

DCMF48_HB-400W

FEATURES

- Isolation voltage : 2250VDC
- Industry standard 1/2-Brick package and pin-out
- Input under-voltage protection, output over-voltage, over-current, short-circuit protection, over-temperature protection
- Wide input voltage range: 36 -75VDC
- High efficiency up to 95%
- Operating ambient temperature range -40°C To +85°C
- 3 Years Warranty



MODEL NUMBERING

DCMF48xxHB-400W

Series Name
Input Voltage
Output Voltage

Rated Wattage
Packaging Form

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)
DCMF4812HB-400W	N	48VDC (36-75)	12	33000/0	92/94	10000/470
DCMF4815HB-400W	N		15	26500/0	93/95	6800/470
DCMF4824HB-400W	N		24	16500/0	93/95	3300/470
DCMF4828HB-400W	N		28	14200/0	92/94	3300/470

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

Use suffix "H" for heatsink

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Current (Rate load)	Nominal voltage Input 48VDC	--	8865	9058	mA
Input Current (No load)	Nominal voltage Input 48VDC	--	80	150	mA
Reflected Ripple Current	Nominal voltage input	--	200	--	mA
Input under-voltage protection	Nominal voltage input 48VDC	30	32	--	VDC
Start-up Voltage		--	--	36	VDC
Input impulse voltage	(1sec. max.)	-0.7	--	90	VDC
Starting voltage	Nominal voltage input 48VDC	--	--	100	ms
Remote control foot (Ctrl*)	Module On	Ctrl pin connected to -Vin or low level (0-1.2VDC)			
	Module shutdown	Ctrl pin open or pulled high (TTL 3.3-12VDC)			
	Input current during shutdown	--	10	20	mA
Input filter		PI 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	±0.75	%
Dynamic Response Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Dynamic Response Step Deviation			--	±3	±5	%
Temperature drift coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise	Nominal input voltage, 5%-100% load	12V, 15V Output	--	80	150	mVp-p
		24V, 28V Output	--	100	220	mVp-p
Trim			90	--	110	%Vo
Sense			--	--	105	

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Over-Temperature Protection	Max. Case Temperature	--	110	--	°C
Over-Voltage Protection	Input Voltage Range	110	120	140	%Vo
Over-Current Protection	Input Voltage Range	110	140	180	%Io
Shot-Circuit Protection		Sustainable, Self-healing			

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.	Input-output	2250	--	--	VDC
		Input-case	2250	--	--	
		Output-case	2250	--	--	
Insulation Resistance	Input-output resistance at 500VDC		100	1000	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	2500	--	pF
Working temperature	See temperature derating curves		-40	--	+85	°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
	Wave soldering, 10 seconds		255	260	265	°C
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	PWM mode		--	280	--	KHz
MTBF	MIL-HDBK-217F@25°C		500	--	--	Khours

EMC CHARACTERISTICS

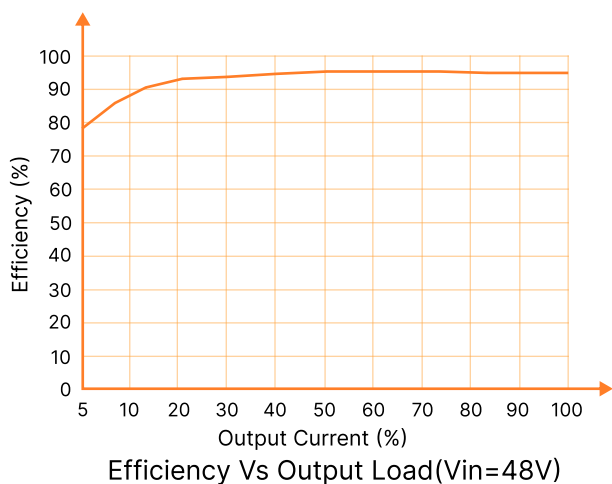
Parameter	Category	Content
EMI	CE	CISPR32/EN55032 CLASS A (see Fig.3 for recommended circuit)
		CISPR32/EN55032 CLASS B (see Fig.4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS A (see Fig.3 for recommended circuit)
		CISPR32/EN55032 CLASS B (see Fig.4 for recommended circuit)
EMS	ESD	IEC61000-4-2 Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$ perf. Criteria B
	RS	IEC61000-4-3 10V/m perf. Criteria A
	EFT	IEC61000-4-4 $\pm 2\text{KV}$ (see Fig.3 or Fig.4 for recommended circuit) perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line $\pm 2\text{kV}$ (see Fig.3 or Fig.4 for recommended circuit) perf. Criteria B
	CS	IEC61000-4-6 10 Vr.m.s perf. Criteria A

PHYSICAL CHARACTERISTICS

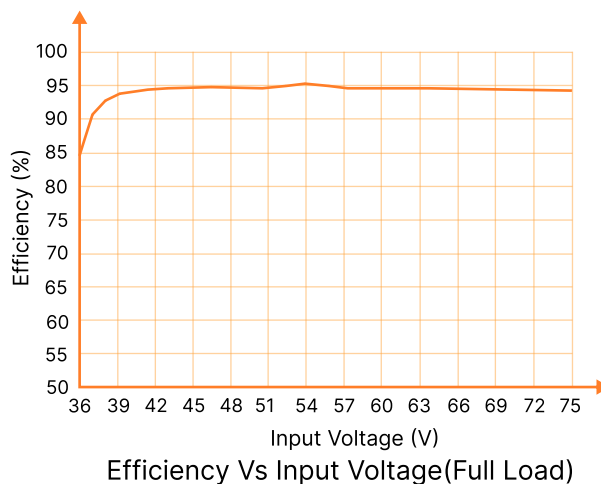
Parameter	Conditions
Case Material	Aluminum alloy case; Black plastic bottom, flame-retardant and heat-resistant (UL94 V-0)
Dimensions	Without heatsink DCMF48xxHB-400W 61.00 × 57.90 × 12.70mm
	With heatsink DCMF48xxHB-400WH 61.80 × 58.00 × 32.70mm
Weight	Without heatsink DCMF48xxHB-400W 135g (Typ.)
	With heatsink DCMF48xxHB-400WH 215g (Typ.)
Cooling Mode	Free air convection or forced convection

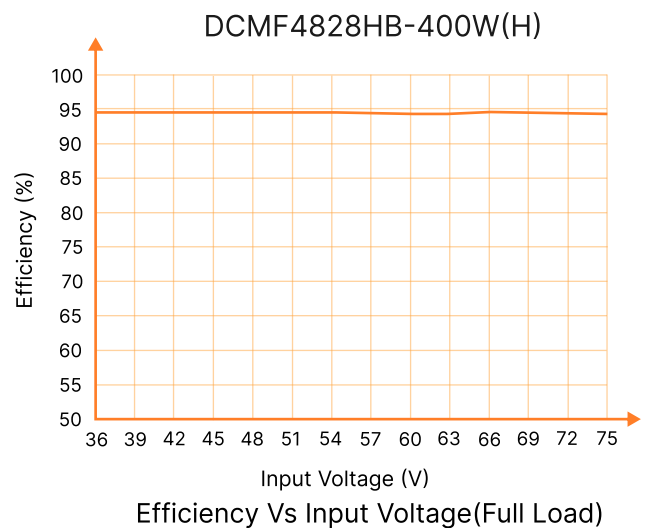
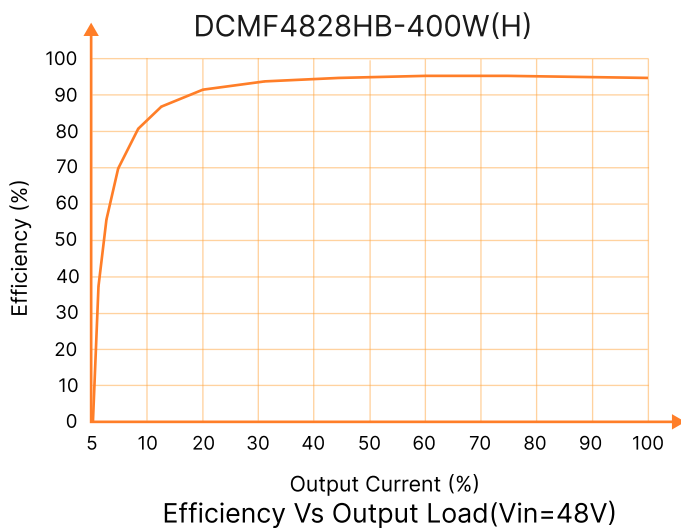
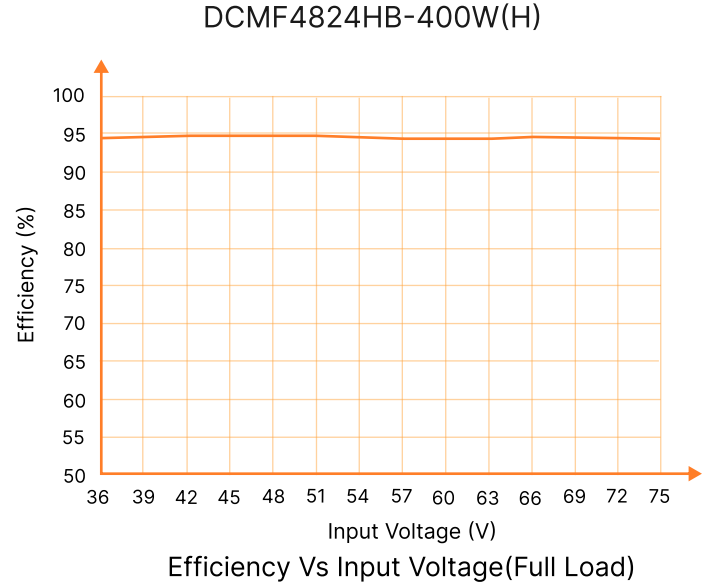
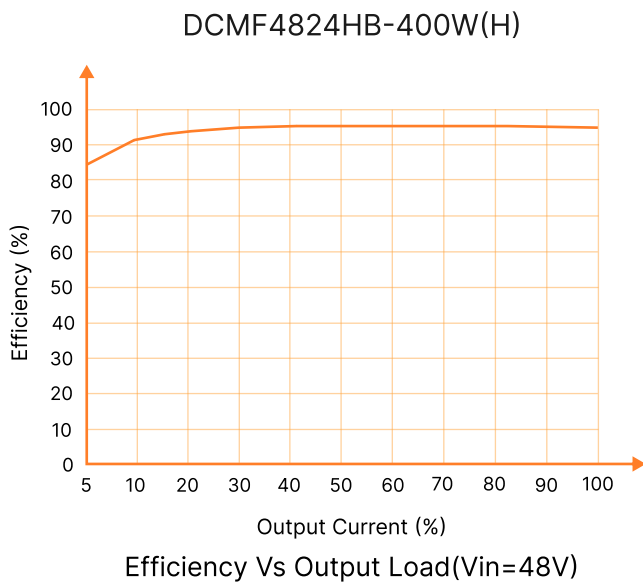
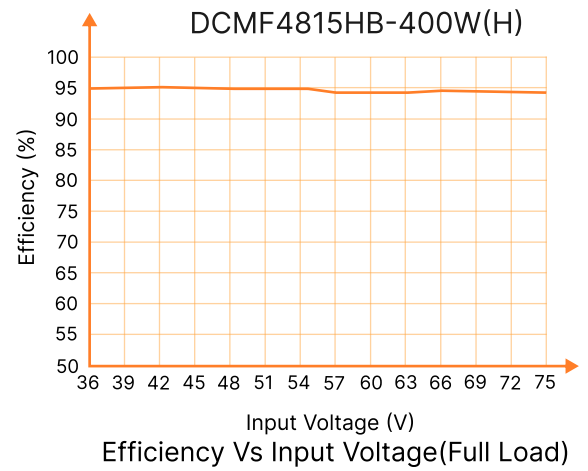
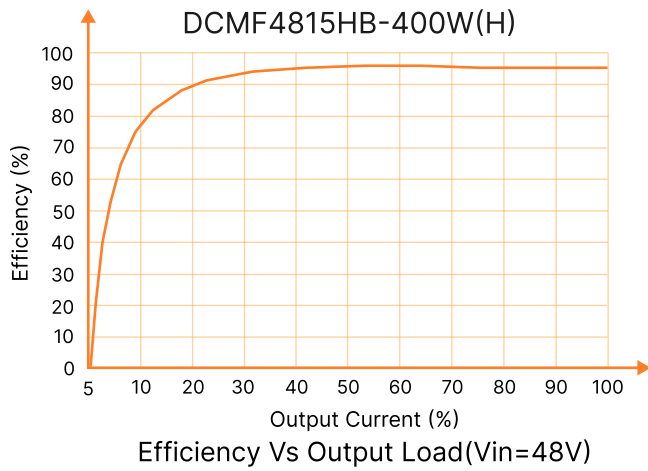
PRODUCT CHARACTERISTICS CURVE

DCMF4812HB-400W(H)

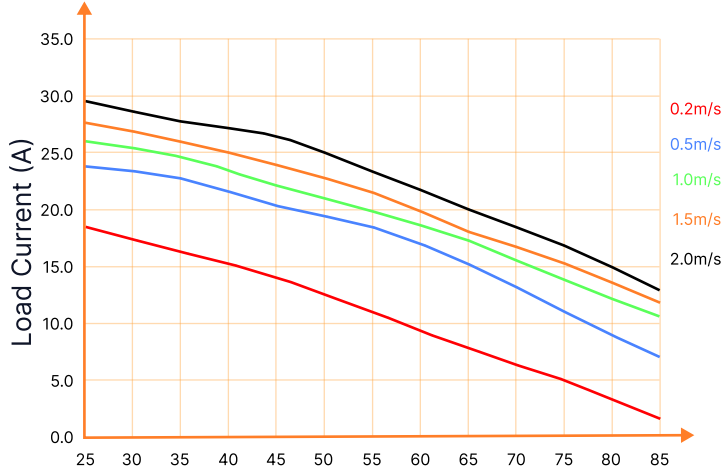


DCMF4812HB-400W(H)



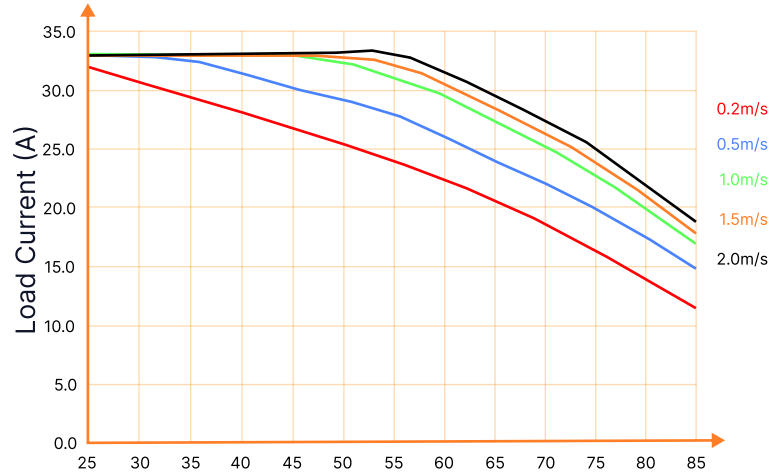


DCMF4812HB-400W



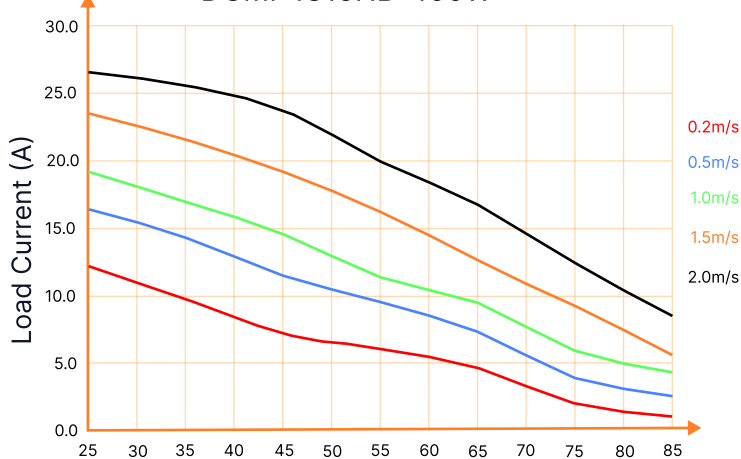
Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4812HB-400WH



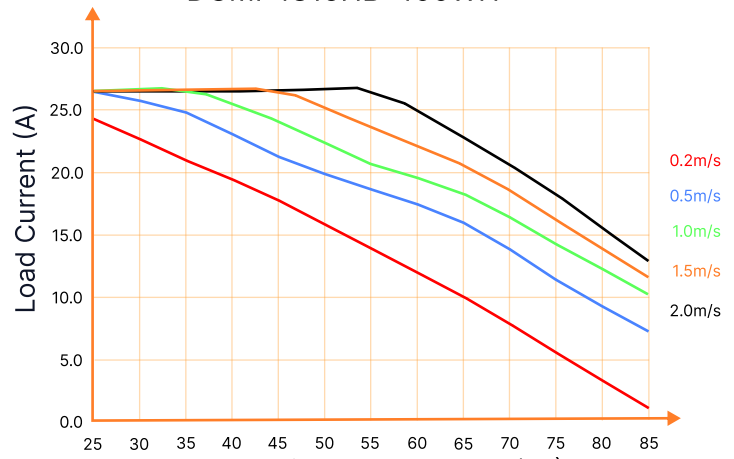
Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4815HB-400W



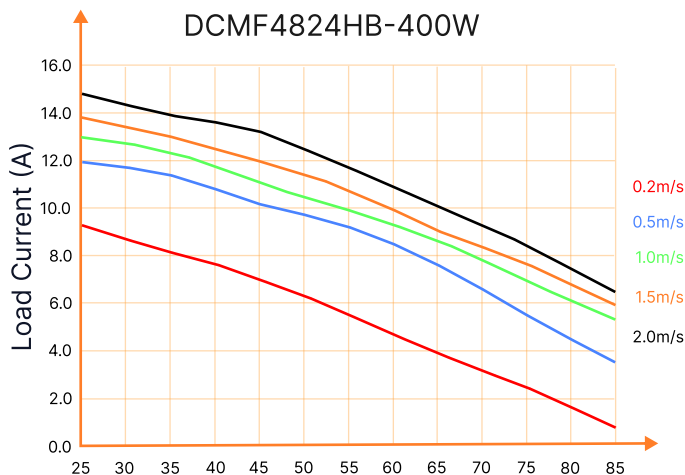
Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4815HB-400WH



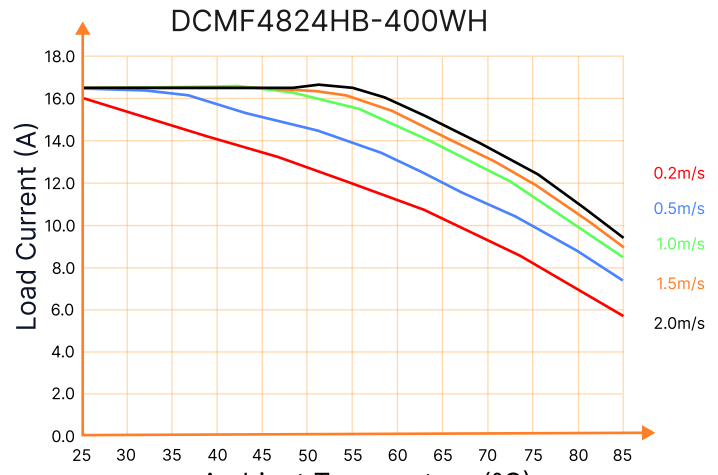
Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4824HB-400W



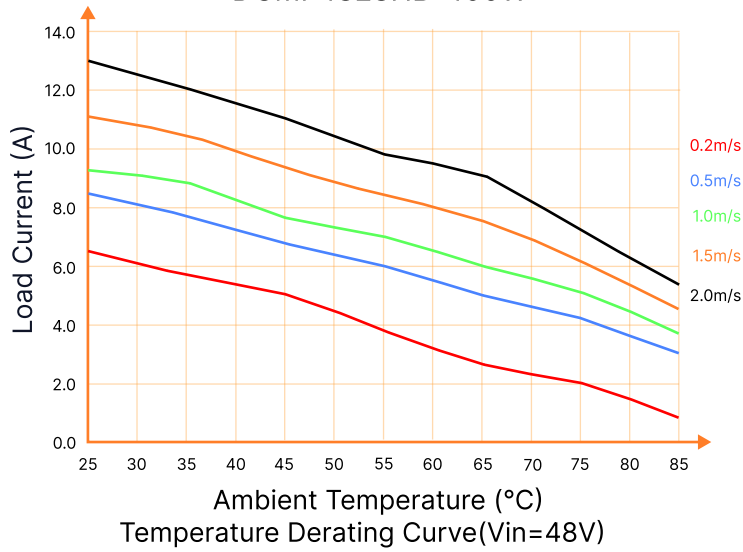
Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4824HB-400WH



Ambient Temperature (°C)
Temperature Derating Curve (Vin=48V)

DCMF4828HB-400W



DCMF4828HB-400WH

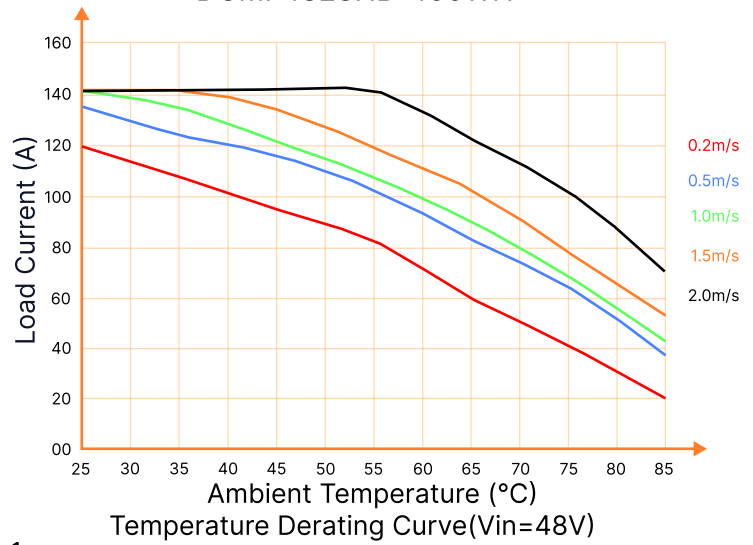


Fig.1

CIRCUIT DESIGN AND APPLICATION

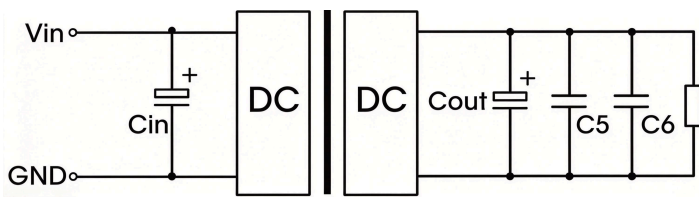


Fig.2

Vout(VDC)	Cin	Cout	C5	C6
12	220μF/ 100V	470μF/ 50V	1μF/25V	10μF/25V
15			1μF/25V	10μF/25V
24			1μF/50V	10μF/50V
28			1μF/50V	10μF/50V

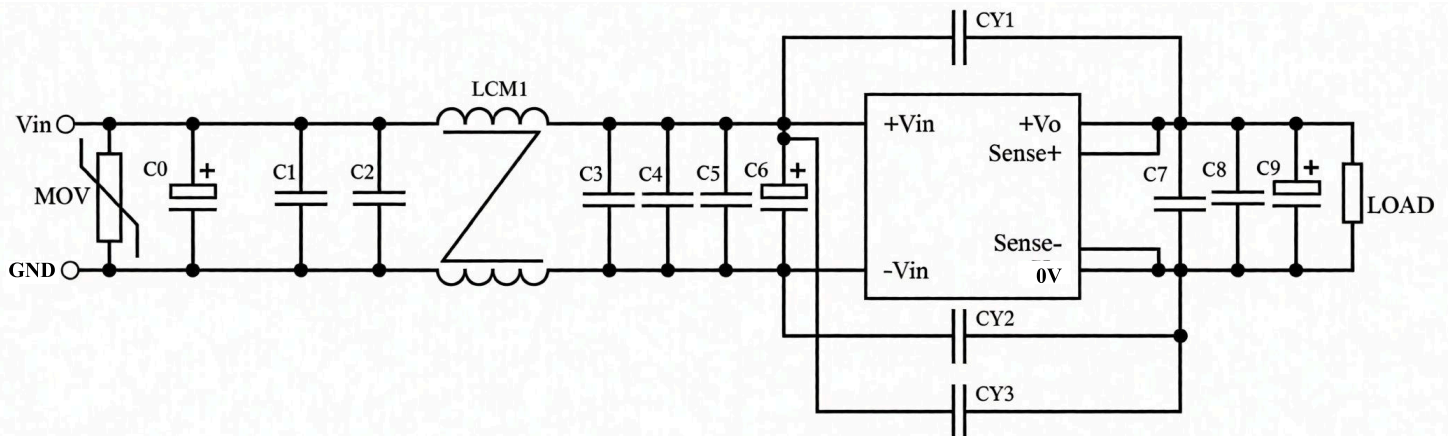


Fig.3

Components	Value
MOV	S14K60 (Varistor)
C0	680 μ F/100V electrolytic capacitor
C6	470 μ F/100V electrolytic capacitor
C9	470uF/50V electrolytic capacitor
C1, C2, C3, C4, C5	4.7 μ F/100V ceramic capacitor
C7, C8	4.7 μ F/50V ceramic capacitor
LCM1	4mH/15A
CY1, CY2	2.2nF/400VAC Y1 safety capacitor
CY3	1nF/400VAC Y1 safety capacitor

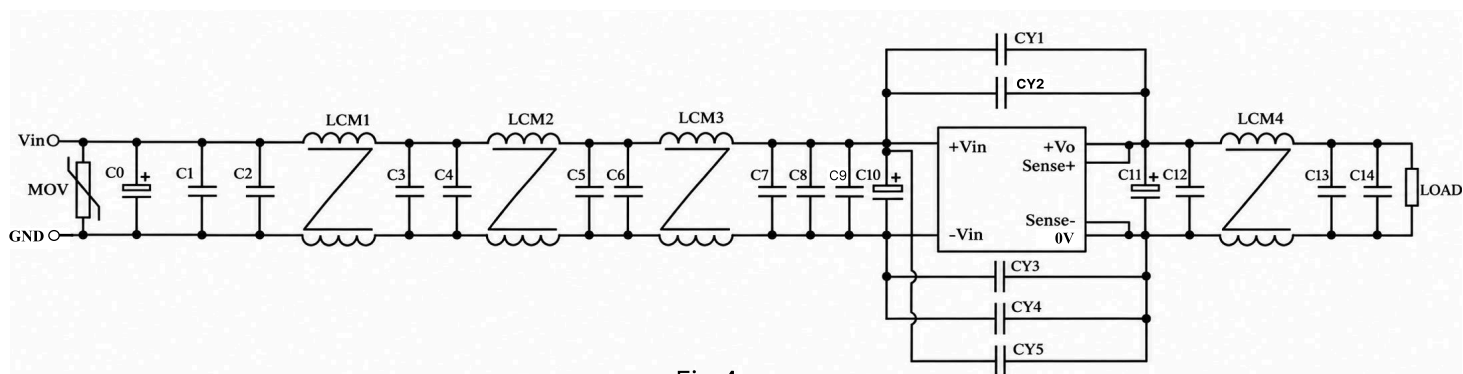


Fig.4

Components	15VDC Output	Other Outputs
CY2, CY4	2.2nF/400VAC Y1 safety capacitor	/
MOV	S14K60 (Varistor)	
C0	680 μ F/100V electrolytic capacitor	
C10	470 μ F/100V electrolytic capacitor	
C11	470uF/50V electrolytic capacitor	
C1, C2, C3, C4, C5, C6, C7, C8, C9	4.7 μ F/100V ceramic capacitor	
C12,C13,C14	4.7 μ F/50V ceramic capacitor	
LCM1	4mH/15A	
LCM2, LCM3	1mH/15A	
LCM4	100uH/40A	
CY1, CY3	2.2nF/400VAC Y1 safety capacitor	
CY5	1nF/400VAC Y1 safety capacitor	

Remote Sense Application

1. Remote Sense Connection if not used

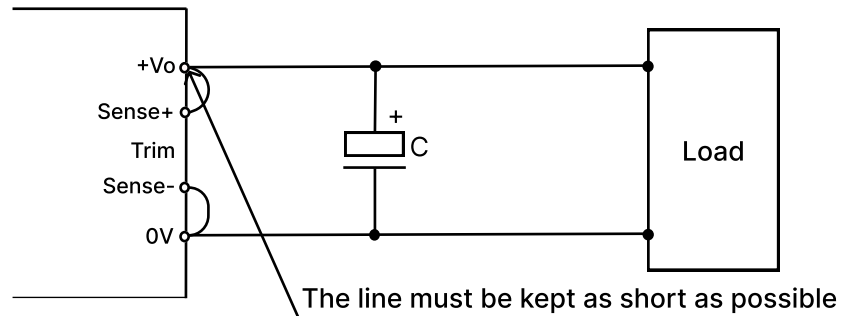


Fig. 5

Notes :

- (1) If the sense function is not used for remote regulation the user must connect the +Sense to +Vo and -Sense to -Vo 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

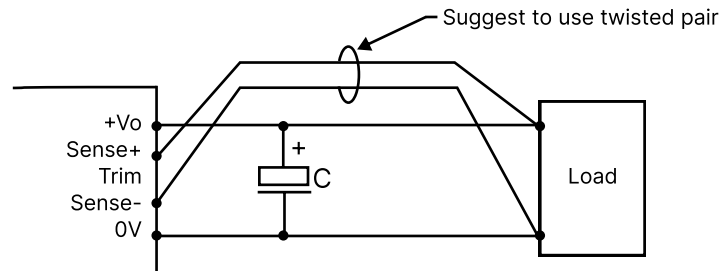


Fig. 6

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)

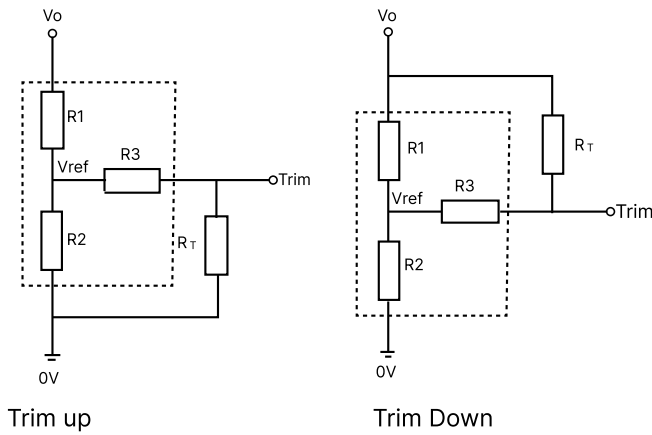


Fig. 7

Calculating Trim resistor value:

$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2-a} - R_3 & a &= \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1-a} - R_3 & a &= \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

Notes:

Value for R1, R2, R3, and Vref refer to the above table 1.
RT: Resistance of Trim.

a: User-defined parameter, no actual meanings.

Vo': The trim up/down voltage.

TRIM resistor connection
(dashed line shows internal resistor network)

Resistance	Vo	12VDC	15VDC	24VDC	28VDC
R1(KΩ)		24.77	31.53	52.19	61.11
R2(KΩ)		2.87	2.87	2.87	2.87
R3(KΩ)		17.1	17.1	17.1	17.1
Vref(V)		1.25	1.25	1.25	1.25

4. Reflected ripple current test circuit

All DC-DC converters of this series are tested using the recommended circuit shown in Fig. 8

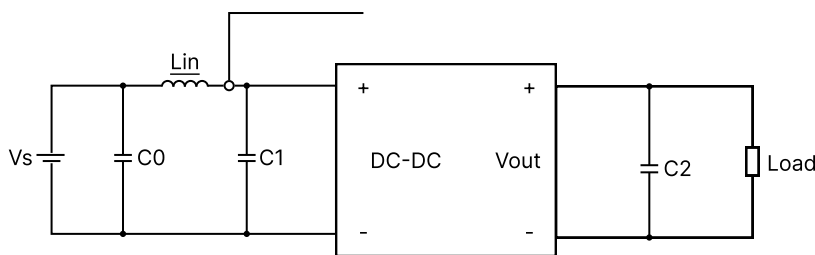
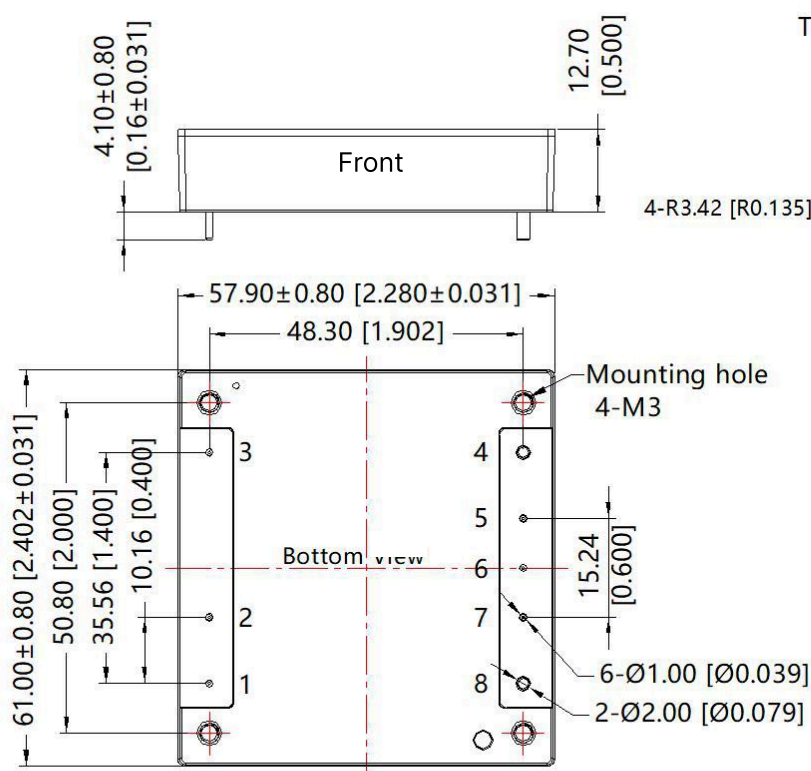


Fig. 8

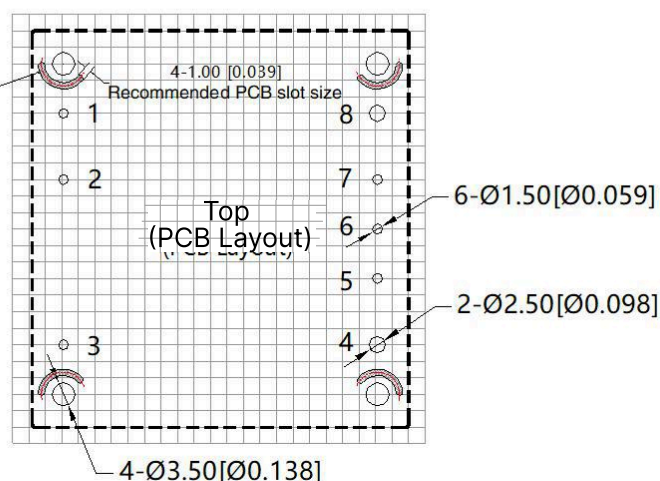
Components	Recommended Component Value
C0	220μF/100V
Lin	10uH/15A
C1	470μF/100V
C2	470μF/50V

OVERALL DIMENSIONS AND PIN FUNCTIONS

DCMF48_HB-400W

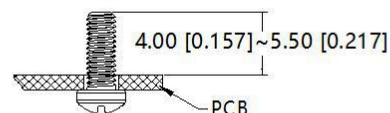


THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Recommended screw length



Note:

Unit: mm[inch]

Pin1, 2, 3, 5, 6, 7 diameter: 1.00[0.039]

Pin4, 8 diameter: 2.00[0.079]

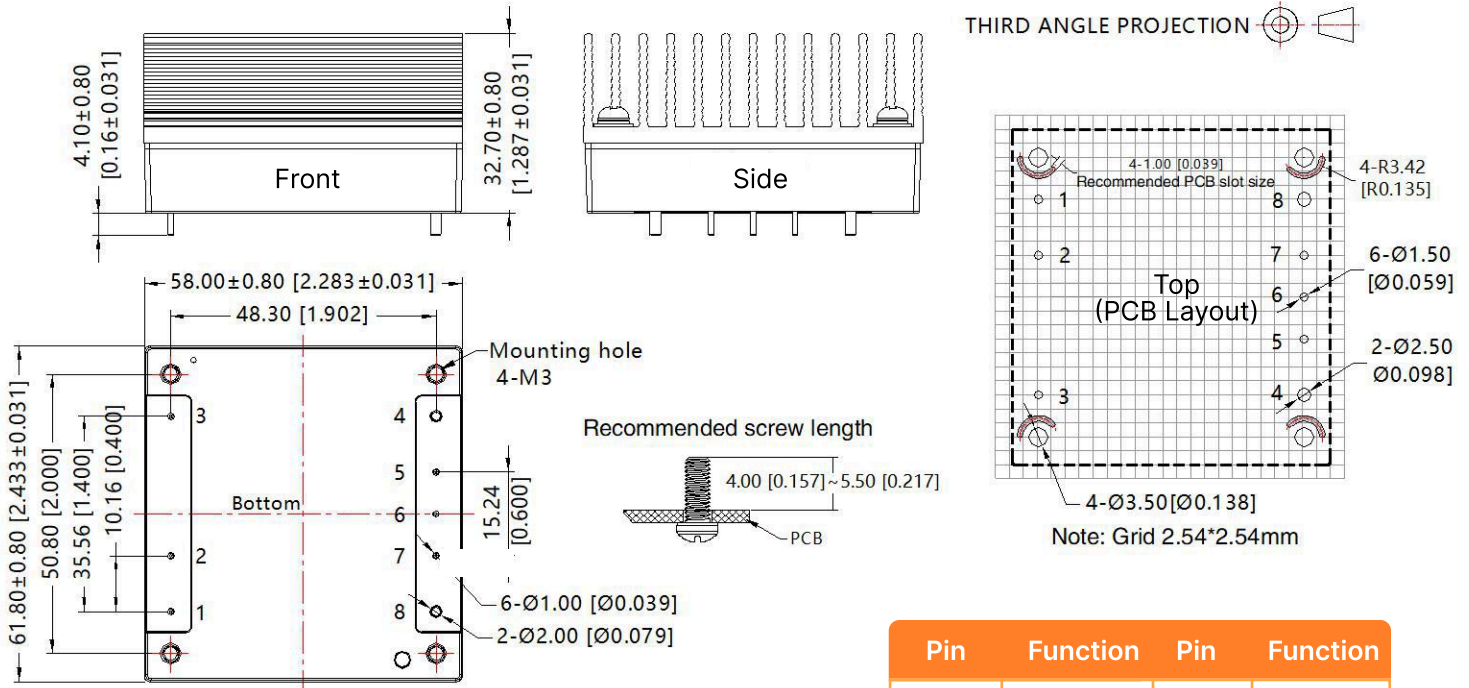
Pin diameter tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.50 [± 0.020]

Mounting hole screwing torque: Max 0.4 N · m

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

DCMF48_HB-400WH



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

NOTES

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 Ta=25°C, humidity <75%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.