Descriptions

100W isolated，DC/DC Converter





RoHS

Features

- Wide input voltage range: 36-75 VDC
- High efficiency up to 93%
- I/O isolation test voltage 1.5K VDC
- Operating ambient temperature range: -40℃ to +100℃
- Input under-voltage protection, output short circuit, over-current, over-voltage protection, over-temperature protection
- Industry standard package: 1/8 brick
- Meet IEC/UL/EN62368 standard

Applications

- Industrial control
- Electric power
- Instruments
- Communication

Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output		Full Load Efficiency③ (%) Min./Typ.	Capacitive Load (uF)Max.
		Nominal (Range)	Max.②	Voltage (VDC)	Current(A) Max./Min.		
--	DOEB100-B4805(F)	48 (36-75)	75	5	20/0	90/92	6000
	DOEB100-B4812(F)			12	8.3/0	91/93	2000
	DOEB100-B4815(F)			15	6.67/0	91/93	2000
	DOEB100-B4824(F)			24	4.17/0	90/92	1000
	DOEB100-B4828(F)			28	3.57/0	90/92	1000

Notes:
①Use "F" 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;
③Efficiency 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		--	2264/20	2315/30	mA
	Reflected Ripple Current			--	30	100	
	Surge Voltage (1sec. max.)			-0.7	--	80	VDC
	Start-up Voltage			--	--	36	
	Start-up Current			--	--	5	A
	Input Under-voltage Protection			26	29	--	VDC
	Start-up Time	Nominal input voltage & constant resistance load		--	--	100	ms
	Input Filter			π 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		--	3	10	mA
Output Specifications	Voltage Accuracy	0%-100% load		--	±1	±3	%Vo
	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	--	±5	±8	%Vo
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise②	20MHz bandwidth, nominal input voltage, 5%-100% load		--	100	150	mVp-p
	Trim			90	--	110	%Vo
	Sense			--	--	105	
	Over Temperature	Product surface max. temperature		--	130	--	℃
	Over-voltage Protection	Input voltage range		110	--	160	%Vo
	Over-current Protection			110	140	190	%Io
	Short-circuit Protection			Continuous, self-recovery, time≤3 seconds			
General Specifications	Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating Temperature	See temperature derating curve		-40	--	+100	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH

	Pin Soldering Resistance Temperature	Wave soldering, 10 seconds	--	--	+260	℃
		Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
	Shock and Vibration Test		10-150Hz, 10G, 30Min. along X, Y and Z			
	Switching Frequency③	PWM mode	--	200	--	kHz
	Altitude		Altitude: ≤2000m, Atmospheric pressure: 80 ~ 110KPa			
	MTBF	MIL-HDBK-217F@25℃	500	--	--	k hours
Mechanical Specifications	Dimensions	DOEB100-B48xx	58.42 x 22.86 x 9.69mm			
		DOEB100-B48xxF	58.42 x 22.86 x 12.7mm			
	Weight	DOEB100-B48xx	27.0g (Typ.)			
		DOEB100-B48xxF	35.9g (Typ.)			
	Cooling method	Natural convection or forced air convection				

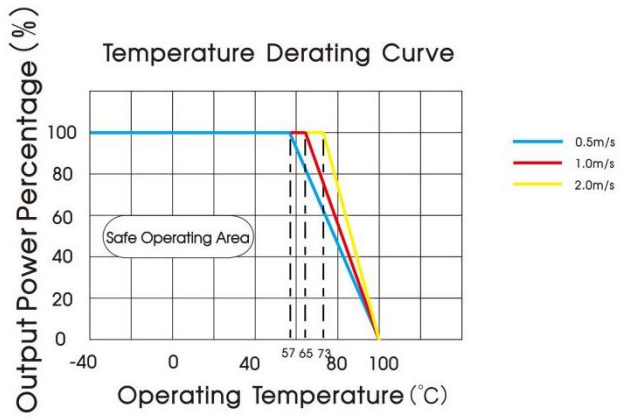
Note:
①The Ctrl pin voltage is referenced to input GND;
②0% -5% load ripple&noise ≤ 5% Vo; the testing method for ripple and noise adopts the reliability method;
③Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

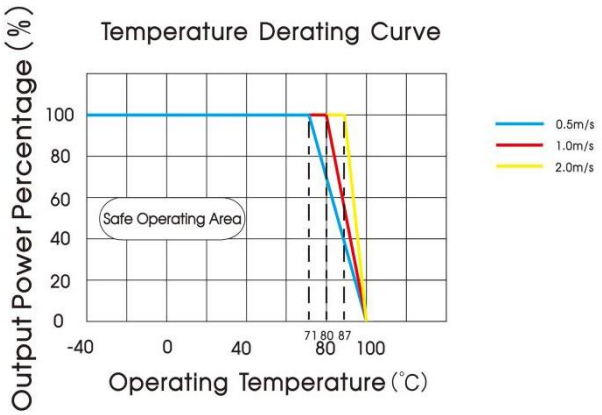
Emissions	CE	CISPR32/EN55032	CLASS A (see Fig.3 for recommended circuit)/CLASS B (see Fig.4 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (see Fig.3 for recommended circuit)/CLASS B (see Fig.4 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (see Fig.3 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (see Fig3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Characteristic Curve

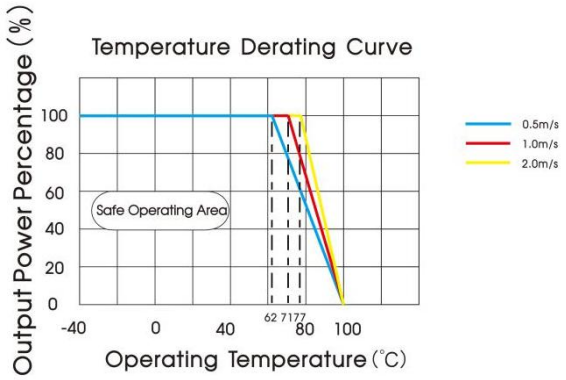
DOEB100-B4805 (Vin=48V)



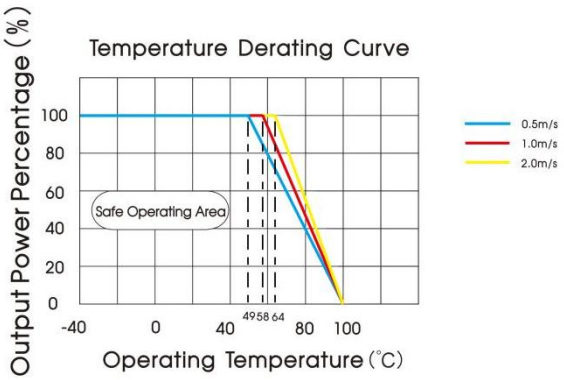
DOEB100-B4812 (Vin=48V)



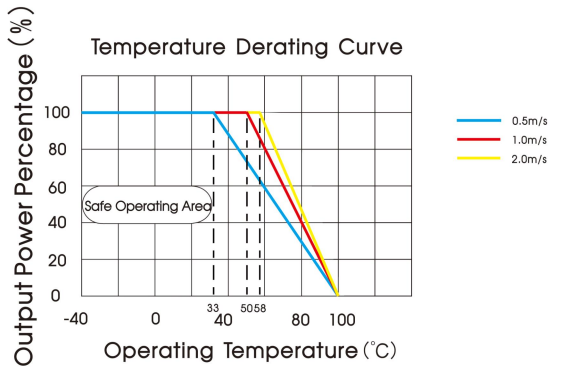
DOEB100-B4815（Vin=48V）



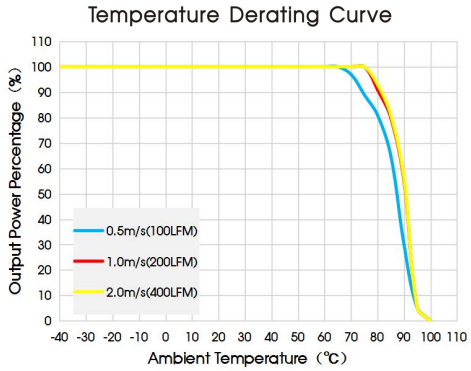
DOEB100-B4824（Vin=48V）



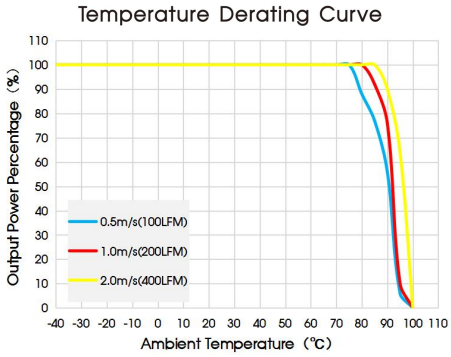
DOEB100-B4828（Vin=48V）



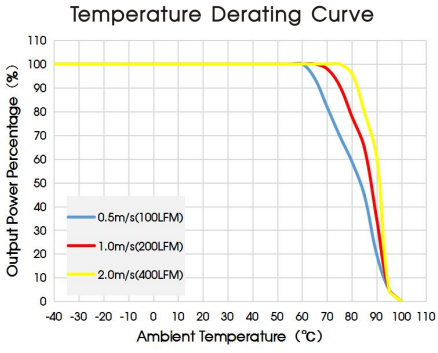
DOEB100-B4805F



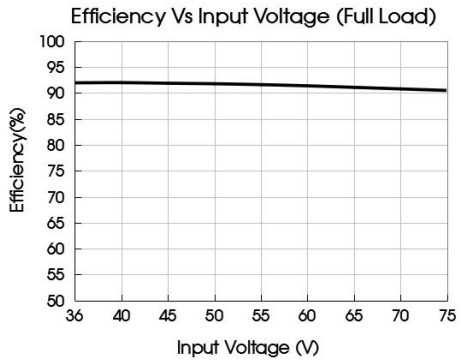
DOEB100-B4815F



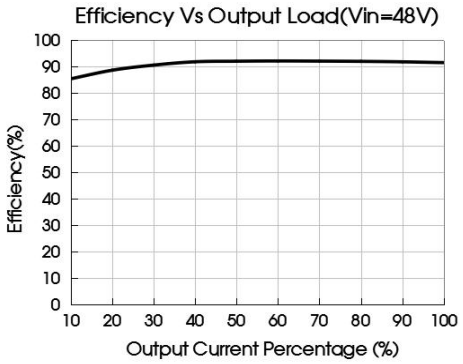
DOEB100-B4828F



DOEB100-B4805F

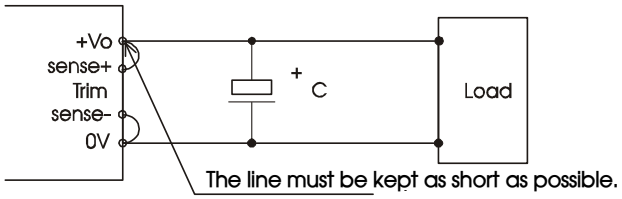


DOEB100-B4805F



Remote Sense Application

1. Remote Sense Connection if not used

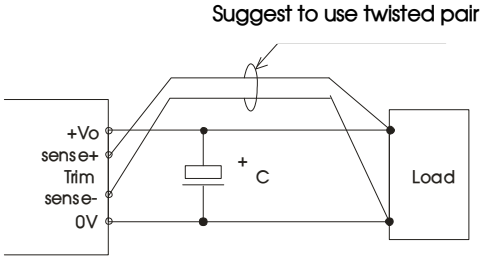


Notes:

① If the sense function is not used for remote regulation the user must connect the +Sense to + Vo and -Sense to 0V 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



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 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. Ripple & Noise

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.

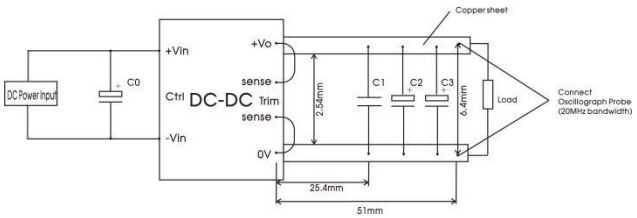


Fig. 1

Capacitors value / Output voltage	C0	C1	C2	C3
5VDC	100μF/ 100V	1μF/ 50V	10μF/ 50V	330μF/ 63V
12VDC				
15VDC				
24VDC				
28VDC				

2. Typical application

①We recommended using EMC circuit, otherwise please ensure that at least a 100μF electrolytic capacitors is connected at the input in order to ensure adequate voltage surge suppression and protection.

②Input 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. 2

Capacitors value / Output voltage	Cin	Cout
5VDC	100μF/100V	330μF/63V
12VDC		
15VDC		
24VDC		
28VDC		

3. EMC compliance recommended circuit

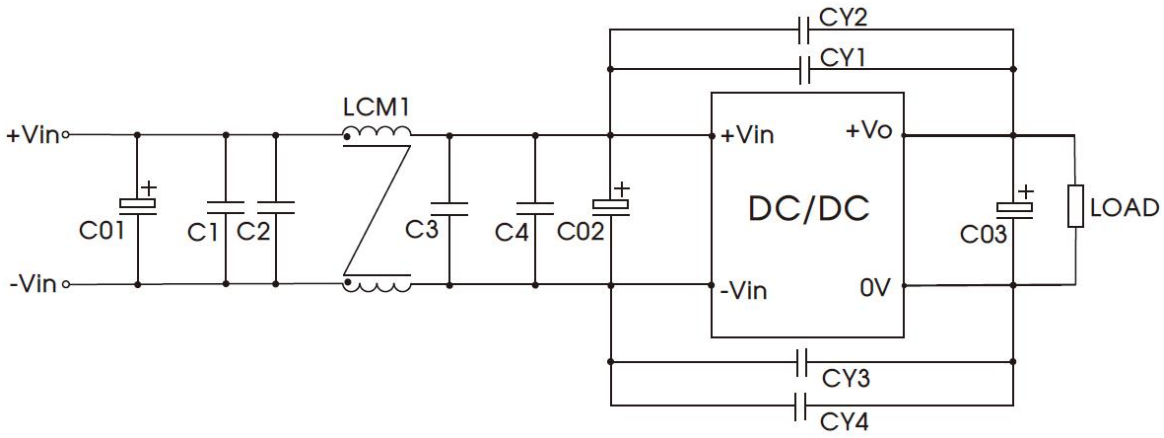


Fig. 3

C01	470uF/100V (electrolytic capacitor)
C02	100uF/100V (electrolytic capacitor)
C03	330uF/63V (electrolytic capacitor)
C1, C2, C3, C4	4.7uF/100V
CY1, CY2, CY3, CY4	2.2nF/2KV
LCM1	2mH, recommended to use P/N:EFL2D-12-202(C)

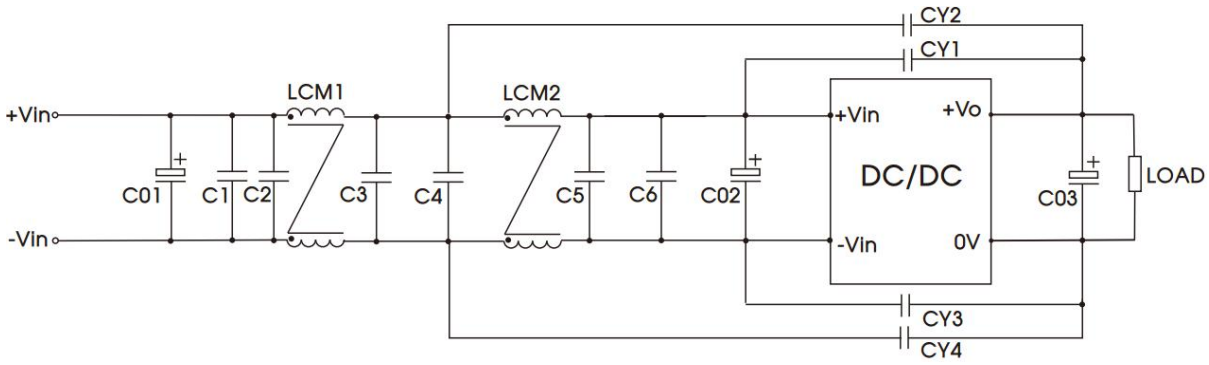
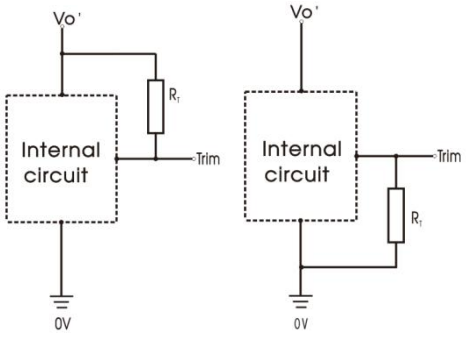


Fig. 4

C01	470uF/100V (electrolytic capacitor)
C02	100uF/100V (electrolytic capacitor)
C03	330uF/63V (electrolytic capacitor)
C1, C2, C3, C4, C5, C6	4.7uF/100V
CY1, CY2, CY3, CY4	4.7nF/1.5KV
LCM1、LCM2	2.0mH, recommended to use P/N: EFL2D-12-202(C)

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

When the output voltage is 12V, the up-regulated voltage is +10%, that is, the output voltage set to 13.2V:

$$\Delta\% = \left|\frac{12-13.2}{12}\right| * 100 = 10 \qquad R_T = \frac{5.11*12*(100+10)}{1.225*10} - \frac{511}{10} - 10.22 = 489K\Omega$$

When the output voltage is 12V, the down-regulated voltage is -10%, that is, the output voltage set to 10.8V:

$$\Delta\% = \left|\frac{12-10.8}{12}\right| * 100 = 10 \qquad R_T = \frac{511}{10} - 10.22 = 40.88K\Omega$$

5. Hot Test Point

The thermal element is installed on the top surface of the product and dissipates heat to the surrounding environment through conduction, convection and radiation. Sufficient heat dissipation conditions should be provided to ensure the reliable operation of the product.By measuring the temperature of the thermal test point ① in Fig. 5, it can be verified whether the heat dissipation conditions are met.



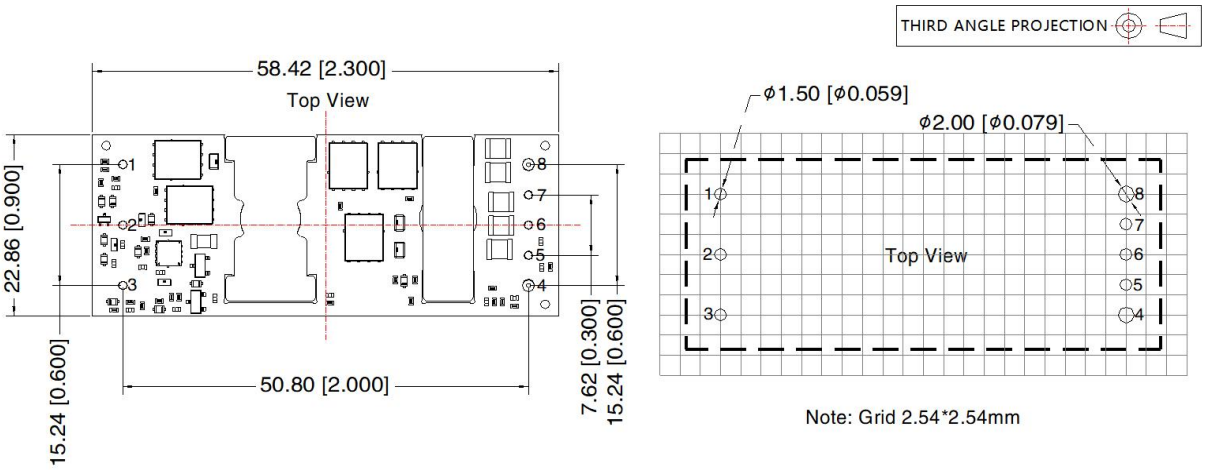
Fig. 5

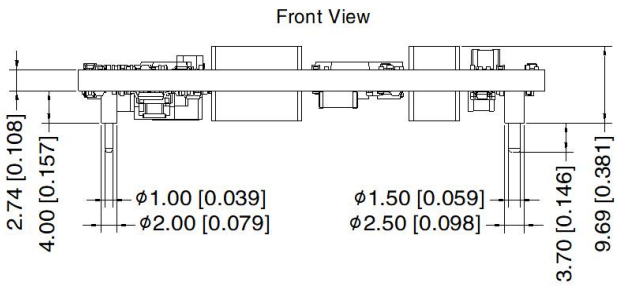
Note:

The temperature of the hot test point ① cannot exceed 130℃, otherwise the product will trigger protection due to excessive temperature and cannot work normally.

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

DOEB100-B48xx Dimensions and Recommended Layout



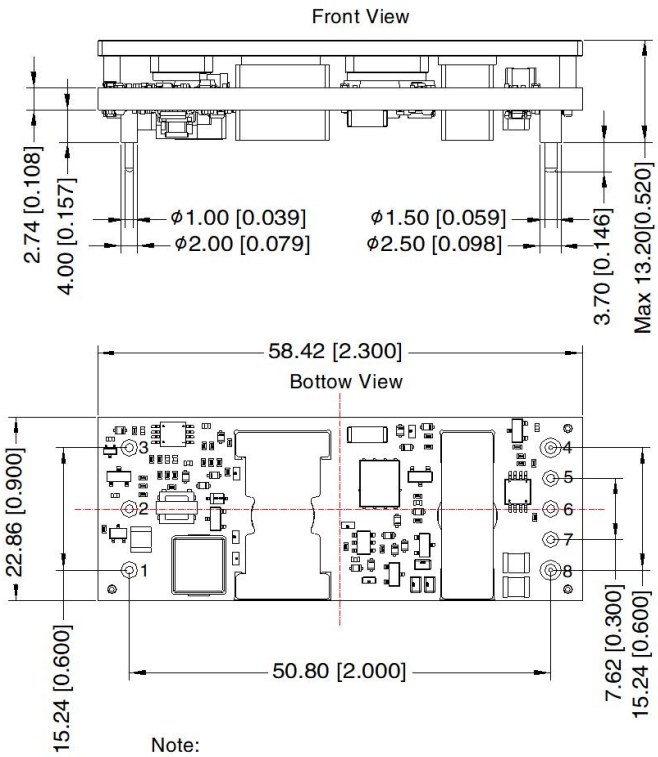


Pin–Out	
Pin	Function
1	+Vin
2	Ctrl
3	–Vin
4	0V
5	–Sense
6	Trim
7	+Sense
8	+Vo

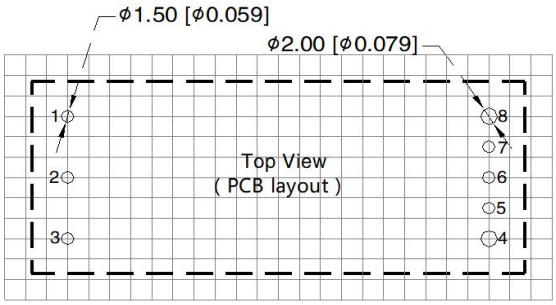
Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
PIN1/2/3/5/6/7: ϕ 1.0mm; PIN4/8: ϕ 1.5mm
The layout of the device is for reference only, please refer to the actual product

DOEB100-B48xxF Dimensions and Recommended Layout





Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
PIN1/2/3/5/6/7: ϕ 1.0mm; PIN4/8: ϕ 1.5mm
The layout of the device is for reference only, please refer to the actual product



Note: Grid 2.54*2.54mm

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

Note:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. 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;
3. All index testing methods in this datasheet are based on company corporate standards;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.