DWQB200-F48xx(F/H)(E5/D6) Series

Descriptions

200W isolated，DC/DC Converter





RoHS

cULus UL 62368-1

CE Report EN 62368-1

UKCA Report BS EN 62368-1

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 91%
- I/O isolation test voltage 2.25k VDC
- Operating ambient temperature range -40℃ to +85℃
- Input under-voltage protection, output short-circuit, over-current, over-voltage, over-temperature protection
- Five-sided metal shielded package
- Industry standard ¼-Brick package and pin-out

Applications

- Industrial control
- Electric Power
- Instrumentation
- Communication
- Railway
- Battery powered systems
- Intelligent robotic

Selection Guide

Certification	Part No.①	Input Voltage (VDC)		Output		Full Load Efficiency(%) Min./Typ.	Max. Capacitive Load (μF)
		Nominal (Range)	Max.③	Voltage (VDC)	Current (A) (Max.)		
EN/BS EN	DWQB200-F4805(F)	48 (18-75)	80	5	40	86/88	6000
--	DWQB200-F4805H						
UL/EN/BS EN	DWQB200-F4812(F/H)			12	16.7	89/91	2000
EN/BS EN	DWQB200-F4815(F/H)			15	13.3	87/89	2000
UL/EN/BS EN	DWQB200-F4824(F/H)			24	8.4	89/91	1000
--	DWQB200-F4836(F/H)			36	5.56	86/88	1000
EN/BS EN	DWQB200-F4848(F)			48	4.2	89/91	450
--	DWQB200-F4848H						
	DWQB200-F4805(H)E5/D6			5	40	84/86	6000
	DWQB200-F4812(H)E5/D6			12	16.7	87/89	2000
	DWQB200-F4815(H)E5/D6			15	13.3	85/87	2000
	DWQB200-F4824(H)E5/D6			24	8.4	87/89	1000
UL/EN	DWQB200-F4824HE5						
--	DWQB200-F4836(H)E5/D6			36	5.56	84/86	1000
EN/BS EN	DWQB200-F4848HE5/D6			48	4.2	87/89	450
EN	DWQB200-F4848E5						
--	DWQB200-F4848D6						

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 1VDC higher than the horizontal package model;
④E5/D6 package products are 2% less efficient than standard products;
⑤Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load/no-load)	Nominal input voltage		--	4735/100	4845/200	mA
	Reflected Ripple Current			--	100	--	
	Surge Voltage (1sec. max.)			-0.7	--	90	VDC
	Start-up Voltage			--	--	18	
	Input Under-voltage Protection			14	16	--	
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
	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
Output Specifications	Output Voltage Accuracy	0% - 100% load		--	±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		--	300	500	μs
	Transient Response Deviation	25% load step change	5V output	--	±3	±7.5	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	20MHz bandwidth	36V output	--	150	300	mVp-p
			Others	--	150	250	
	Trim	36V output		100	--	110	%Vo
		Others		90	--	110	
	Sense			--	--	105	
	Over-temperature Protection	Max. Case Temperature	36V output	95	105	115	℃
			Others	--	115	120	
	Output Over - voltage Protection	Input voltage range		110	130	160	%Vo
	Output Over - current Protection			110	130	150	%Io
	Short-circuit Protection			Hiccup, continuous, self-recovery			
General Specifications	Isolation 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		100	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	2200	--	pF
	Operating Temperature			-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Pin Soldering Resistance Temperature③	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	℃
		Wave soldering, maximum 10 seconds		255	260	265	
	Thermal resistance	Free air convection (20LFM)	DWQB200-F48xx	--	--	7.5	℃/W
			DWQB200-F48xxF	--	--	6.3	
			DWQB200-F48xxH	--	--	5.2	
	Shock And Vibration			IEC/EN61373 - Category 1, Grade B			
	Switching Frequency	PWM 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)					
	Dimension	DWQB200-F48xx	61.8 × 40.2 × 12.7 mm				
		DWQB200-F48xxF	62.0 × 56.0 × 14.6 mm				
		DWQB200-F48xxH	61.8 × 40.2 × 27.7 mm				
		DWQB200-F4805/12E5	135.00 x 70.00 x 20.45 mm				
		DWQB200-F4805/12D6	137.00 x 70.00 x 21.45 mm				
		DWQB200-F4815/24/36/48E5	135.00 x 70.00 x 22.60 mm				
		DWQB200-F4815/24/36/48D6	137.00 x 70.00 x 23.60 mm				
		DWQB200-F48xxHE5	135.00 x 70.00 x 36.20 mm				
		DWQB200-F48xxHD6	137.00 x 70.00 x 37.20 mm				
	Weight	DWQB200-F48xx	89.0g (Typ.)				
		DWQB200-F48xxF	109.0g (Typ.)				
		DWQB200-F48xxH	120.0g (Typ.)				
		DWQB200-F4805/12E5	187.0g (Typ.)				
		DWQB200-F4805/12D6	257.0g (Typ.)				
		DWQB200-F4805/12HE5	218.0g (Typ.)				
		DWQB200-F4805/12HD6	288.0g (Typ.)				
		DWQB200-F4815/24/36/48E5	165.0g (Typ.)				
		DWQB200-F4815/24/36/48D6	235.0g (Typ.)				
		DWQB200-F4815/24/36/48HE5	196.0g (Typ.)				
		DWQB200-F4815/24/36/48HD6	266.0g (Typ.)				
	Cooling Method	Free air convection (20LFM)					

Note:

①The Ctrl pin voltage is referenced to input GND;

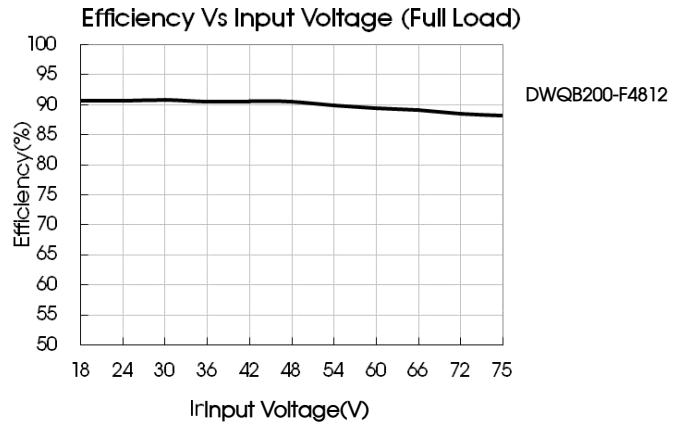
②The "parallel cable" method is used for ripple and noise test;

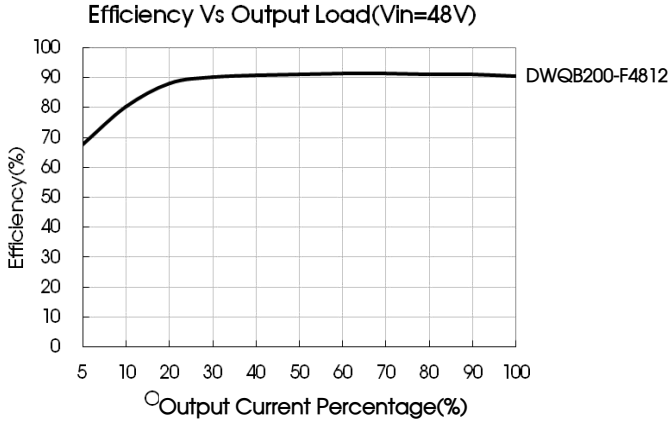
③The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection.

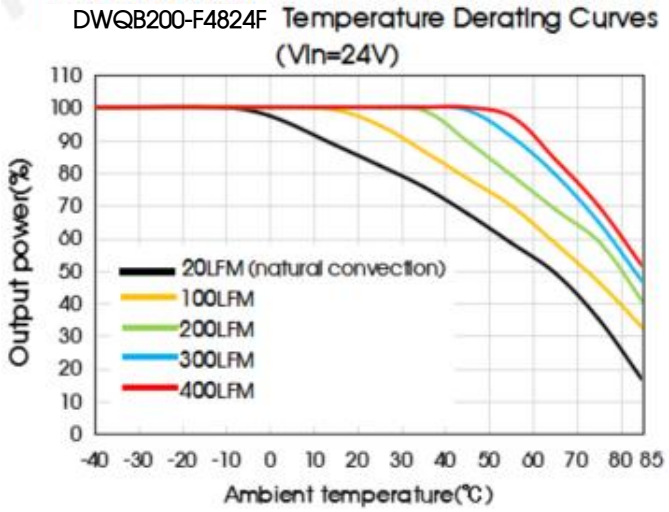
Electromagnetic Compatibility (EMC)

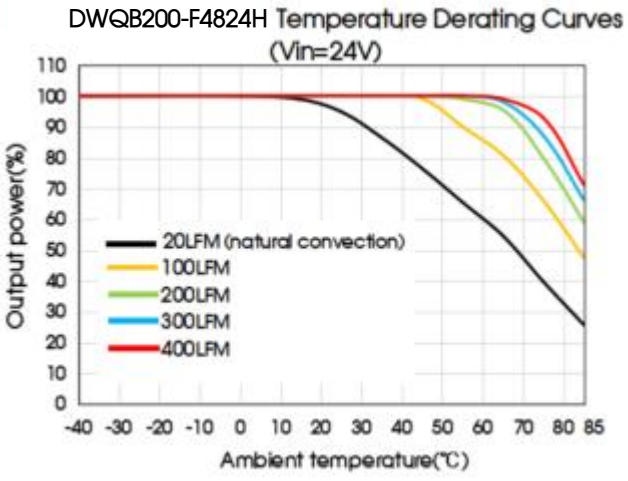
Emissions	CE	CISPR32/EN55032 CLASS A (see Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (see Fig. 2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2, EN50121-3-2 Contact ±6KV Air ±8KV	perf.Criteria B
	RS	IEC/EN61000-4-3, EN50121-3-2 10V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4, EN50121-3-2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

Characteristic Curve





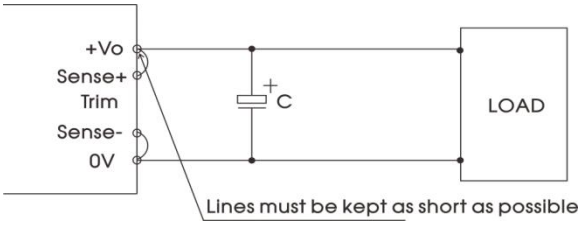




Note: Product application thermal design should be referred to the recommended PCB layout and recommended heat dissipation structure.

Remote Sense Application

1. Remote Sense Connection if not used

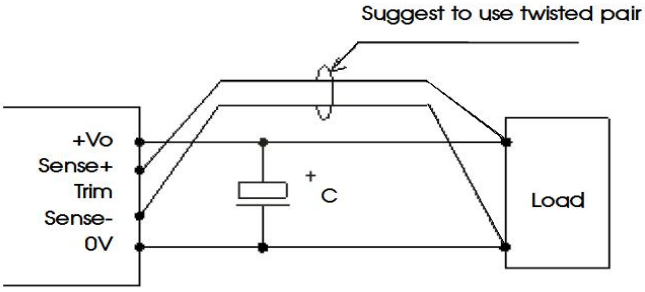


Note:

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.

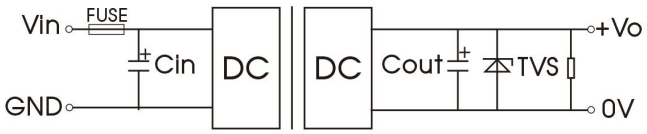


Fig.1

Vout(VDC)	Fuse	Cin①	Cout	TVS
5	20A, slow blow	220μF	470μF	SMDJ6.0A
12			220μF	SMDJ14A
15				SMDJ17A
24			100μF	SMDJ28A
36				SMDJ47A
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 compliance circuit

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

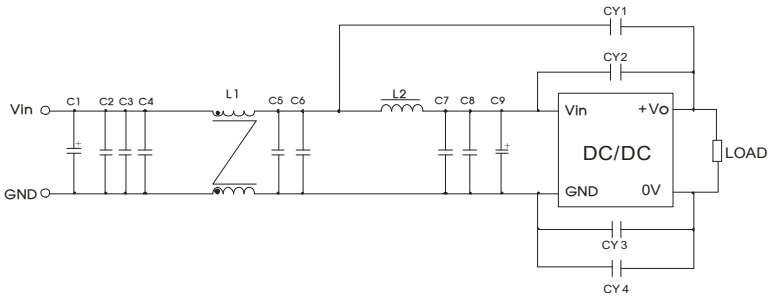
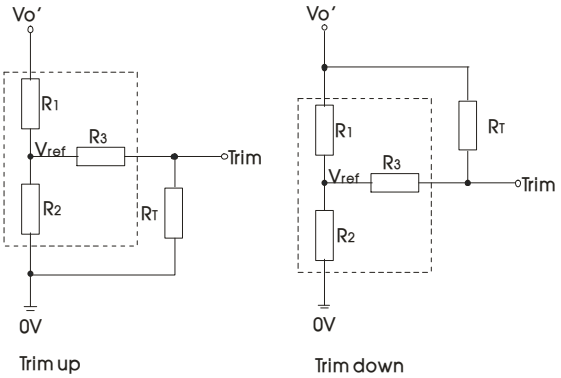


Fig. 2

Components	Recommended Component Value
C1	150μF/100V electrolytic capacitor
C9	47μF/100V electrolytic capacitor
C2/ C3/ C4/ C5/ C6/C7/ C8	2.2μF/100V ceramic capacitor
L1	2.0mH
L2	1.5μH/15A inductance
CY1/ CY2/ CY3/ CY4	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:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

R_T = Trim Resistor value;

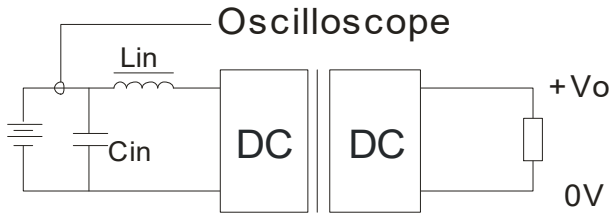
a = User-defined parameter,no actual meanings

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

Vout (VDC)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)	Vref (V)
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
36	38.73	2.85	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

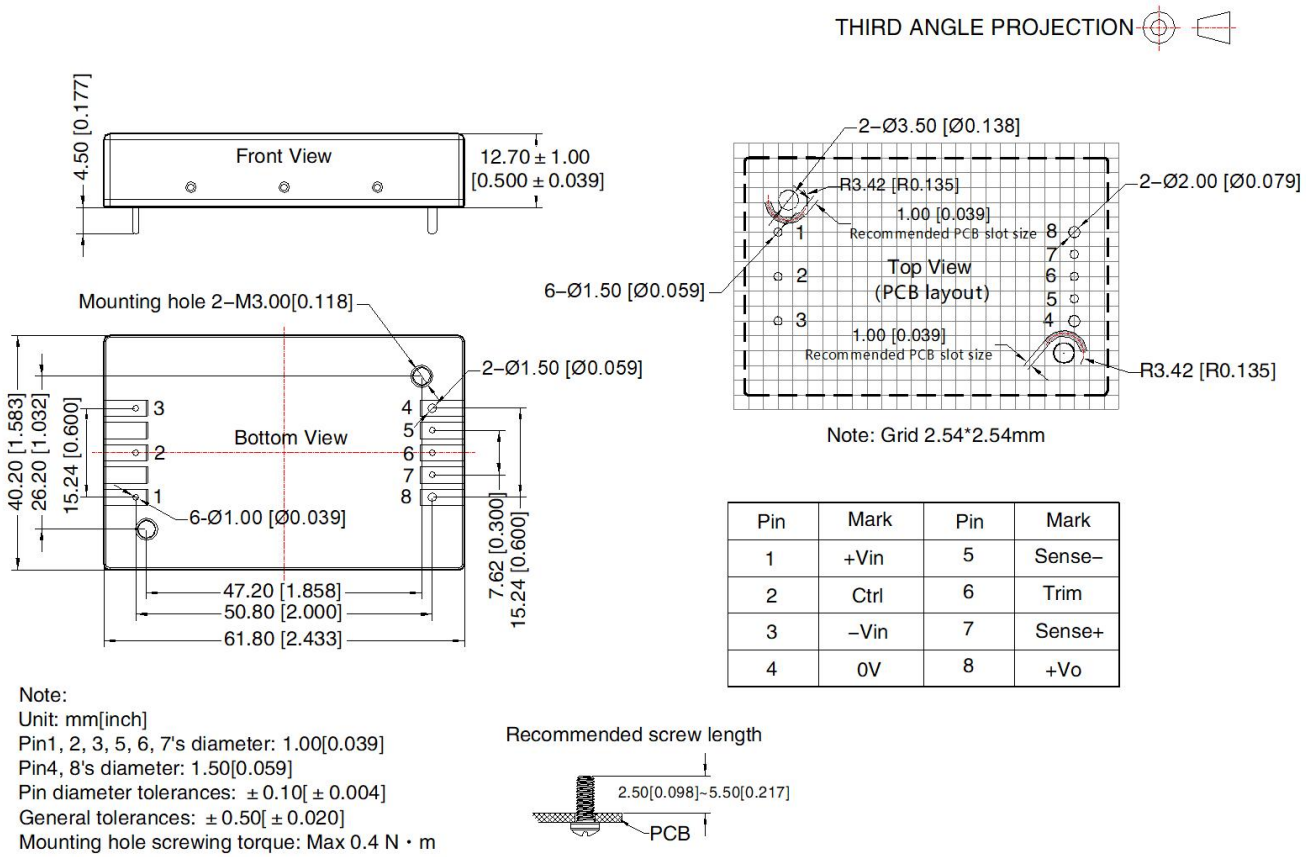


Note:Lin (4.7μH) , Cin (220μF, ESR < 1.0Ω at 100 KHz)

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.

DWQB200-F48xx Dimensions and Recommended Layout



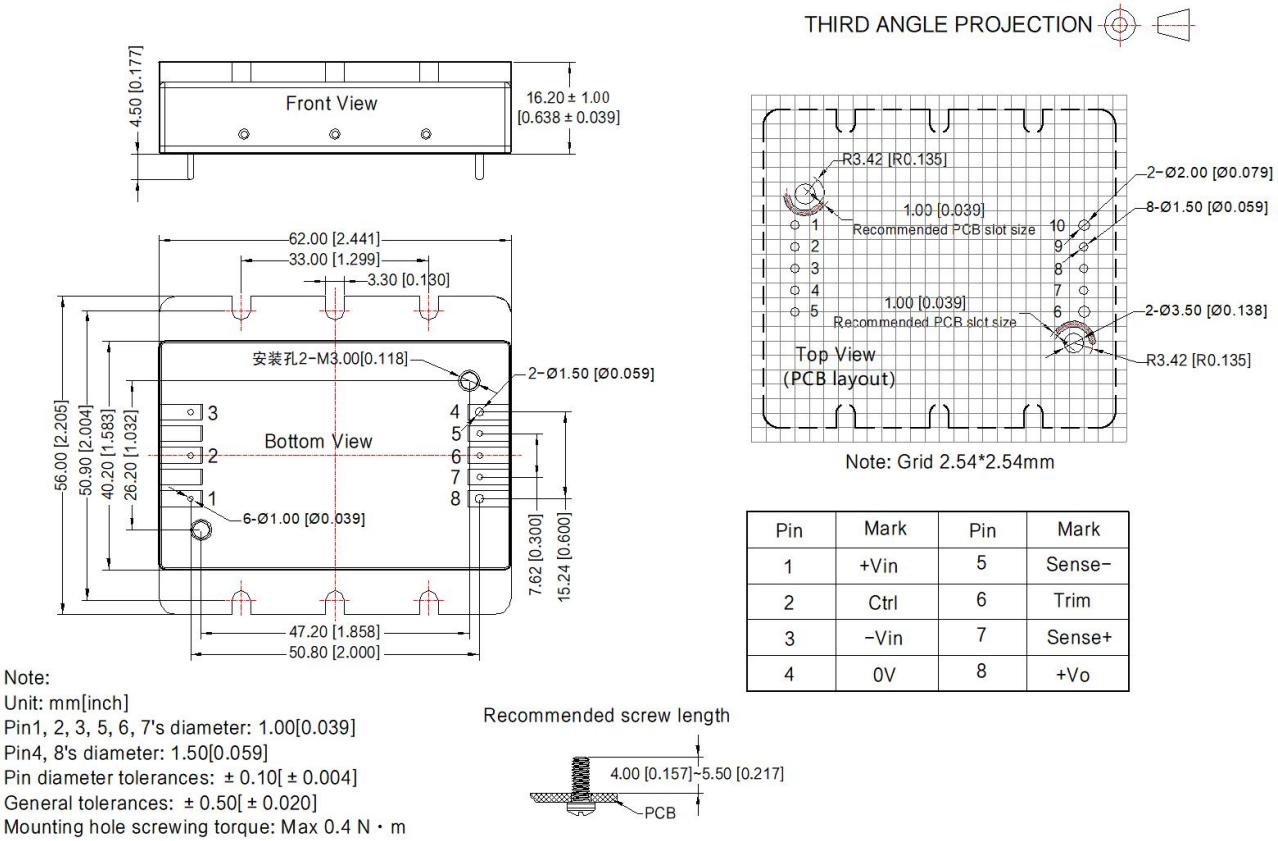
Note: Grid 2.54*2.54mm

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

Recommended screw length

DWQB200-F48xxF Dimensions and Recommended Layout



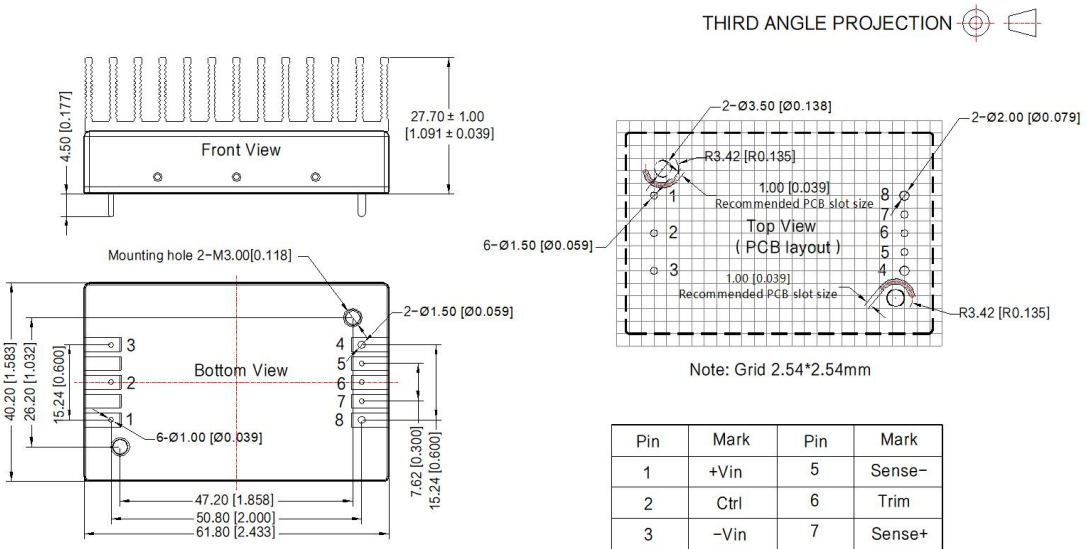
Note: Grid 2.54*2.54mm

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

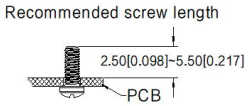
Recommended screw length

DWQB200-F48xxH Dimensions and Recommended Layout

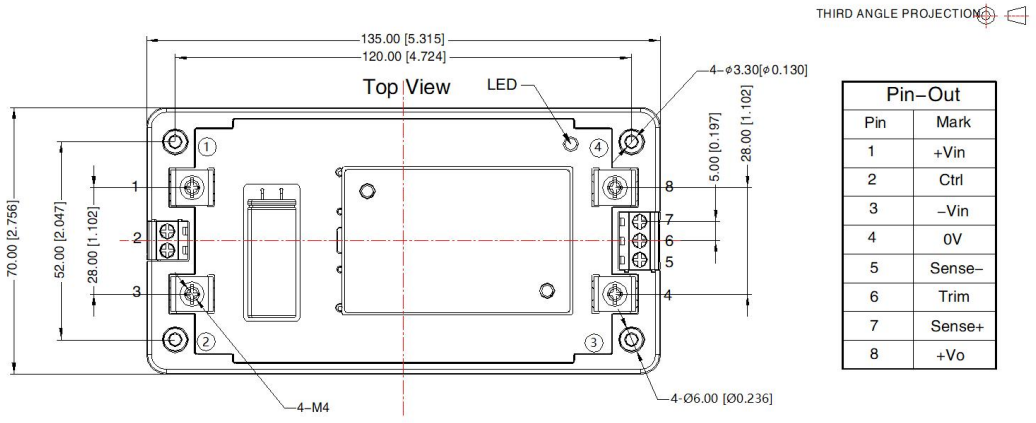


Pin	Mark	Pin	Mark
1	+Vin	5	Sense−
2	Ctrl	6	Trim
3	−Vin	7	Sense+
4	0V	8	+Vo

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

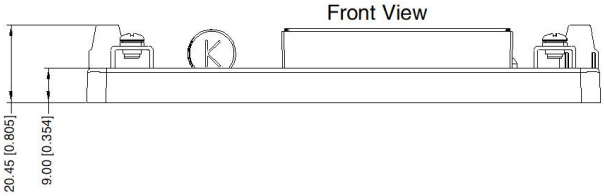


DWQB200-F4805/12E5 Dimensions and Recommended Layout



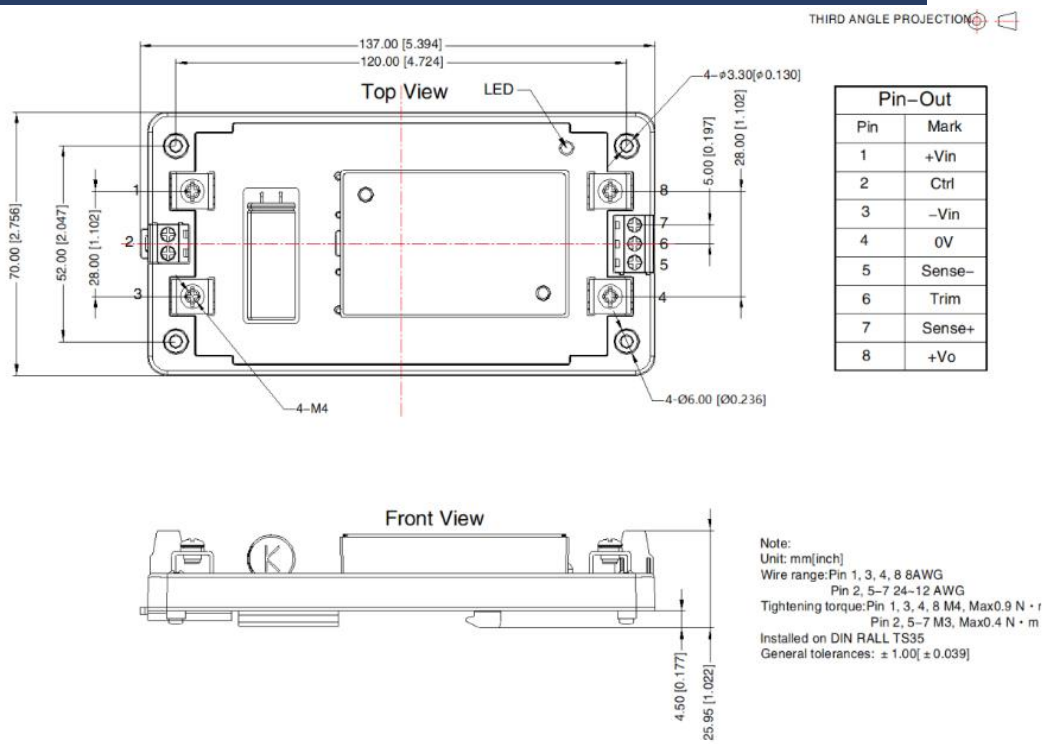
Pin-Out	
Pin	Mark
1	+Vin
2	Ctrl
3	−Vin
4	0V
5	Sense−
6	Trim
7	Sense+
8	+Vo

Position	Screw Spec	Torque(max)
①−④	M3	0.4N・m



Note:
Unit: mm[inch]
Wire range: Pin 1, 3, 4, 8 8AWG
Pin 2, 5-7 24-12 AWG
Tightening torque: Pin 1, 3, 4, 8 M4, Max0.9 N・m
Pin 2, 5-7 M3, Max0.4 N・m
General tolerances: ± 1.00[± 0.039]

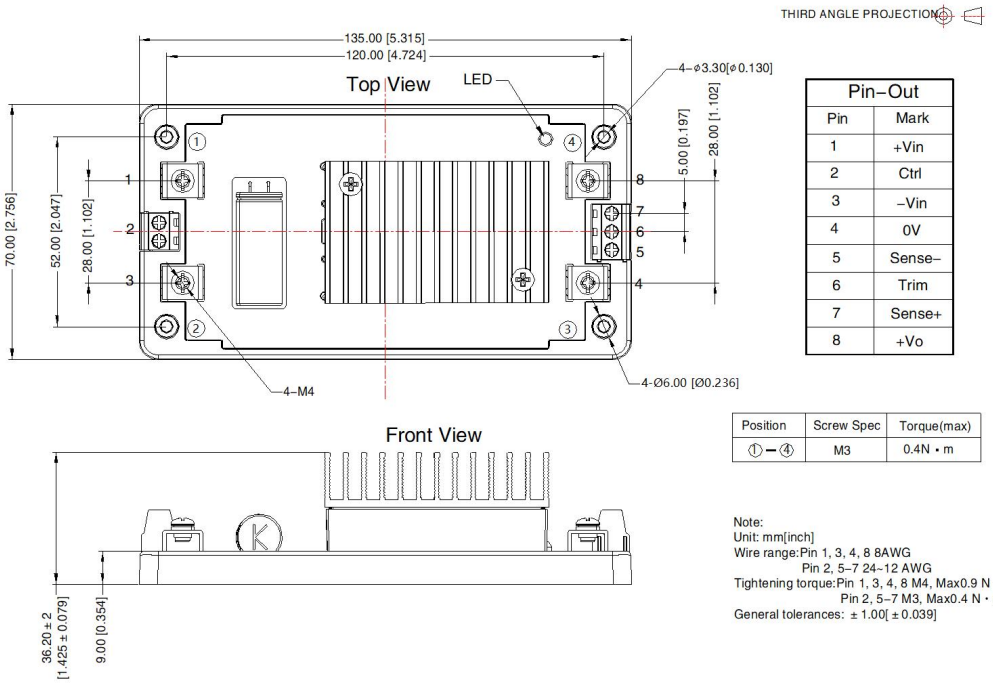
DWQB200-F4805/12D6 Dimensions and Recommended Layout



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

Note:
Unit: mm[inch]
Wire range:Pin 1, 3, 4, 8 8AWG
Pin 2, 5-7 24~12 AWG
Tightening torque:Pin 1, 3, 4, 8 M4, Max0.9 N・r
Pin 2, 5-7 M3, Max0.4 N・m
Installed on DIN RALL TS35
General tolerances: ± 1.00[± 0.039]

DWQB200-F4805/12HE5 Dimensions and Recommended Layout

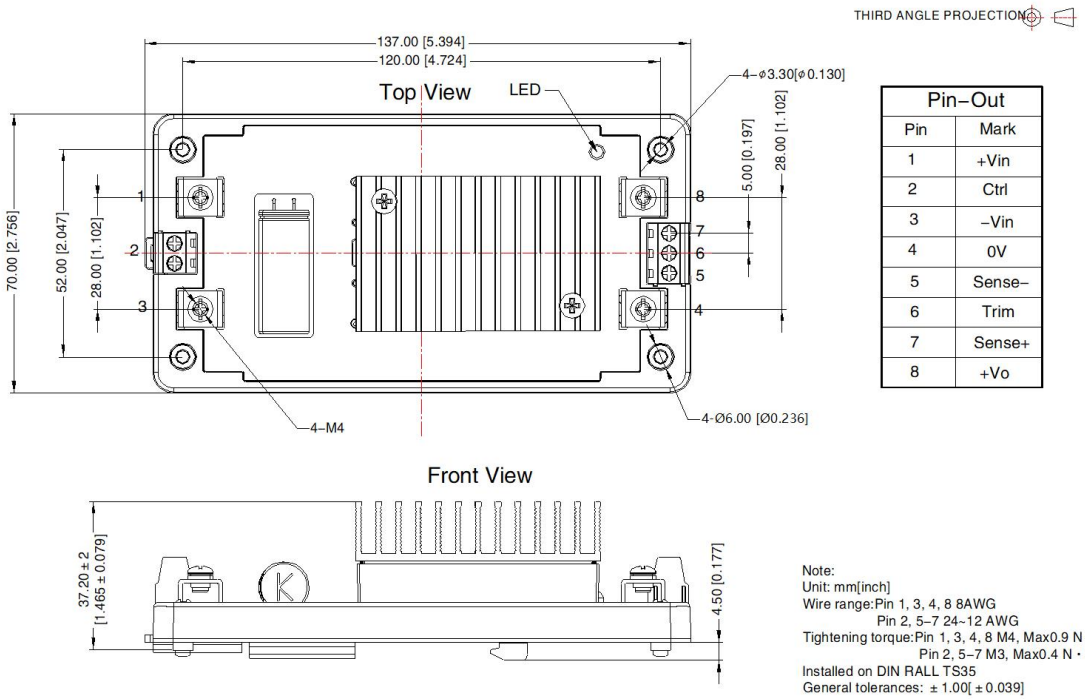


Pin-Out	
Pin	Mark
1	+Vin
2	Ctrl
3	-Vin
4	0V
5	Sense-
6	Trim
7	Sense+
8	+Vo

Position	Screw Spec	Torque(max)
①-④	M3	0.4N・m

Note:
Unit: mm[inch]
Wire range:Pin 1, 3, 4, 8 8AWG
Pin 2, 5-7 24~12 AWG
Tightening torque:Pin 1, 3, 4, 8 M4, Max0.9 N・m
Pin 2, 5-7 M3, Max0.4 N・m
General tolerances: ± 1.00[± 0.039]

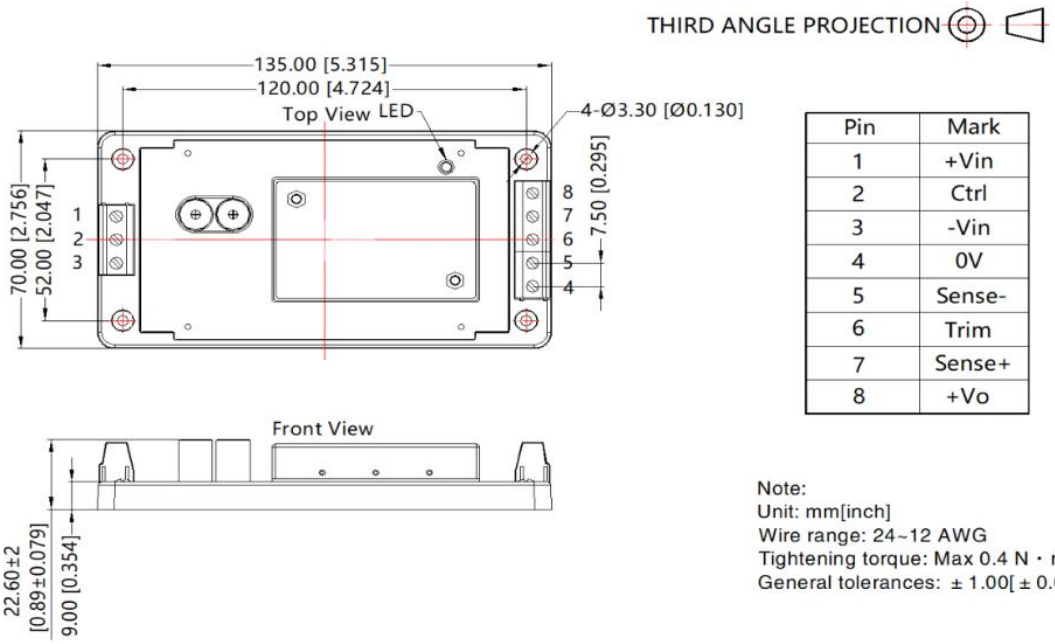
DWQB200-F4805/12HD6 Dimensions and Recommended Layout



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

Note:
Unit: mm[inch]
Wire range: Pin 1, 3, 4, 8 8AWG
Pin 2, 5–7 24~12 AWG
Tightening torque: Pin 1, 3, 4, 8 M4, Max0.9 N · m
Pin 2, 5–7 M3, Max0.4 N · m
Installed on DIN RALL TS35
General tolerances: ± 1.00[± 0.039]

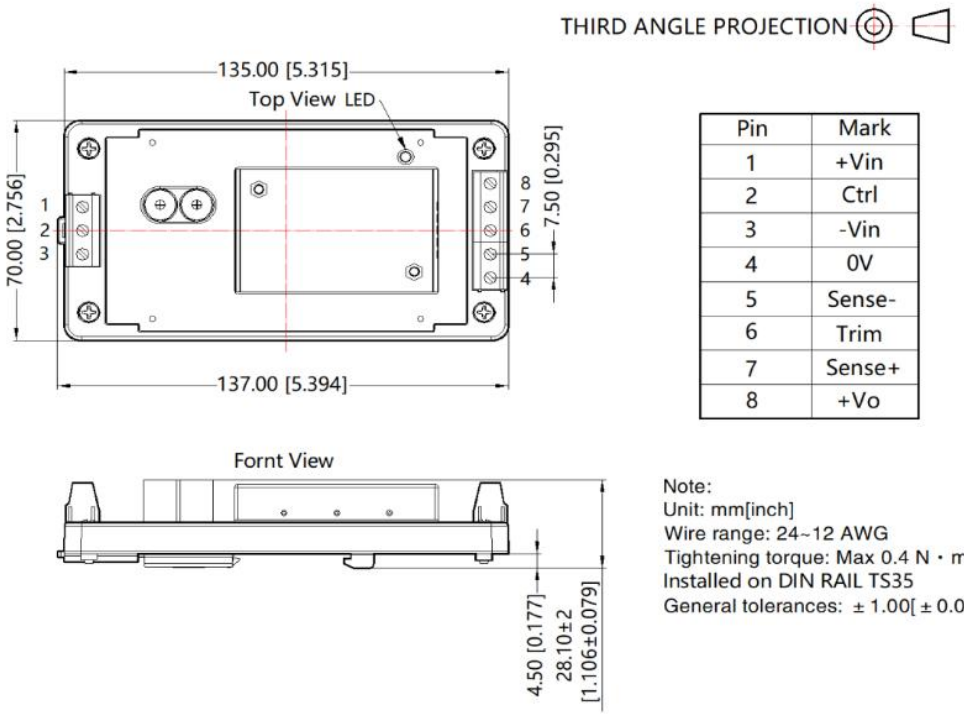
DWQB200-F4815/24/36/48E5 Dimensions and Recommended Layout



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]

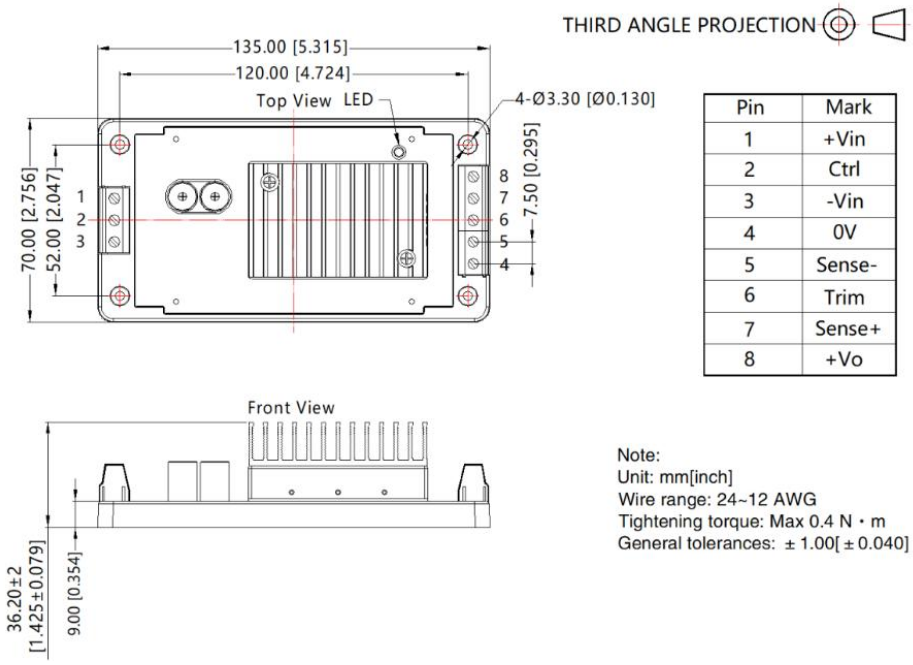
DWQB200-F4815/24/36/48D6 Dimensions and Recommended Layout



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]

DWQB200-F4815/24/36/48HE5 Dimensions and Recommended Layout

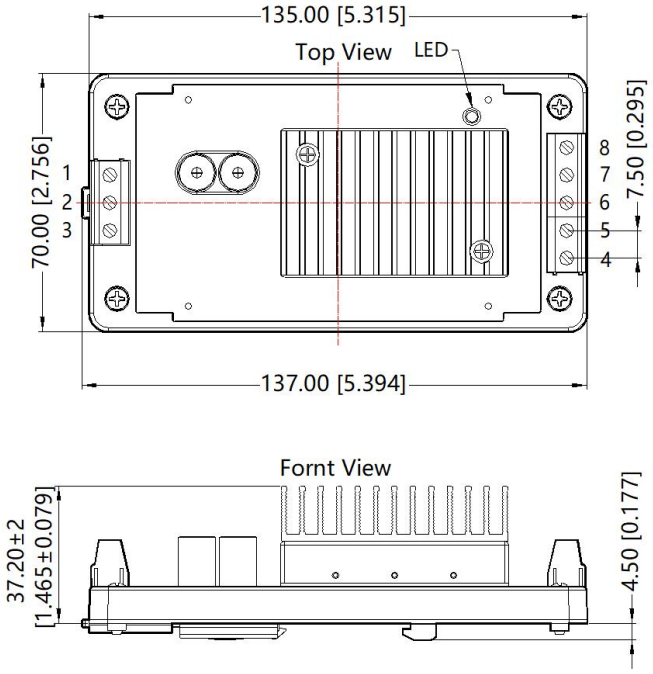


Pin	Mark
1	+Vin
2	Ctrl
3	-Vin
4	0V
5	Sense-
6	Trim
7	Sense+
8	+Vo

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

DWQB200-F4815/24/36/48HD6 Dimensions and Recommended Layout

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]

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;
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on t he physical mark or packaging label.