FEATURES

- Ultra-wide 4:1 input voltage range
- High effic iency up to 90%
- I/O isolation test voltage: 2250VDC
- Input under-voltage protection, output
- short-circuit, over-current, over-voltage, over-temperature protection
- Operating ambient temperature range:-40℃ to +100℃
- Five-sided metal shielded pac kage
- Industry standard ¼-Brick package and pin-out
- EN62368 approved
- Meet UL62368, IEC62368, EN50155 standards
- 3 years warranty

100W isolated DC-DC converter,
Ultra-wide input and regulated single output

Selec tion Guide

Certification	Part No①	Input Voltage(VDC)		Output		Full Load Effic iency (%) Min./Typ.	Capac itive Load (μF) Max.
		Nominal (Range)	Max.②	Voltage (VDC)	Current (A) Max.		
	CFDQR100-24S05	24 (9-36)	40	5	20	87/89	6000
	CFDQR100-24S12			12	8.3	88/90	2000
	CFDQR100-24S15			15	6.7	88/90	2000
	CFDQR100-24S24			24	4.2	88/90	1000
	CFDQR100-24S28			28	3.6	88/90	1000
	CFDQR100-24S48			48	2.1	88/90	470

Note:
①"S"suffix for heat sink 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.

Input Spec ifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	Nominal input voltage	--	4682/120	4789/160	mA
Reflec ted Ripple Current	Nominal input voltage	--	30	--	
Surge Voltage (1sec.max.)		-0.7	--	50	VDC
Start-up Voltage		--	--	9	
Under-voltage Protec tion		7.0	7.5	--	
Input Filter		Pi filter			
CNT *	Module on	CNT pin open or pulled high (3.5-12VDC)			
	Module off	CNT pin pulled low to -Vin(0-1.2VDC)			

CNT*	Input current when off	--	2	10	mA
Hot Plug		Unavailable			
Note: *The CNT pin voltage is referenced to input -Vin.					

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
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		--	200	500	μs
Transient Response Deviation	25% load step change	5V output	--	±3	±7.5	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Ripple/Noise*	20MHz bandwidth	12V/15V output	--	100	200	mVp-p
		Others	--	130	250	
Over-voltage Protection	Input voltage range		110	125	160	%Vo
Over-current Protection			110	125	150	%Io
Short-circuit Protection			Hiccup, continuous, self-recovery			
Note:* The “parallel cable” method is used for ripple and noise test,						

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1 minute with a leakage current of 1mA max.	2250	--	--	VDC
	Input-case		1600	--	--	
	Output-case		500	--	--	
Insulation Resistance	Input-output resistance at 500VDC		100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	2200	--	pF
Trim	5V,15V output		91	--	110	%Vo
	Others		90	--	110	
Sense	See remote sense application		--	--	110	
Thermal Resistance	Natural convection	CFDQR100-24S05	--	--	8	℃/W
		CFDQR100-24S05S	--	--	5.7	
			--	--	5.7	
Operating Temperature			-40	--	+100	℃
Storage Temperature			-55	--	+125	
Over-temperature Protection	Max. case temperature		--	115	120	
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 - 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 (UL94V-0)
Dimensions	CFDQR100-24S05	61.8×40.2×12.7mm

Dimensions	CFDQR100-24S05S	61.8×40.2×27.7mm
Weight	CFDQR100-24S05	86.0g(Typ.)
	CFDQR100-24S05S	117.0g(Typ.)
Cooling Method		Natural air convection or forced convection

Electromagnetic Compatibility(EMC)

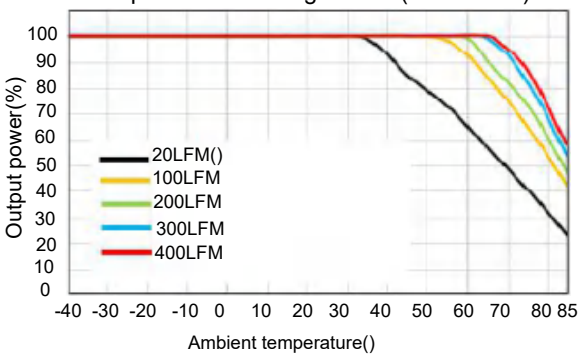
Emissions	CE	CISPR32/EN55032	CLASS A and CLASS B (see Fig.3 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A and CLASS B (see Fig.3 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV Air ±8KV	perf.Criteria B
	RS	IEC/EN61000-4-3	20V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4	±2KV(see Fig. 2 for recommended circuit)	perf.Criteria A
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf.Criteria A

Electromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2 EN55016-2-1	150kHz-500kHz 99dBuV (see Fig.3 for recommended circuit) 500kHz-30MHz 93dBuV
	RE	EN50121-3-2 EN55016-2-1	30MHz-230MHz 40dBuV/m at 10m (see Fig.3 for recommended circuit) 230MHz-1GHz 47dBuV/m at 10m
Immunity	ESD	EN50121-3-2	Contact ±6KV/Air ±8KV
	RS	EN50121-3-2	80MHz-800MHz 20V/m(rms)
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz (see Fig.2 for recommended circuit)
	Surge	EN50121-3-2	line to line ±1KV (42Ω 0.5uF see Fig.2 for recommended circuit)
	CS	EN50121-3-2	0.15MHz-80MHz 10V(rms)

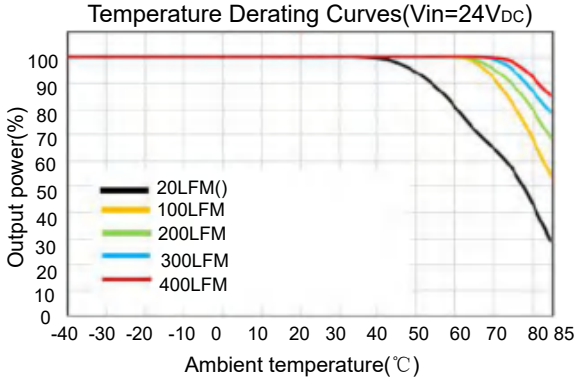
Typical Characteristic Curves

Temperature Derating Curves(Vin=24VDC)



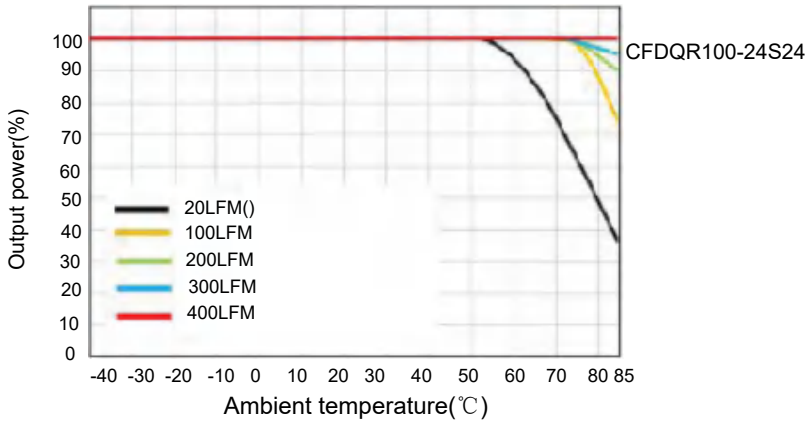
CFDQR100-24S24

Temperature Derating Curves(Vin=24VDC)

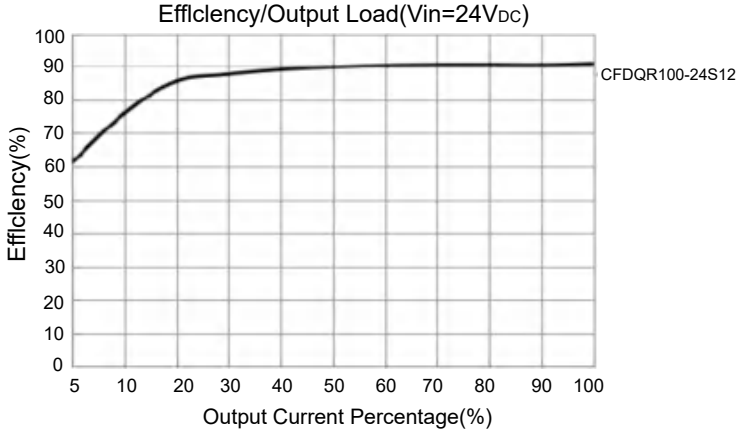


CFDQR100-24S24S

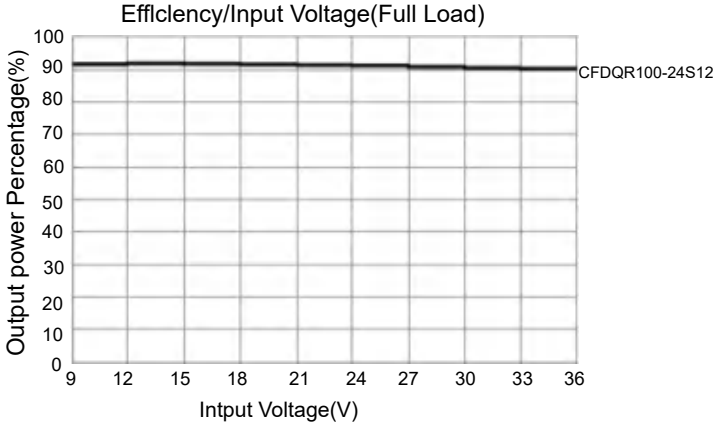
Temperature Derating Curves(Vin=24VDC)



Efflclency/Output Load(Vin=24VDC)



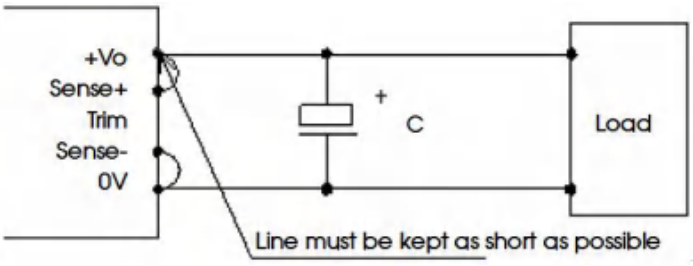
Efflclency/Input Voltage(Full Load)



Notes：
1) Product application thermal design should be referred to the recommended PCB layout and recommended heat dissipation structure, please see DC-DC Converter Application Notes for specific operation.

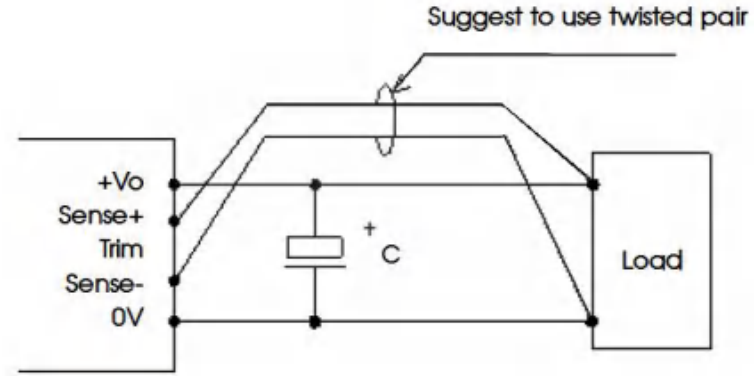
Remote Sense Application

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 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



(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 wairs 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 stablity of input terminal and avoid repeatedly start-up problems due to input voltage lower than undervoltage 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.

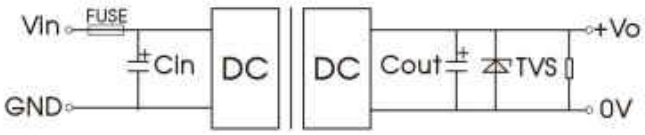


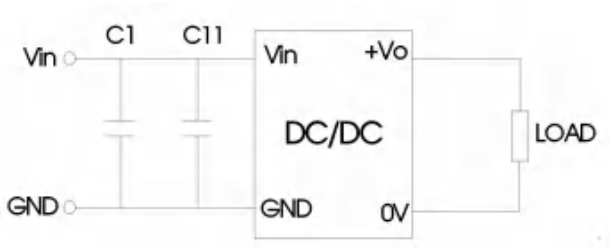
Fig.1

Vout(VDC)	Fuse	Cin	Cout	TVS
5	20A, slow blow	220μF	470μF	SMDJ7.0A
12			220μF	SMDJ15A
15				SMDJ18A
24			100μF	SMDJ30A
28				SMDJ36A
48				SMDJ64A

Note:
*Please 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.



Capacitor	Recommended value	Function
C1	150μF electrolytic capacitor	Meets EFT and surge
C11	47μF electrolytic capacitor	

Fig.2

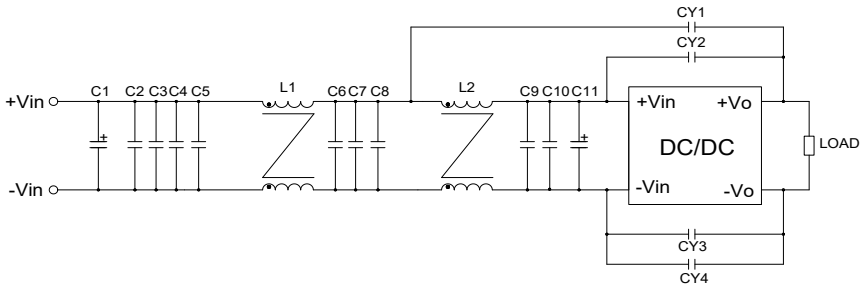
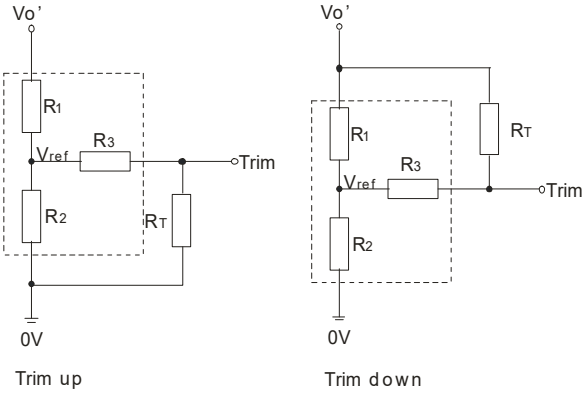


Fig.3

CLASS A components	CLASS B components	Recommended component value	Function
C1		150μF electrolytic capacitor	Meets conducted emission and radiated emission
C11		47μF electrolytic capacitor	
C2, C3, C4, C5, C6, C7, C8, C9, C10		10μF ceramic capacitor	
L1, L2		1.6mH common mode inductor	
CY3	CY1, CY2	2.2nF Y1safety capacitor	
	CY3, CY4	1nF Y1safety capacitor	

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



Calculation formula of Trim resistance:

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

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

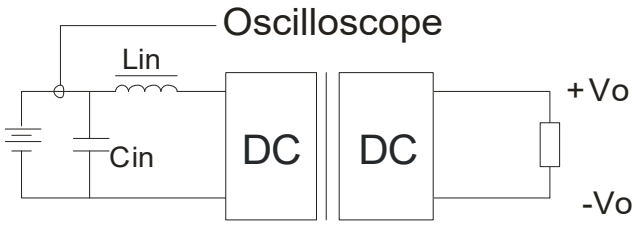
RT=Trim Resistor value; a=self-defined parameter
Vo'=desired output voltage (±10% max.)

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
28	29.201	2.851	15	2.5
48	53.017	2.894	15	2.5

Note: If the Trim pin is shorted with "+Vo", or its value is too low, then the output voltage Vo' would be lower than 0.90Vo, which may cause permanent damage .

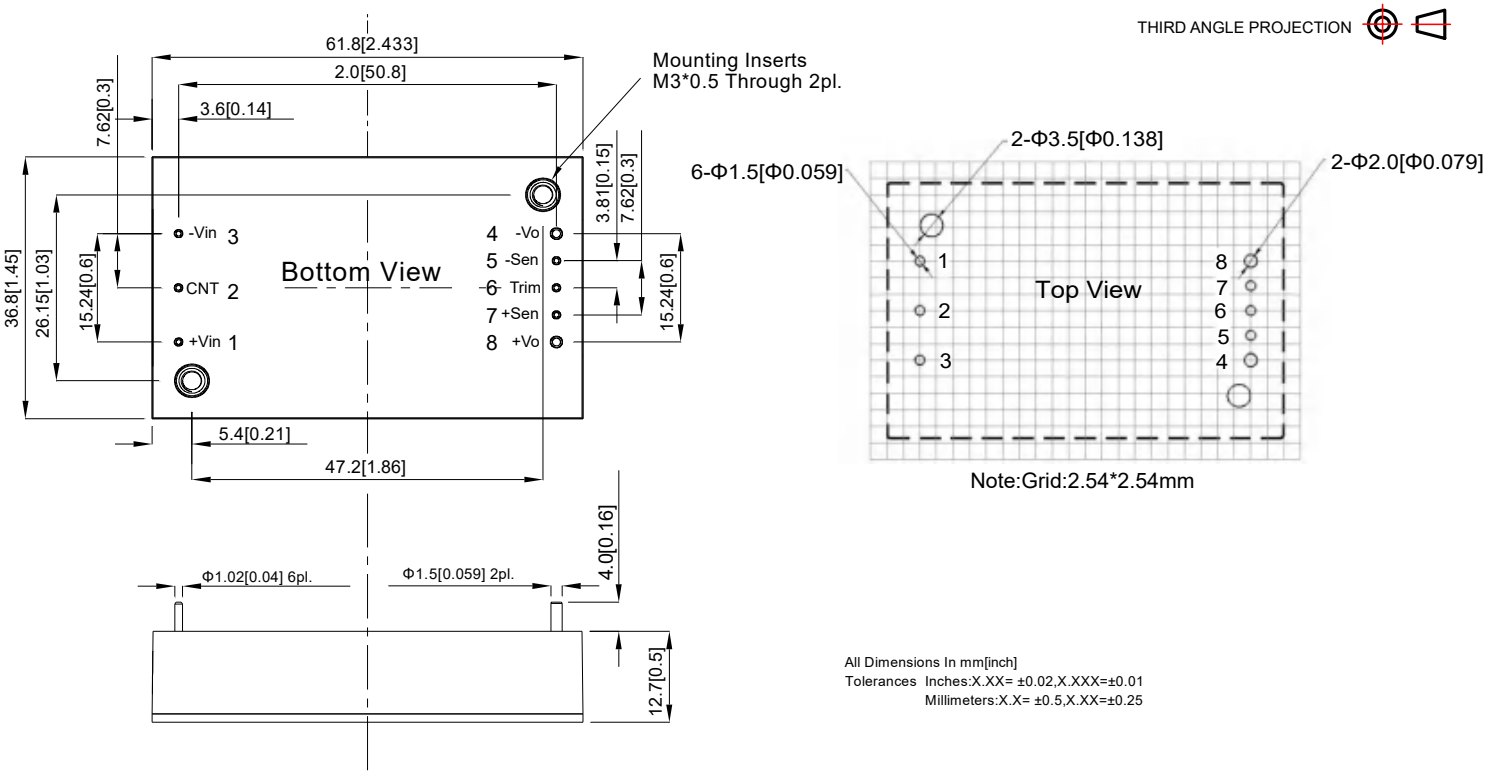
4.Reflected ripple current--test circuit



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

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

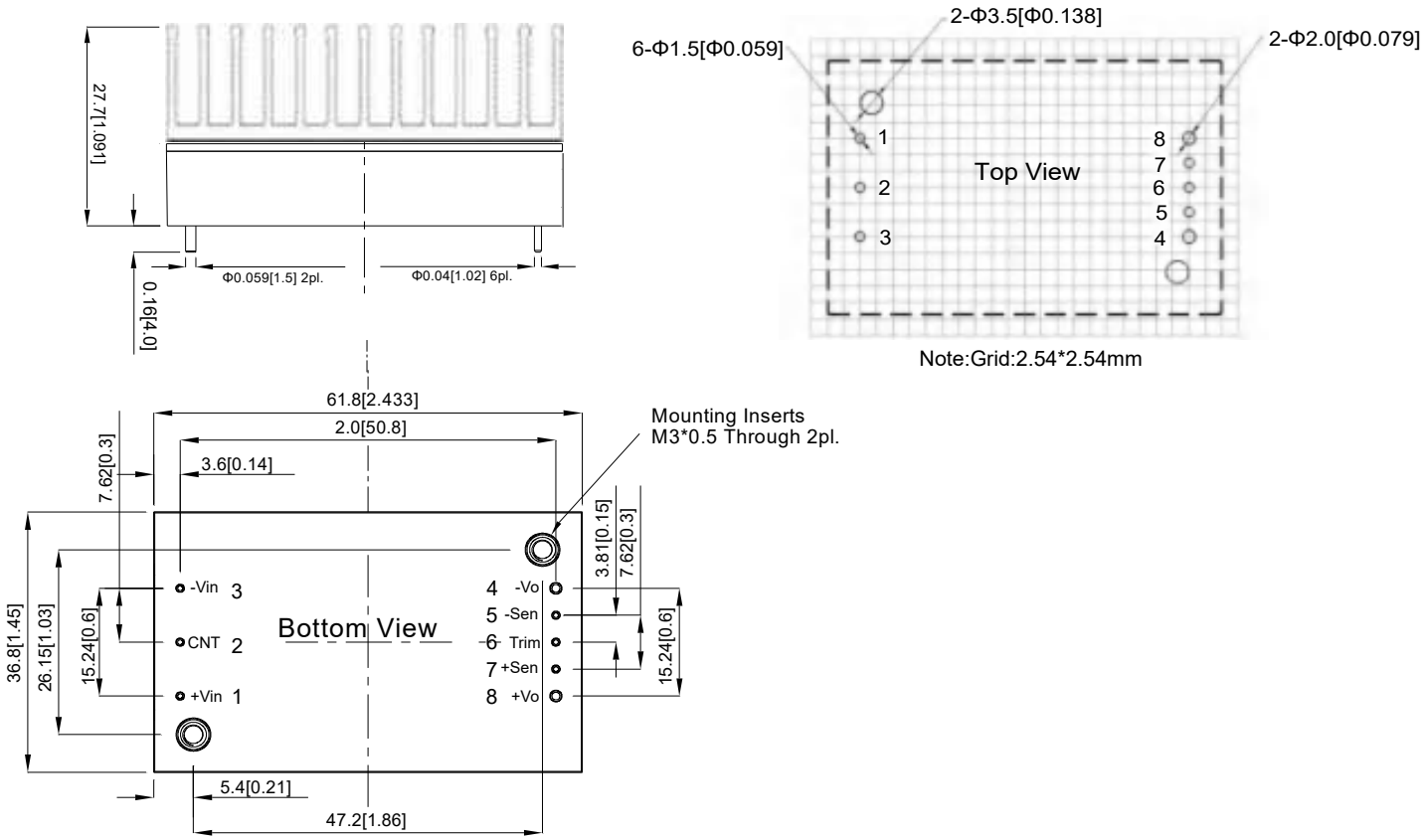
Dimensions and Recommended Layout



All Dimensions In mm[inch]
Tolerances Inches:X.XX= ±0.02,X.XXX=±0.01
Millimeters:X.X= ±0.5,X.XX=±0.25

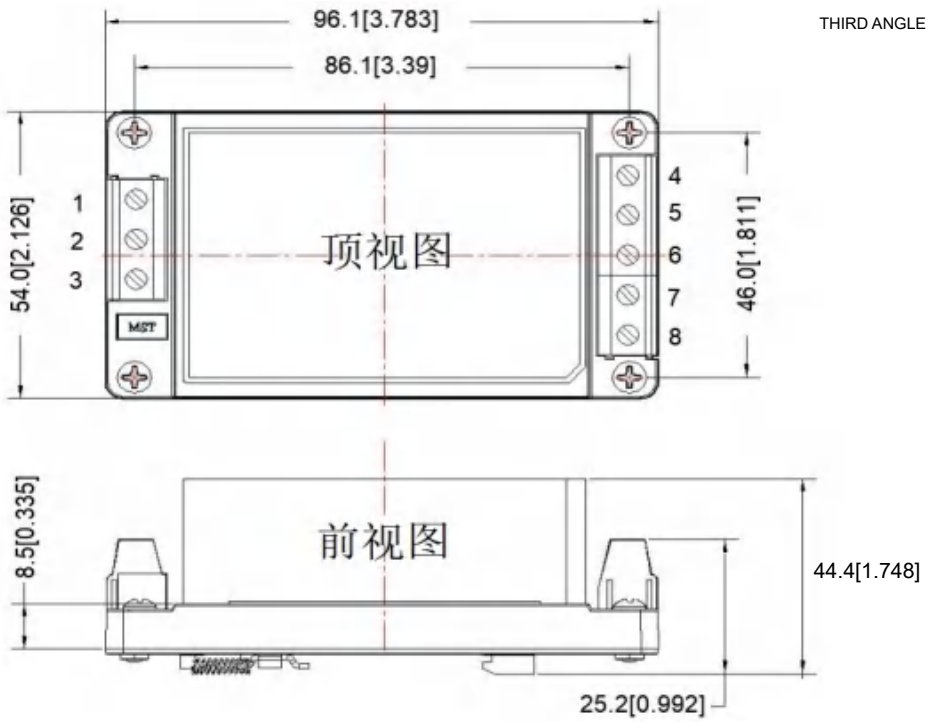
CFDQR75-48S05S Dimensions and Recommended Layout

Third angle projection



Z Dimensions

THIRD ANGLE PROJECTION



Note:
Unit:mm[inch]
Wire range:24-12 AWG
Tinghtening torgue:Max 0.4 N•m
Mounting rail:TS35,rail needs to connect safety ground
General tolerances:±0.5[±0.02]

Note:

1：The maximum capac itive load offered were tested at input voltage range and full load;
2：Unless otherwise spec ified, data in this datasheet should be tested under the conditionsof Ta=25℃, humidity<75%RH with nominal input voltage and rated load;
3：All index testing methods in thisdatasheet are based on our company corporate standards;
4：We can provide produc t customization service, please contac t our technic ians direc tly for spec ific information;
5：Produc tsare related to laws and regulations: see "Features" and "EMC";
6：Our produc ts shall be c lassified ac cording to ISO14001 and related environmental lawsand regulations, and shall be handled by qualifiedunits.

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