Descriptions

50W isolated，DC/DC Converter



RoHS

Report Report

EN62368-1 BS EN62368-1

Features

- Wide input voltage range: 36V-75V
- High efficiency up to 90%
- I/O isolation test voltage 1500 VDC
- Input under-voltage protection, output short circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40℃ to +85℃
- Industry standard package: 1/16 brick, meet DOSA standard

Applications

- Communication

Selection Guide

Certification	Part No.	Ctrl Logic③	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Typ.	Capacitive Load (μF)Max.
			Nominal (Range)	Max.①	Voltage (VDC)	Current(mA) Max./Min.		
EN/BS EN	DOSB50-B4805(F)S	P	48 (36-75)	80	5	10000/0	88	4000
	DOSB50-B4812(F)S				12	4170/0	90	2000
	DOSB50-B4805(F)NS	N			5	10000/0	88	4000
	DOSB50-B4812(F)NS				12	4170/0	90	2000

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured in nominal input voltage and rated output load;
③" P" means positive logic, "N" means negative logic.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	Nominal input voltage		--	1185/15	1220/20	mA
	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			C filter			
	Hot Plug			Unavailable			
	Ctrl①	Module on	DOSB50-B4805(F)S	Ctrl pin open or pulled high (TTL 4.5-12VDC)			
			DOSB50-B4812(F)S				
			DOSB50-B4805(F)NS	Ctrl pin pulled low to GND (0-1.2VDC)			
			DOSB50-B4812(F)NS				
		Module off	DOSB50-B4805(F)S	Ctrl pin pulled low to GND (0-1.2VDC)			
			DOSB50-B4812(F)S				
			DOSB50-B4805(F)NS	Ctrl pin open or pulled high (TTL 4.5-12VDC)			
			DOSB50-B4812(F)NS				
		Input current when off		--	10	20	mA
Output Specifications	Voltage Accuracy	5%-100% load		--	±1	±3	%Vo
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation②	5%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation	25% load step change, nominal input voltage	5V output	--	±5	±10	%Vo
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise③	20MHz bandwidth, nominal input voltage, 5%-100% load		--	100	200	mVp-p
	Trim	Input voltage range		90	--	110	%Vo
	Sense			--	--	105	
	Over-voltage Protection			110	130	160	
	Over-current Protection			110	150	190	%Io
	Short-circuit Protection			CONTINUOUS, SELF-RECOVERY			
General Specifications	Isolation Voltage	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	--	4700	--	pF
	Operating Temperature	See Fig1	-40	--	+85	℃
	Storage Temperature		-55	--	+125	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Shock and Vibration Test		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency ④	PWM mode	--	200	--	KHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours
Mechanical Specifications	Dimensions	DOSB50-B48xx(N)S	33.04 × 22.88 × 9.70 mm			
		DOSB50-B48xxF(N)S	33.04 × 22.88 × 12.90 mm			
	Weight	DOSB50-B48xx(N)S	12.0g (Typ.)			
		DOSB50-B48xxF(N)S	20.0g (Typ.)			
	Cooling method	Natural convection or forced air convection				

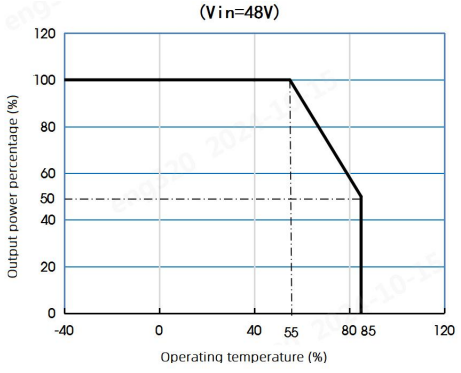
Note:
①The Ctrl pin voltage is referenced to input GND.
②Linear Regulation at 0%-100% load is ±3% max.
③The "Tip and barrel" method is used for ripple and noise test, Ripple & Noise at <5% load is 5%Vo max.
④Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

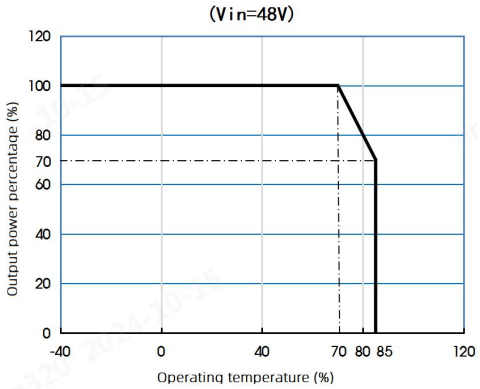
Emissions	CE	CISPR32/EN55032	CLASS A (see Fig.3 for recommended circuit)/ CLASS B (see Fig.4 for recommended circuit)
	RE	CISPR32/EN55032	CLASS A (see Fig.3 for recommended circuit)/ CLASS B (see Fig.4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Contact ±4KV perf. Criteria B
	RS	IEC/EN61000-4-3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

Temperature Derating Curve

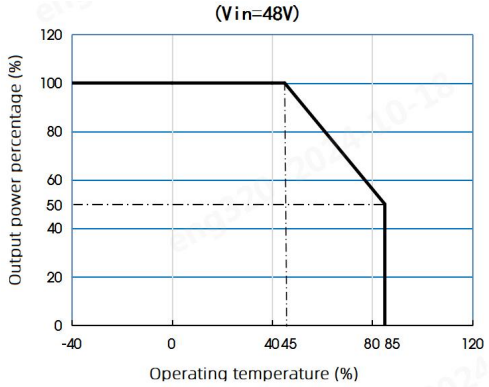
DOSB50-B4812(N)S Temperature derating curve graph



DOSB50-B4812F(N)S Temperature derating curve graph



DOSB50-B4805(N)S Temperature derating curve graph



DOSB50-B4805F(N)S Temperature derating curve graph

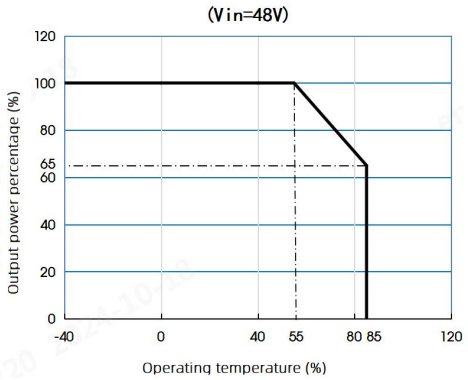
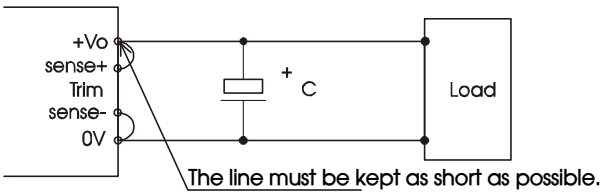


Fig.1

Note: The data is for reference only. This curve is obtained by testing in accordance with industry common standards and enterprise temperature rise testing norms. To ensure the heat dissipation effect, it is recommended to add auxiliary heat dissipation measures by yourself when using it. For specific information, please consult our technical personnel.

Remote Sense Application

1. Remote Sense Connection if not used

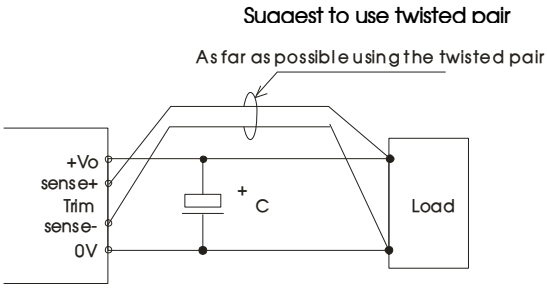


Note:

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



Note:

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 wires 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. Typical application

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

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.

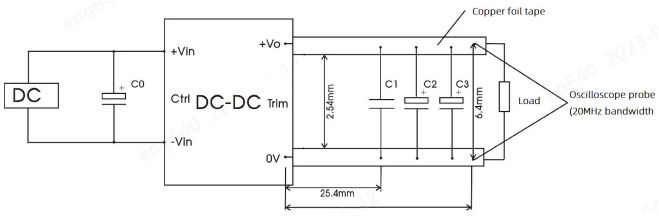


Fig. 2

Capacitance value / Output voltage	C0	C1	C2	C3
5V/12VDC	100μF/100V	1μF/50V	10μF/35V	470μF/35V

2. EMC compliance recommended circuit

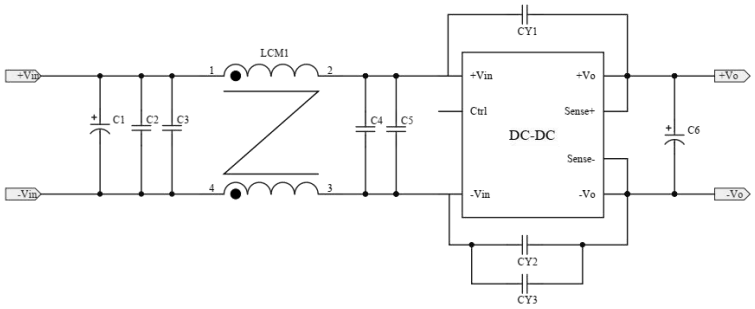


Fig.3

Parameter explaination:

Model	Vo: 5V/12V
C1	2000μF/100V
C2、C3、C4、C5	225K/100V
C6	470μF/35V
CY1、CY2、CY3	2.2nF/400VAC
LCM1	2.0mH，EFL2D-12-202

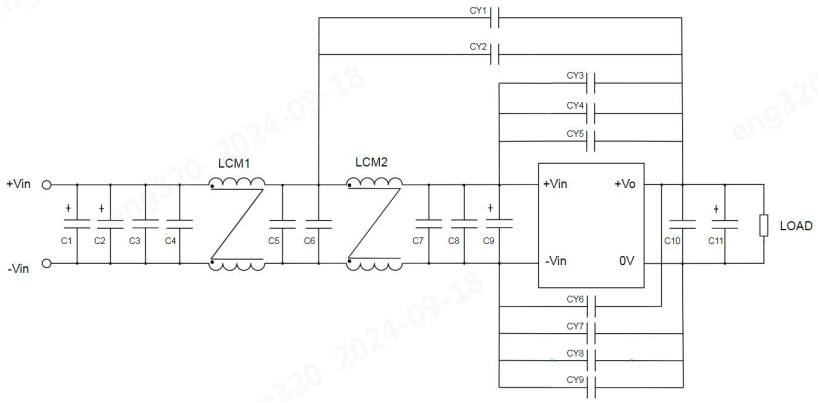
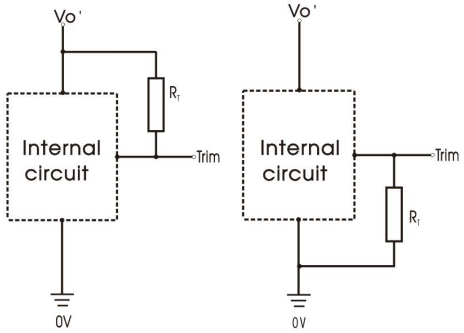


Fig.4

Parameter explaination:

Model	Vo: 5V/12V
C1、C2	1000μF/63V
C3、C4、C5、C6、C7、C8、C10	4.7μF/100V
C9	330μF/100V
C11	470μF/35V
LCM1	18mH
LCM2	4.5mH
CY1	0.1nF/400VAC
CY2、CY4、CY5、CY6、CY7、CY8	1nF/400VAC
CY3、CY9	0.47nF/400VAC

3. 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

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

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

4. Thermal 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.

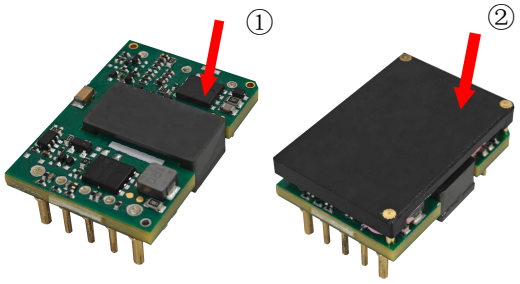


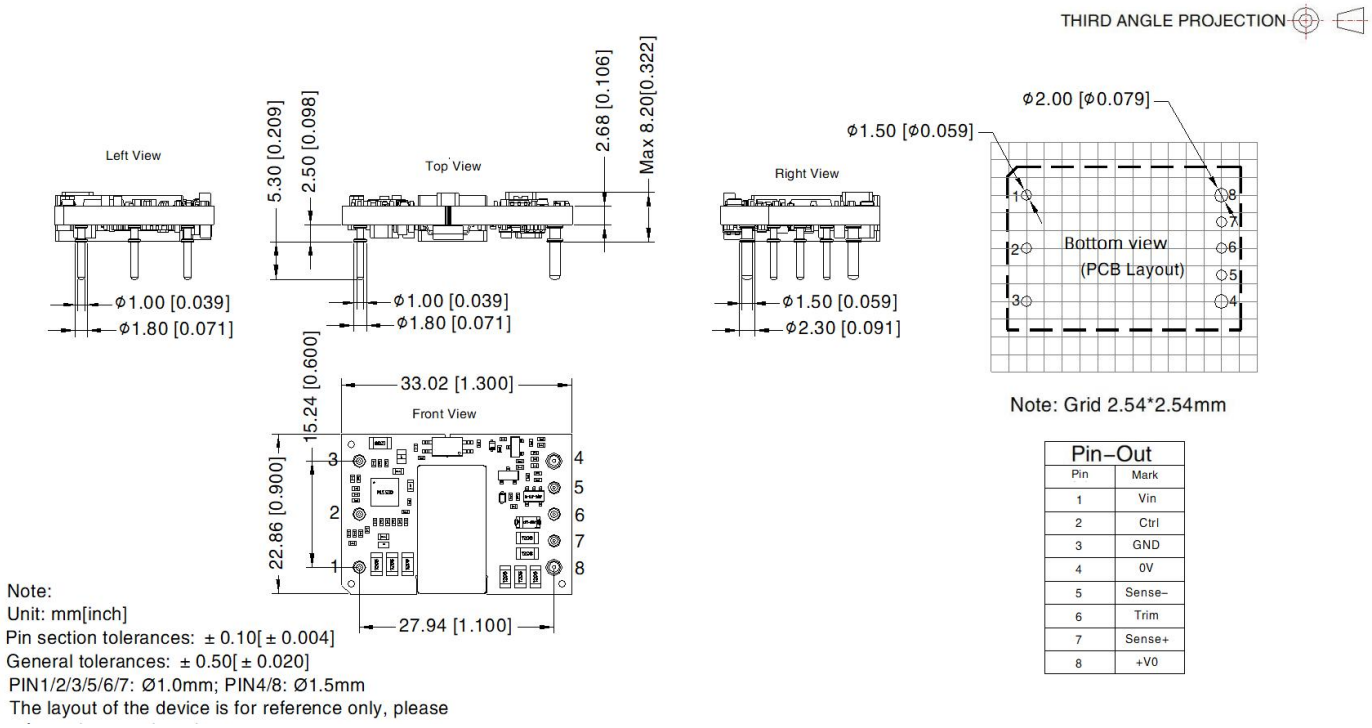
Fig. 5

Note:

Thermal test points: The temperature of ① generally should not exceed 130℃, and that of ② generally should not exceed 115℃. Otherwise, the product will trigger protection due to excessive temperature and fail to operate normally.

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

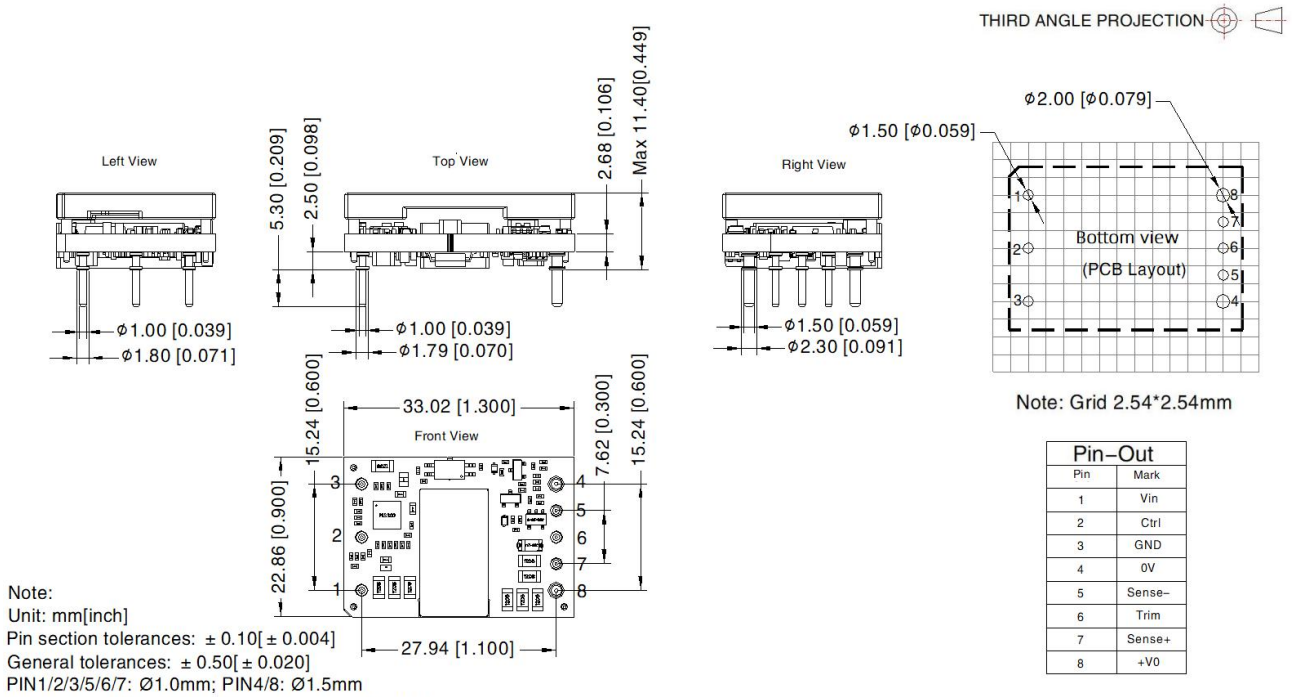
DOSB50-B48xx(N)S Dimensions and Recommended Layout



Pin–Out	
Pin	Mark
1	Vin
2	Ctrl
3	GND
4	0V
5	Sense–
6	Trim
7	Sense+
8	+V0

Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
PIN1/2/3/5/6/7: Ø1.0mm; PIN4/8: Ø1.5mm
The layout of the device is for reference only, please

DOSB50-B48xxF(N)S Dimensions and Recommended Layout



Pin-Out	
Pin	Mark
1	Vin
2	Ctrl
3	GND
4	0V
5	Sense-
6	Trim
7	Sense+
8	+V0

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. We can provide product customization service, please contact our technicians directly for specific information;
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.