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



Patent Protection RoHS

FEATURES

- Input voltage range: 18 - 85VDC
- Maximum 252W output power
- High efficiency up to 98%
- Input under-voltage protection, output short-circuit, over-current protection, over-temperature protection
- Operating ambient temperature range: -40℃ to +85℃
- Industry standard 1/16-Brick package and pin-out

KJB48xxSBO-10A series are high efficiency switching regulators. It features ultra-wide input range of 18- 85V, efficiency up to 98%, 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)		Output		Full Load Efficiency③(%) Min./Typ.	Capacitive Load (μF) Max.
		Nominal① (Range)	Max.②	Voltage (VDC)	Current(A) Max.		
--	KJB4805SBO-10A	48 (18-85)	90	5	10	91	8500
	KJB4812SBO-10A			12	10	95	5500
	KJB4815SBO-10A	48 (21-85)		15	10	95	3300
	KJB4824SBO-10A	48 (30-85)		24	10	97	3300
	KJB4836SBO-7A	48 (43-85)		36	7	98	1000

Note:
① For input voltage exceeding 48VDC, an input capacitor of 330μF/100V is required;
② Exceeding the maximum input voltage may cause permanent damage;
③ 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 input voltage	KJB4805SBO-10A	--	1145/2	1184/--	mA
		KJB4812SBO-10A	--	2632/2	2718/--	
		KJB4815SBO-10A	--	3290/2	3397/--	
		KJB4824SBO-10A	--	5155/2	5320/--	
		KJB4836SBO-7A	--	5358/2	5527/--	
Reflected Ripple Current	Nominal input voltage		--	200	--	
Surge Voltage (1sec. max.)			-0.7	--	90	VDC
Start-up Voltage	KJB4805SBO-10A, KJB4812SBO-10A		--	17	18	
	KJB4815SBO-10A		--	20	21	
	KJB4824SBO-10A		--	29	30	
	KJB4836SBO-7A		--	42	43	
Under-voltage Protection	KJB4805SBO-10A, KJB4812SBO-10A		13	--	--	
	KJB4815SBO-10A		16	--	--	
	KJB4824SBO-10A		25	--	--	
	KJB4836SBO-7A		36	--	--	

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Input Filter		Capacitance filter			
Hot Plug		Unavailable			
Input Reverse Polarity Protection		Unavailable			
Ctrl*	Module on	Ctrl pin open or pulled high (TTL 3 - 20VDC)			
	Module off	Ctrl pin pulled low to GND (0 - 1VDC)			
	Input current when off	--	1	5	mA

Note: *The voltage of the Ctrl control pin is relative to the input pin GND

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 input voltage, 10% - 100%Io		--	±0.5	±2	
Transient Recovery Time	Nominal input voltage, 25% load step change		--	300	500	us
Transient Response Deviation	Nominal input voltage, 25% load step change	5VDC output	--	--	±8	%
		Other output	--	--	±5	
Temperature Coefficient	Operating temperature -40℃ to +85℃, full load		--	±0.02	--	%/℃
Ripple & Noise①	20MHz bandwidth, nominal input voltage, full load		--	200	300	mVp-p
Over-temperature Protection③	Maximum surface temperature of the product		--	125	--	℃
Current Limit	Normal temperature, input voltage range		110	130	230	%Io
Short-circuit Protection	Input voltage range		Hiccup, continuous, self-recovery			

Note: ① The method is used for ripple and noise test, please refer to Fig.2 and DC-DC Converter Application Notes for specific information;
② Over-temperature protection for product is output off.

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	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
	Wave soldering,10 seconds		255	260	265	
Storage Humidity	Non-condensing		5	--	95	%RH
Vibration			10-150Hz, 5g, 0.75mm, 90 Min. along X, Y and Z			
Switching Frequency②	Nominal input voltage, full load	KJB4805SBO-10A, KJB4812SBO-10A	--	300	--	kHz
		KJB4815SBO-10A	--	360	--	
		KJB4824SBO-10A	--	420	--	
		KJB4836SBO-7A	--	400	--	
MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours

Note: ① When using Trim and Sense, the 24VDC output needs to meet Vin≥34VDC, the 36VDC output needs to meet Vin≥48VDC;
② Switching frequency varies with input voltage and load, ranging from 110-750 kHz.

Mechanical Specifications

Dimension	33.02x 22.86x 11.80mm
Weight	14.5g(Typ.)
Cooling Method	Natural air cooling or forced air cooling

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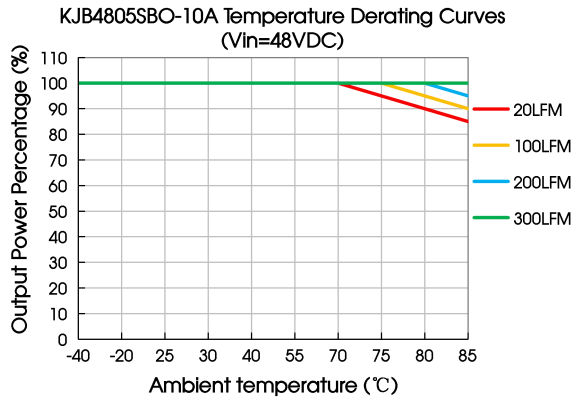
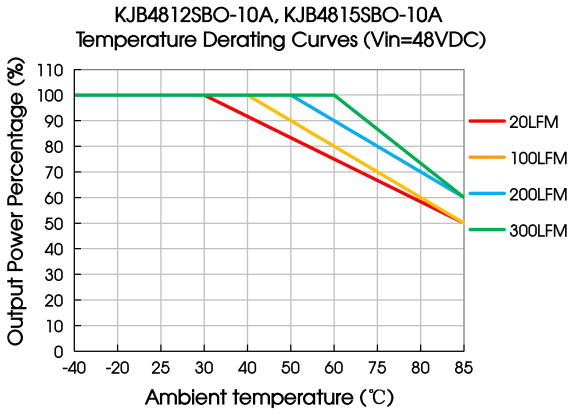
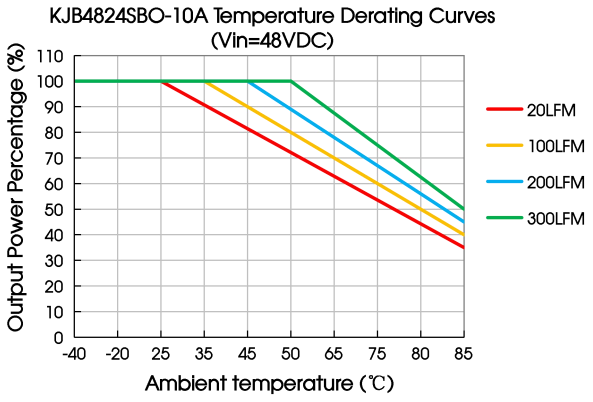
Electromagnetic Compatibility (EMC)

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, Air ±8kV	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 A
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig. 3 for recommended circuit)	perf.Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf.Criteria A

Typical Performance Curves







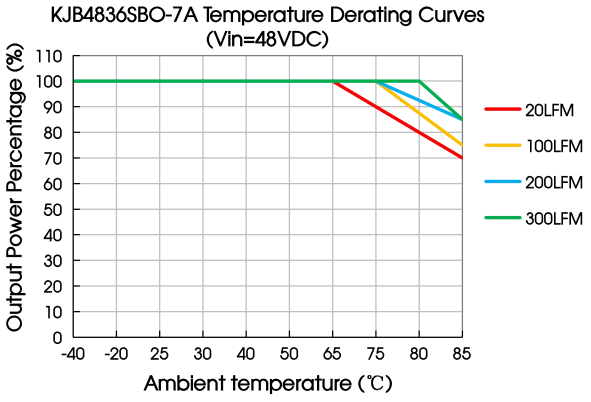
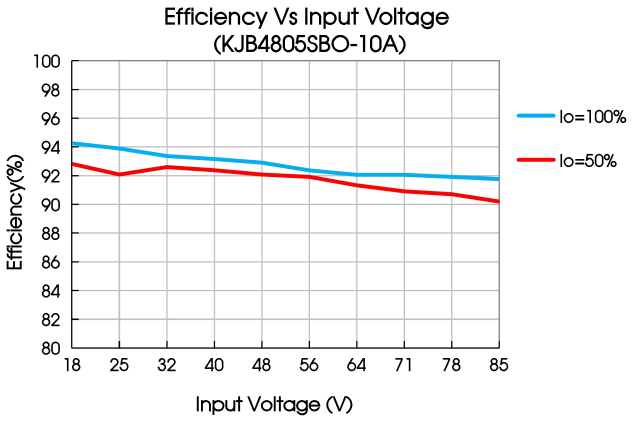
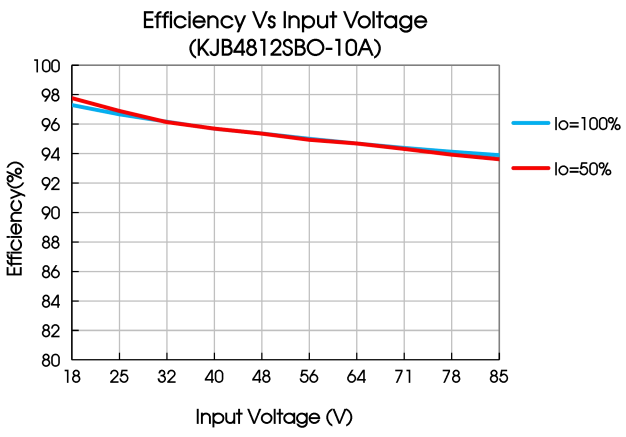


Fig. 1





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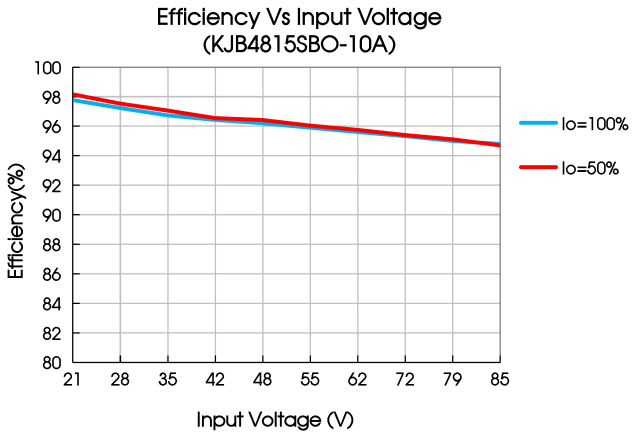
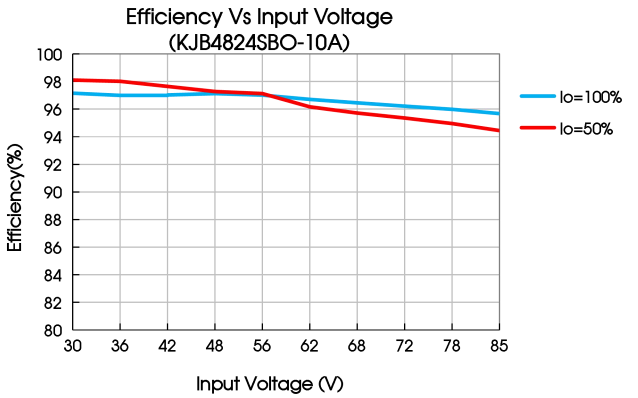
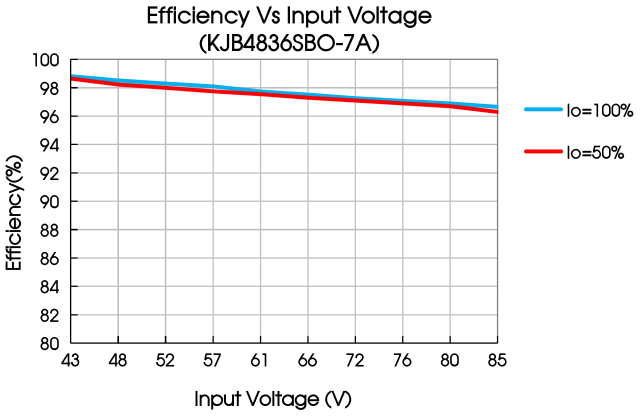
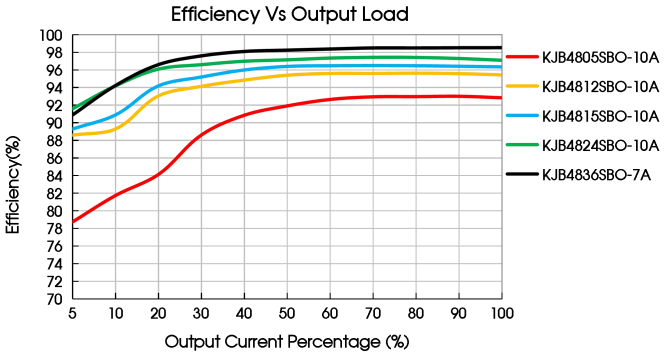


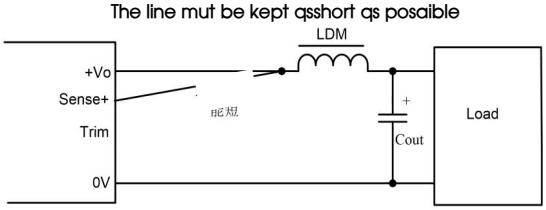






Remote Sense Application

1. Remote Sense Connection if not used

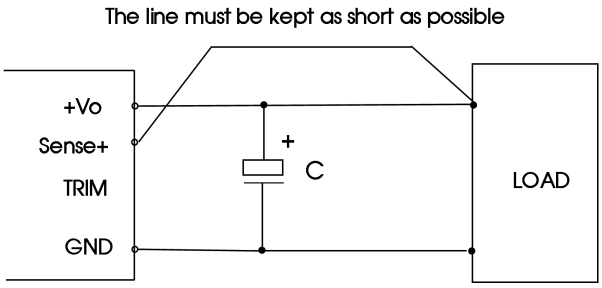


Note：

(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



Note:

(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

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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; An external inductor and electrolytic capacitor are connected to output for output filtering;
(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.

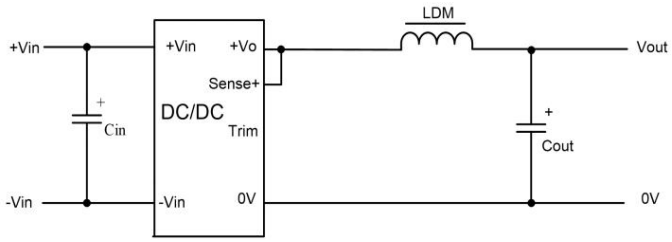

Fig. 2

Cin	LDM	Cout
330μF/100V(ESR<45mΩ)	0.47μH/27A	330μF/50V

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.

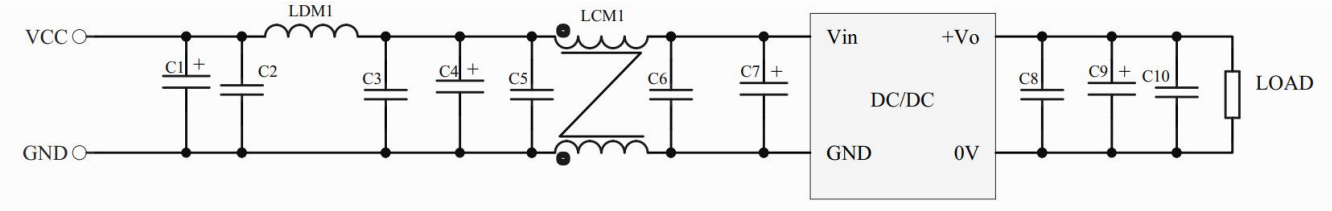

Fig. 3

Device No	Device Parameters	Device Function
C1	2000μF/100V Electrolytic capacitor	Meet pulse group and surge
C7	330μF/100V Electrolytic capacitor	
C1, C4, C7	330μF/100V Electrolytic capacitor	Meet the requirements of conduction disturbance and radiation disturbance
C2, C3, C5, C6	4.7 μF/100V Ceramic capacitor	
C8, C10	4.7 μF/50V Ceramic capacitor	
C9	330μF/50V Electrolytic capacitor	
LDM1	8.2uH/10A chip inductor	
LCM1	FL2D-D0-040 (MORNSUN)	

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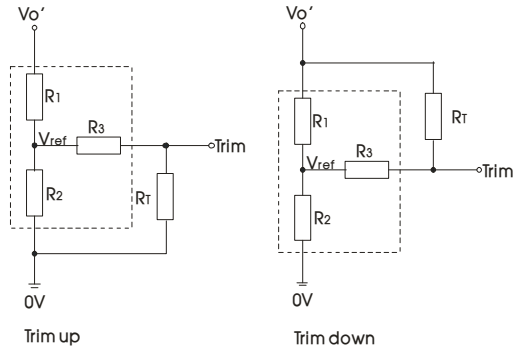
3. Trim Function for Output Voltage Adjustment



Trim usage circuit (dotted box is inside the product)

Trim resistance calculation formula:

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

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

R_T : the Trim resistor
A : a user-defined parameter and has no actual meaning
Vo ': the actual up or down voltage required

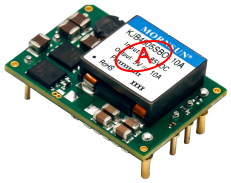
Part No.	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
KJB4805SBO-10A	6.8	2.87	12.8	1.5
KJB4812SBO-10A	20	2.87	14.7	
KJB4815SBO-10A	25.80	2.87	17.5	
KJB4824SBO-10A	43.13	2.87	17	
KJB4836SBO-7A	83.08	3.6	20.4	

When using the Trim function, it is not recommended to directly short-circuit the Trim and +Vo pins or the Trim and 0V pins, which may cause irreversible damage to the product.

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

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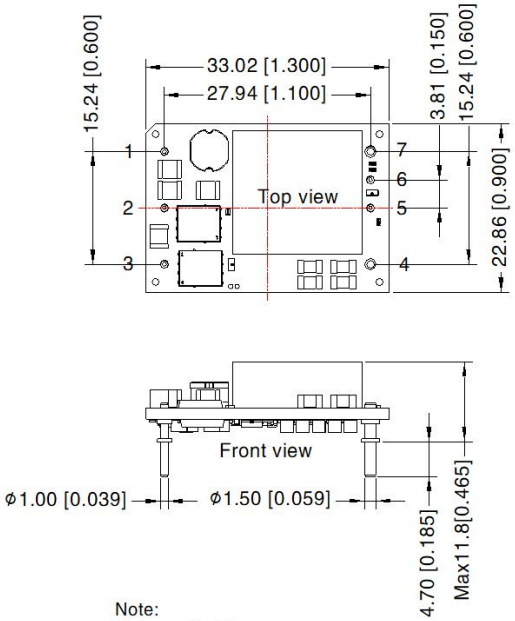
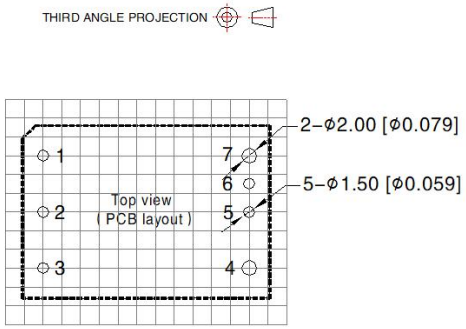
Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
PIN 1/2/3/5/6: ϕ1.0mm; PIN 4/7: ϕ1.5mm
The layout of the device is for reference only, please refer to the actual product



Note: Grid 2.54*2.54mm

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

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210102;
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.

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