

DCWF48_QB-75W



FEATURES

- Operating ambient temperature range: -40°C To +85°C
- Wide 4:1 input voltage range
- Industry standard 1/4-Brick package and pin-out
- High efficiency up to 93%
- I/O isolation test voltage: 2.25k VDC
- Input under-voltage protection, output short circuit, over-current, over-voltage, over-temperature protection
- Five-sided metal shielded package
- 3 Years Warranty

Applications

- Railway systems

DESCRIPTION

The DCWF_QB-75W series is a compact 75W isolated DC-DC converter with a 4:1 wide input range, delivering up to 93% efficiency and 2250VDC isolation. It offers comprehensive protection features and is ideal for industrial, railway, communication, and battery-powered applications.

MODEL NUMBERING

DCWF48xxQB-75W



SELECTION GUIDE

	Input Voltage (VDC) (Nominal/Max)	Output Voltage (VDC)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum Capacitive load (uF)
DCWF4805QB-75W	48 (18-75)	5	15000	89/91	6000
DCWF4812QB-75W		12	6250	90/92	2000
DCWF4815QB-75W		15	5000	91/93	2000
DCWF4824QB-75W		24	3130	90/92	1000
DCWF4848QB-75W		48	1560	90/92	470

Note: *Use suffix "ST" for chassis mounting, suffix "H" for heatsink, suffix "F" for Aluminum baseplate, suffix "DR" for DIN-Rail mounting

INPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Input Current (full load)	Nominal input voltage	--	1698	1756	mA
Input Current (no-load)	Nominal input voltage	--	50	80	mA
Reflected Ripple Current		--	30	--	mA
Input Impulse Voltage	(1sec. max.)	-0.7	--	90	VDC
Starting Voltage	Nominal input voltage	--	--	18	VDC
Under Voltage Protection	5VDC, 15VDC output	16	16.5	--	VDC
	Others	15	15.5	--	VDC
Input Filter		Pi type			
Ctrl*	Module on	Ctrl pin open or pulled high TTL (3.5-12VDC)			
	Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	Input current when off	--	2	10	mA

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	%
Linear Regulation Rate	Input voltage variation from low to high at full load		--	±0.2	±0.5	%
Load Regulation Rate	0%-100% load		--	±0.5	±0.75	%
Dynamic Response Recovery Time	25% load step change		--	200	500	μs
Dynamic Response Step Deviation	25% load step change	5VDC output	--	±3	±7.5	%
		Others	--	±3	±5	%
Temperature Drift Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise	20MHz bandwidth	12VDC, 15VDC output	--	100	200	mVp-p
		Others	--	150	250	mVp-p
Trim			95	--	110	%Vo

DC - DC CONVERTERS

75 WATTS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Sense		--	--	105	%Vo
Over Temperature Protection	Max. Case Temperature	--	115	120	°C
Output Over Voltage Protection	Full Voltage Range Input	110	130	160	%Vo
Output Over Current Protection		110	140	190	%Io
Short Circuit Protection		Continuous, Self-Recovery			

GENERAL CHARACTERISTICS

Parameter	Operating Conditions		Min.	Typ.	Max.	Units
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 5 mA	Input-output	2250	--	--	VDC
		Input-case	1500	--	--	VDC
		Output-case	500	--	--	VDC
Insulation Resistance	Input-output insulation Voltage 500VDC		100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	2200	--	pF
Working Temperature			-40	--	+85	°C
Storage Temperature			-55	--	+125	°C
Storage Humidity	Non-condensing		5	--	95	%RH
Soldering Temperature Resistance Of Pins	Wave-soldering, 10 seconds		--	--	260	°C
	The distance from the welding spot to the shell is 1.5mm, 10 seconds		--	--	300	°C
Vibration			IEC/EN61373 -Category 1, Grade B			
Switching Frequency	PWM mode		--	250	--	KHz
MTBF	MIL-HDBK-217F @ 25°C		500	--	--	K hours

EMC CHARACTERISTICS

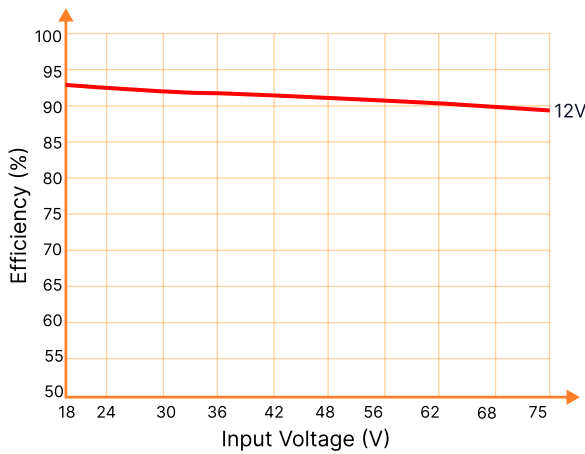
Parameter	Category	Content
EMI	CE	CISPR32/EN55032
	RE	CISPR32/EN55032
		CLASS A and CLASS B (see Fig. 3 for recommended circuit)
		CLASS A and CLASS B (see Fig. 3 for recommended circuit)

Parameter	Category	Content		
EMS	ESD	IEC/EN61000-4-2, EN50121-3-2	Contact $\pm 6\text{KV}$ Air $\pm 8\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3, EN50121-3-2	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4, EN50121-3-2	$\pm 2\text{KV}$ (see Fig. 2 for recommended circuit)	perf. Criteria A
	Surge	EN50121-3-2	differential mode $\pm 1\text{KV}$, 1.2/50us, source impedance 42Ω (see Fig.2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6, EN50121-3-2	10 Vr.m.s	perf. Criteria A

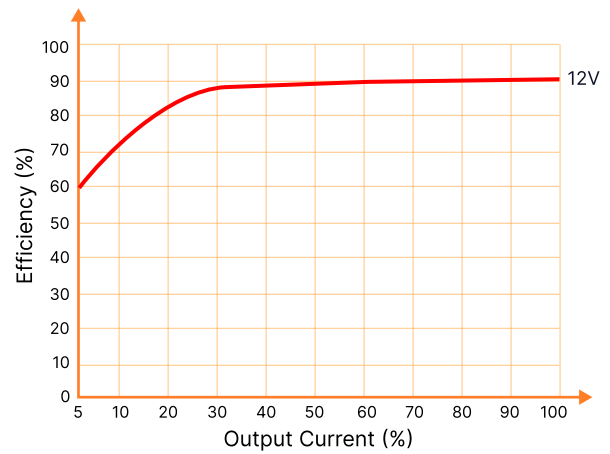
PHYSICAL CHARACTERISTICS

Parameter	Conditions		
Case Material	Aluminum alloy case, black plastic bottom, flame-retardant and heat-resistant (UL94 V-0)		
Dimension	Without heatsink	DCWF48_QB-75W	61.8 × 40.2 × 12.7 mm
		DCWF48_QB-75WST	135.00 × 70.00 × 22.6mm
		DCWF48_QB-75WDR	137.00 × 70.00 × 28.10mm
	With heatsink	DCWF48_QB-75WF	62.0 × 56.0 × 14.6 mm
		DCWF48_QB-75WH	61.8 × 40.2 × 27.7 mm
		DCWF48_QB-75WHST	135.00 × 70.00 × 36.20mm
		DCWF48_QB-75WHDR	137.00 × 70.00 × 37.20mm
Weight	Without heatsink	DCWF48_QB-75W	90.0g (Typ.)
		DCWF48_QB-75WST	166.0g (Typ.)
		DCWF48_QB-75WDR	236.0g (Typ.)
	With heatsink	DCWF48_QB-75WF	110.0g (Typ.)
		DCWF48_QB-75WH	121.0g (Typ.)
		DCWF48_QB-75WHST	197.0g (Typ.)
		DCWF48_QB-75WHDR	267.0g (Typ.)
Cooling Mode	Free air convection (20LFM)		

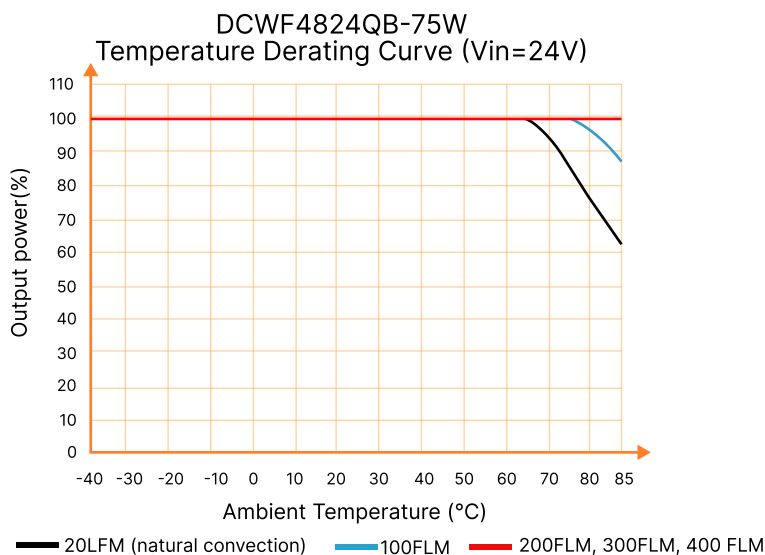
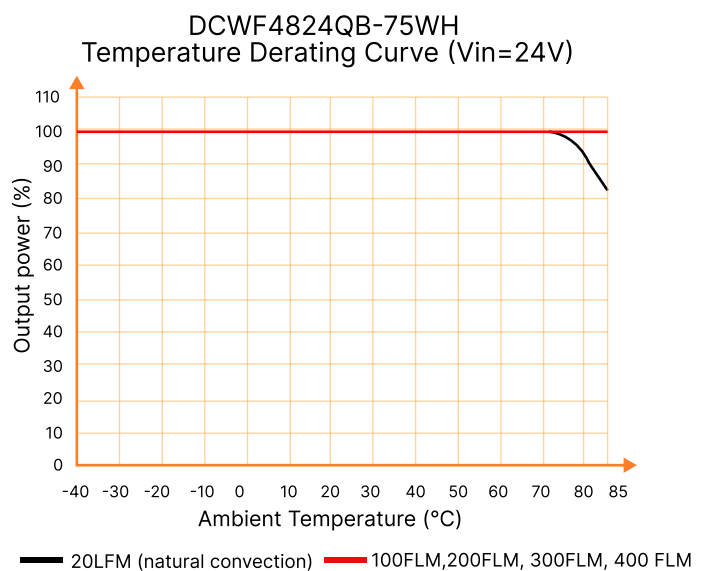
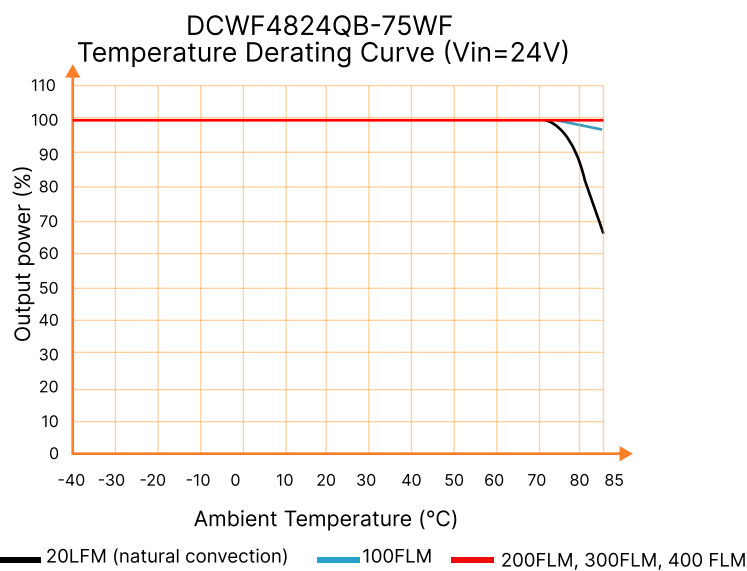
PRODUCT CHARACTERISTIC CURVE



Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=48V)



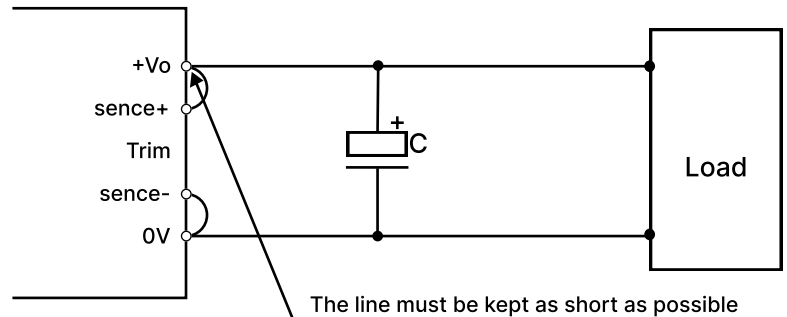
CIRCUIT DESIGN & APPLICATION

REMOTE SENSE APPLICATION

1. Remote Sense Connection if not used

Notes :

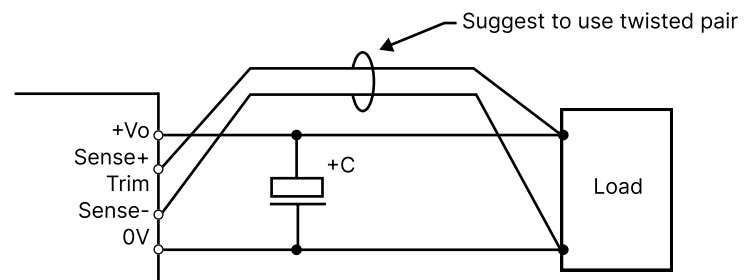
- (1) If the sense function is not used for remote regulation the user must connect the +Sense to +Vo and -Sense to 0V.
- (2) The connections between Sense lines and their respective power lines must be kept as short as possible, otherwise they may be picking up noise, interference and/or causing unstable operation of the power module.



2. Remote Sense Connection used for Compensation

Notes :

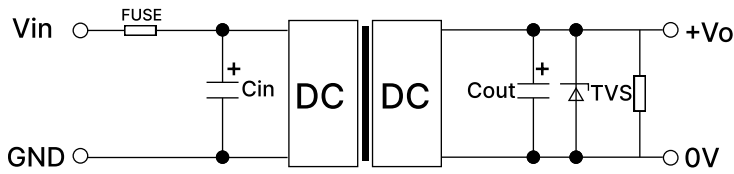
1. Using remote sense with long wires may cause unstable output, please contact technical support if long wires must be used.
2. PCB-tracks or cables/wires for Remote Sense must be kept as short as possible. Twisted pair or shielded wires are suggested for remote compensation and must be kept as short 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.



DESIGN REFERENCE

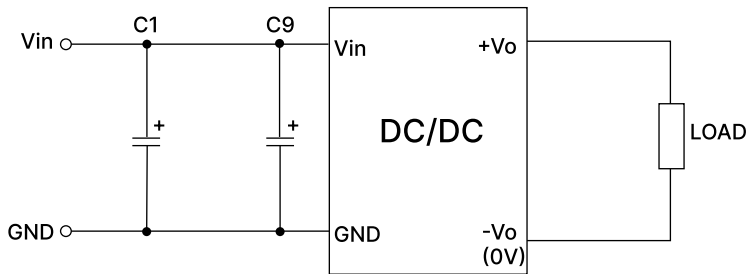
1. Typical application

- (1) We recommended using the recommended circuit shown in Fig.1 during product testing and application, otherwise please ensure that at least a 220μF electrolytic capacitors is connected at the input in order to ensure adequate voltage surge suppression and protection.
- (2) We recommended increasing the value of Cin and pay attention to the unstable input voltage if the product input side is paralleled with motor drive circuit and/or larger energy transient circuits, to ensure the stability of input terminal and avoid repeatedly start-up problems due to input voltage lower than under-voltage protection point.
- (3) We recommended increasing the output capacitance with limited to the capacitive load specification and/or increasing the voltage clamping circuit (such as TVS) if the output terminal is inductive device such as relay or a motor, to ensure adequate voltage surge suppression and protection.
- (4) Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout 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.

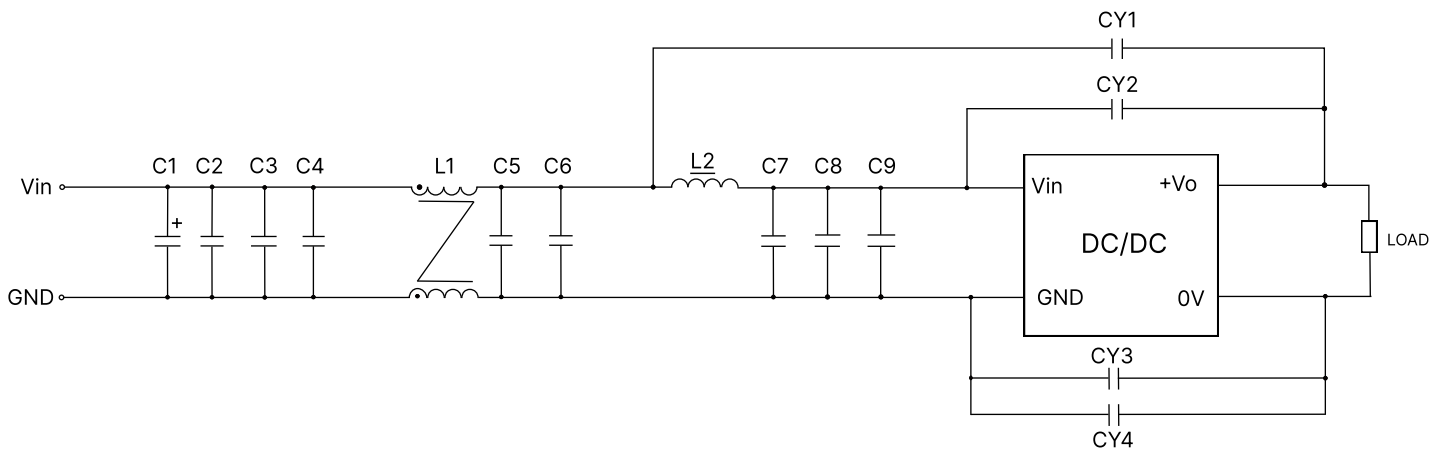


Vout(VDC)	Fuse	Cin	Cout	TVS
5	10A, slow blow	220μF	470μF	SMDJ6.0A
12			220μF	SMDJ14A
15				SMDJ17A
24			100μF	SMDJ28A
48				SMDJ54A

2. EMC solution-recommended circuit

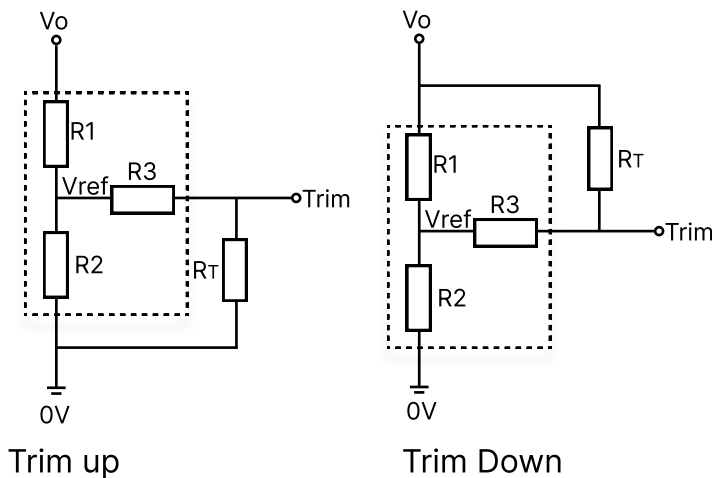


Capacitor	Recommended Value	Function
C1	150μF electrolytic	Meets EFT and surge
C9	47μF electrolytic	



Class A Components	Class B Components	Recommended Component Value	Function
C1		150μF electrolytic capacitor	Meets conducted emission and radiated emission
C9		47μF electrolytic capacitor	
C2, C3, C4, C5, C6, C7, C8		2.2μF ceramic capacitor	
L1		1.0mH common mode inductor	
L2		1.5μH inductance	
CY3	CY1, CY2, CY3, CY4	1nF Y1 safety capacitor	

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



The Calculation formula for trip resistance

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

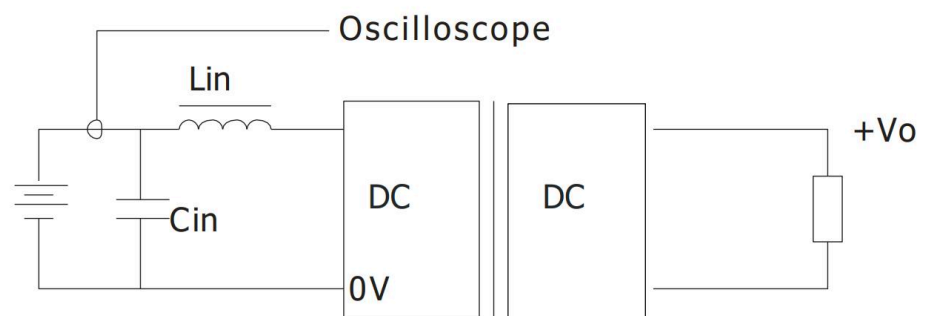
R_T is Trim resistance
 a is a self-defined parameter, with no real meaning.

TRIM resistor connection (dashed line shows internal resistor network)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	3.036	3	10	2.5
12	11.00	2.87	15	2.5
15	14.03	2.8	15	2.5
24	24.872	2.87	15	2.5
48	53.017	2.913	15	2.5

Note: When using the Trim down function, if R_T resistor value is too low, or the Trim pin is shorted with +Vo, then the output voltage V_o' would be lower than $0.9V_o$, which may cause permanent damage to the product.

4. Reflected ripple current-test circuit



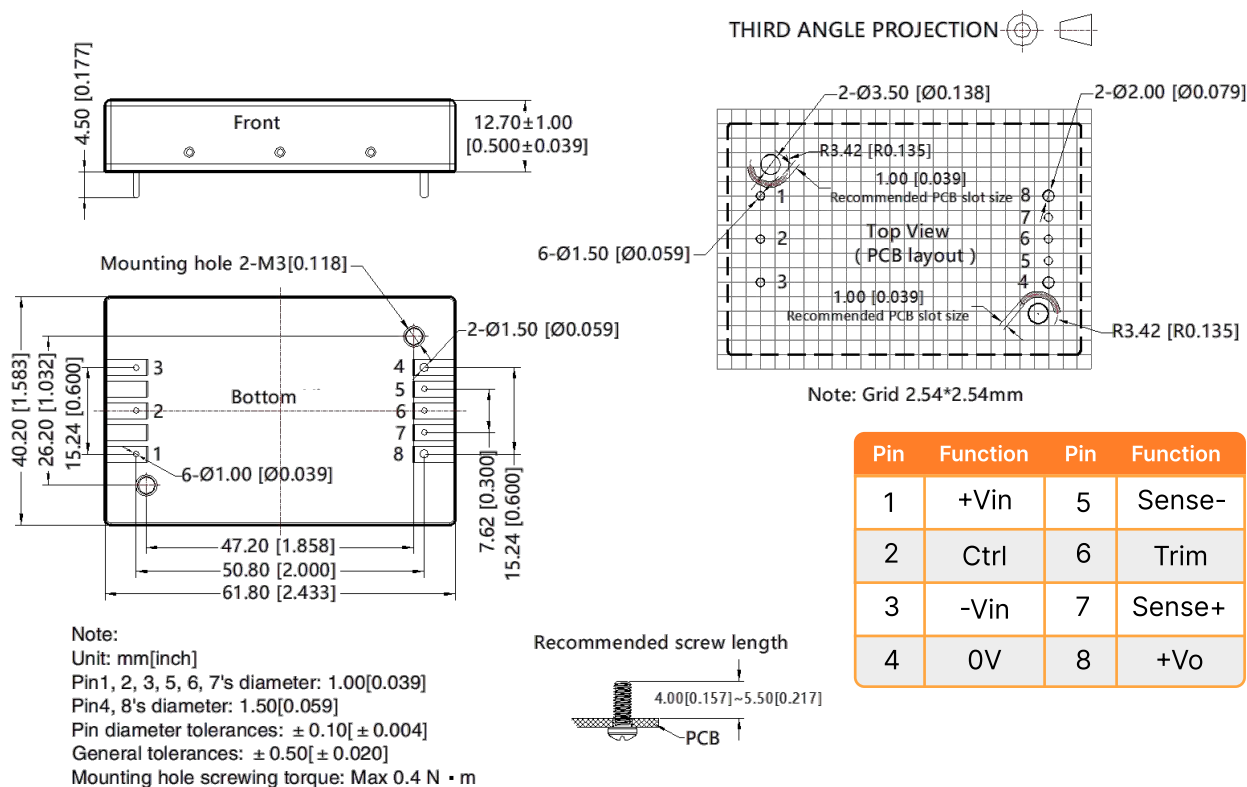
Note: $L_{in}(4.7\mu H)$, $C_{in}(220\mu F)$, $ESR < 1.0\Omega$ at 100 KHz)

5. The products do not support parallel connection of their output.

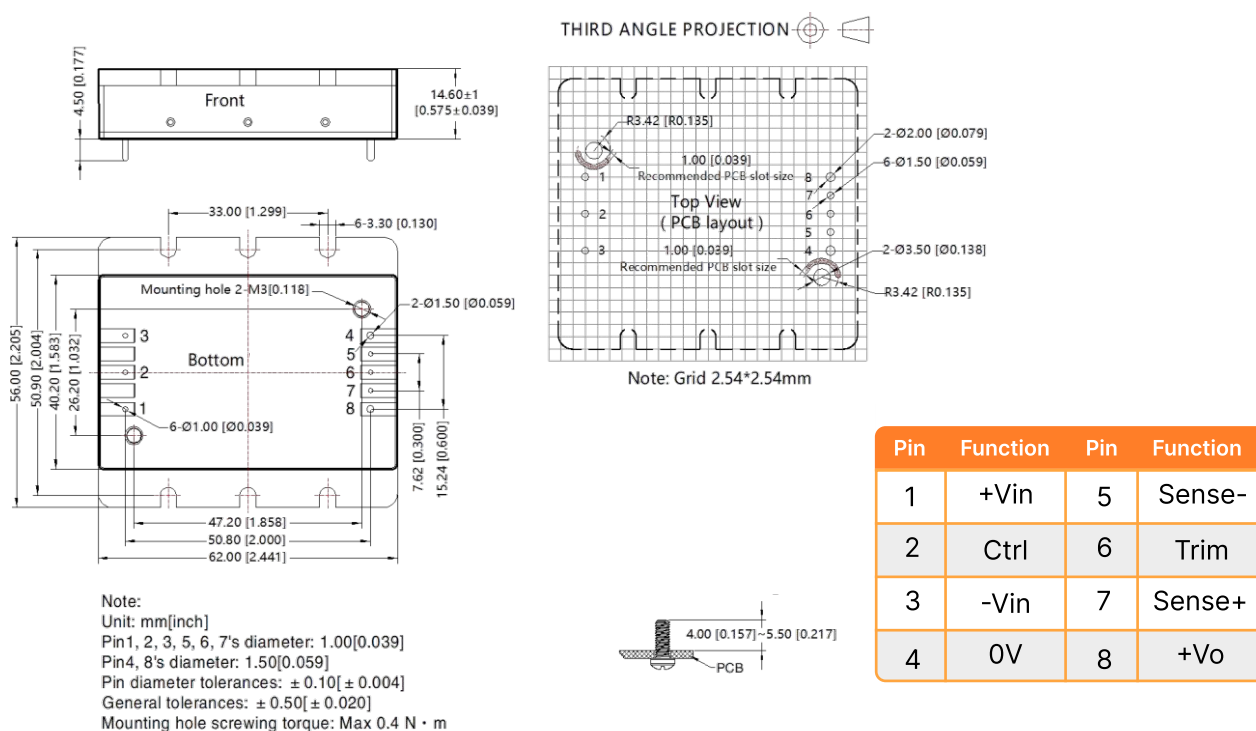
6. The product test process shall ensure that the current of the input terminal meets the requirements of the starting current to ensure that the power supply of the product does not suffer from under-power.

DIMENSIONS AND INSTALLATION

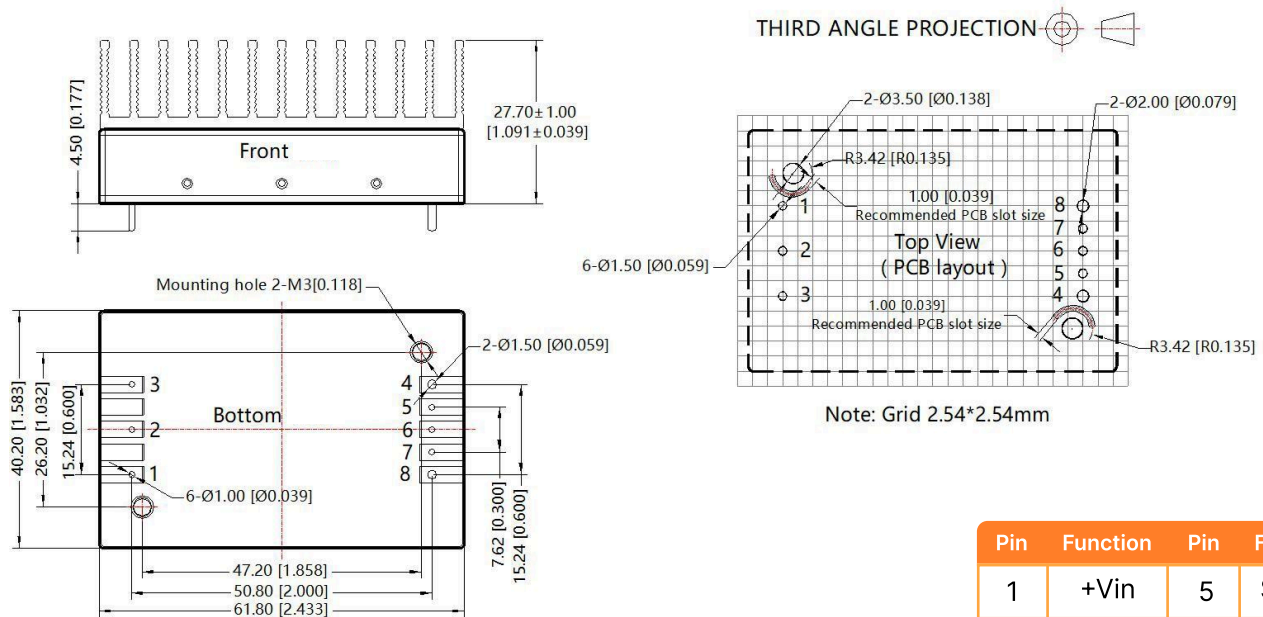
DCWF48_QB-75W



DCWF48_QB-75WF



DCWF48_QB-75WH



Note:

Unit: mm[inch]

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

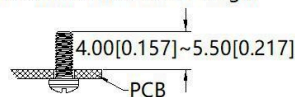
Pin4, 8's diameter: 1.50[0.059]

Pin diameter tolerances: ± 0.10[± 0.004]

General tolerances: ± 0.50[± 0.020]

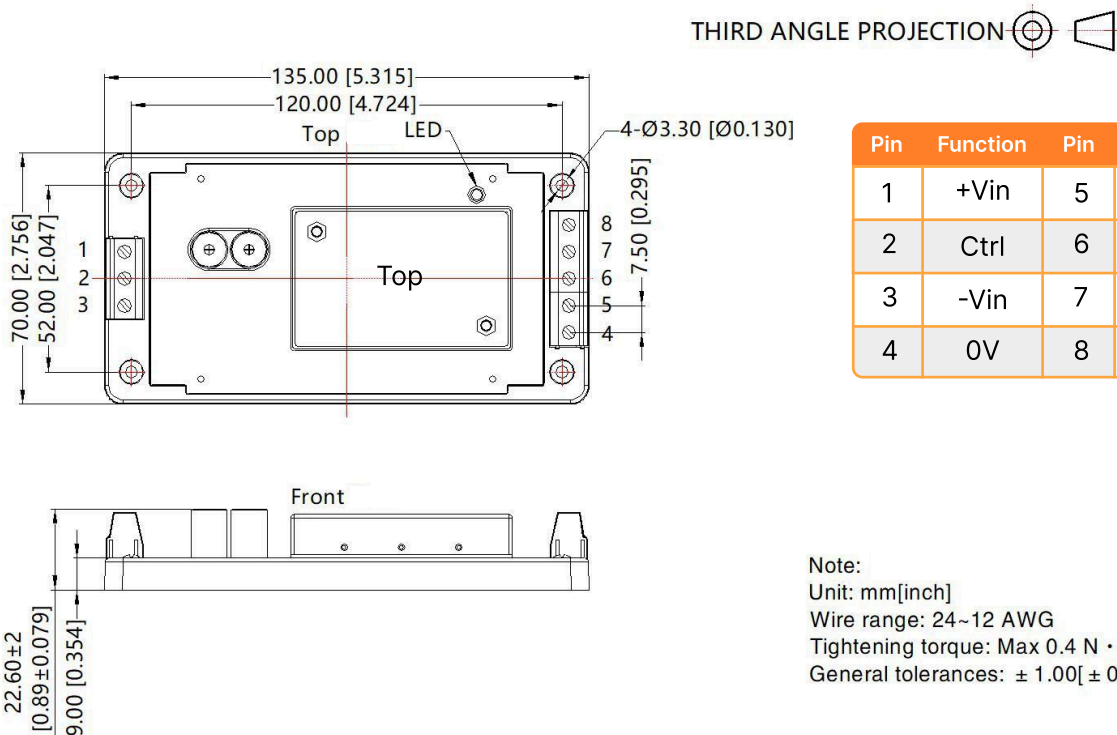
Mounting hole screwing torque: Max 0.4 N · m

Recommended screw length



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

DCWF48_QB-75WST



Note:

Unit: mm[inch]

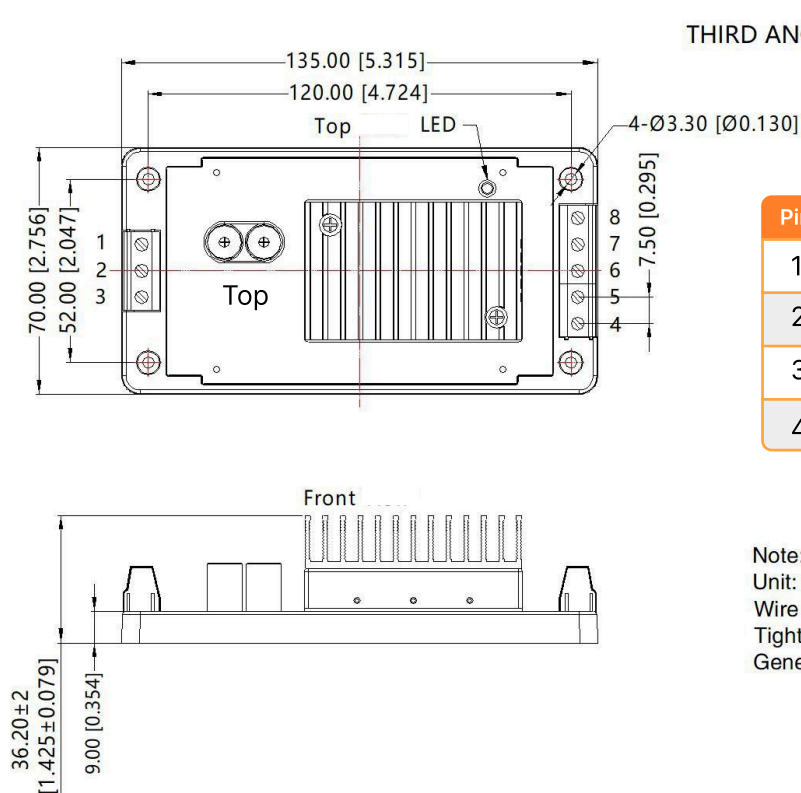
Wire range: 24~12 AWG

Tightening torque: Max 0.4 N · m

General tolerances: ± 1.00[± 0.040]

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

DCWF48_QB-75WHST

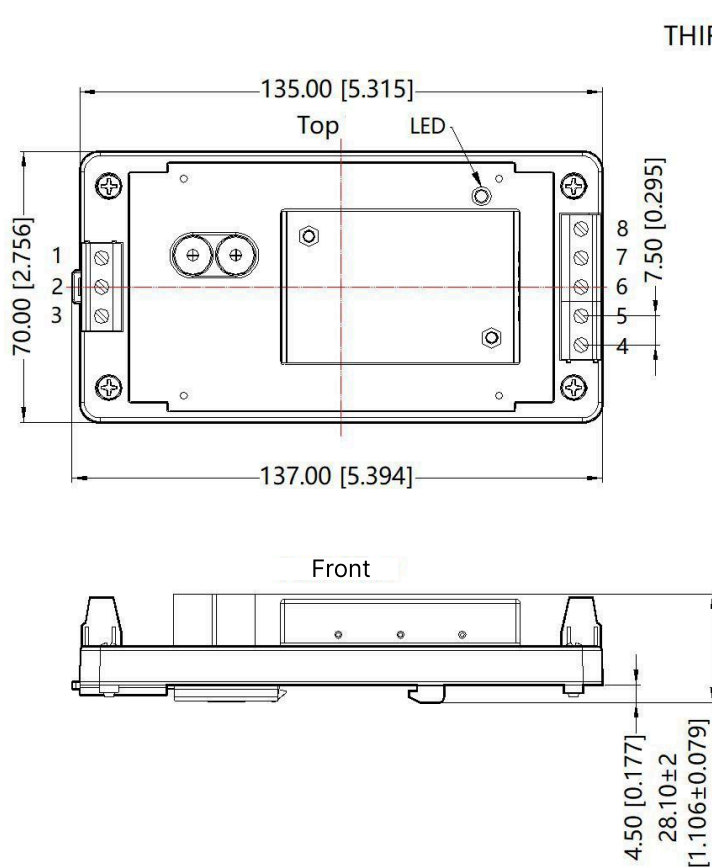


THIRD ANGLE PROJECTION

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

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N · m
General tolerances: ± 1.00[± 0.040]

DCWF48_QB-75WDR

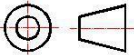


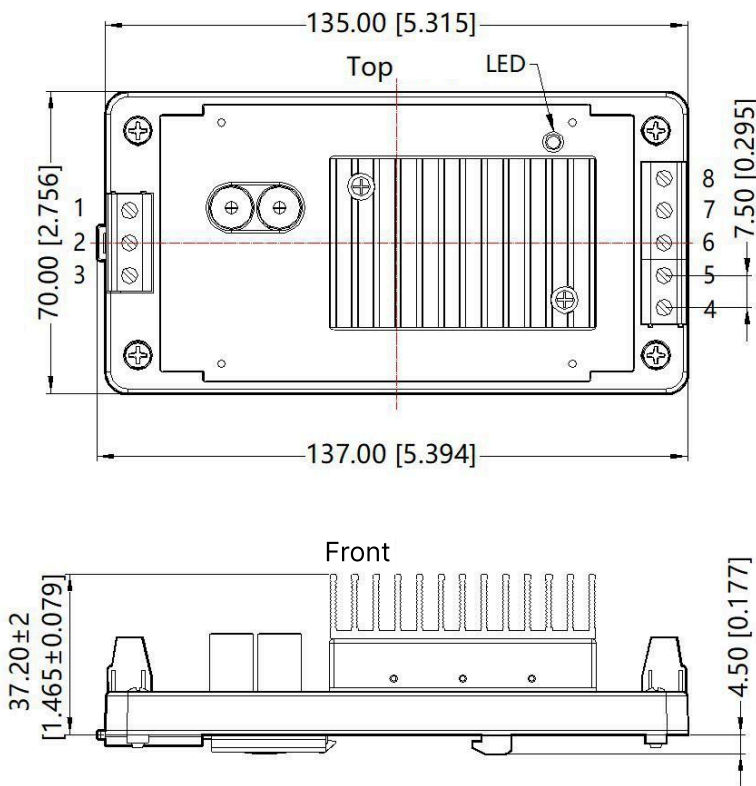
THIRD ANGLE PROJECTION

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

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N · m
Installed on DIN RAIL TS35
General tolerances: ± 1.00[± 0.040]

DCWF48_QB-75WHDR

THIRD ANGLE PROJECTION 



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

Note:

Unit: mm[inch]

Wire range: 24~12 AWG

Tightening torque: Max 0.4 N · m

Installed on DIN RAIL TS35

General tolerances: $\pm 1.00 [\pm 0.040]$

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 $T_a=25^{\circ}\text{C}$, 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;