

DCMB24_HB-500W

FEATURES

- Wide input voltage range (2:1)
- I/O isolation test voltage 2.25k VDC
- High efficiency up to 94%
- I/O isolation test voltage 2.25k VDC
- Industry standard 1/2 brick
- Input under-voltage protection, output short-circuit, over-current, over-voltage, over-temperature protection
- Parallel current sharing function
- Shell operating temperature range Tc:-40°C To +100°C



MODEL NUMBERING

DCMB24xxHB-500W



SELECTION GUIDE

Product Model	ON/OFF logic ①	Input Voltage Standard Value (range)	Output Voltage (Vdc)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load (μF) (Max/Min)
DCMB2412HB-500W	N	24VDC (18-36)	12	42000/0	91/93	12000/470
DCMB2415HB-500W	N		15	34000/0	92/94	10000/470
DCMB2424HB-500W	N		24	21000/0	91/93	6000/470
DCMB2428HB-500W	N		28	18000/0	92/94	5000/470

① "P" means positive logic, "N" means negative logic;

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Current (Rate load)	Nominal voltage output 12VDC	--	22581	23077	mA
	Nominal voltage output 15VDC	--	22607	23098	mA
	Nominal voltage output 24VDC	--	22581	23077	mA
	Nominal voltage output 28VDC	--	22607	23098	mA
Input Current (No load)	Nominal voltage output 12VDC	--	340	380	mA
	Nominal voltage output 15VDC	--	340	380	mA
	Nominal voltage output 24VDC	--	340	380	mA
	Nominal voltage output 28VDC	--	340	380	mA
Reflected Ripple Current	Nominal voltage input 24VDC	--	500	--	mA
Input under-voltage protection	Nominal voltage input 24VDC	15.5	--	--	VDC
Start Time	Nominal input voltage & constant resistance load	--	--	100	ms
Input impulse voltage	(1sec. max.)	-0.7	--	50	VDC
Starting voltage	Nominal voltage input 24VDC	--	--	18	VDC
Remote control foot (Ctrl*)	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	--	25	40	mA
Input filter		Capacitance filter			

Note: *The Ctrl pin voltage is referenced to input -Vin

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	--	±0.25	±0.75	%
Dynamic Response Recovery Time	25% load step change, 2A/us	--	300	500	μs
Dynamic Response Step Deviation		--	±3	±5	%Vo
Parallel current sharing accuracy	24VDC nominal input voltage, 100% load, 2pcs parallel	--	±8	±10	%Io

Parameter	Operating Conditions		Min.	Typ.	Max.	Units
Temperature drift coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise	24VDC nominal input voltage 20MHz bandwidth, 5%-100% load	12V, 15V Output	--	--	150	mVp-p
		24V, 28V Output	--	--	220	mVp-p
Trim			90	--	110	%Vo
Sense			--	--	110	
Over-Temperature Protection	Max. Case Temperature		--	110	120	°C
Over-Voltage Protection	Input Voltage Range		110	115	130	%Vo
Over-Current Protection	Input Voltage Range		110	115	130	%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.	2250	--	--	VDC
		2250	--	--	
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	3000	--	pF
Working temperature		-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	--	280	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	Khours

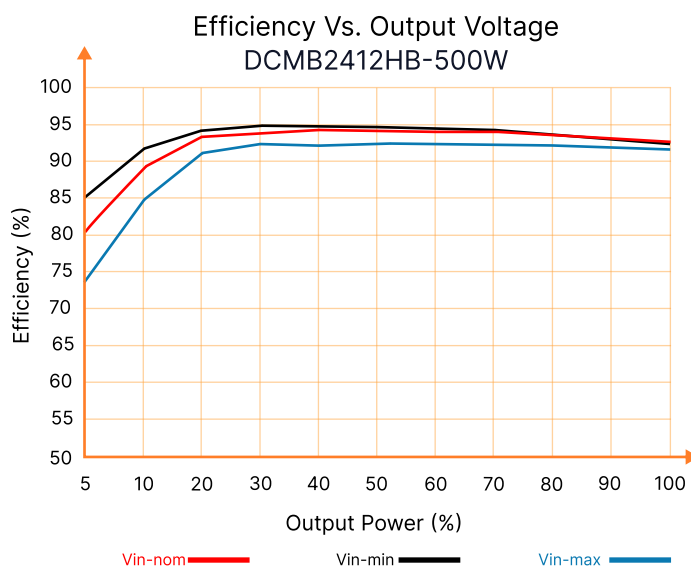
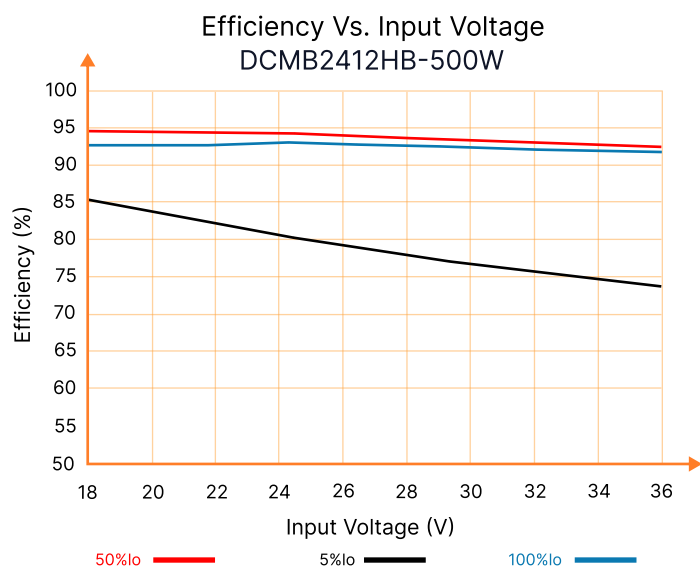
EMC CHARACTERISTICS

Parameter	Category		Content	
EMI	CE	CISPR32/EN55032	CLASS A (additional circuit) (see Fig.2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (additional circuit) (see Fig.2 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$, Air $\pm 8\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m (see Fig. 2 for recommended circuit)	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$ (see Fig. 2 for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ (see Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s (see Fig. 2 for recommended circuit)	perf. Criteria A

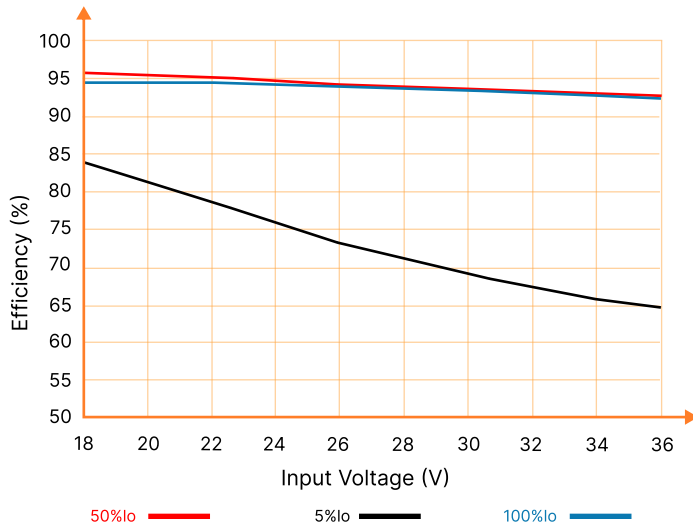
PHYSICAL CHARACTERISTICS

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	130g (Typ.)
Cooling Mode	Free air convection or forced convection

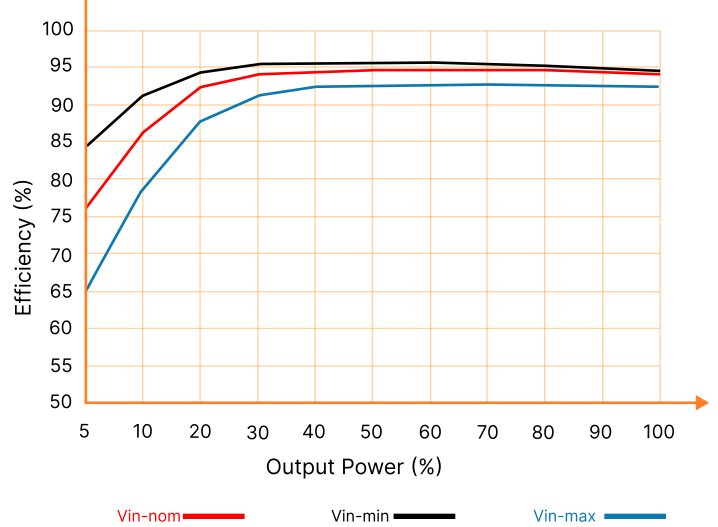
PRODUCT CHARACTERISTICS CURVE



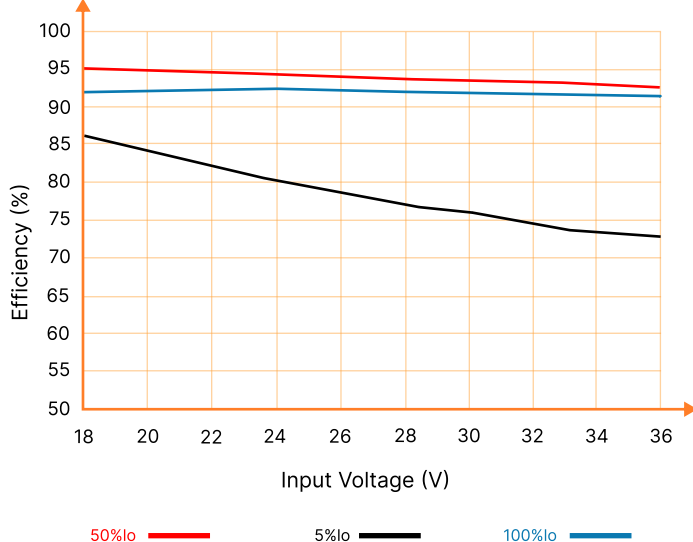
Efficiency Vs. Input Voltage
DCMB2415HB-500W



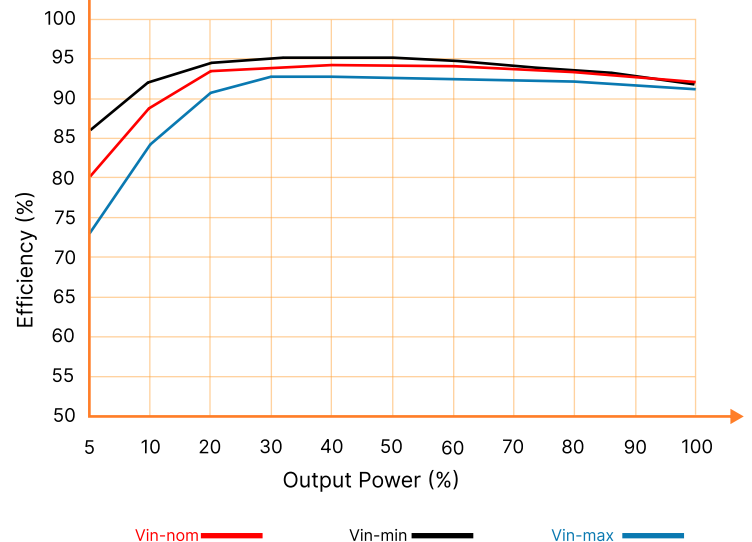
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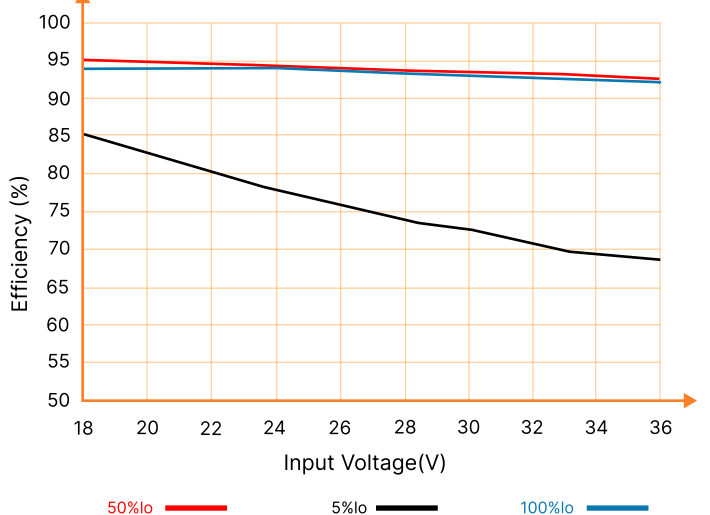
Efficiency Vs. Input Voltage
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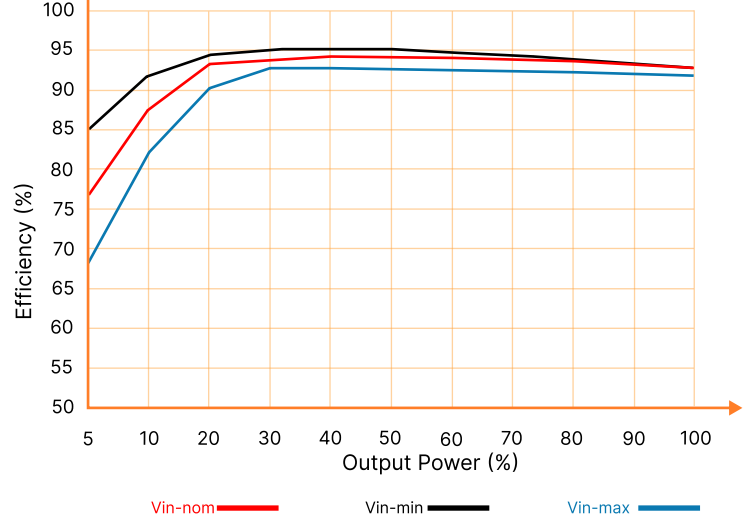
Efficiency Vs. Output Voltage
DCMB2424HB-500W



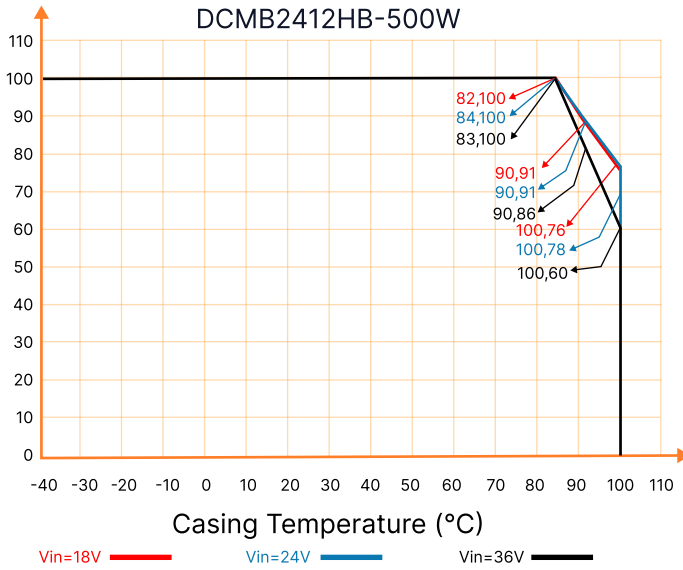
Efficiency Vs. Input Voltage
DCMB2428HB-500W



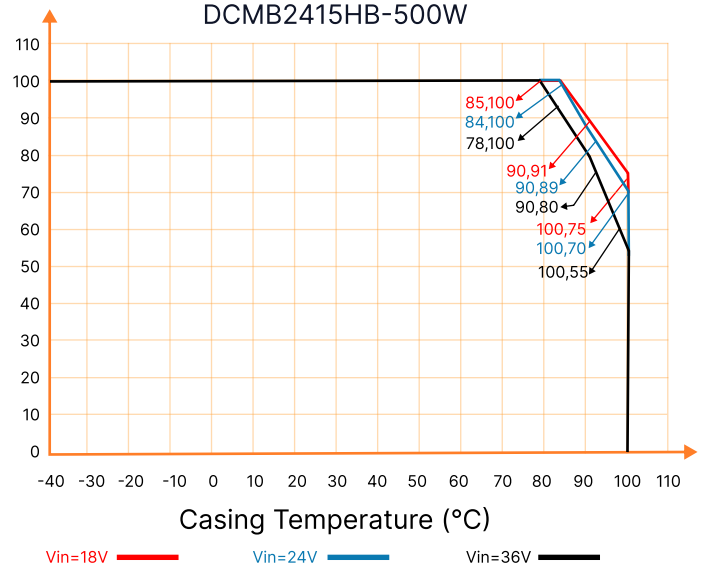
Efficiency Vs. Output Voltage
DCMB2428HB-500W



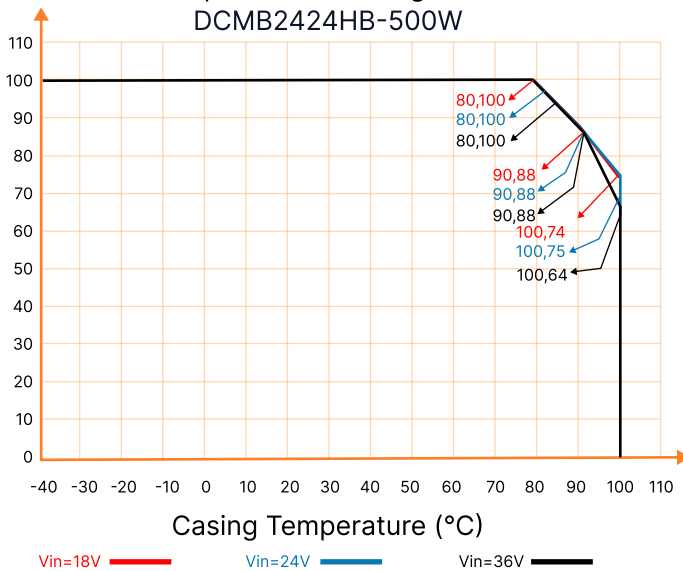
Temperature Derating Curve
DCMB2412HB-500W



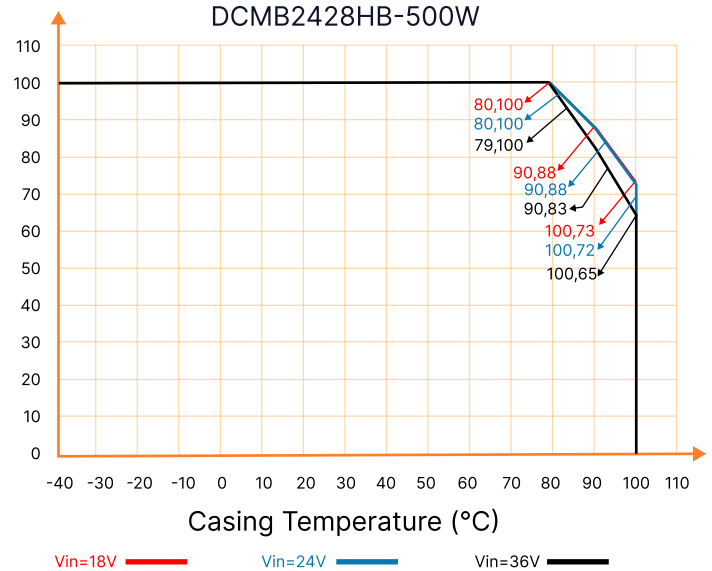
Temperature Derating Curve
DCMB2415HB-500W



Temperature Derating Curve
DCMB2424HB-500W



Temperature Derating Curve
DCMB2428HB-500W



CIRCUIT DESIGN AND APPLICATION

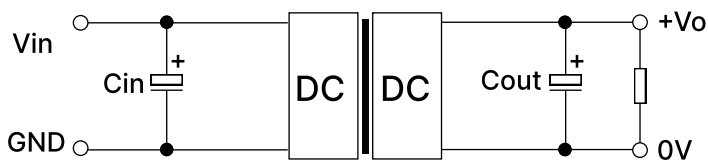


Fig. 1 Application circuit

Capacitance Value/
Output Voltage

Cout(min.)

Cin

12V/15V/24V/28V

470μF/35V

220μF/63V

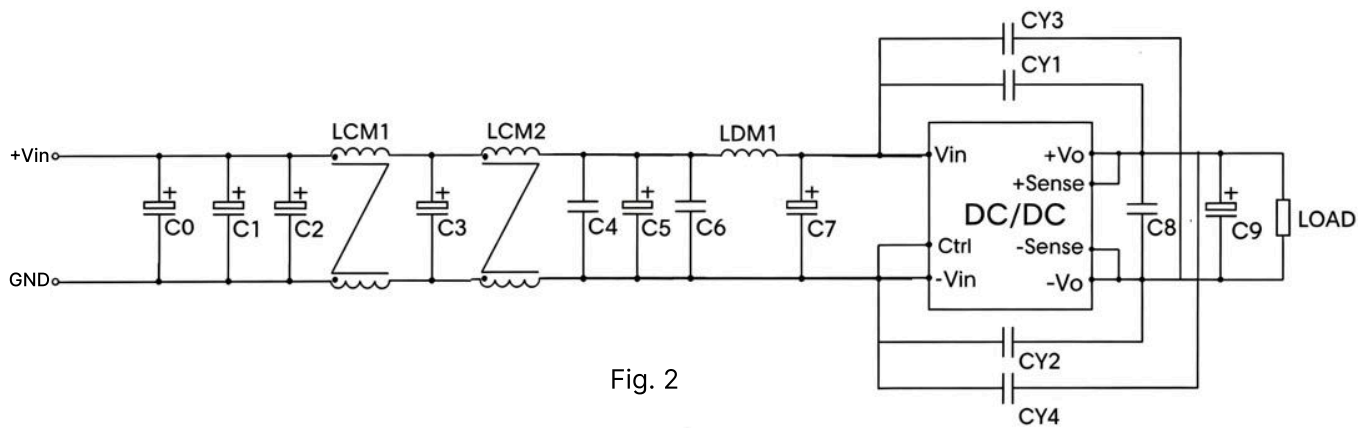


Fig. 2

Parameter description:

Components	Value
C0, C1, C2, C3, C5, C7	330μF/63V Electrolytic Capacitor
C4, C6, C8	2.2μF/100V Ceramic Capacitor
C9	470μF/63V Electrolytic Capacitor
LCM1	560uH
LCM2	200uH
LDM1	10uH
CY1, CY2, CY3, CY4	4.7nF/400VAC Safety Y Capacitor

Remote Sense Application

1. Remote Sense Connection if not used

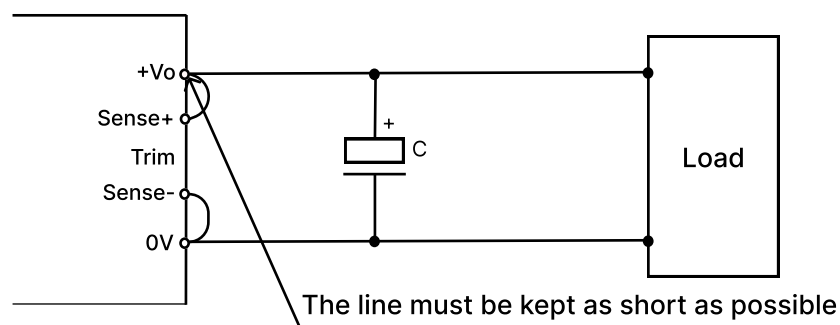


Fig. 3

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

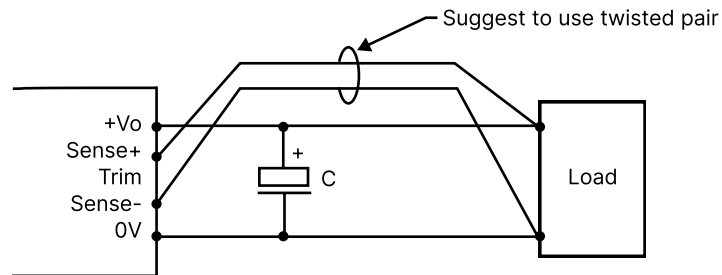


Fig. 4

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.

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

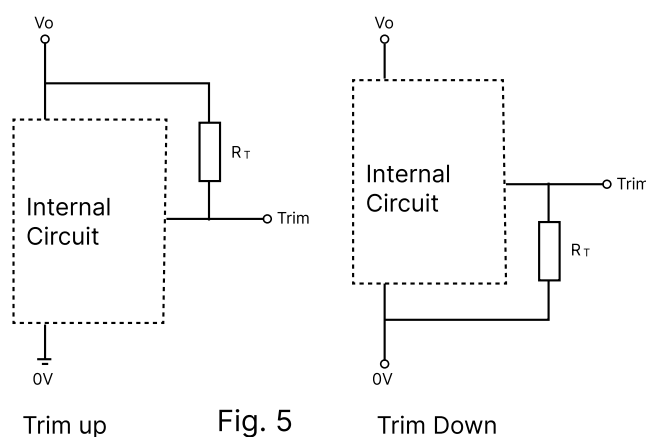


Fig. 5

TRIM resistor connection
(dashed line shows internal resistor network)

Calculating Trim resistor value:

Trim up

$$R_T = \left(\frac{5.11V_{nom}(100 + \Delta\%)}{1.225\Delta\%} - \frac{511}{\Delta\%} - 10.22 \right) (k\Omega)$$

Trim down

$$R_T = \left(\frac{511}{\Delta\%} \right) - 10.22 (k\Omega)$$

Notes:

R_T is Trim resistance

$$\Delta\% = \left| \frac{V_{nom} - V_{out}}{V_{nom}} \right| \times 100$$

V_{nom} is the typical output voltage
 V_{out} to set the output voltage

4. Reflected ripple current test circuit

All DC-DC converters of this series are tested using the recommended circuit shown in Fig. 6

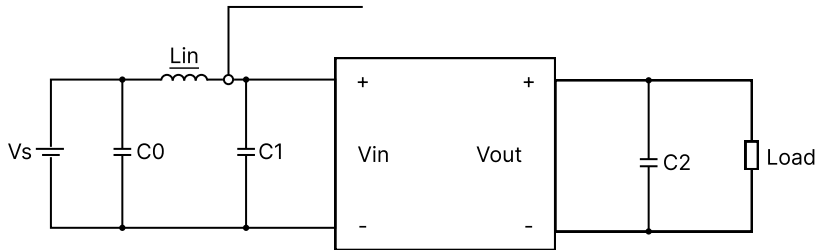


Fig. 6

Components	Recommended Component Value
C0	220μF/63V
Lin	10uH/40A
C1	470μF/63V
C2	470μF/35V

5. The products do support parallel connection of their output

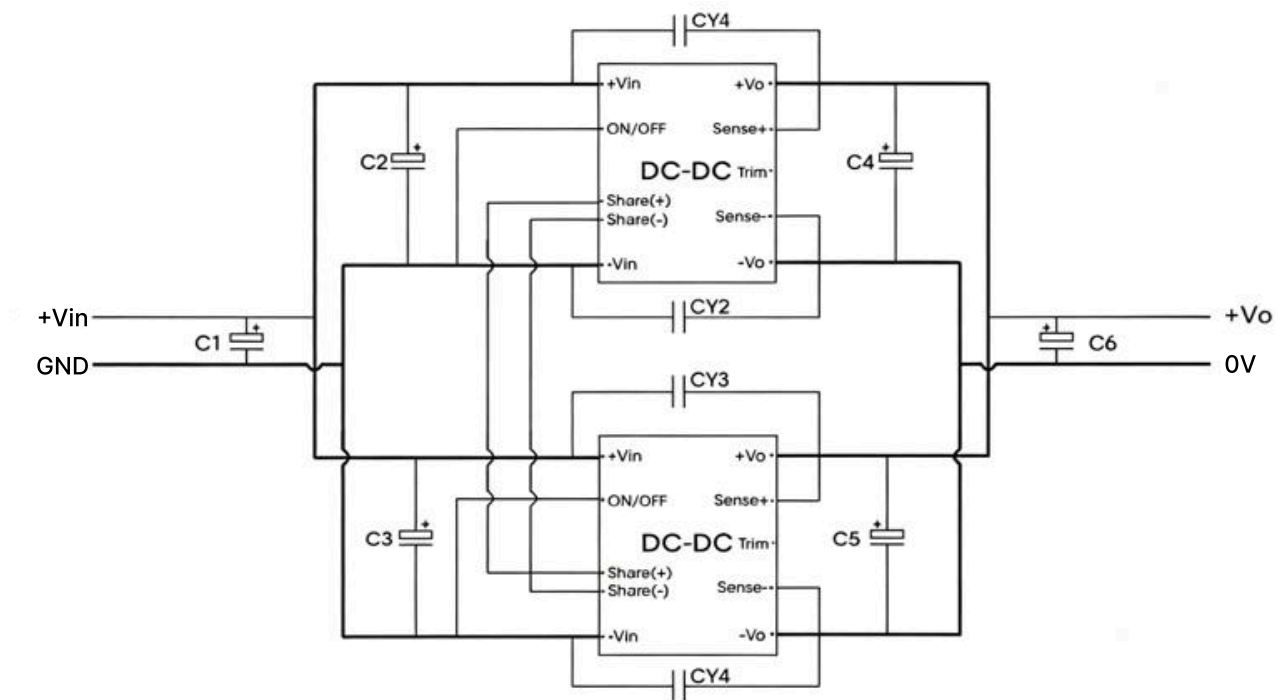


Fig. 7

Parallel current sharing wiring diagram

When the parallel current balancing function is used, ensure that the cable lengths of power modules are equal, the maximum number of parallel connections is 4 .

Vin (VDC)	Vout (VDC)	C1/C2/C3	C4/C5/C6	CY1/CY2/CY3/CY4
24	12/15/24/28	220uF/63V	470uF/35V	222M/Y2

6. Recommended solution for thermal testing

In the process of application, the thermal design of the product can be evaluated in combination with the product temperature derating curve, or the stable working interval of the product can be determined by the temperature of the thermal test point in Fig. 8 When the temperature at point A is lower than 100°C, it is the stable working range of the product.

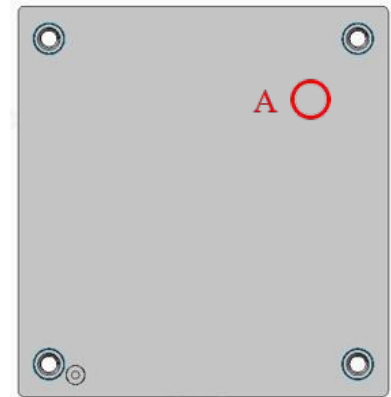
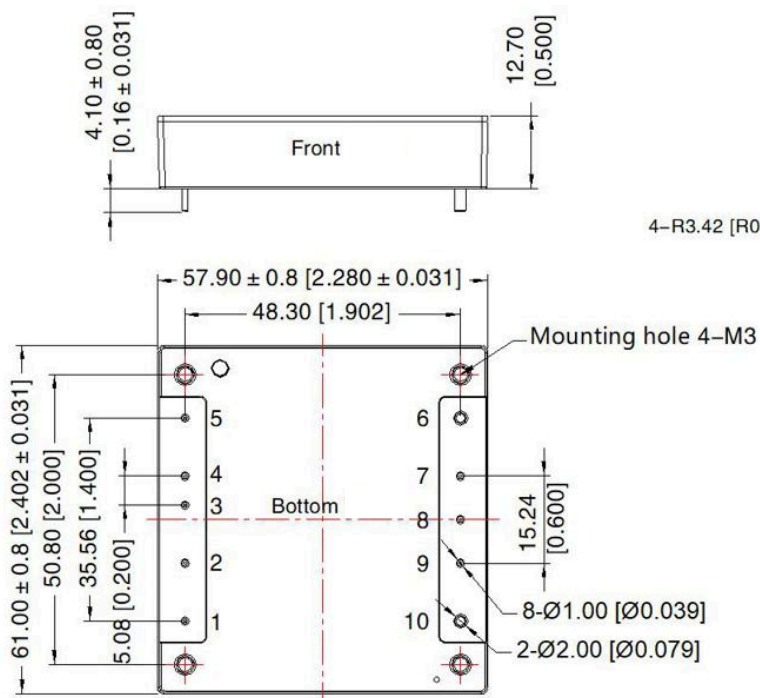


Fig. 8

DIMENSIONS AND INSTALLATION

DCMB24_HB-500W



Note:

Unit: mm[inch]

Pin1, 2, 3, 4, 5, 7, 8, 9 diameter: 1.00[0.039]

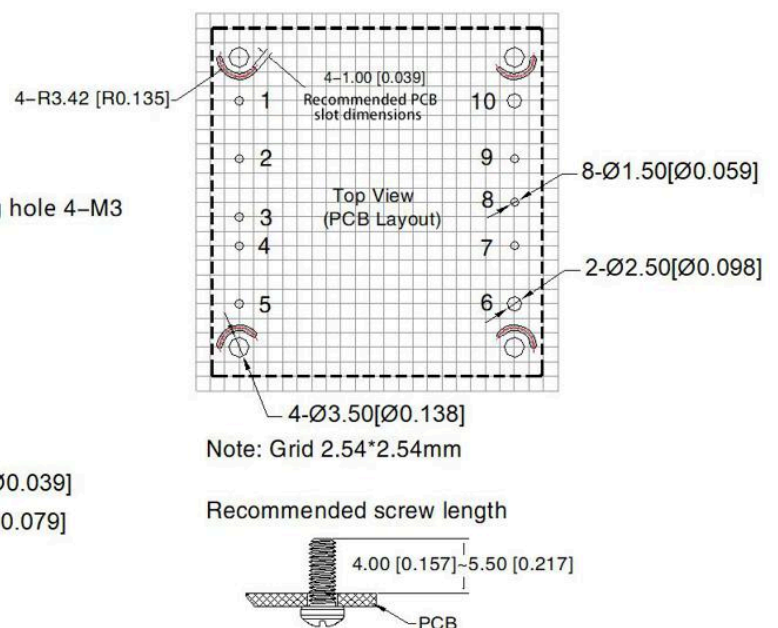
Pin6, 10 diameter: 2.00[0.079]

Pin diameter tolerances: $\pm 0.10 [\pm 0.004]$

General tolerances: $\pm 0.50 [\pm 0.020]$

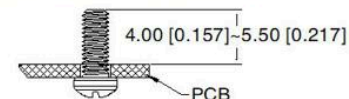
Mounting hole screwing torque: Max 0.4 N · m

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Recommended screw length



Pin	Function	Pin	Function
1	+Vin	6	0V
2	On/Off	7	Sense-
3	Share(+)	8	Trim
4	Share(-)	9	Sense+
5	GND	10	+Vo

NOTES & INSTRUCTIONS

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at $T_a=25^{\circ}\text{C}$, humidity $<75\%\text{RH}$, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;
6. RHENXV reserves the right to make changes to the product at any time without notice