Descriptions

100W isolated，DC/DC Converter



RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 94%
- I/O isolation test voltage: 2250VDC
- Operating ambient temperature range: -40℃ to +85℃
- Input under-voltage protection, output over-voltage, over-current, short circuit, over-temperature protection
- Five-sided metal shielding package
- Industry standard ¼-Brick package and pin-out

Applications

- Industrial control
- Power
- Instrumentation
- Communication
- Railway
- Battery powered systems

Selection Guide

Certification	Part No.①	Input Voltage③ (VDC)		Output		Full Load Efficiency(%) Min./Typ.		Max. Capacitive Load (μF)
		Nominal (Range)	Max.②	Voltage (VDC)	Current (A) (Max.)	Vin=24V	Vin=48V	
--	DWQB100-F4803	48 (18-75)	80	3.3	22.7	87/89	86/88	10000
--	DWQB100-F4805			5	20	91/93	89/91	6000
--	DWQB100-F4812			12	8.3	91/93	90/92	2000
--	DWQB100-F4815			15	6.7	92/94	91/93	2000
--	DWQB100-F4824			24	4.2	91/93	90/92	1000
--	DWQB100-F4848			48	2.1	91/93	90/92	470
--	DWQB100-F4803E5/D6	48 (18-75)	80	3.3	22.7	85/87	84/86	10000
--	DWQB100-F4805E5/D6			5	20	89/91	87/89	6000
EN/BS EN	DWQB100-F4812E5			12	8.3	89/91	88/90	2000
--	DWQB100-F4812D6							
--	DWQB100-F4815E5/D6			15	6.7	90/92	89/91	2000
--	DWQB100-F4824E5/D6			24	4.2	89/91	88/90	1000
--	DWQB100-F4848E5/D6			48	2.1	89/91	88/90	470

Note:

①Use "F" suffix is for added aluminum baseplate and "H" suffix for heat sink mounting, Use " E5" suffix for chassis mounting and "D6" suffix for DIN-Rail mounting, we recommend to choose modules with a heat sink for enhanced heat dissipation and applications with extreme temperature requirements;

②Exceeding the maximum input voltage may cause permanent damage;

③The minimum input voltage range and start -up voltage of the E5 /D6 product model are 1VDV higher than the horizontal package model;
④E5/D6 package products are 2% less efficient than standard products.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load/no-load)	Nominal input voltage	3.3V output	--	1776/50	1812/80	mA
			Others	--	2265/50	2341/80	
	Reflected Ripple Current		All	--	30	--	
	Surge Voltage (1sec. max.)			-0.7	--	90	VDC
	Start-up Voltage			--	--	18	
	Input Under-voltage Protection	5V、15V output		16	16.5	--	
		Others		15	15.5	--	
	Input Filter			Pi filter			
	Ctrl①	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
	Hot Plug			Unavailable			
Output Specifications	Output Voltage Accuracy			--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation	5%-100% load		--	±0.5	±0.75	
	Transient Recovery Time	25% load step change		--	200	500	μs
	Transient Response Deviation	25% load step change	3.3V, 5V output	--	±3	±7.5	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	20MHz bandwidth	12V, 15V output	--	100	200	mVp-p
			Others	--	130	250	
	Output Over-voltage Protection	Input voltage range		110	125	160	%Vo
	Output Over-current Protection			110	125	190	%Io
	Short-circuit Protection			Hiccup, continuous, self-recovery			
General Specifications	Insulation Voltage	Electric Strength Test for 1 minute with a leakage current of 5mA max.	Input-output	2250	--	--	VDC
			Input-case	1500	--	--	
			Output-case	500	--	--	
	Insulation Resistance	Input-output, insulation voltage 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output, capacitance at 100KHz/0.1V		--	2200	--	pF
	Trim①			95	--	110	%Vo
	Sense			--	--	105	
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Over-temperature Protection	Max. Casing Temperature		+95	+105	+115	

	Pin Soldering Resistance Temperature	Wave-soldering, 10 seconds	--	--	+260	
		Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Vibration		IEC/EN61373 train 1B category			
	Switching Frequency	PFM mode	--	250	--	kHz
	MTBF	MIL-HDBK-217F@25℃	500	--	--	k hours
Mechanical Specifications	Case Material	Aluminum alloy case; Black plastic bottom, flame-retardant and heat-resistant (UL94 V-0)				
	Dimensions	DWQB100-F48xx	61.8 x 40.2 x 12.7 mm			
		DWQB100-F48xxF	62.0 x 56.0 x 14.6 mm			
		DWQB100-F48xxH	61.8 x 40.2 x 27.7 mm			
		DWQB100-F48xxE5	135.00 x 70.00 x 22.60mm			
		DWQB100-F48xxD6	137.00 x 70.00 x 28.10mm			
		DWQB100-F48xxHE5	135.00 x 70.00 x 27.70mm			
		DWQB100-F48xxHD6	137.00 x 70.00 x 37.2mm			
	Weight	DWQB100-F48xx	89g (Typ.)			
		DWQB100-F48xxF	109g (Typ.)			
		DWQB100-F48xxH	120g (Typ.)			
		DWQB100-F48xxE5	166 (Typ.)			
		DWQB100-F48xxD6	239 (Typ.)			
		DWQB100-F48xxHE5	197 (Typ.)			
		DWQB100-F48xxHD6	270 (Typ.)			
	Cooling Method	Free air convection or forced convection				

Note:

①The Ctrl pin voltage isreferenced to input GND.

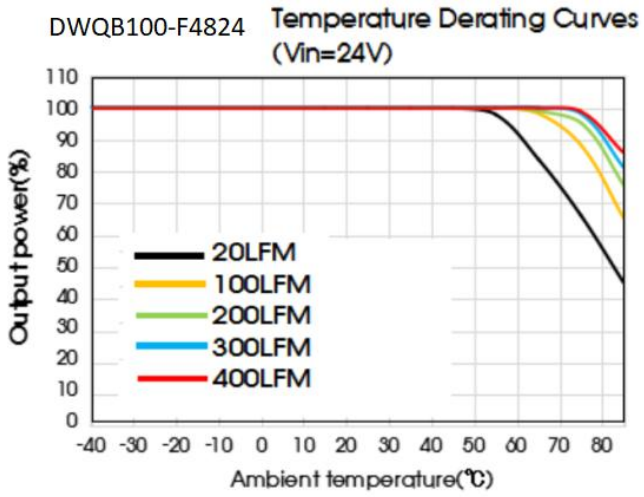
②The “parallel cable” method is used for ripple and noise test.

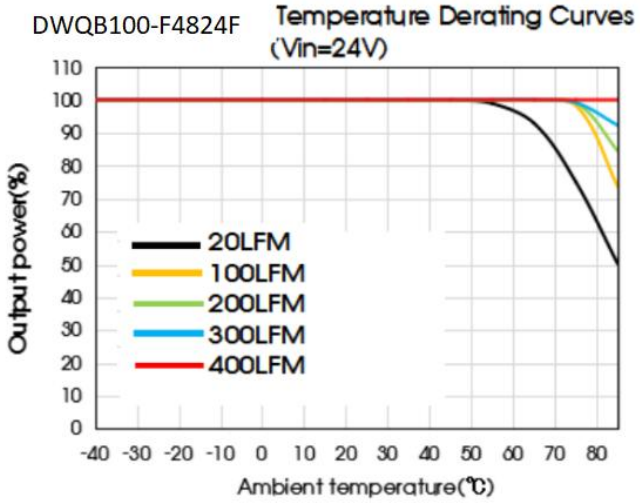
③For DWQB100-F4803 (F/H)、DWQB100-F4805 (F/H) and DWQB100-F4815 (F/H), when the Trim function satisfies the output up to 10% or the Sense function satisfies the output up to 5%, Vin needs to be higher than 20VDC.

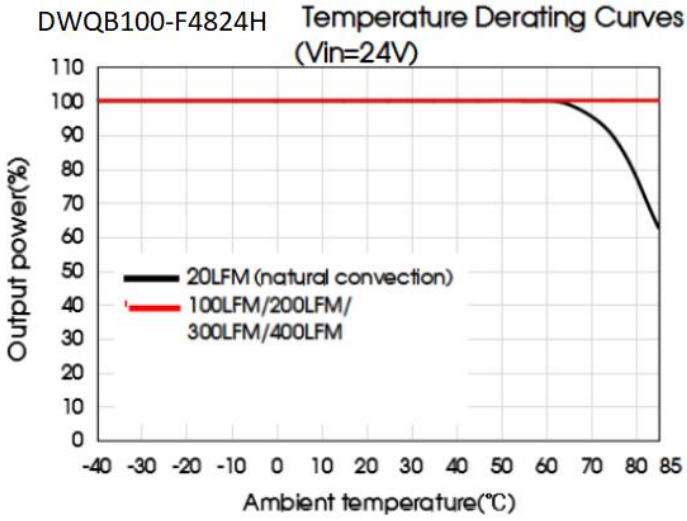
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032, EN50121-3-2 CLASS A and CLASS B (see Fig. 2 for recommended circuit)	
	RE		
Immunity	ESD	IEC/EN61000-4-2, EN50121-3-2 Contact ±6KV Air ±8KV	perf.Criteria B
	RS	IEC/EN61000-4-3, EN50121-3-2 10V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4, EN50121-3-2 ±2KV(see Fig. 2 for recommended circuit)	perf.Criteria A
	Surge	EN50121-3-2 differential mode ±1KV, 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

Characteristic Curve



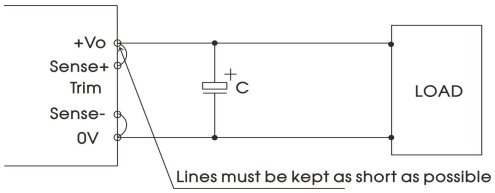




Note: Product application thermal design should be referred to the recommended PCB layout and recommended heat dissipation structure,.

Design Reference

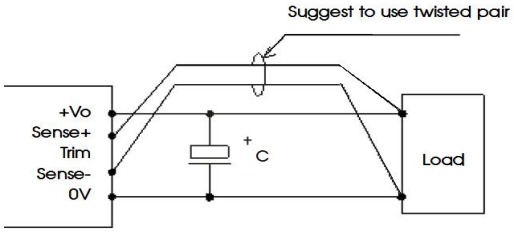
1. Remote Sense Connection if not used



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



Note:

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 capactive 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.

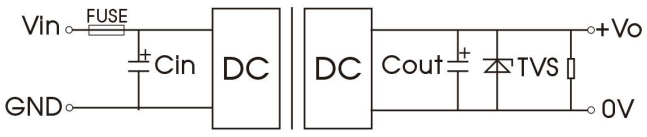


Fig.1

Vout(VDC)	Fuse	Cin①	Cout	TVS
3.3	10A, slow blow	220μF	680μF	SMDJ6.0A
5			470μF	SMDJ6.0A
12			220μF	SMDJ14A
15				SMDJ17A
24			100μF	SMDJ28A
48				SMDJ54A

Note:

①Please pay attention to the ambient temperature of the product when using an external capacitor, increase the electrolytic capacitor values to at least 1.5 times the original parameter if the ambient temperature is low(such as -25℃).

2. EMC solution-recommended circuit

We recommended using the recommended circuit shown in Fig.2 during product EMC testing and application.

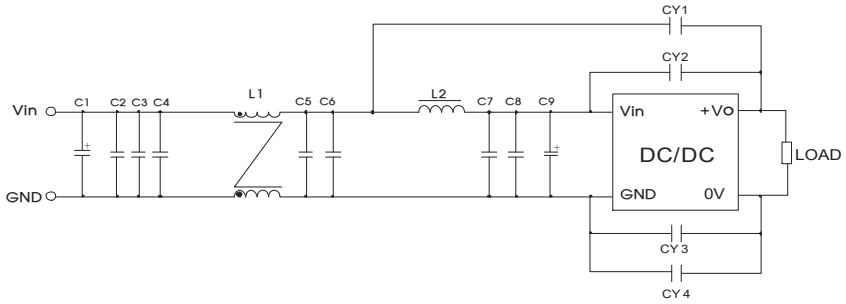
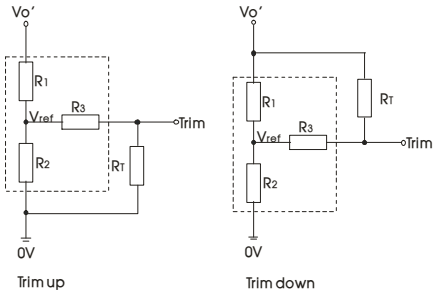


Fig. 2

CLASS A Components	CLASS B Components	Recommended Component value of 3.3V	Recommended Component value of 05-48V	Function
C1		150μFelectrolytic capacitor	150μF electrolytic capacitor	Meet EFT and surge
C9		470μFelectrolytic capacitor	47μF electrolytic capacitor	
C1		150μFelectrolytic capacitor	150μF electrolytic capacitor	Meet conducted emission and radiated emission
C9		470μFelectrolytic capacitor	47μF electrolytic capacitor	
C2、C3、C4、C5、C6、C7、C8		4.7μFceramic capacitor	2.2μF ceramic capacitor	
L1		2mH	2mH	
L2		1.5μHinductance	1.5μH inductance	
CY1、CY2		1nF Y1 safety capacitor	1nF Y1 safety capacitor	
CY3	CY3、CY4	2.2nF Y1 safety capacitor	1nF Y1 safety capacitor	

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



TRIM resistor connection (dashed line shows internal resistor network)

Calculation formula of Trim resistance:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{V_{ref}}{V_o'-V_{ref}}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$$

Note:

Value for R1、R2、R3、and Vref refer to the above table 1

R_T = Trim Resistor value

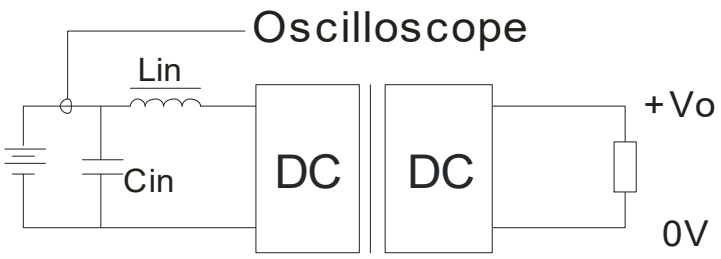
a = User-defined parameter, no actual meanings

Vo' = desired output voltage (±10% max.)

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	5	3	10	1.24
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 RT resistor value is too low, or the Trim pin is shorted with +Vo, then the output voltage Vo' would be lower than 0.9Vo, which may cause permanent damage to the product.

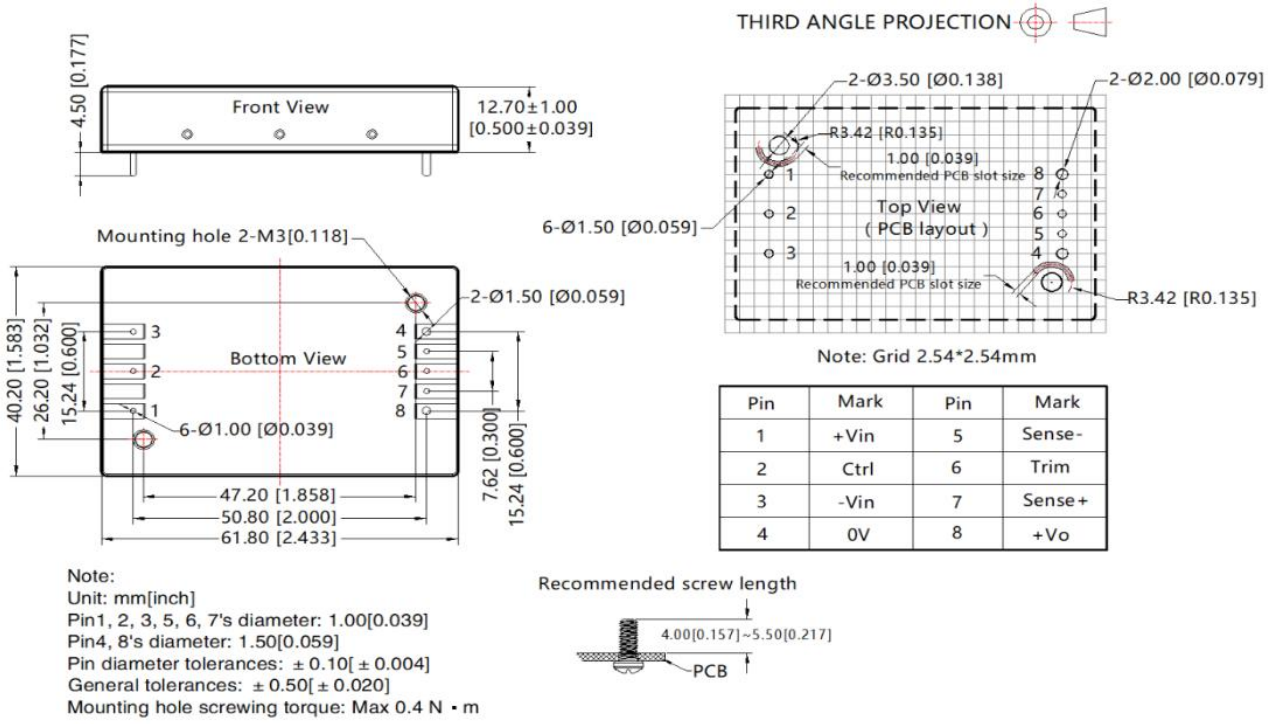
4. Reflected ripple current--test circuit



Note: Lin(4.7μH), Cin(220μF, ESR < 1.0Ω at 100 KHz)

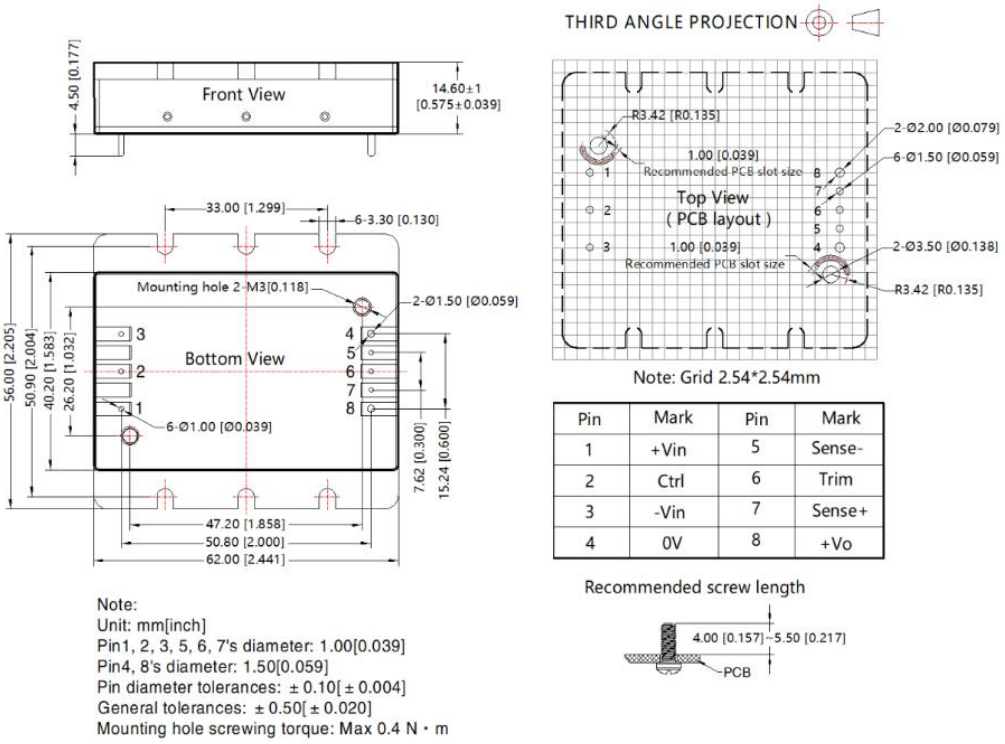
5. The products do not support parallel connection of their output.
6. The product test process shall ensure that the current of the input terminal meets the requirements of the starting current to ensure that the power supply of the product does not suffer from under-power.

Dimensions and Recommended Layout (DWQB100-F48xx)



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

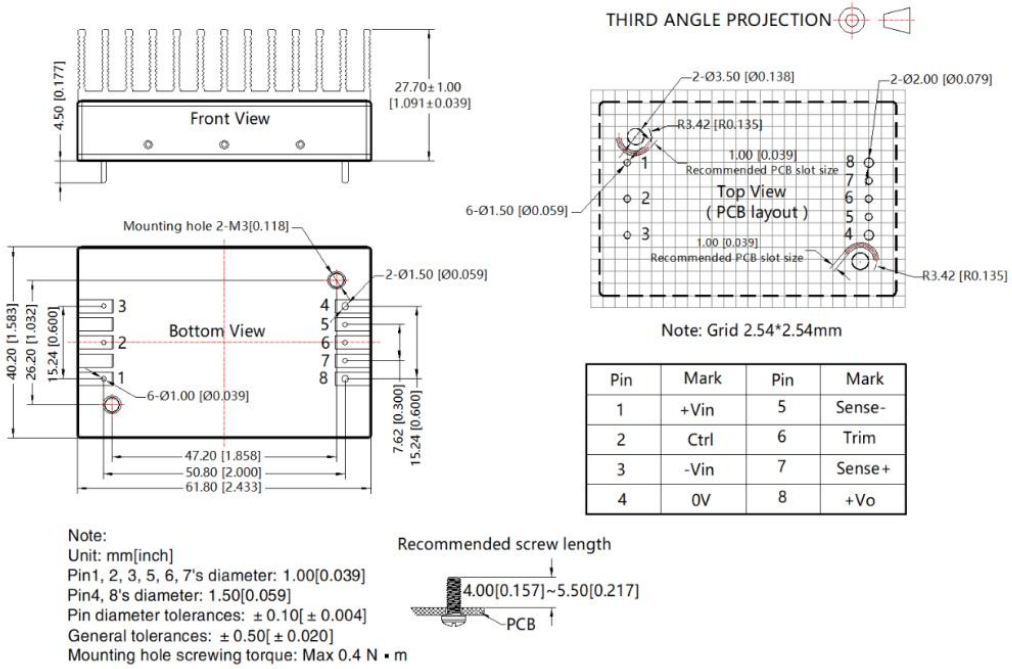
Dimensions and Recommended Layout(DWQB100-F48xxF)



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

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

Dimensions and Recommended Layout(DWQB100-F48xxH)

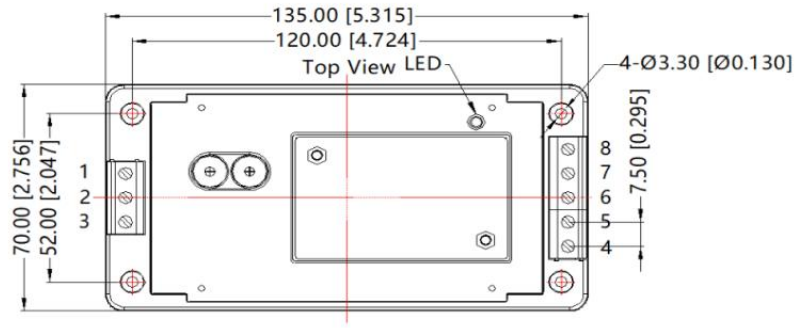


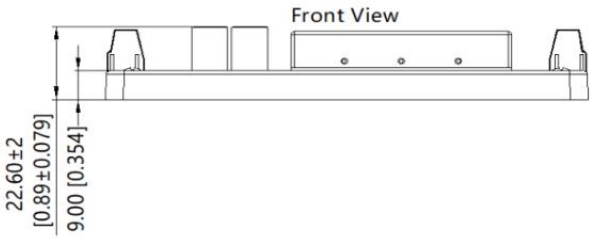
Pin	Mark	Pin	Mark
1	+Vin	5	Sense-
2	Ctrl	6	Trim
3	-Vin	7	Sense+
4	0V	8	+Vo

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

Dimensions and Recommended Layout(DWQB100-F48xxE5)

THIRD ANGLE PROJECTION



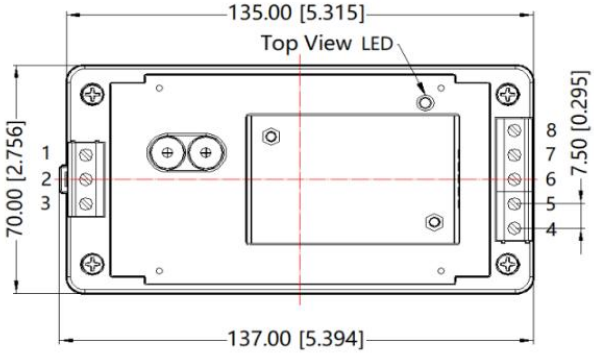


Pin	Mark
1	+Vin
2	Ctrl
3	-Vin
4	0V
5	Sense-
6	Trim
7	Sense+
8	+Vo

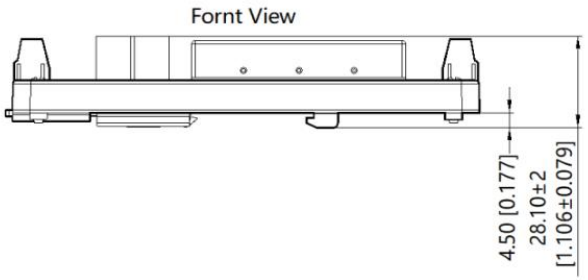
Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N · m
General tolerances: ± 1.00[± 0.040]

Dimensions and Recommended Layout(DWQB100-F48xxD6)

THIRD ANGLE PROJECTION

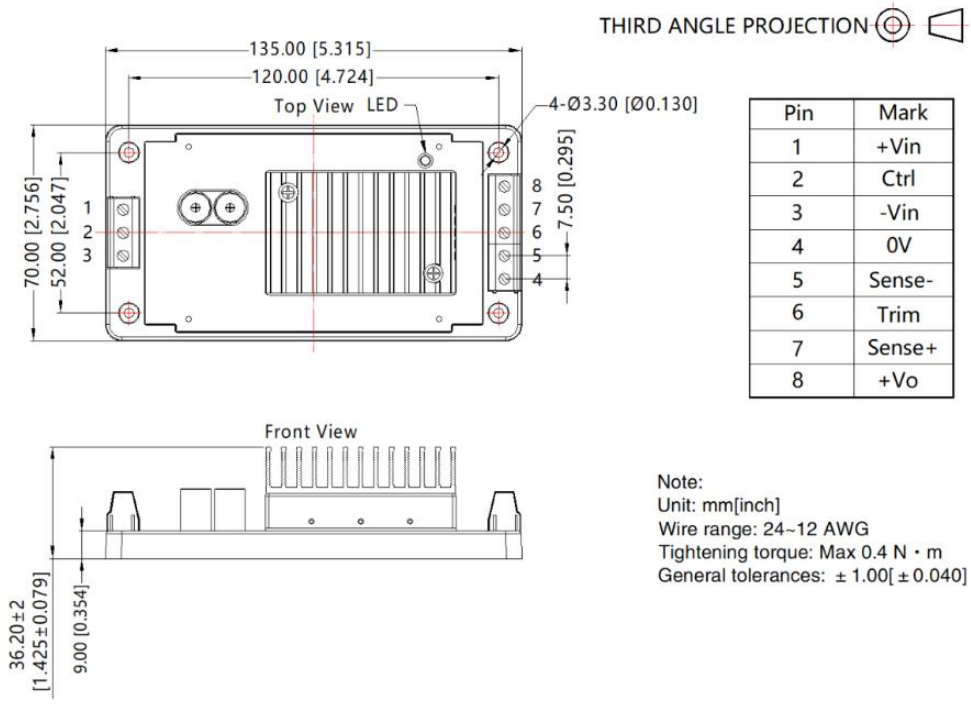


Pin	Mark
1	+Vin
2	Ctrl
3	-Vin
4	0V
5	Sense-
6	Trim
7	Sense+
8	+Vo



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]

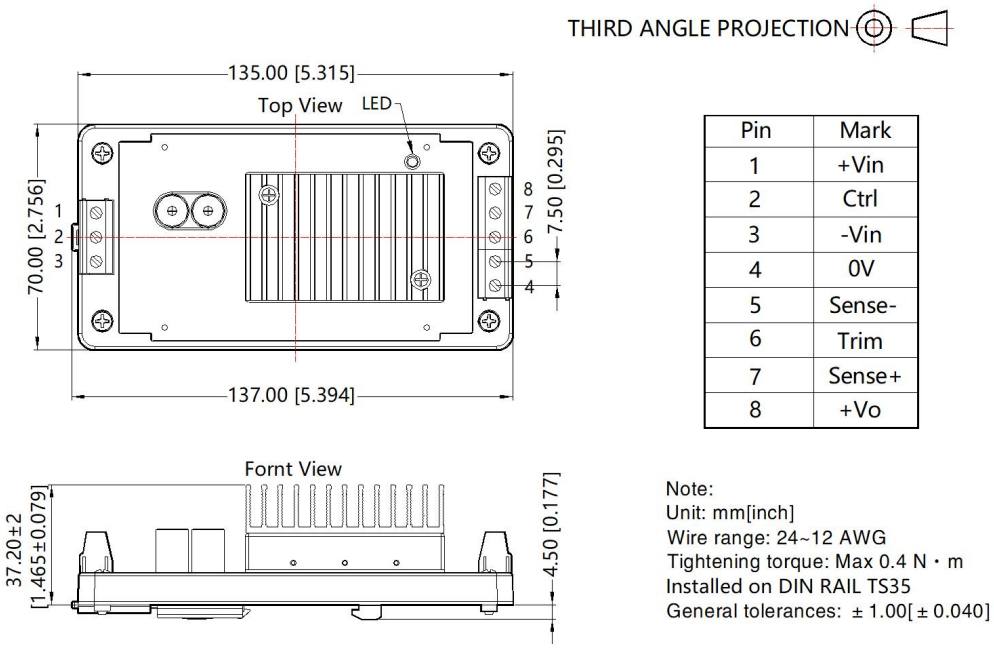
Dimensions and Recommended Layout(DWQB100-F4812HE5)



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

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

Dimensions and Recommended Layout(DWQB100-F48xxHD6)



Pin	Mark
1	+Vin
2	Ctrl
3	-Vin
4	0V
5	Sense-
6	Trim
7	Sense+
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]

Note:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service and match filter module;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.