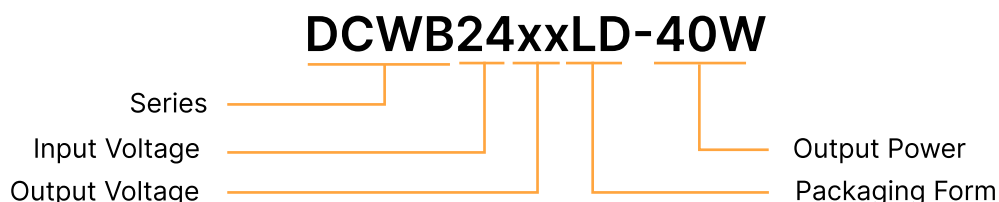
APPLICATION

- Industrial Control
- Electrical Power
- Instrumentation
- Communication

DESCRIPTION

DC-DC Module Power Supply, Wide Voltage Input, Power 40W, Isolated, Regulated, Single Output, DIP Packaging.

MODEL NUMBERING



SELECTION GUIDE

Product Model	Input Voltage (Vdc) Standard Value(range)	Output Voltage (Vdc)	Output Current (mA) Max./Min.	Efficiency % (Min./Typ.)	Maximum capacitive load (μF)
DCWB2405LD-40W	24VDC (9-36)	5	8000/400	89/91	15000
DCWB2412LD-40W		12	3333/166	90/92	3000
DCWB2415LD-40W		15	2666/133	91/93	2200
DCWB2424LD-40W		24	1666/83	90/92	1300

Note: Use suffix "H" for Heatsink

INPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Input current (full load)	Nominal voltage input 24VDC	--	1811	1872	mA
Input current (no load)	Nominal voltage input 24VDC	--	15	30	mA
Reflected ripple Current	0-100% load	--	--	40	mA
Input impulse voltage	(1sec. max.)	-0.7	--	50	VDC
Starting voltage	Nominal voltage input 24VDC	--	--	9	VDC
Input filter		Pi filter			
Remote control foot (Ctrl*)	Module on	Ctrl pin open or pulled high (TTL 3-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	6	12	mA

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	0% -100% Load		--	±1	±5	%
Line Regulation Rate	Input voltage will vary from low to high at full load		--	±0.2	±0.5	%
Load Regulation Rate	5%-100% load		--	±0.5	±1	%
Dynamic Response Step Deviation	25% load step change, input voltage range	5V output	--	±3	±10	%
		Other output	--	±3	±5	%
Temperature Drift Coefficient	100% load		--	--	±0.03	%/°C
Dynamic Response Recovery Time	25%load step change,nominal input voltage		--	250	500	μs
Ripple & Noise*	20MHz bandwidth	5V output	--	--	5	%Vo
		Other output	--	--	3	%Vo
	20MHz bandwidth, 5%-100% load		--	100	200	mVp-p

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Output Overvoltage Protection	Max Input Voltage Range	110	140	160	%Vo
Output Overcurrent Protection	Max Input Voltage Range	110	140	200	%Io
Short-Circuit Protection		Sustainable, Self-healing			

* By measuring method is used for Ripple and Noise test, please refer to Fig. 2. for recommended circuit.

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.	1500	--	--	VDC
	Input/output-Case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1000	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	1400	--	pF
Working Temperature	See Fig. 4	-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
Vibration		10-150Hz, 5G, 0.75mm.along X, Y & Z			
Switching Frequency *	PWM mode	--	370	--	KHz
MTBF	MIL-HDBK-217F @ 25°C	1000	--	--	Khours

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

PHYSICAL CHARACTERISTICS

Parameter	Conditions	
Case Material	Aluminum alloy	
Overall Dimensions	Without heatsink	50.80 × 25.40 × 11.80 mm
	With heatsink	51.40 × 26.20 × 16.50 mm
Weight	Without heatsink	41.0g (Typ.)
	With heatsink	50.8g (Typ.)
Cooling Mode	Free air convection	

EMC CHARACTERISTICS

Parameter	Category	Content		
EMI	CE	CISPR32/EN55032	CLASS A (Vout=12/15V see Fig. 2-Ⓐ for recommended circuit, Vout=05/24V see Fig. 2-Ⓒ for recommended circuit)	
			CLASS B (Vout=12/15V see Fig. 2-Ⓑ for recommended circuit, Vout=05/24V see Fig. 2-Ⓓ for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (Vout=12/15V see Fig. 2-Ⓐ for recommended circuit, Vout=05/24V see Fig. 2-Ⓒ for recommended circuit)	
			CLASS B (Vout=12/15V see Fig. 2-Ⓑ for recommended circuit, Vout=05/24V see Fig. 2-Ⓓ for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	100KHz ±2KV (Vout=12/15V see Fig. 2-Ⓑ for recommended circuit, Vout=05/24V see Fig. 2-Ⓓ for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV (Vout=12/15V see Fig. 2-Ⓑ for recommended circuit, Vout=05/24V see Fig. 2-Ⓓ for recommended circuit)	perf. Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

CIRCUIT DESIGN AND APPLICATION

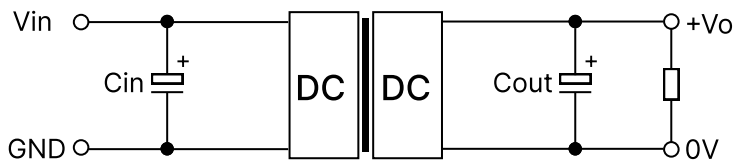


Fig 1: Application circuit

Table 1: Recommended Capacitive Load Values

Vout (VDC)	Cin(μF)	Cout(μF)
5	100μF/50V	220μF/16V
12/15		100μF/50V
24		47μF/50V

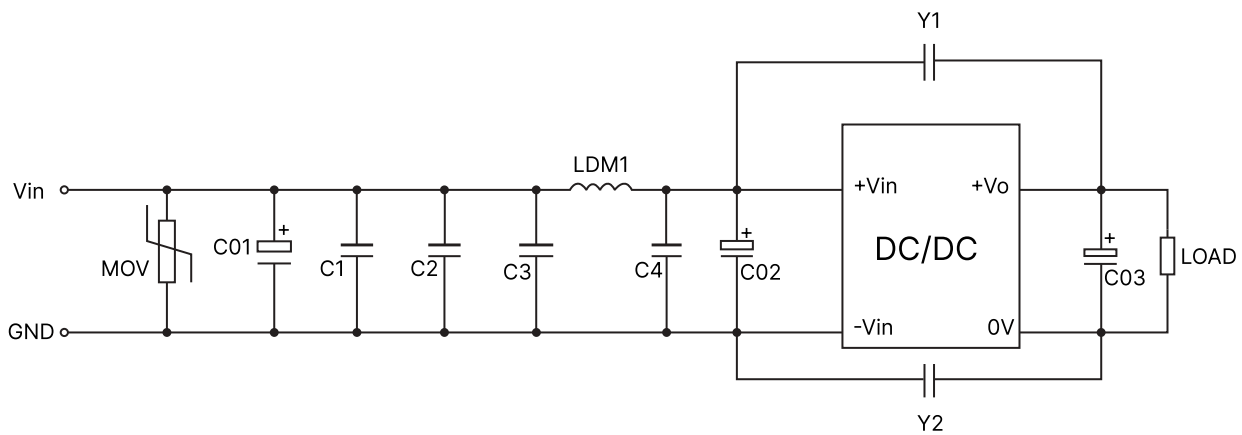


Fig 2- (A) : EMC Typical Recommended Circuits

Table 2 : Recommended component parameters

Model	Parameter	Parameter description
C1/C2	4.7μF	50V
C3/C4	10μF	50V
C01	680μF	50V
C02	330μF	50V
C03	100μF	50V
Y1/Y2	2.2nF	Y1
LDM1	2.2μH	/
MOV	S14K30	/

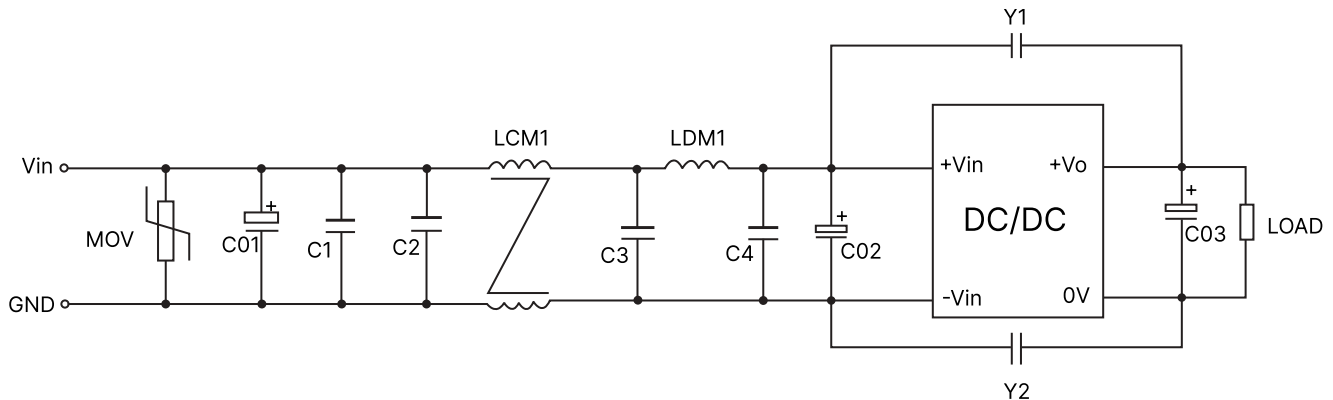


Fig. 2- (B) : EMC Typical Recommended Circuits

Table 3 : Recommended component parameters

Model	Parameter	Parameter description
C1/C2	4.7uF	50V
C3/C4	10uF	50V
C01	680uF	50V
C02	330uF	50V
C03	100uF	50V
Y1/Y2	2.2nF	Y1
LCM1	2.2mH	/
LDM1	2.2uH	/
MOV	S14K30	/

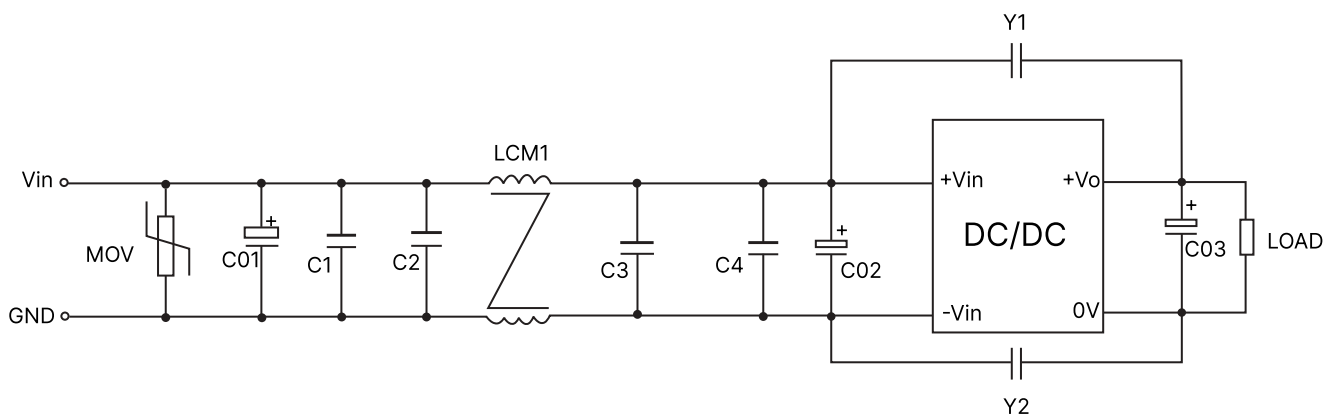


Fig. 2- (C) : EMC Typical Recommended Circuits

Table 4 : Recommended component parameters

Model	Parameter	Parameter description
C1/C2	4.7uF	50V
C3/C4	10uF	50V
C01	680uF	50V
C02	330uF	50V
C03	100uF	50V
Y1/Y2	2.2nF	Y1
LCM1	10mH	10.0mH MIN/180m Ω Max
MOV	S14K30	/

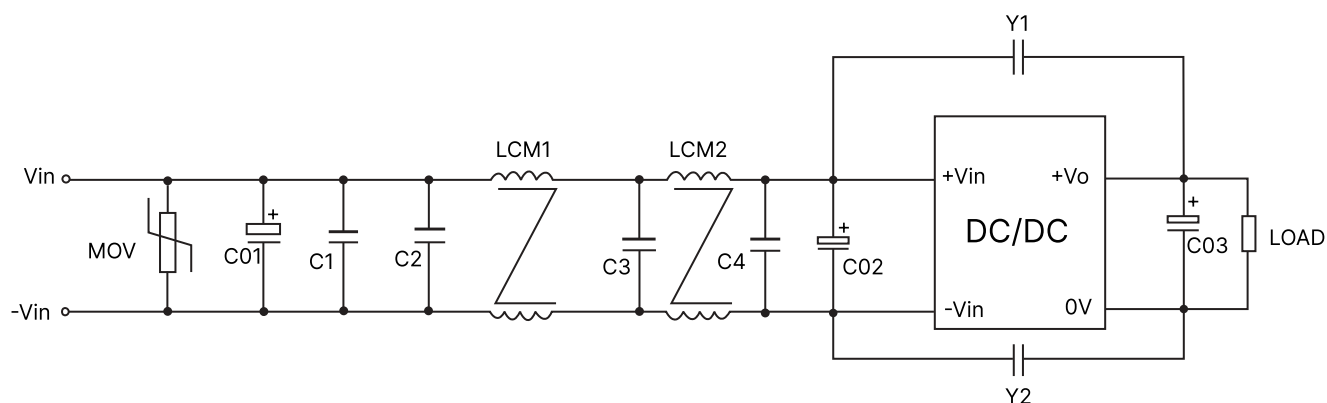
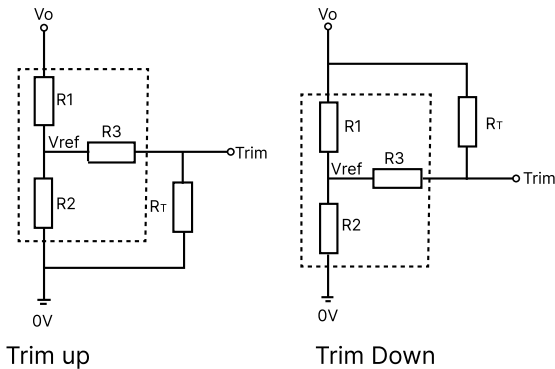


Fig. 2- ④ : EMC Typical Recommended Circuits

Table 5 : Recommended component parameters

Model	Parameter	Parameter description
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	10mH	10.0mH MIN/180m Ω Max
MOV	S14K30	/

Trim Function for Output Voltage Adjustment (open if unused)



Trim resistor connections (dashed line shows internal resistor network)

Calculating Trim resistor values:

$$\text{Trim up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_o' - V_{ref}} R_1$$

$$\text{Trim down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_o' - V_{ref}}{V_{ref}} R_2$$

R_T = Trim resistance

a = self-defined parameter, with no real meaning.

V_o' = desired output voltage

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	2.97	2.87	6.1	2.5
12	10.91	2.87	6.1	2.5
15	14.35	2.87	6.1	2.5
24	24.77	2.87	6.1	2.5

Recommended solution for thermal testing



During the application process, the thermal design of the product can be evaluated in combination with the temperature derating curve of the product, or it can be determined by testing the temperature at point (A), it is a safe working area if the temperature lower than 100°C.

Reflected ripple current test circuit

All DC-DC converters of this series are tested using the recommended circuit shown in Fig. 3 Test point.

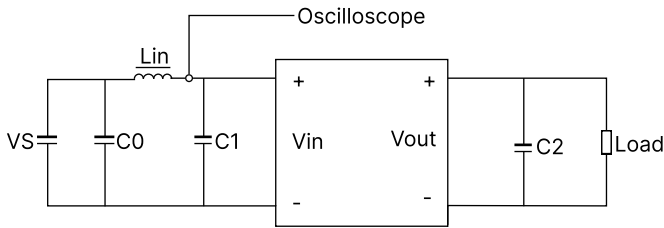


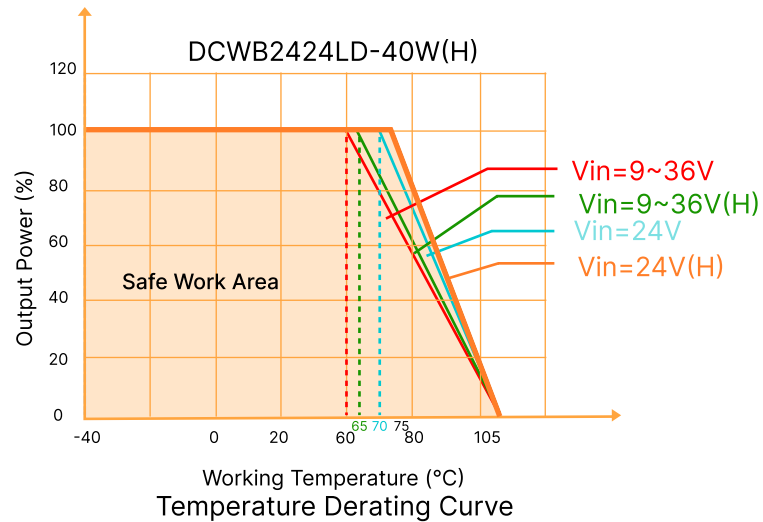
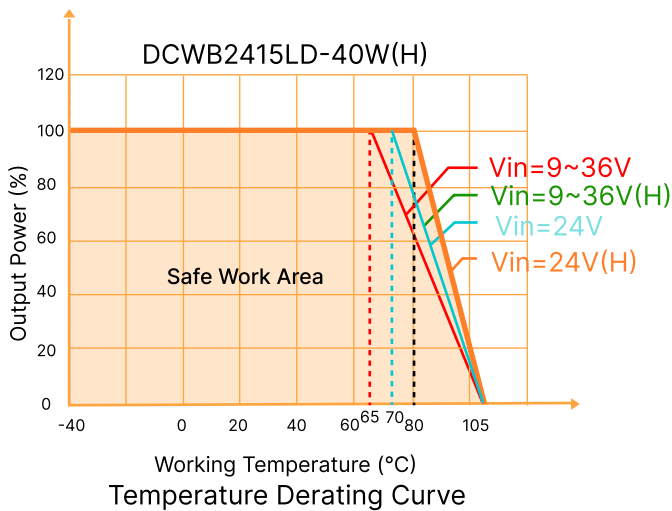
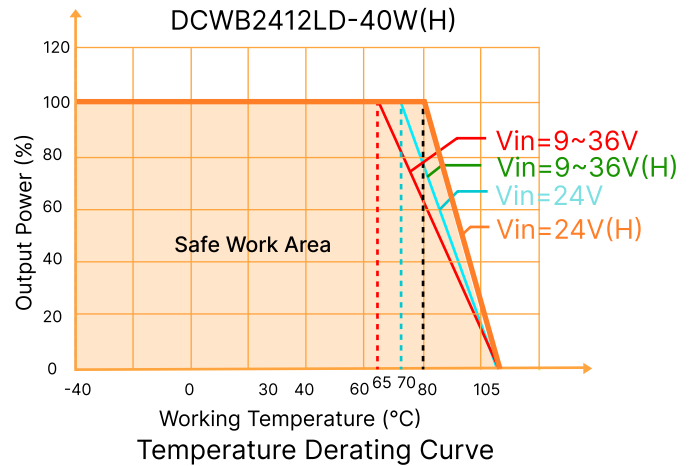
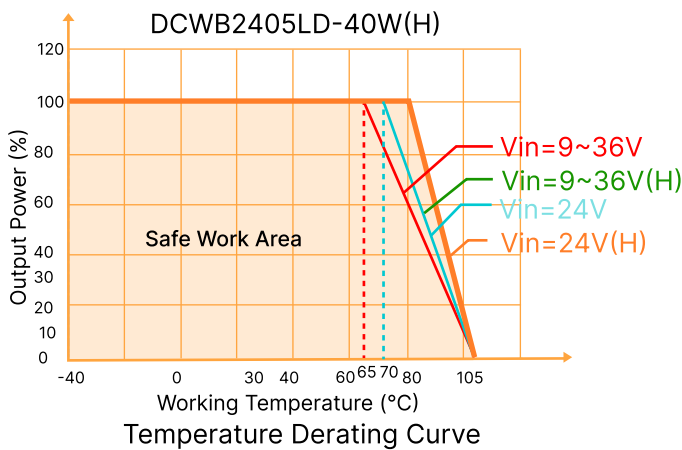
Fig. 3

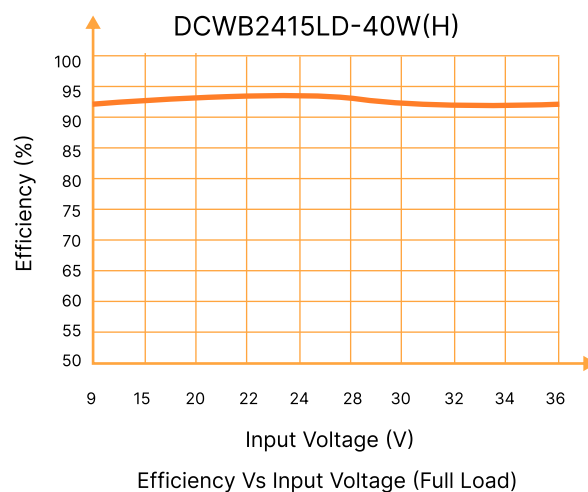
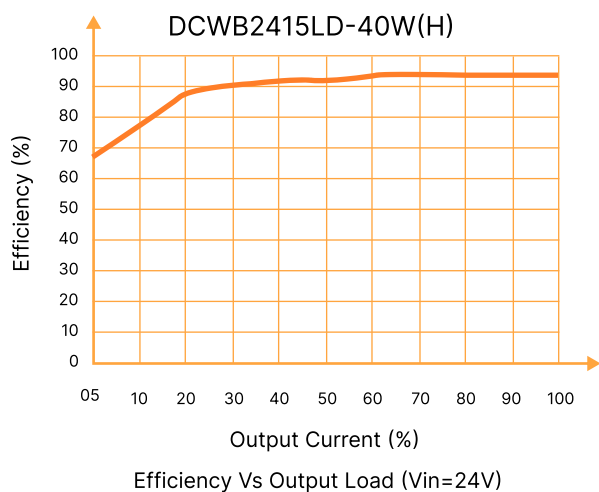
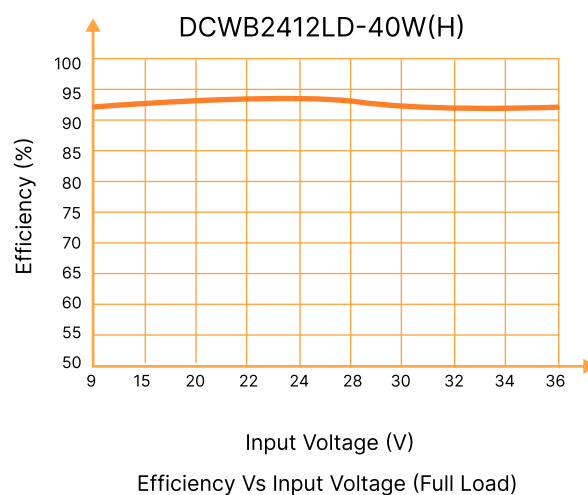
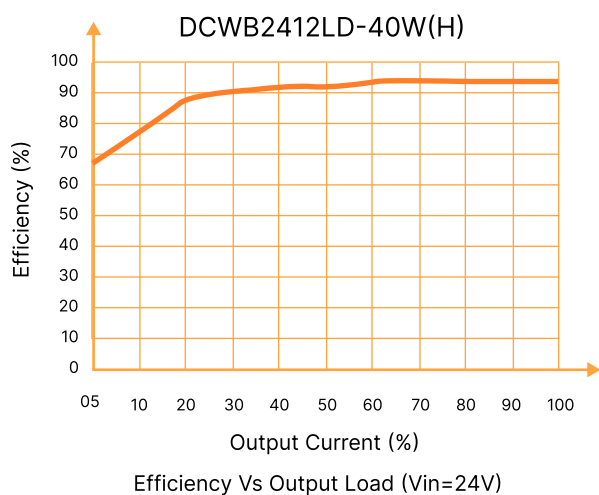
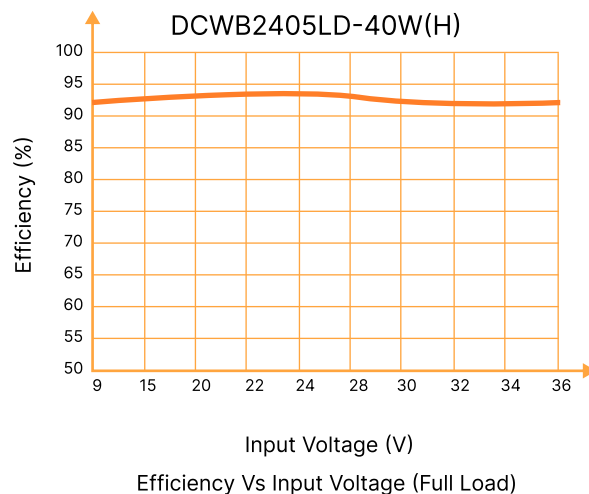
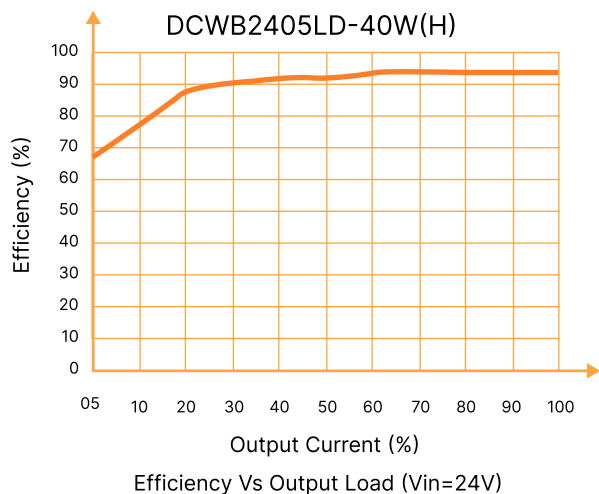
The products do not support parallel connection of their output

Table 6 : Recommended component parameters

Components	Recommended Component Value
C0	220μF/100V
Lin	10uH/15A
C1	470μF/100V
C2	470μF/63V

PRODUCT CHARACTERISTIC CURVE





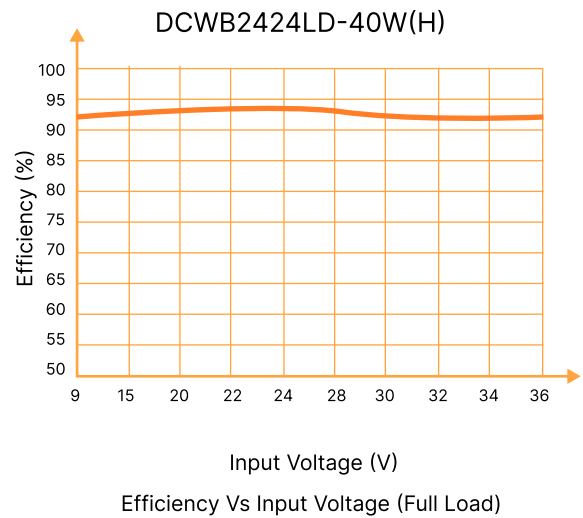
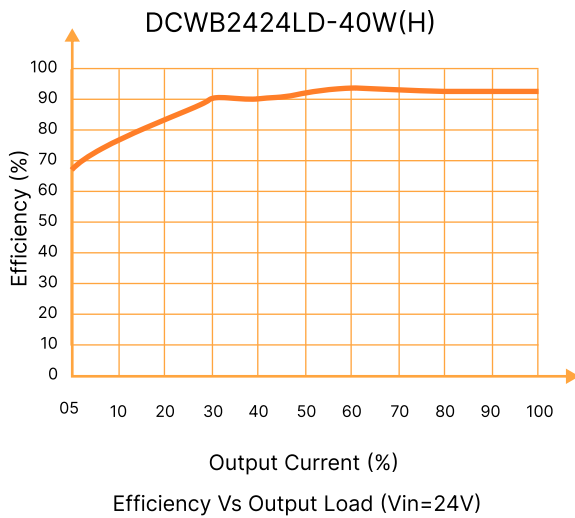
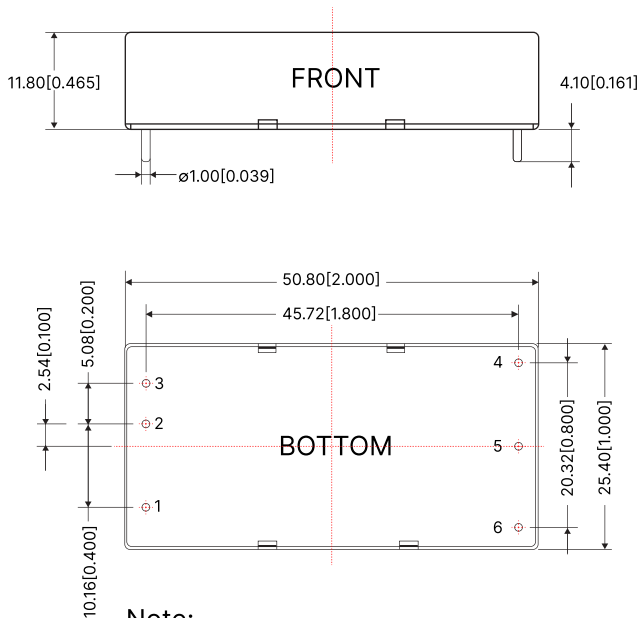


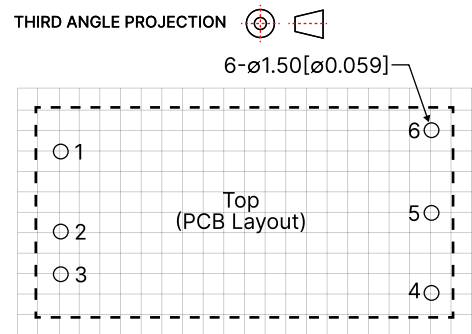
Fig. 4

OVERALL DIMENSIONS AND PIN FUNCTIONS

DCWB24_LD-40W (without heatsink)



Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

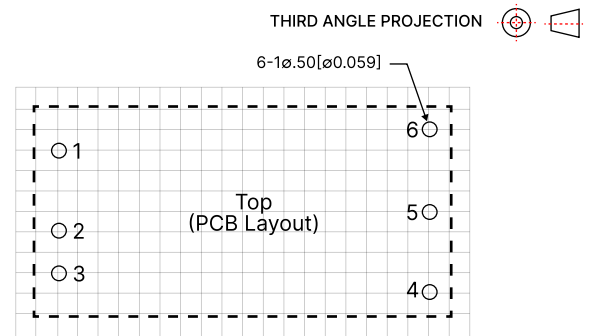
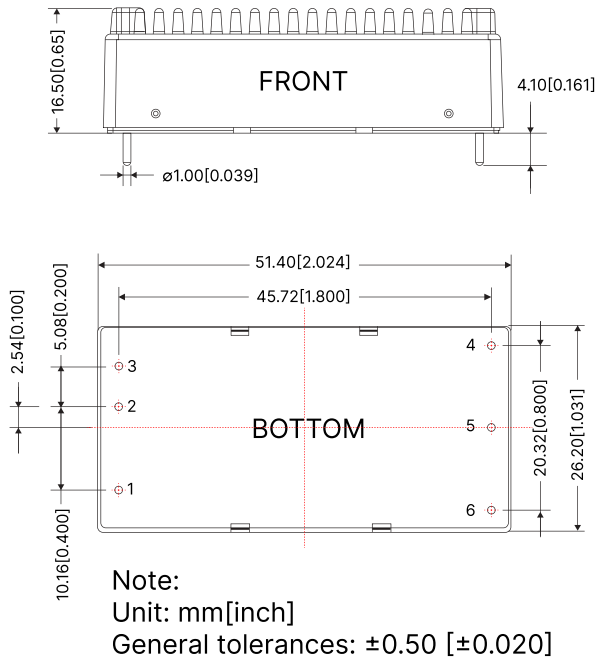


Note: Grid 2.54*2.54

Table 7: Pin Function Table

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	OV
6	Trim

DCWB24_LD-40WH (with heatsink)



Note: Grid 2.54*2.54

Table 8: Pin Function Table

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

NOTES

1. 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;
2. All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1
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 engineers directly for specific information
8. The copyright and the final interpretation right of the product belong to RHENXV.