

DCMB_LD-30W Series

FEATURES

- Wide 2:1 input voltage range
- High efficiency up to 90%
- No-load power consumption as low as 0.14W
- I/O isolation test voltage 1.5k VDC
- Output short-circuit, over-voltage, over-current protection
- Operating ambient temperature range: -40°C to +80°C
- Meets CISPR32/EN55032 CLASSA EMI without extra components
- Metal shielded package
- 3 Years Warranty



DESCRIPTION

DC-DC module power supply, Wide voltage input, Power 30W, Isolated, Regulated, Single output, DIP packaging.

MODEL NUMBERING

DCMBxxxxLD-30W



SELECTION GUIDE

Product Model	Input Voltage (Vdc)		Output Voltage (Vdc)	Output Current(mA) Max./Min.	Full Load Efficiency(%) Min./Typ.	Capacitive Load(μF) Max.
	Nominal (Range)	Max.				
DCMB2403LD-30W	24 (18-36)	40	3.3	6000/0	83/85	10000
DCMB2405LD-30W			5	6000/0	86/88	10000
DCMB2409LD-30W			9	3333/0	84/86	4700
DCMB2412LD-30W			12	2500/0	86/88	2700
DCMB2415LD-30W			15	2000/0	88/90	1680
DCMB2424LD-30W			24	1250/0	88/90	680

Product Model	Input Voltage (Vdc)		Output Voltage (Vdc)	Output Current(mA) Max./Min.	Full Load Efficiency(%) Min./Typ.	Capacitive Load(μF) Max.
	Nominal (Range)	Max.				
DCMB4803LD-30W	48 (36-75)	80	3.3	6000/0	84/86	10000
DCMB4805LD-30W			5	6000/0	86/88	10000
DCMB4812LD-30W			12	2500/0	87/89	2700
DCMB4815LD-30W			15	2000/0	87/89	1680
DCMB4824LD-30W			24	1250/0	87/89	680

INPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Input Current (full load)	24VDC nominal input series	--	1389	1507	mA
	48VDC nominal input series	--	711	745	mA
Input Current (no-load)	24VDC nominal input series	--	6	100	mA
	48VDC nominal input series	--	5	35	mA
Reflected Ripple Current	24VDC / 48VDC input	--	40	--	mA
Input impulse voltage (1sec. max.)	24VDC input	-0.7	--	50	VDC
	48VDC input	-0.7	--	100	VDC
Starting voltage	24VDC input	--	--	18	VDC
	48VDC input	--	--	36	VDC
Start Time	Nominal Input Voltage & Constant Resistance Load	--	10	--	ms
Input Filter		Pi filter			
Remote Control Foot (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

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	±3	%
	0%-5% load		--	±1	±5	%
Linear Regulation Rate	Input voltage variation from low to high at full load		--	±0.2	±0.5	%
Load Regulation Rate	5%-100% load		--	±0.5	±1	%
Dynamic response recovery time			--	300	500	μs
Dynamic response step deviation	25% load step change, Nominal input voltage	3.3V/5VDC output	--	±5	±8	%
		Others	--	±5	±8	%
Temperature drift coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise	20MHz bandwidth, 5%-100% load		--	50	100	mVp-p
Trim	Input voltage range		90	--	110	%Vo
Output overvoltage protection	Input voltage range		110	--	160	%Vo
Output overcurrent protection	Input voltage range		110	--	190	%Io
Short-circuit Protection	Input voltage range		Hiccup, continuous, self-recovery			

Note:

1. Load regulation for 0%-100% load is ±5%;
2. The "parallel cable" method is used for Ripple and Noise test

GENERAL CHARACTERISTIC

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
Insulation Resistance	Input-output resistance at 500VDC/60sec.	1000	--	--	MΩ

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2000	--	pF
Working Temperature	See Fig.3 and Fig.4	-40	--	+80	°C
Storage Temperature		-55	--	+125	°C
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	°C
Resistance Of Pins	Wave soldering, 10 seconds	255	260	265	°C
Vibration		10-55Hz, 2G, 30Min.along X, Y and Z			
Switching Frequency *	PWM mode	--	300	--	kHz
Mean time between failures 【MTBF】	MIL-HDBK-217F@25°C	1000	--	--	khours

Note: *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
Dimensions	50.80 × 25.40 × 11.80 mm
Weight	27.8g (Typ.)
Cooling Method	Natural air cooling

EMC CHARACTERISTICS

Parameter	Category	Content
EMI	CE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (see Fig.2-Ⓐ for recommended circuit)
	RE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (see Fig.2-Ⓐ for recommended circuit)
EMS	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.2-Ⓑ for recommended circuit) perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2KV (see Fig.2-Ⓑ for recommended circuit) perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A

CIRCUIT DESIGN AND APPLICATION

Typical application

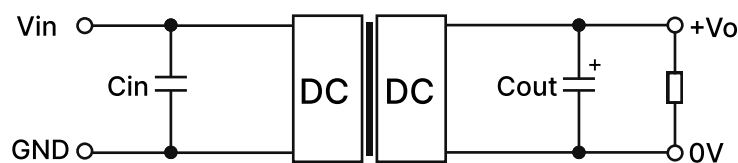


Fig.1

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig.1

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.

Table 1 : Recommended Capacitive Load Values

Vin(VDC)	Cout (μF)	Cin (μF)
3.3, 5, 9	220	100
12, 15, 24	100	

EMC compliance circuit

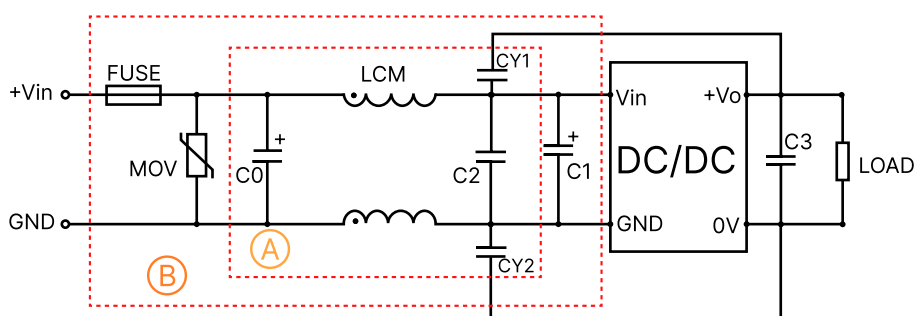


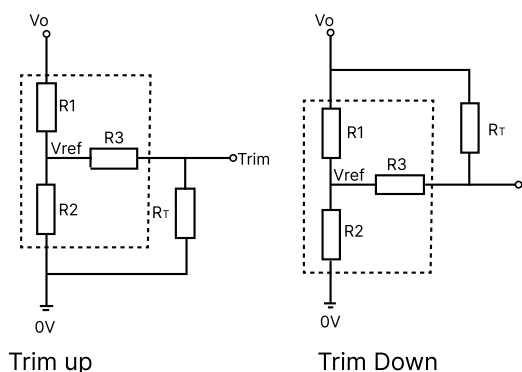
Fig: 2

Notes: For EMC tests we use Part (B) in Fig.2 for immunity and part (A) for emissions test.

Table 2: Recommended Circuit Parameter Values

Mode	Vin:24VDC	Vin: 48VDC
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680μF/50V	330μF/100V
C1	330μF/50V	330μF/100V
C2	4.7μF/50V	2.2μF/100V
C3	Refer to the Cout in Fig.1	
LCM	1mH	
CY1/ CY2	1nF/2kV	

Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

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

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

R_T = Trim resistance;
 a = self-defined parameter.
 V_o' = desired output voltage.

Vout(VDC)	R1(K Ω)	R2(K Ω)	R3(K Ω)	Vref(V)
3.3	4.801	2.87	12.4	1.24
5	2.883	2.87	10	2.5
9	7.500	2.87	15	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	17.8	2.5

PRODUCT CHARACTERISTIC CURVE

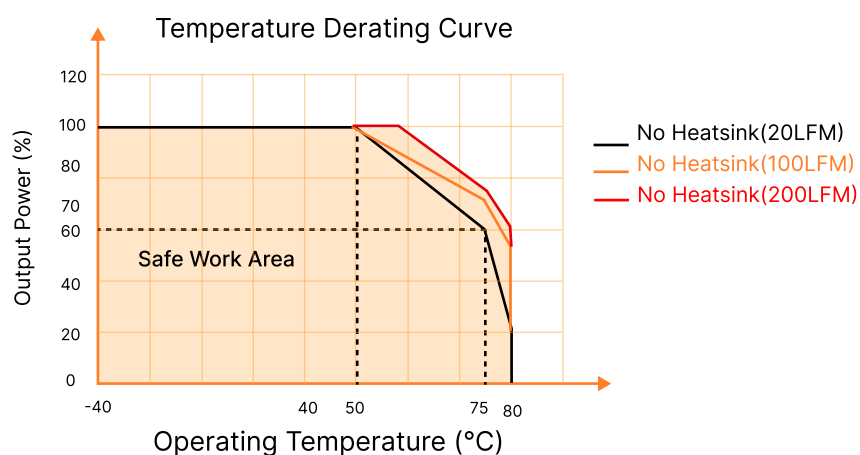


Fig. 3

Applicable Models
DCMB2403LD-30W, DCMB2405LD-30W,
DCMB4803LD-30W, DCMB4805LD-30W

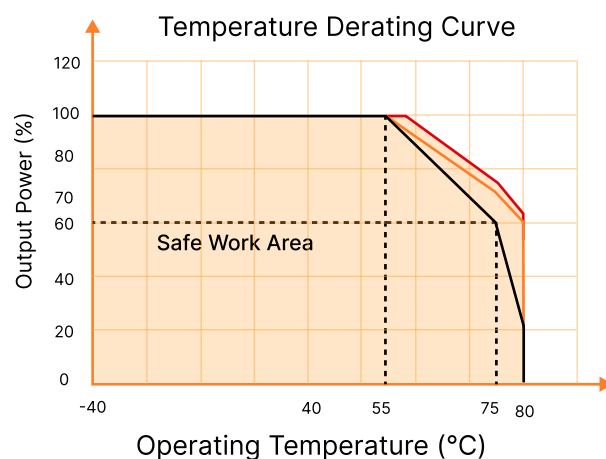
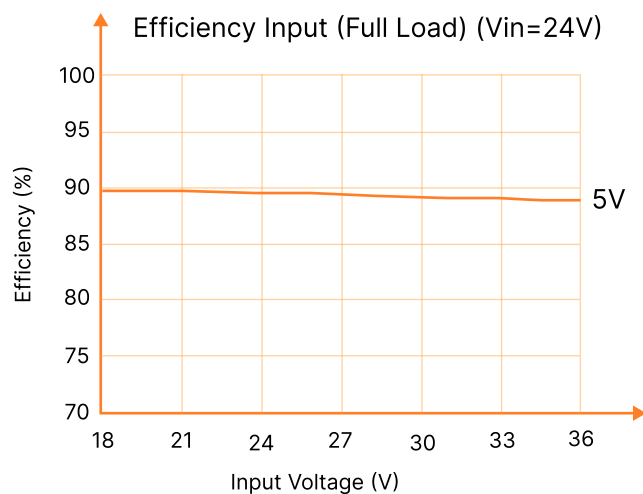
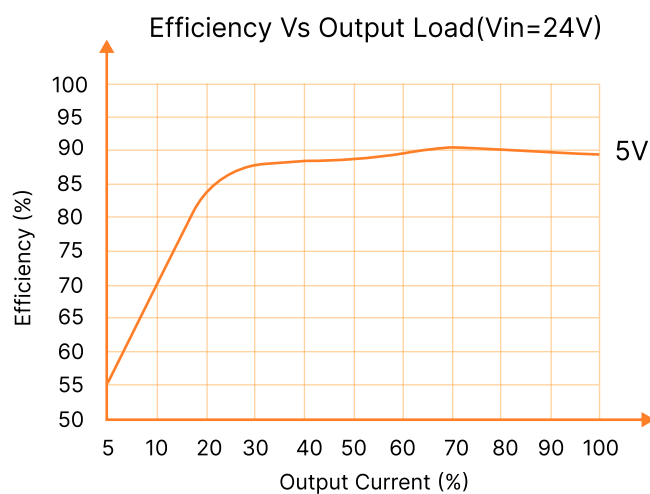
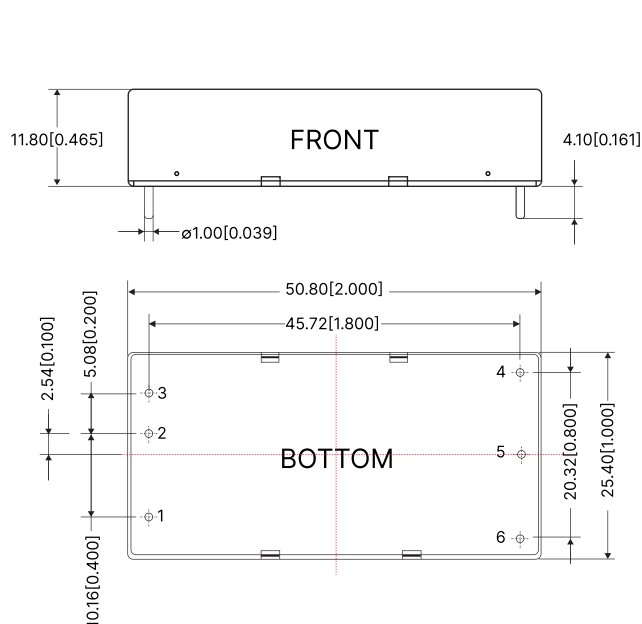


Fig. 4

Applicable Models
DCMB2409LD-30W, DCMB2412LD-30W,
DCMB2415LD-30W, DCMB2424LD-30W,
DCMB4812LD-30W, DCMB4815LD-30W
DCMB4824LD-30W



OVERALL DIMENSIONS AND PIN FUNCTIONS



Note:

Unit: mm[inch]

Pin diameter tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

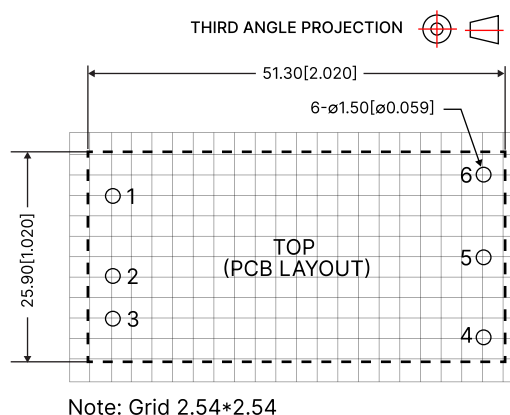


Table 3 : Pin Function Table

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

NOTES

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity $<75\%\text{RH}$ with nominal input voltage and rated output load;
3. We can provide product customization service, please contact our engineers directly for specific information;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. The copyright and the final interpretation right of the product belong to RHENXV.