RHENXV
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DC - DC CONVERTERS

350 WATTS

DCMB24_HB-350W

RoHS

FEATURES

- Wide input voltage range (2:1)
- Operating ambient temperature range -40°C to +100°C
- I/O isolation test voltage 1.5k VDC
- High efficiency up to 89%
- Industry standard 1/2 brick
- Output over-voltage, short-circuit, over-current protection, over-temperature protection

MODEL NUMBERING

DCMB24xxHB-350W

- Series Name
- Input Voltage
- Output Voltage
- Rated Wattage
- Packaging Form

SELECTION GUIDE

Product Model	Input Voltage Standard Value(range)	Output Voltage (Vdc)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load (μF)
DCMB2412HB-350W	24VDC (20-36)	12	24000/0	83/86	6800
DCMB2424HB-350W		24	14500/0	85/87	4000
DCMB2428HB-350W		28	12500/0	87/89	3300
DCMB2432HB-350W		32	11000/0	87/89	2700

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Current (Rate load)	Nominal voltage output 12VDC	--	13953	--	mA
	Nominal voltage output 24VDC	--	16667	--	mA
	Nominal voltage output 28VDC	--	16400	--	mA
	Nominal voltage output 32VDC	--	16480	--	mA
Input Current (No load)	Nominal voltage output 12VDC	--	30	--	mA
	Nominal voltage output 24VDC	--	30	--	mA
	Nominal voltage output 28VDC	--	30	--	mA
	Nominal voltage output 32VDC	--	30	--	mA
Reflected Ripple Current	Nominal voltage input 24VDC	--	300	--	mA
Input impulse voltage	(1sec. max.)	-0.7	--	40	VDC
Starting voltage	Nominal voltage input 24VDC	--	--	20	VDC
Remote control foot (Some models are applicable)	Module On	Ctrl hovering or connected to TTL high level (3.5-12VDC)			
	Module shutdown	Ctrl connected to GND or low level (0-1.2VDC)			
	Input current during shutdown	--	6	10	mA
Input filter	C Filter				

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

OUTPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy	0%-100% load	--	±1	±3	%
Line 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	25% load step change, nominal input voltage	--	300	500	μs
Dynamic response step deviation		--	±5	±8	%
Temperature drift coefficient	Full load	--	--	±0.03	%/°C

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Ripple & Noise *	20MHz bandwidth, 5%-100% load	--	200	300	mVp-p
Trim		60	--	110	%Vo
Sense		--	--	105	
Over-Temperature Protection	Max. Case Temperature	--	125	--	°C
Over-Voltage Protection	Input Voltage Range	Hiccup			
Over-Current Protection	Input Voltage Range	110	--	190	%Io
Shot-Circuit Protection		Continuous, self-recovery			

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
		1500	--	--	
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	500	--	--	VAC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	1500	--	pF
Working temperature	See Fig. 1	-40	--	+100	°C
Storage Humidity	Without condensation	5	--	95	%RH
Storage Temperature		-55	--	+125	°C
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	--	270	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	Khours

EMC CHARACTERISTICS

	Parameter	Category	Content	
EMI	CE	CISPR32/EN55032	Class A (see Fig. 3 for recommended circuit)	
	RE	CISPR32/EN55032	Class A (see Fig. 3 for recommended circuit)	
EMS	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	±2KV(see Fig. 3 for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig. 3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s (see Fig. 3 for recommended circuit)	perf. Criteria A

PHYSICAL CHARACTERISTICS

Parameter	Conditions
Case Material	Aluminum alloy case; Black plastic bottom, flame-retardant and heat-resistant (UL94 V-0)
Dimensions	61.00 × 57.90 × 12.70mm
Weight	81.6g (Typ.)
Cooling Mode	Forced water convection or other heat dissipation methods, ensuring product surface temperature less than 100°C

PRODUCT CHARACTERISTIC CURVE

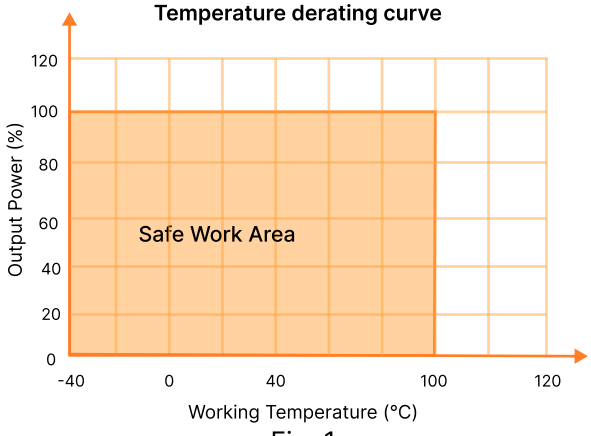
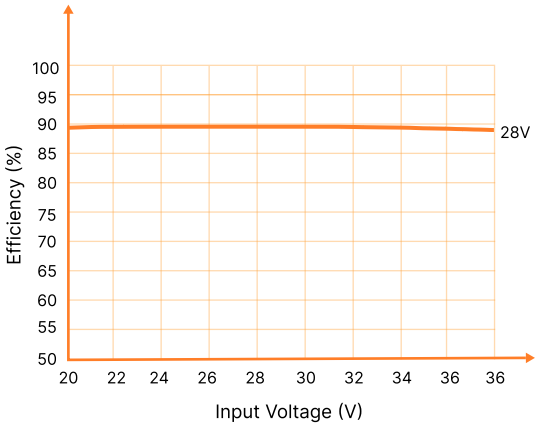
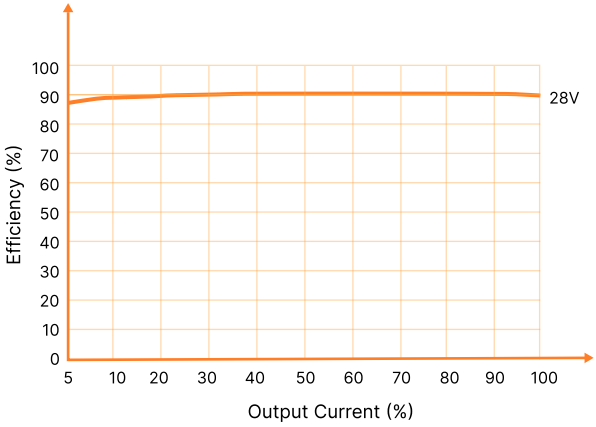


Fig. 1



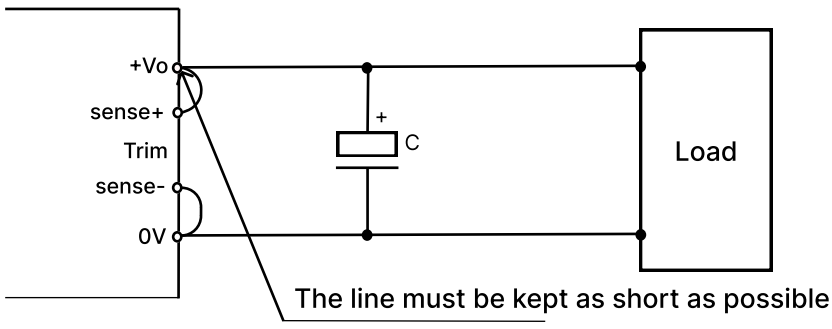
Efficiency Vs Input Voltage
(100% Load)



Efficiency Vs Output Load
(Vin=24V)

CIRCUIT DESIGN AND APPLICATION

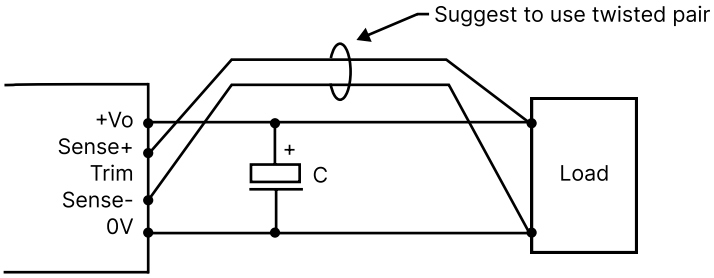
1. Remote Sense Connection if not used



Notes：
(1)If the sense function is not used for remote regulation the user must connect the +Sense to +Vo and -Sense to 0V at the DC-DC converter pins and will compensate for voltage drop across pins only.

(2)The connections between Sense lines and their respective power lines must be kept as short as possible, otherwise they may be picking up noise, interference and/or causing unstable operation of the power module.

2. Remote Sense Connection used for Compensation



Notes:
(1)Using remote sense with long wires may cause unstable output, please contact technical support if long wires must be used.

(2)PCB-tracks or cables/wires for Remote Sense must be kept as short as possible. Twisted pair or shielded wires are suggested for remote compensation and must be kept as short as possible.

(3)We recommend using adequate cross section for PCB-track layout and/or cables to connect the power supply module to the load in order to keep the voltage drop below 0.3V and to make sure the power supply's output voltage remains within the specified range.

(4)Note that large wire impedance may cause oscillation of the output voltage and/or increased ripple. Consult technical support or factory for further advice of sense operation.

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig.2

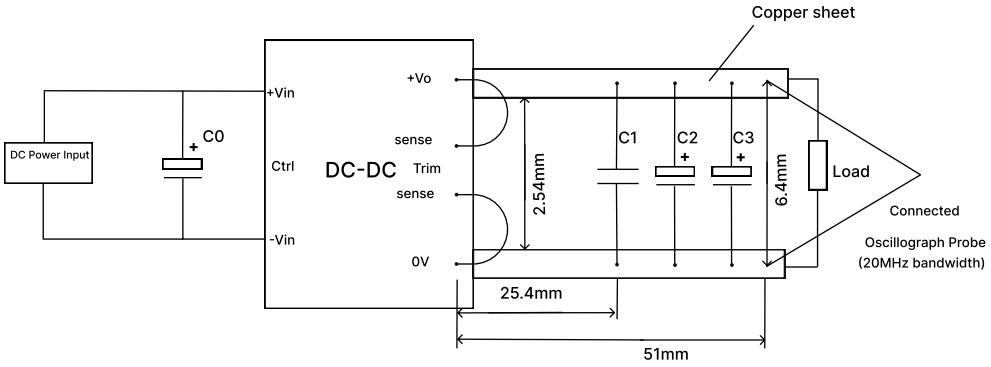


Fig. 2

Capacitors Output Voltage Value	C0(μF)	C1(μF)	C1(μF)	C1(μF)
12VDC	100μF/ 200V	1μF/25V	10μF/25V	330μF/25V
24VDC		1μF/50V	10μF/50V	330μF/50V
28VDC		1μF/50V	10μF/50V	330μF/50V
32VDC		1μF/50V	10μF/50V	330μF/50V

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/orby 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.

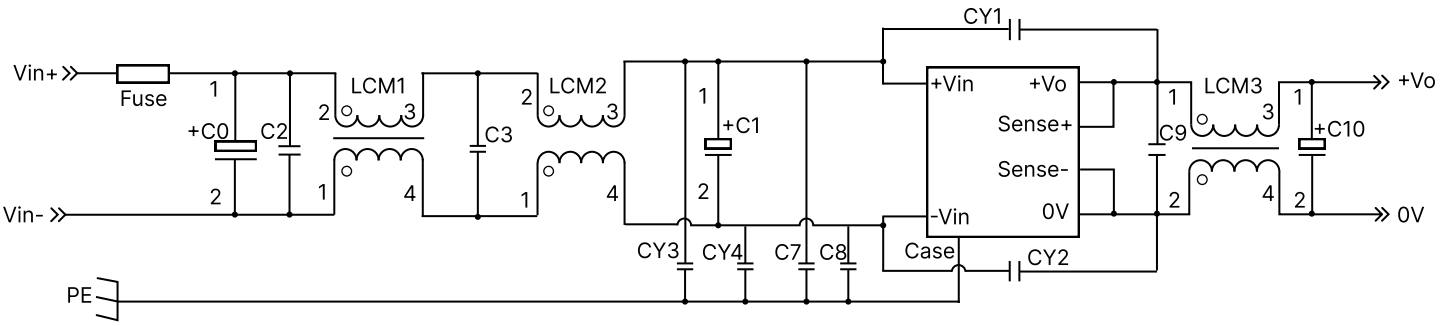
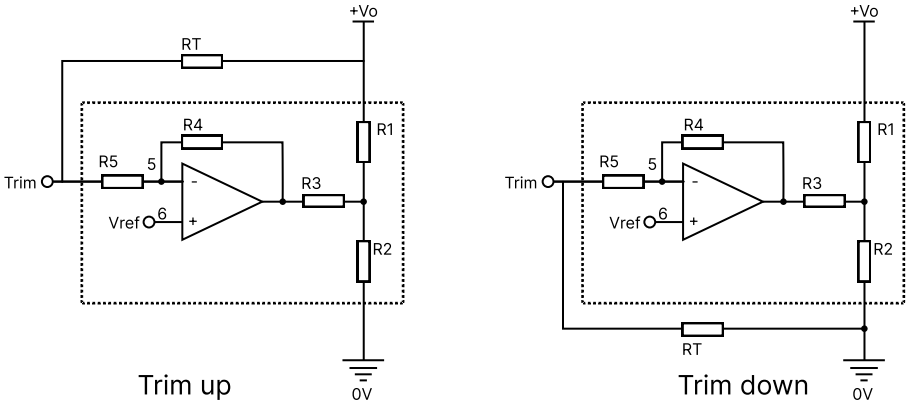


Fig. 3

Parameter description:

Components	Value
Fuse	Choose according to actual input current
C0	1000μF/100V
C1	470μF/100V
C2, C3, C9	2.2μF/250V
C7, C8	0.1μF/2000V
C10	220μF/63V
CY1, CY2, CY3, CY4	2.2nF/400VAC
LCM1	100uH/25A
LCM2	1mH/25A
LCM3	4uH/36A

3. Trim Function for Output Voltage Adjustment (open if unused)



$$\text{Up:}\quad RT = \frac{(\triangle\%+100)R_1R_4}{\triangle\%R_3} - \frac{100V_{ref}R_1R_4}{\triangle\%V\ R_3} - R_5$$

$$\text{Down:}\quad RT = \frac{100V_{ref}R_1R_4}{\triangle\%V_{out}R_3} - R_5$$

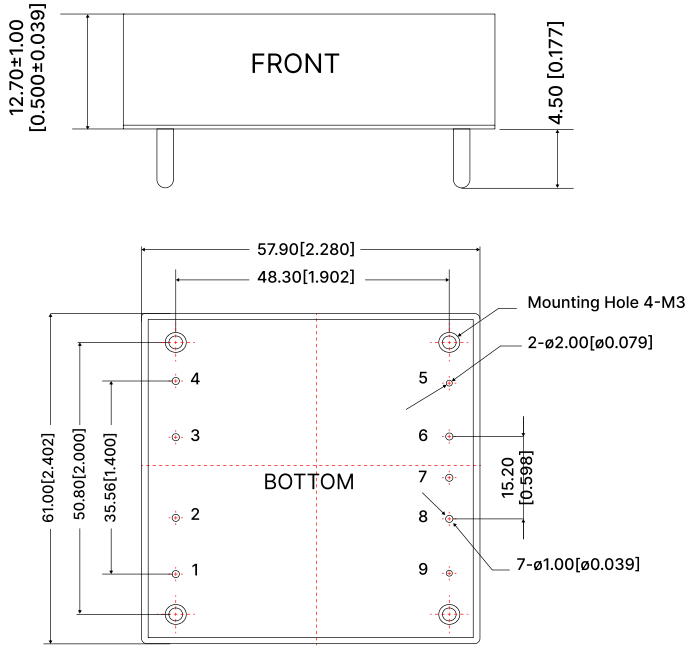
Vout(V)	R1(KΩ)	R3(KΩ)	R4(KΩ)	R5(KΩ)	Vref(V)
12	10.91	5	10	4.5	2.5
24	24.87	12	10	4.5	2.5
28	29.12	10	10	4.5	2.5
32	34.02	12	10	4.5	2.5

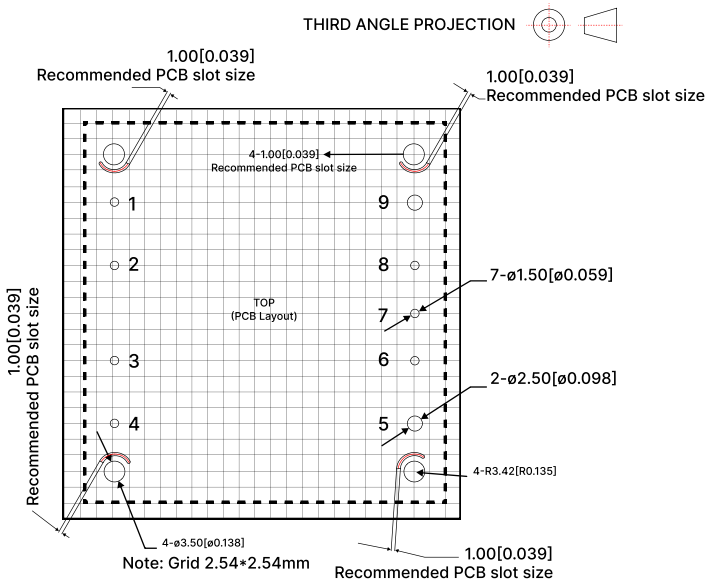
Note： Value for R1, R3, R4, R5, Vref refer to the above table 1. RT: Resistance of Trim. △% is designed percentage of trim up or trim down. Example: Take the 12V model as an example, if it needs to be reduced by 10%, then △% is substituted into the value of 10

$$RT = \left(\frac{100\times2.5\times10.91\times10}{10\times12\times5} - 4.5\right)^{k\Omega}$$

DIMENSIONS AND INSTALLATION

DCMB24_HB-350W





Note:
Unit: mm[inch]
PIN 1, 2, 3, 4, 6,7, 8's Diameter: 1.00[0.039]
PIN 5, 9's Diameter: 2.00[0.079]
PIN Diameter Tolerance: ±0.10[±0.004]
General Tolerances: ±0.50[±0.020]
Mounting Hole Screwing Torque: Max 0.4 N.m

Pin	Function	Pin	Function
1	+Vin	7	Trim
2	Ctrl	8	Sense+
3	NC	9	+Vo
4	-Vin		
5	0V		
6	Sense-		

NOTES & INSTRUCTIONS

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. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. The product test process shall ensure that the current of the input terminal meets the requirements of the starting current to ensure that the power supply of the product does not suffer from under-power.