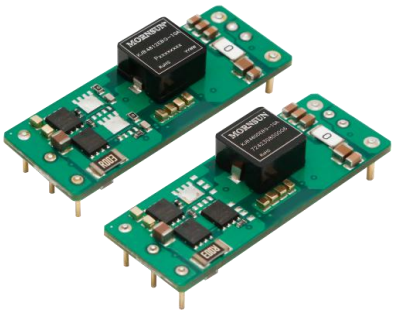
Non-isolated DC-DC converter
Ultra-wide input and buck single output



RoHS

FEATURES

- High efficiency up to 94%
- Maximum 240W output power
- Operating ambient temperature range: -40℃ to +85℃
- Input voltage range: 18 - 75VDC
- Industry standard 1/8-Brick package and pin-out
- Input under-voltage protection, output short-circuit, over-current protection, over-temperature protection

KJB48xxEBO-10A series are high efficiency switching regulators. It features ultra-wide input range of 18- 75V, efficiency up to 94%, operating temperature of -40℃ to + 85℃, input under-voltage protection, output short-circuit and output over-current protection, over-temperature protection, remote control, output voltage regulation and remote compensation and other functions. It is widely used in robotics, communications, battery management, DC-DC distributed power supply and other occasions.

Selection Guide

Certification	Part No.	Input Voltage(VDC) Nominal① (Range)	Output Voltage (VDC)	Output Current(A) Max.	Full Load Efficiency③(%) Min./Typ.	Capacitive Load (μF) Max.
--	KJB4805EBO-10A	48 (18-75)	5	10	86/88	8500
	KJB4812EBO-10A		12	10	89/92	5500
	KJB4824EBO-10A	48 (30-75)	24	10	91/94	3300

Notes:
① For input voltage exceeding 48VDC, an input capacitor of 330μF/100V is required;
② Current efficiency is measured at a nominal 48V input.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	Nominal 48VDC input voltage	KJB4805EBO-10A	--	1184	1212	mA
		KJB4812EBO-10A	--	2718	2809	
		KJB4824EBO-10A	--	5320	5495	
Input no-load power consumption	Nominal 48VDC input voltage	5VDC output	--	1	3	W
		12, 24VDC output	--	3	4.5	
Reflected Ripple Current	Nominal input voltage		--	200	--	mA
Start-up Voltage	KJB4805EBO-10A, KJB4812EBO-10A		--	--	18	VDC
	KJB4824EBO-10A		--	--	30	
Under-voltage Protection①	KJB4805EBO-10A, KJB4812EBO-10A		11	--	--	
	KJB4824EBO-10A		22	--	--	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			
Input Reverse Polarity Protection			Unavailable			
Ctrl②	Module on		Ctrl pin open or pulled high (TTL 3 - 20VDC)			
	Module off		Ctrl pin pulled low to -Vin (0 - 0.4VDC)			
	Input current when off		--	2	4	mA

Notes:
① Under voltage shutdown in no-load state at least need to add 1%Io dummy load at the output end to achieve complete shutdown;
② The voltage of the Ctrl control pin is relative to the input pin -VIND.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Input voltage range, 10% - 100%Io		--	±2	±3	%
Linear Regulation	Input voltage range, full load		--	±0.3	±1	
Load Regulation	Nominal 48VDC input voltage, 10% - 100%Io		--	±0.5	±2	
Transient Recovery Time	Nominal 48VDC input voltage, 25% load step change		--	300	500	us
Transient Response Deviation	Nominal 48VDC input voltage, 25% load step change	5VDC output	--	--	±8	%
		12, 24VDC output	--	--	±5	
Temperature Coefficient	Operating temperature -40℃ to +85℃, full load		--	±0.02	±0.04	%/℃
Ripple & Noise①	20MHz bandwidth, nominal 48VDC input voltage, full load	5VDC/12VDC output	--	200	300	mVp-p
		24VDC output	--	250	350	
Current Limit	Normal temperature, input voltage range		110	150	220	%Io
Short-circuit Protection	Input voltage range		Hiccup, continuous, self-recovery			

Notes:
① Parallel line test method is used for ripple noise test. For special requirements, please refer to Figure 2 and the Application Guide for Non-isolated Module Power Supply.

General Specificationsc

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Trim①			90	--	110	%Vo
Sense	See Use of Sense and precautions		--	--	105	
Operating Temperature			-40	--	+85	℃
Storage Temperature			-55	--	+125	
Pin Soldering Resistance Temperature	Wave-soldering, 10 seconds		--	--	260	
Storage Humidity	Non-condensing		5	--	95	%RH
Vibration			10-150Hz, 5g, 0.75mm, 90 Min. along X, Y and Z			
Switching Frequency②	Nominal 48VDC input voltage, full load	KJB4805EBO-10A	--	150	--	kHz
		KJB4812EBO-10A	--	150	--	
		KJB4824EBO-10A	--	200	--	
MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours

Notes:
①When using Trim and Sense, the voltage difference between input and output needs to be ⩾ 6VDC.
②For 24V output model in a windless environment when the input voltage is 65-75V, the operating temperature range is -40 ~ +70 ° .

Mechanical Specifications

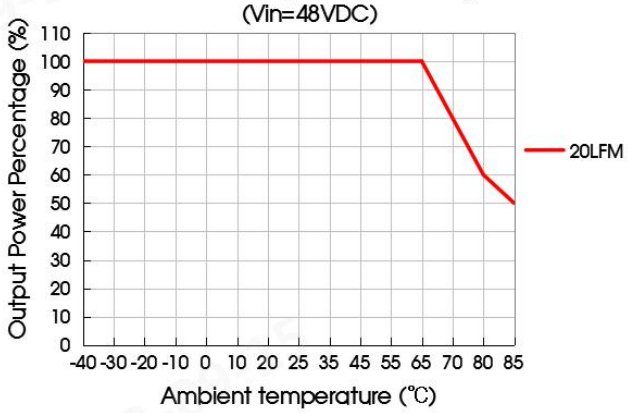
Dimension	57.37 x 21.57 x 12.20mm
Weight	16.0g(typ.)
Cooling Method	Natural air cooling or forced air cooling

Electromagnetic Compatibility (EMC)

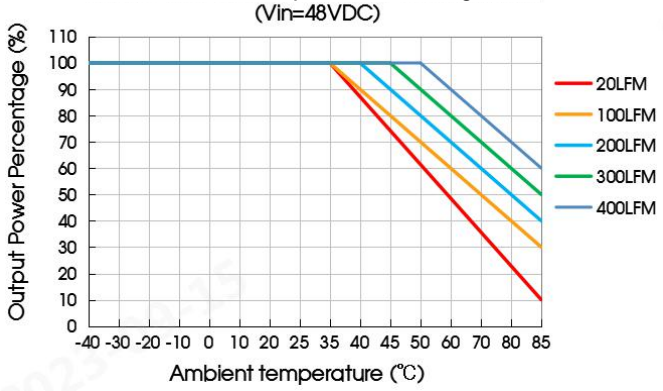
Emissions	CE	CISPR32/EN55032 CLASS A (see Fig. 3 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (see Fig. 3 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria B
	EFT	IEC/EN61000-4-4 ±2kV (see Fig. 3 for recommended circuit)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

Typical Performance Curves

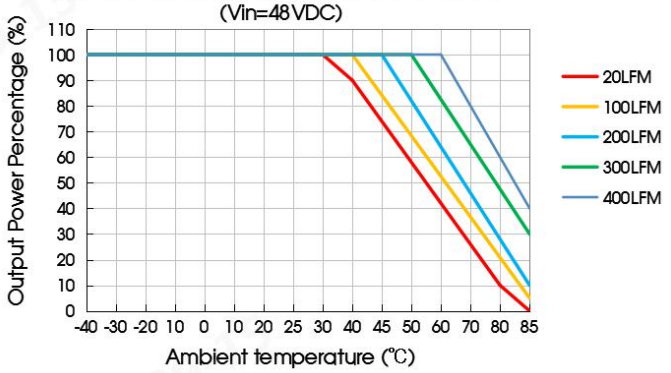
KJB4805EBO-10A Temperature Derating Curves
(Vin=48VDC)



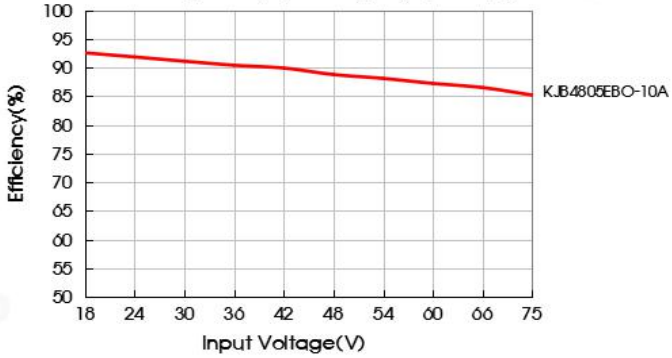
KJB4812EBO-10A Temperature Derating Curves
(Vin=48VDC)



KJB4824EBO-10A Temperature Derating Curves
(Vin=48VDC)



Efficiency Vs Input Voltage (Full Load)



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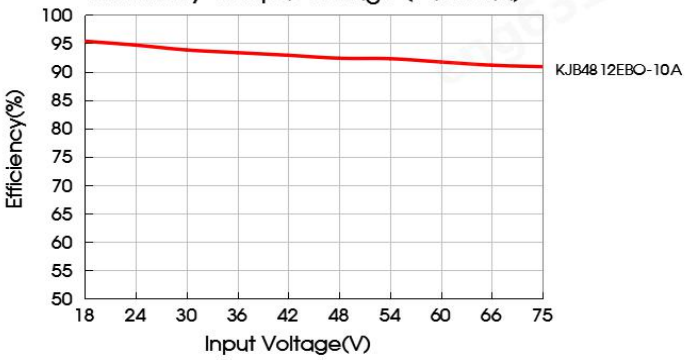
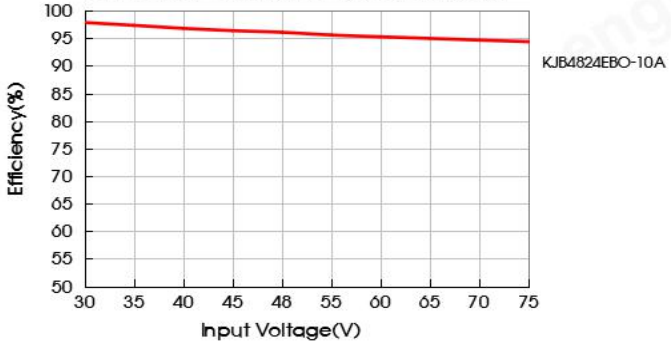
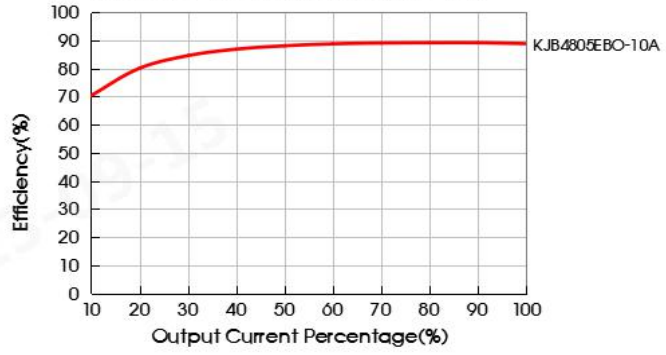


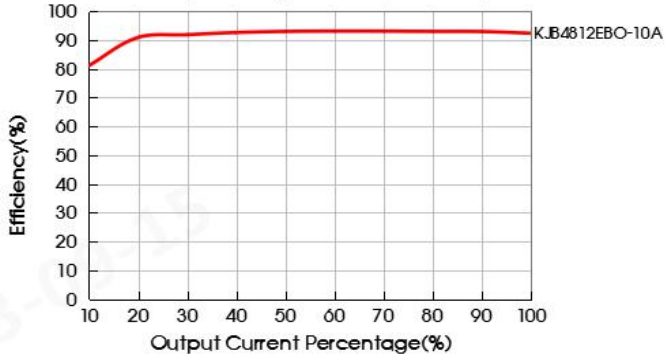
Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load(Vin=48V)



Efficiency Vs Output Load(Vin=48V)



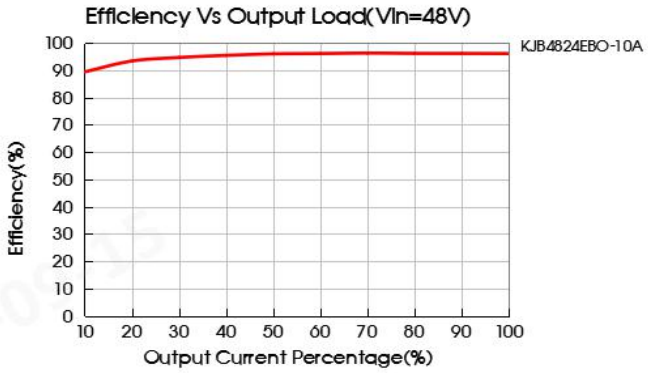
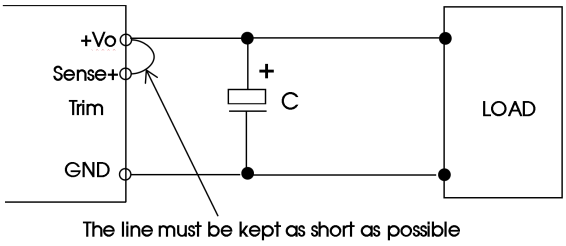


Fig. 1

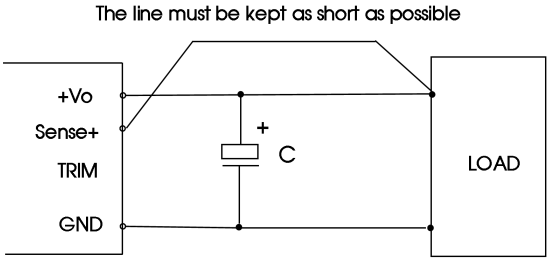
Remote Sense Application

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 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

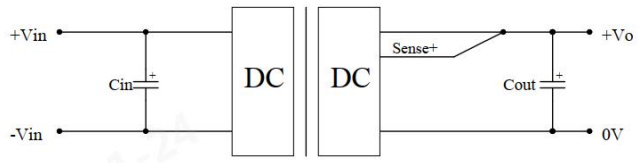


Notes:
(1) Using remote sense with long wires may cause unstable output, please contact technical support if long wires must be used;
(2) We recommend using adequate cross section for PCB-track layout and/or cables to connect the power supply module to the load in order to keep the voltage drop below 0.3V and to make sure the power supply's output voltage remains within the specified range;
(3) 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. Applied circuit

(1) During product testing and application, please follow the recommended test circuit (Fig. 2); At least one electrolytic capacitor Cin is guaranteed to be connected externally to suppress the possible input surge voltage;
(2) If the input terminal of the product is connected in parallel with a circuit with large transient energy (such as a parallel motor drive circuit), the input voltage of the product may be pulled down. At this time, pay attention to the fluctuation of the input voltage of the product, and it is recommended to appropriately increase the capacitance of the electrolytic capacitor Cin at the input terminal to ensure the stability of the input terminal voltage and avoid the situation where the input voltage is lower than the under-voltage protection point and cause the product to restart repeatedly;
(3) If the input and output ripple needs to be further reduced, Cin and Cout capacity of external capacitors can be appropriately increased or external capacitors with small series equivalent impedance can be selected.



Cin	Cout
330μF/100V(ESR<45mΩ)	330μF/50V

Fig. 2

2. EMC compliance circuit

When measuring EMC characteristics of the product, you are advised to follow the recommended test circuit (as shown in Fig. 3). The following table lists the recommended circuit parameters.

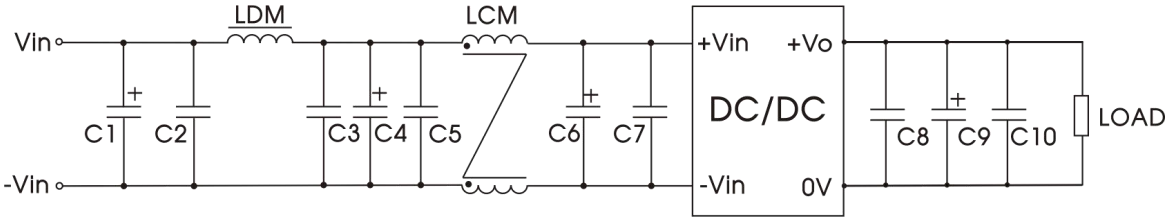
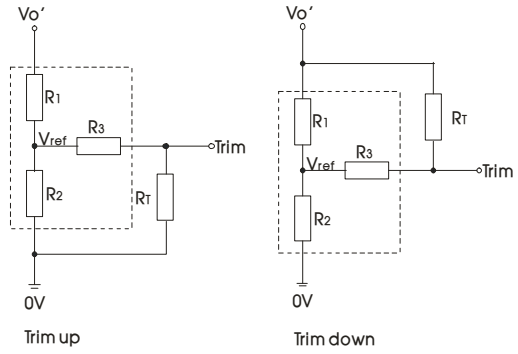


Fig. 3

Device No	Device Parameters
C1，C6	1000μF/100V Electrolytic capacitor
C2，C3，C5，C7	4.7 μF/100V Ceramic capacitor
LDM	10uH/15A chip inductor
LCM	FL2D-D0-040 (MORNSUN)
C8，C10	4.7 μF/50V Ceramic capacitor

3. Trim Function for Output Voltage Adjustment



Trim usage circuit (dotted box is inside the product)

Trim resistance calculation formula:

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

R_T : the Trim resistor

A : a user-defined parameter and has no actual meaning

Vo ': the actual up or down voltage required

Part No.	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
KJB4805SBO-10A	75	14.35	10	0.8
KJB4812SBO-10A	33	2.36	10	0.8
KJB4815SBO-10A	68	2.34	17.4	0.8

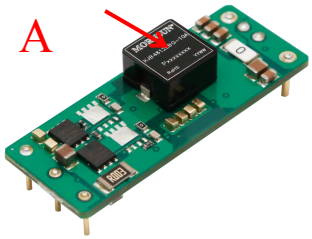
Notes:

①When the Trim function is connected to 0V to increase the voltage, the input and output pressure difference should be maintained at least 6V;

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

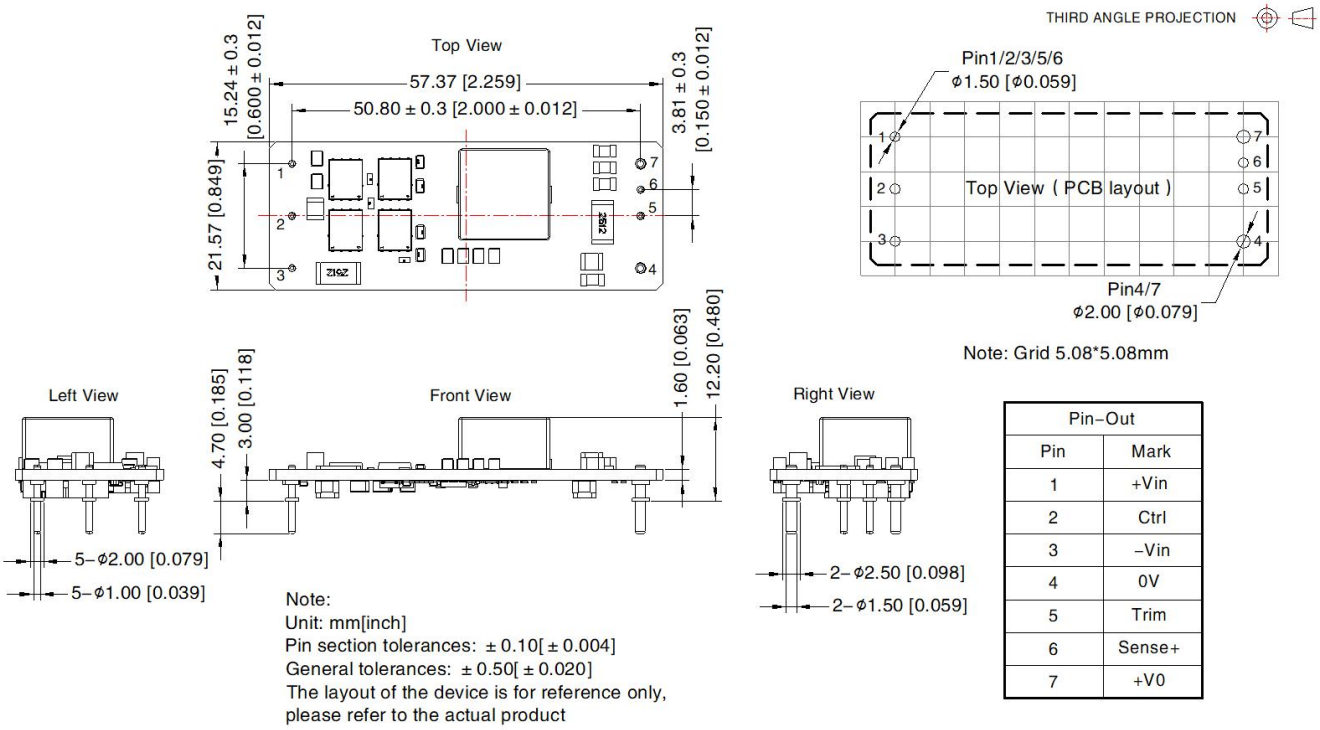
5. Recommended solution for thermal test

In the application process, the product temperature derating curve can be combined to evaluate the product thermal design; The temperature of point A is used to determine the stable operating range of the product, when it is lower than 125℃, it is the stable operating range.



6. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



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

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tape/Reel packaging bag number: 58210332;
2. The maximum capacitive load offered were tested at nominal input voltage 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 our 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.

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