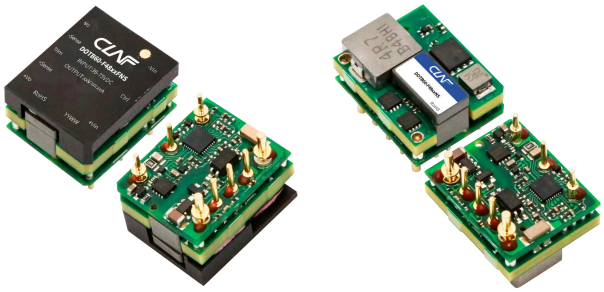
Descriptions

60W isolated，DC/DC Converter



RoHS

Features

- Wide input voltage range: 36V-75V
- I/O isolation test voltage 2250 VDC
- Input under-voltage protection, output over-current, short-circuit, over-voltage, over- temperatur protection
- Operating ambient temperature range: -40℃ to +85℃
- Industry standard package: 1/32 brick, meet DOSA standard

Applications

- Communication field
- Switches
- Repeaters
- Intelligent communication gateways
- GPS synchronous clock
- 4G/5G base station related DC power supply

Selection Guide

Certification	Part No. ①	Ctrl Logic②	Input Voltage (VDC)		Output		Full Load Efficiency④ (%) Min./Typ.	Capacitive Load (uF)Max.
			Nominal (Range)	Max.③	Voltage (VDC)	Current(mA) Max./Min.		
--	DOTB60-F4803(F)NS	N	48 (36-75)	80	3.3	15150/0	87/89	6060
	DOTB60-F4805(F)NS				05	12000/0	89/91.5	4800
	DOTB60-F4812(F)NS				12	5000/0	89/91.5	2000

Notes:
①Use suffix "F" for the heat sink package;
② "N" means negative logic;
③Exceeding the maximum input voltage may cause permanent damage;
④Efficiency is measured in nominal input voltage and rated output load.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	Nominal input voltage, 3.3V output		--	1170/20	1198/30	mA
		Nominal input voltage, 5/12V output		--	1366/20	1404/30	
	Reflected Ripple Current			--	50	--	
	Surge Voltage (1sec. max.)			-0.7	--	100	VDC
	Start-up Voltage			--	--	36	
	Input Under-voltage Protection			26	29	--	
	Start-up Time	Nominal input voltage & constant resistance load		--	--	100	ms
	Input Filter			LC filter			
	Hot Plug			Unavailable			
	Ctrl①	Module on		Ctrl pin pulled low to -Vin (0-1.2VDC)			
		Module off		Ctrl pin open or pulled high (TTL 4.5-12VDC)			
		Input current when off		--	10	20	mA
Output Specifications	Voltage Accuracy	5%-100% load		--	±1	±3	%Vo
	Linear Regulation②	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, Nominal input voltage		--	200	500	us
	Transient Response Deviation	25% load step change, Nominal input voltage	3.3V output	--	±5	±8	%Vo
			5V output	--	±4	±5	
			12Voutput	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise③	20MHz bandwidth, nominal input voltage, 5%-100% load	3.3V/5V	--	100	120	mVp-p
			12V	--	120	150	
	Trim	Input voltage:40-75VDC		90	--	110	%Vo
	Sense			--	--	105	
	Over-voltage Protection	Input voltage range		110	130	160	
	Over-current Protection			110	140	190	%Io
	Short-circuit Protection④			Continuous, self-recovery			
General Specifications	Isolation Voltage	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		2250	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating Temperature	See Fig1		-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Shock and Vibration Test			10-55Hz, 10G/Hz, 30Min. Dlong X, Y and Z			
	Switching Frequency ⑤	PWM mode		--	400	--	kHz

	MTBF	MIL-HDBK-217F@25℃	500	--	--	k hours
Mechanical Specifications	Dimensions	DOTB60-F4803/05/12NS	23.36 × 19.05 × 12.7mm			
		DOTB60-F4803/05/12FNS	23.36 × 19.05 × 15.0mm			
	Weight	DOTB60-F4803/05/12NS	12.0g(typ.)			
		DOTB60-F4803/05/12FNS	16.6g(typ.)			
	Cooling method	Natural convection or forced air convection				

Note:
①The Ctrl pin voltage is referenced to input -Vin;
②Linear Regulation at 0%-100% load is ±3% max.
③0% -5% load Ripple & Noise less than or equal to 5%Vo. Ripple & Noise are tested according to the recommended circuit Figure 2, and the method by test shall prevail.
④If the low-voltage input is 36-40VDC, the protection function may enter burp protection mode.
⑤Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

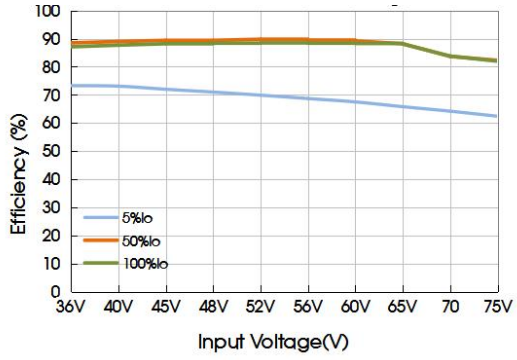
Emissions	CE	CISPR32/EN55032 CLASS A (see Fig.4 for recommended circuit)/CLASS B (see Fig.5 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (see Fig.4 for recommended circuit)/CLASS B (see Fig.5 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 100kHz ±2kV (see Fig.4 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (see Fig.4 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A

Note: *Out-case is not support static protection.

Characteristic Curve

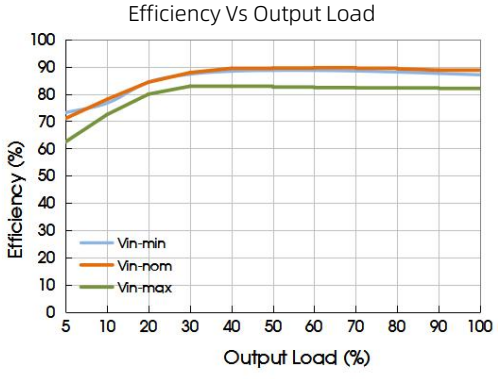
DOTB60-F4803(F)NS

Efficiency Vs Input Voltage



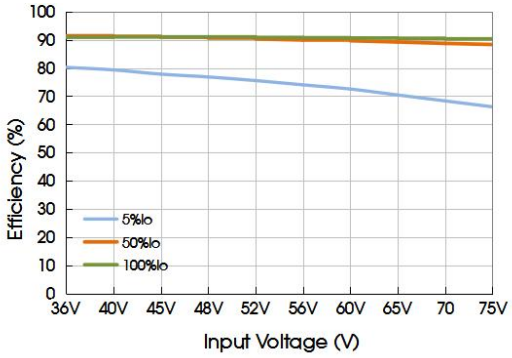
DOTB60-F4803(F)NS

Efficiency Vs Output Load



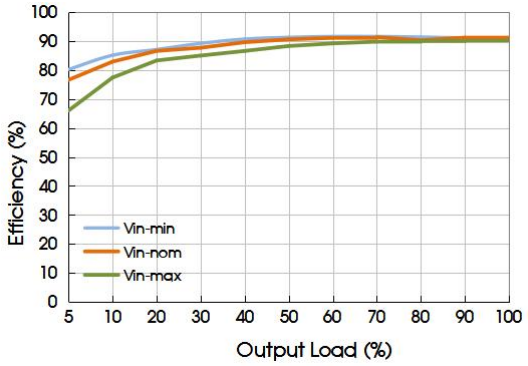
DOTB60-F4805(F)NS

Efficiency Vs Input Voltage



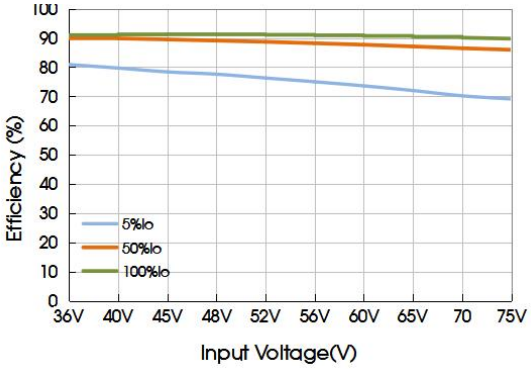
DOTB60-F4805(F)NS

Efficiency Vs Output Load



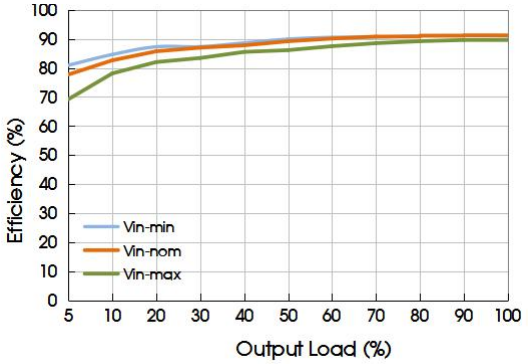
DOTB60-F4812(F)NS

Efficiency Vs Output Load



DOTB60-F4812(F)NS

Efficiency Vs Output Load



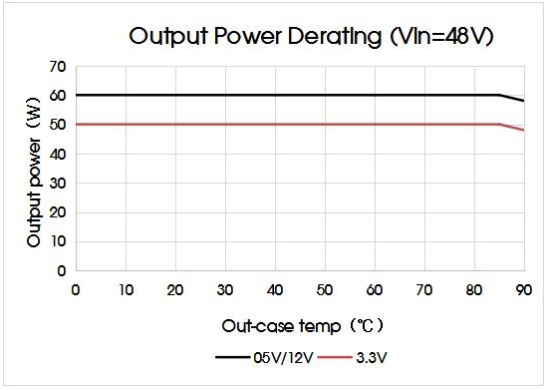


Fig.1

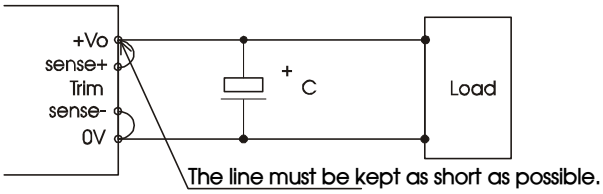
Note:

①For preliminary evaluation only.

②Test conditions: The maximum temperature rise of the shell evaluates the allowable load of the product under the corresponding conditions, and the maximum temperature of the shell at the corresponding load point should be controlled below the corresponding horizontal coordinate temperature.

Remote Sense Application

1. Remote Sense Connection if not used

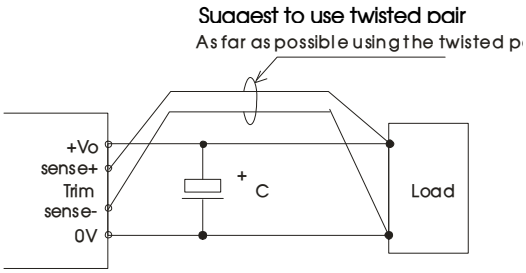


Notes:

①If 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.

②The 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:

①Using remote sense with long wires may cause unstable output, please contact technical support if long wires must be used.

②PCB-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.

③We 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.

④Note 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. Ripple & Noise

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

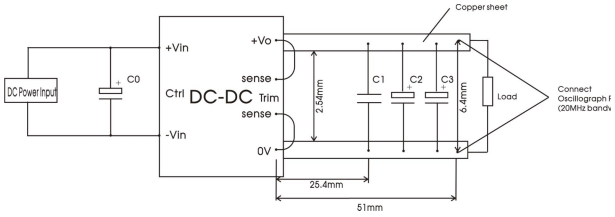


Fig. 2

Parameter explaination:

Capacitors value / Output voltage	C0	C1	C2	C3
3.3/5/12VDC	100uF/100V	1uF/50V	10uF/35V	330uF/ 63V(solid)

2. Typical application

We recommended using Mornsun's EMC circuit, otherwise please ensure that at least a 100uF electrolytic capacitors is connected at the input in order to ensure adequate voltage surge suppression and protection.

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. 3

Parameter explaination:

Capacitors value / Output voltage	Cin	Cout
3.3/5/12VDC	100uF/100V	330uF/63V (solid)

3. EMC compliance recommended circuit

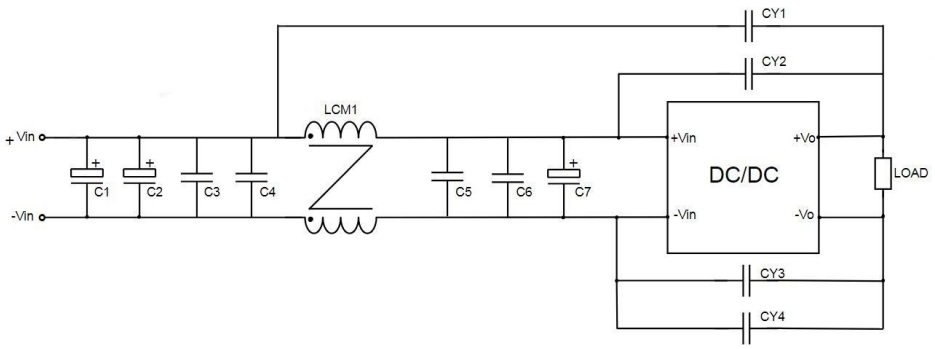


Fig. 4

Model	Vo:3.3/5/12V
C1/C2	1000uF/100V
C3/C4/C5/C6	4.7uF/100V
C7	100uF/100V
LCM1	18mH
CY1/CY2/CY3/CY4	2.2nF/400VAC

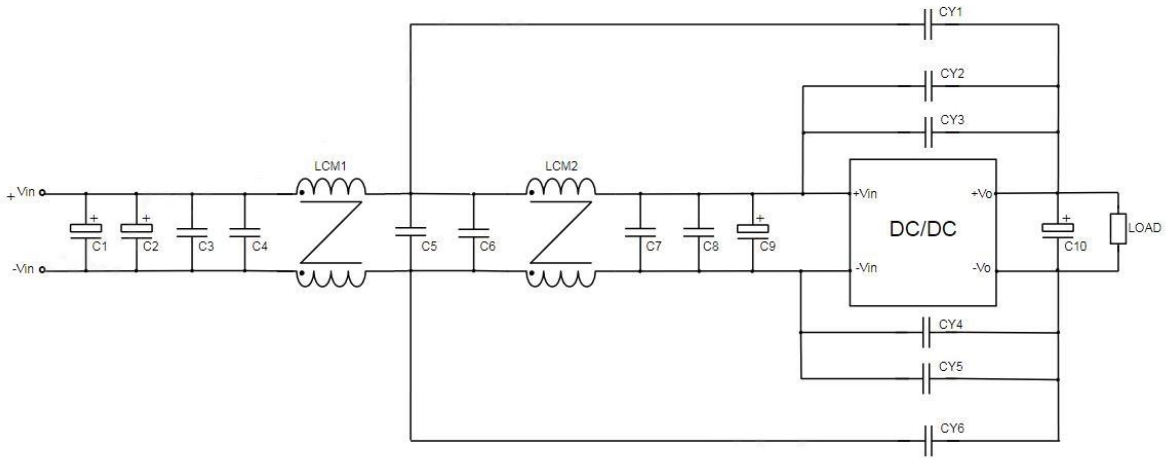
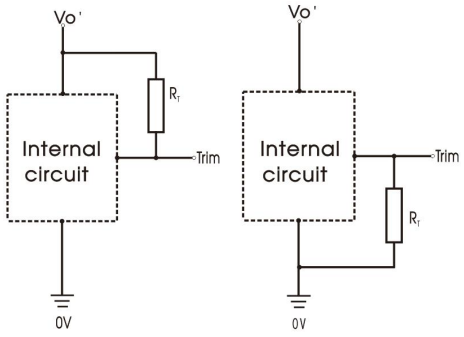


Fig. 5

Model	Vo: 3.3/5/12V
C1/C2	1000uF/100V
C3/C4/C5/C6/C7/C8	4.7uF/100V
C9	100uF/100V
C10	330uF/63V
LCM1/LCM2	18mH
CY2/CY3/CY4/CY5	1nF/400VAC
CY1/CY6	4.7nF/400VAC

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



Trim up Trim down

TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

Trim up

$$R_T = \left(\frac{5.11 V_{nom}(100+\Delta\%)}{1.225\Delta\%} - \frac{511}{\Delta\%} - 10.22 \right)(k\Omega)$$

Trim down

$$R_T = \left(\frac{511}{\Delta\%} \right) - 10.22(k\Omega)$$

Note:

RT = Trim Resistor value

$$\Delta\% = \left| \frac{V_{nom} - V_{out}}{V_{nom}} \right| \times 100$$

V_{nom} = nominal output voltage

V_{out} = desired output voltage

5. Recommended solution for thermal test

During the application process, the thermal design of the product can be evaluated in combination with the product temperature derating curve, or the stable working range of the product can be determined by testing the temperature at point ABCD in Figure 6. When the temperature at point ABCD is lower than 125℃, it is the stable working range of the product.

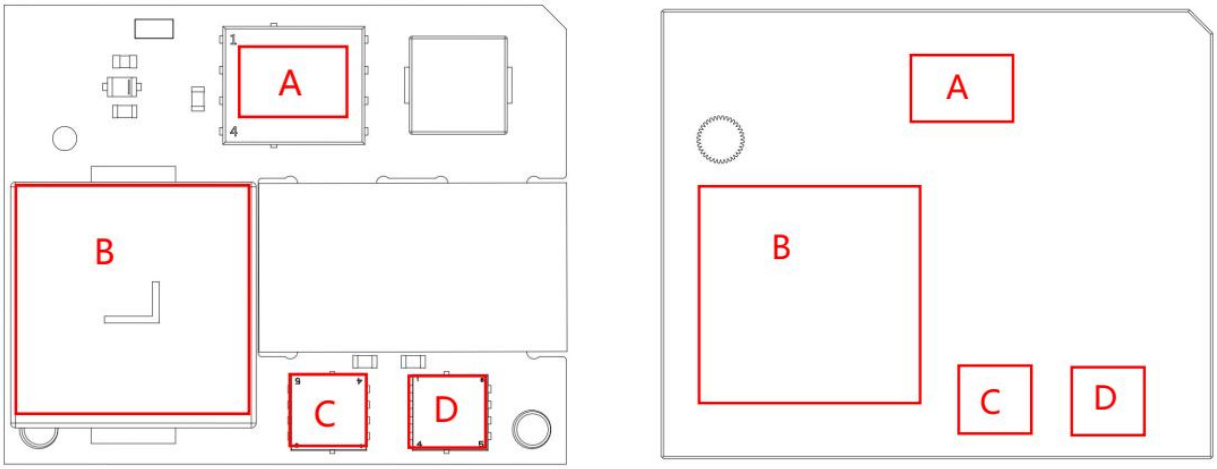
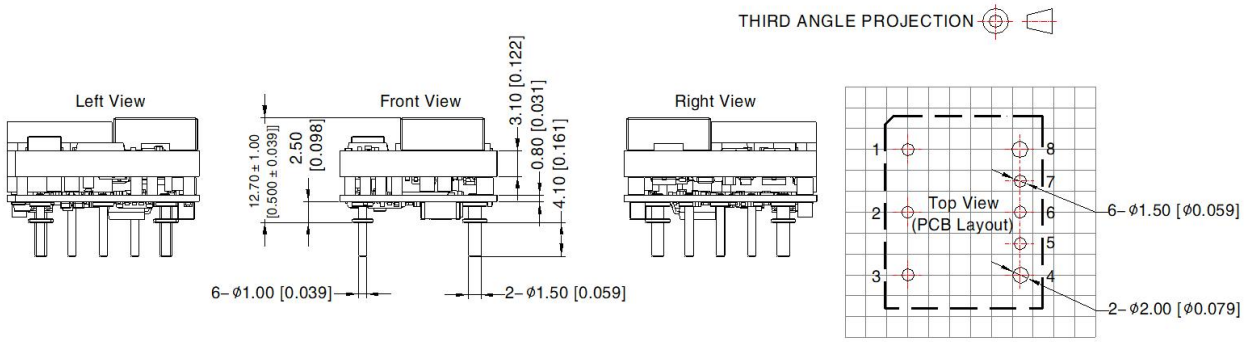
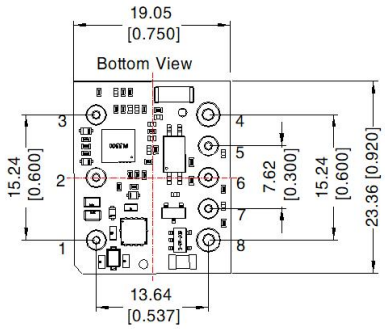


Fig. 6

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

Dimensions and Recommended Layout

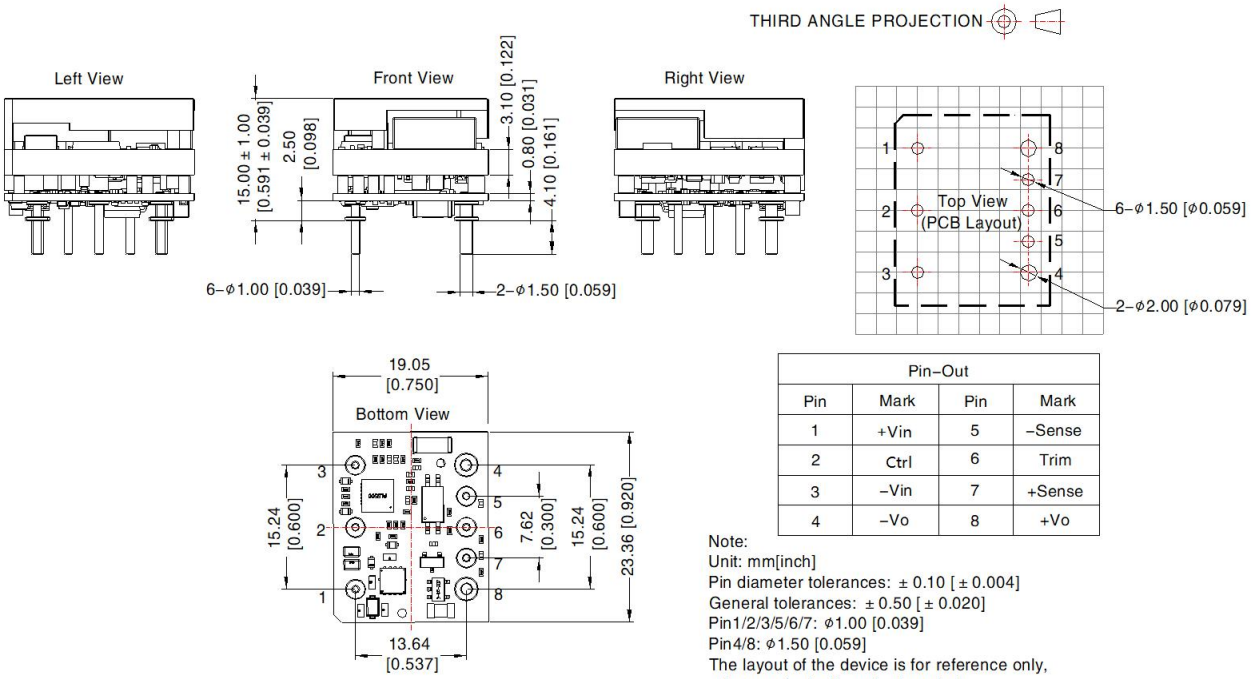




Pin–Out			
Pin	Mark	Pin	Mark
1	+Vin	5	–Sense
2	Ctrl	6	Trim
3	–Vin	7	+Sense
4	–Vo	8	+Vo

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]
Pin1/2/3/5/6/7: ϕ1.00 [0.039]
Pin4/8: ϕ1.50 [0.059]
The layout of the device is for reference only,
please refer to the actual product

F Dimension



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

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]
Pin1/2/3/5/6/7: φ1.00 [0.039]
Pin4/8: φ1.50 [0.059]
The layout of the device is for reference only,
please refer to the actual product

Notes:

1. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.