AC/DC Converter
LBF750-13Bxx Series

MORNSUN®

750W, AC-DC Brick Converter

CE Report EN62368-1 UKCA BS EN 62368-1 RoHS 5年质保

FEATURES

- Ultra-wide 85 - 305VAC and 120 - 430VDC input voltage range
- 750W, international standard full brick package
- PFC & DCDC converter integrated package
- Typical efficiency up to 92%, PF value up to 0.99
- Output voltage adjustable ±10%
- Input under-voltage protection, over temperature protection, output short circuit/over-voltage/ over-current protection
- Integrated parallel current sharing, status indication, remote control, auxiliary power supply, remote compensation function
- Designed to meet UL/IEC/EN62368, GB4943 standards

LBF750-13Bxx series is the Mornsun AC-DC brick package power supply. They feature universal AC input and at the same time accepts DC input voltage, high power density, high efficiency, reinforced isolation. It offers good EMC performance compliant to CISPR32/EN55032, UL/IEC/EN62368 standards. The products are widely used in military, industrial control, data communication, network communication, server, vehicle/airborne/ship system and other industries. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.③
EN	LBF750-13B12	696W	12V/58A	90	5000
	LBF750-13B24	750W	24V/31.2A	91	4000
	LBF750-13B28		28V/26.8A	91	3000
	LBF750-13B48		48V/15.6A	92	1000
	LBF750-13B54		54V/13.9A	92	820

Note:
1. The product picture is for reference only. For details, please refer to the actual product.
2. *Under any steady-state conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current.

Input Specifications③

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		85	--	305	VAC
	DC input		120	--	430	VDC
Input Frequency			47	--	63	Hz
Input Current	115VAC		--	6.7	10	A
	230VAC		--	3.6	5	
Inrush Current	115VAC	External 12Ω power resistor	--	20	--	
	230VAC		--	40	--	
Power Factor	115VAC		PF≥0.99			
	230VAC		PF≥0.96			
Input Under-voltage Protection	Under-voltage protection start		60	--	75	VAC
	Under-voltage protection release		75	--	85	
Input Reverse Protection	DC input		Reverse connection without output, the product is not damaged			
Remote Control Switch (ON/OFF)*			ON/OFF connect to COM or Low-level (0-1VDC) or left open, Power on			
			ON/OFF connect to AUX or High-level (3-14VDC), Power off			

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Hot Plug		Unavailable
Note: *Remote Control Switch (ON/OFF) control the voltage of pin relative to pin COM.		

Output Specifications①

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range		--	±2	--	%
Line Regulation	Rated load		--	±0.5	--	
Load Regulation	10% -100% load		--	±0.5	--	
Ripple & Noise②	⩾10% Io, 20MHz bandwidth (peak-to-peak value)	12V	--	180	--	mV
		24V	--	180		
		28V	--	200		
		48V	--	340	--	
		54V	--	380	--	
Stand-by Power Consumption	Room temperature, 0% Io, 230VAC input voltage		--	3	--	W
Hold-up Time	115/230VACinput (PFC capacitor 840uF)		--	8	--	ms
Minimum Load③			10	--	--	%
Output Voltage Adjustable (Trim)			90	--	110	%Vo
Output Voltage Remote (Sense)			--	--	105	
Parallel (PC)	PC to COM in parallel		Support direct parallel use, achieve N+1 parallel redundancy			
Current Staring Accuracy	Output >50% Io		--	--	5	%
Auxiliary Source Supply (AUX)	Io=50mA		10	--	14	V
IOG Status Indication④	Normal output		IOG output low-level: 0~1V			
	Abnormal output		IOG output high-level: 8~15V			
Short Circuit Protection			Hiccup or turn off, self-recover			
Over-current Protection⑤			⩾105% Io, self-recover			
Over-voltage Protection	12VDC output		⩽20VDC (Hiccup or clamp)			
	24VDC output		⩽35VDC (Hiccup or clamp)			
	28VDC output		⩽35VDC (Hiccup or clamp)			
	48VDC output		⩽63VDC (Hiccup or clamp)			
	54VDC output		⩽70VDC (Hiccup or clamp)			
Over Temperature Protection	Over-temperature protection start (Al-Substrate temperature)		⩾105℃, Locked-up			
	Over-temperature protection recovery		Power off, BOOST discharge, restart			

Note: ① The above specifications are tested at the rated input voltage based on the recommend circuit 1.
② The "Tip and barrel method" is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information;
③ The product is able to work stably at load of 0% - 10%;
④ In the old version, when the power supply is normal, the IOG output is 'pulse'.
⑤ Long-term overload power cannot exceed 1.1 times of rated output power.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input - Output	Electric Strength Test for 1min., leakage current <5mA	3000	--	--	VAC
	Input - PE		2500	--	--	
	Output - PE		1500	--	--	
Insulation Resistance	Input - Output	Ta=25±5℃, Relative humidity: <95%RH, non-condensing Testing voltage: 500VDC	100	--	--	MΩ
	Input - PE		100	--	--	
	Output - PE		100	--	--	
Al-Substrate Temperature			-40	--	+100	℃
Storage Temperature			-40	--	+100	
Storage Humidity		Non-condensing	--	--	95	%RH

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Soldering Temperature	Wave-soldering		260 ± 5℃; time: 5 - 10s			
	Manual-welding		360 ± 10℃; time: 3 - 5s			
Switch Frequency			--	130	--	kHz
Power Derating	Al-Substrate Temperature	+50℃ to +100℃ (12V output)	0.88	--	--	%/℃
		+70℃ to +100℃ (Other output)	0.67	--	--	
	Input voltage	85VAC - 150VAC	0.43	--	--	%/VAC
	Altitude	2000m - 5000m	6.67	--	--	℃/Km
Safety Standard			BS EN/EN62368-1(report) safety approved; Design refer to UL/IEC62368-1, GB4943.1			
Safety Class			CLASS I			
MTBF	MIL-HDBK-217F@25℃		≥500,000 h			

Mechanical Specifications

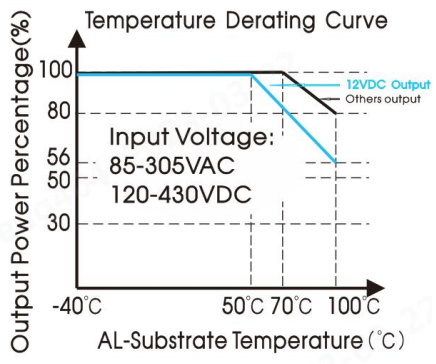
Case Material		Aluminum substrate+black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	DIP	116.80 x 61.00 x 12.70mm
Weight	DIP	260g (Typ.)
Cooling method		Conduction heat dissipation, it is necessary to ensure that the product aluminum substrate surface temperature lower than 100℃.

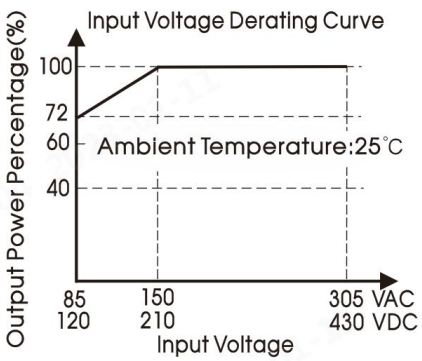
Electromagnetic Compatibility (EMC)*

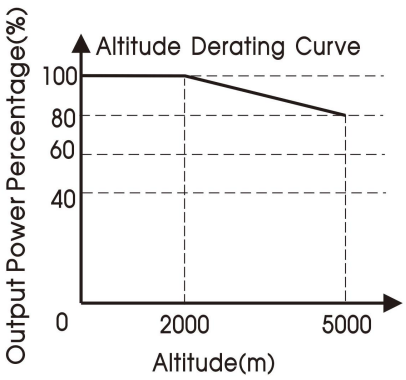
Emissions	CE	CISPR32/EN55032	CLASS A	
		CE102 GJB151B	(See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A	
	Harmonic current	EN61000-3-2	CLASS A	
	THD	EN61000-3-2	≤8%	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria A
	Surge	IEC/EN61000-4-5	Line to line ±1KV/line to PE ±2KV	perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	MS	IEC/EN61000-4-8	10A/m	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

Note: *Except for CE102 of the CE, other EMC test results are based on recommended circuit 1.

Product Characteristic Curve







Note:
1. With an AC input voltage between 85 - 150VAC/120 - 210VDC the output power must be derated as per the temperature derating curves;
2. The temperature derating curve is a typical test value, the working condition is heat sink with air cooling.

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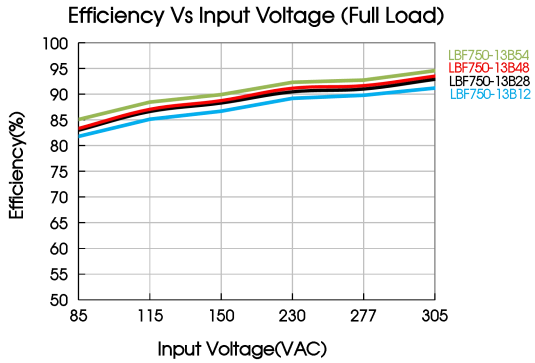

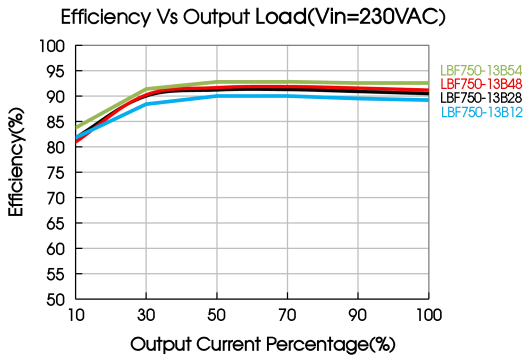

Additional Circuits Design Reference

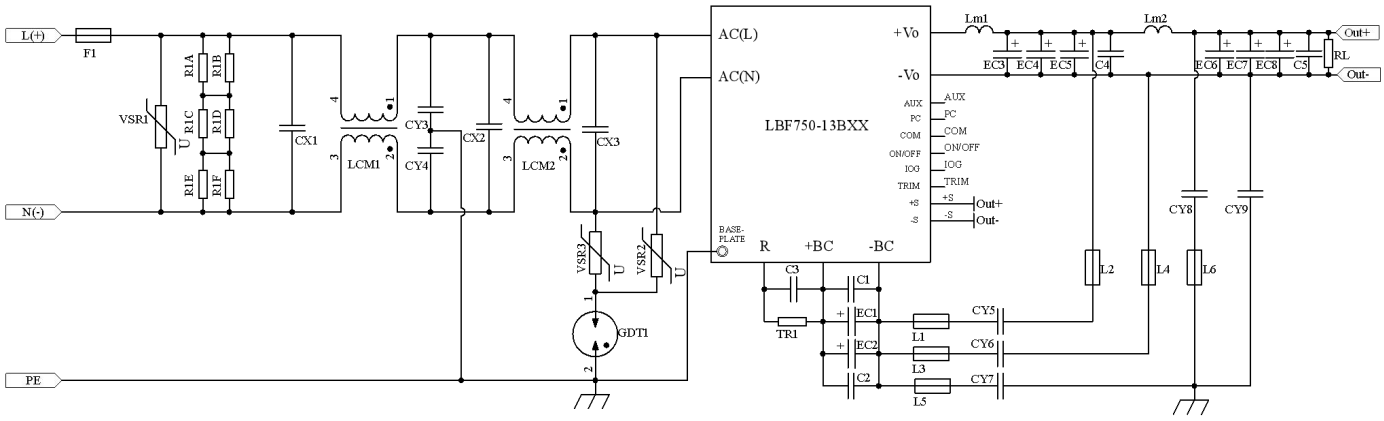

Fig. 1: Recommended circuit 1

Component	Recommended value	
F1	300VAC/15A, show-blow	
VSR1/VSR2/VSR3	S14K350/6000A	
R1A/R1B/R1C/R1D/R1E/R1F	240KΩ/1206 (X capacitor leakage)	
CX1/CX2/CX3	225K/310VAC	
LCM1/LCM2	2mH, P/N: FL2D-A2-202 (MORNSUN) is recommended	
GDT1①	800V/5KA (GDT)	
EC1/EC2②	470uF/450V (Electrolytic Capacitor)	
C1②	683K/630V	
C2②	472K/630V	
C3③	683K/630V	
TR1③	12-51Ω (Recommended two resistors 5W43RF in parallel of PAK HENG)	
CY3/CY4/CY7	Y2/472M/250VAC	
CY5/CY6/CY8	Y2/222M/250VAC	
CY9	Y2/102M/250VAC	
L1/L2/L3/L4	K081/T3.5*1.5*2.35/G300±25%	
L5/L6	4x3.1x2.6/47Ω/DCR 0.004Ω Max (Suppressing high frequency beads, recommended HCB403026-470Y of HUASUN)	
Lm1	12V	0.33uH/0.35mΩ Max/80A (Recommended RKR0415-R39M of CODACA)
	24V/28V/48V/54V	short-circuit
Lm2	48V	0.55uH/0.65mΩ Max/52A (Recommended RKR0620-R55M of CODACA)
	12V/24V/28V/54V	short-circuit

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EC3/EC4/EC5/EC6/EC7/EC8④	12V	1000uF/16V/5600mA（Electrolytic Capacitor）
	24V/28V	680uF/35V/2900mA（Electrolytic Capacitor）
	48V	330uF/63V/1200mA（Electrolytic Capacitor）
	54V	330uF/100V/930mA（Electrolytic Capacitor）
C4/C5⑤	12V/24V/28V	106K/50V/1206
	48V/54V	225K/100V/1206
RL⑥	12V	150Ω/3W (supports multiple resistors in parallel)
	24V/28V	0.5KΩ/3W (supports multiple resistors in parallel)
	48V/54V	2KΩ/3W (supports multiple resistors in parallel)

Note:
①For lightning surge protection, isolation voltage test needs to be removed.
②C1, C2, EC1 layout should be close to the +BC and -BC terminals, the routing loop as short as possible, C1, C2 are recommended to use metallized polypropylene film capacitor or ceramic capacitor.
③In the actual layout of the power module, the absorption capacitors C3 and TR1 must be close to the power module. C3 is used to filter out PFC start voltage spikes, which may damage the power module if not connected. TR1 is used to suppress the starting inrush current, and the resistance power dissipation capacity should be paid attention to.
④EC3/EC4/EC5/EC6/EC7/EC8 are output filter electrolytic capacitor. It is recommended to use high frequency and low resistance solid-state electrolytic capacitors, and the PCB layout should consider the flow equalization of each capacitor.
⑤C4/C5 are ceramic capacitors, used for filtering high frequency noise .Not required if ripple noise is satisfied.
⑥RL is a resistor, can be multiple parallel, and the resistance value after parallel equivalence is the same as the recommended value of RL.

Conducted Emission (CE102) Recommended Circuit

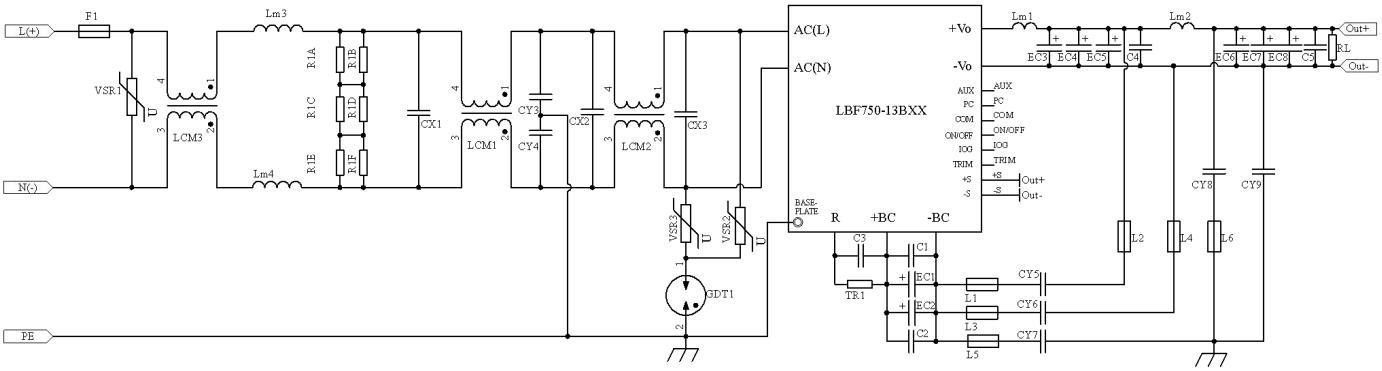

Fig. 2: Recommended circuit 2

Component	Recommended value
LCM3	5.6mH, P/N: FL2D-50-203 (MORNSUN) is recommended
Lm3/Lm4	2mH, P/N: FD2D-40-202(MORNSUN) is recommended

Note: 1. The external circuit component parameters are the same as those of the above recommended circuit 1.
2. This peripheral is only suitable for testing conventional input and output characteristics and cannot meet the requirements of EMC characteristics testing.

Minimum Circuits Design Reference

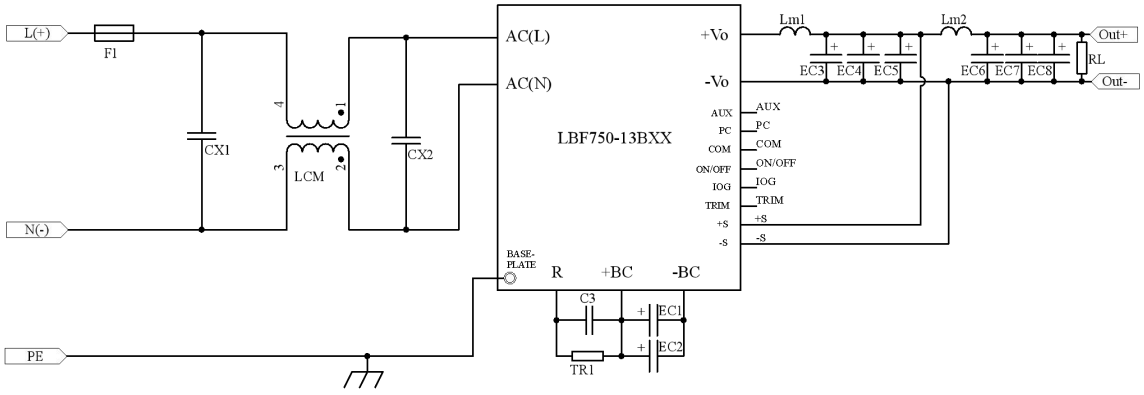

Fig.3：Recommended circuit 3

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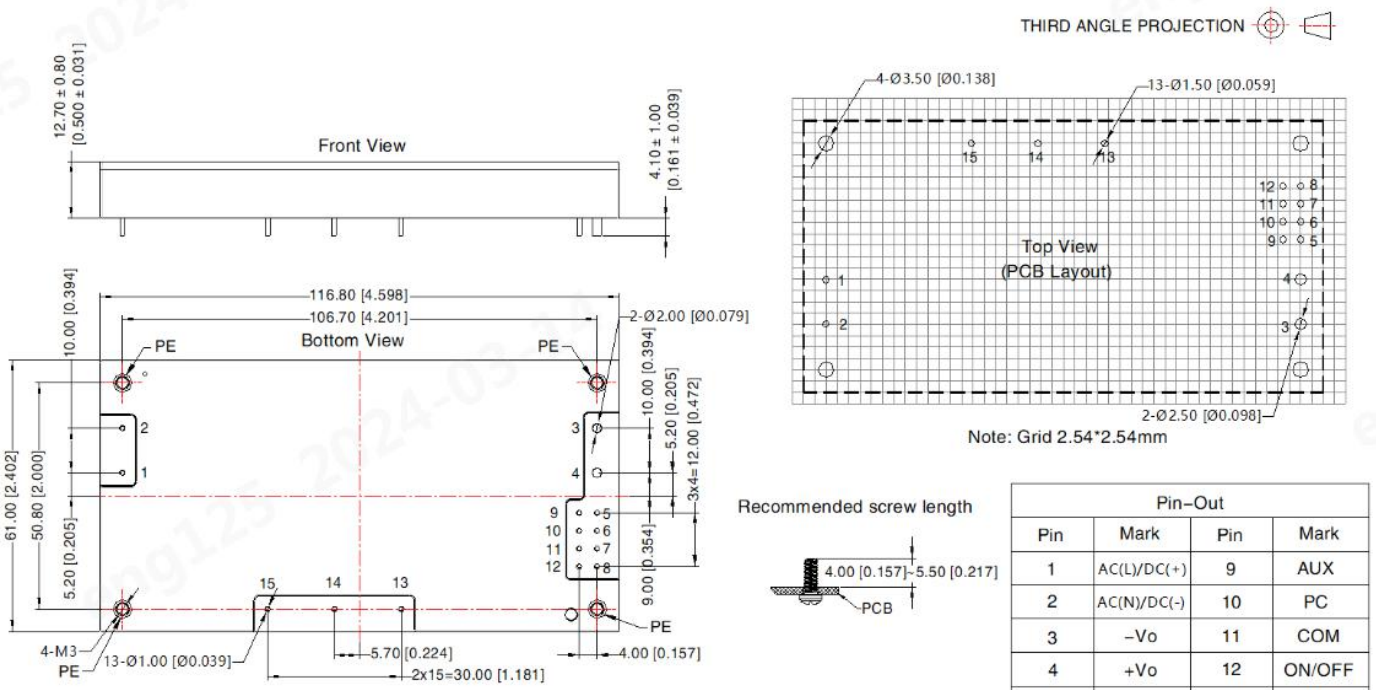
Component	Recommended value
LCM	2mH, P/N: FL2D-A2-202 (MORNSUN) is recommended
Note: The external circuit component parameters are the same as those of the above recommended circuit 1.	

Dimensions and Recommended Layout



Pin–Out			
Pin	Mark	Pin	Mark
1	AC(L)/DC(+)	9	AUX
2	AC(N)/DC(-)	10	PC
3	–Vo	11	COM
4	+Vo	12	ON/OFF
5	–S	13	–BC
6	+S	14	+BC
7	Trim	15	R
8	IOG		

Note:
Unit: mm[inch]
Pin3, 4's diameter: 2.00[0.079]
Pin1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15's diameter: 1.00[0.039]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
Mounting hole screwing torque: Max 0.4 N・m

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210413;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% 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.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 8 Nanyun 4th Road, Huangpu District, Guangzhou, China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com

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LBF750-13Bxx Series Power Supply Application Manual

Content

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1. Appearance Pin Definition

1.1. Appearance pin definition

Figure 1: Appearance pins

Terminal name	Terminal definition
AC(L)/DC(+)	AC input L line/DC input +
AC(N)/DC(-)	AC input N line/DC input -
-Vo	Output voltage negative
+Vo	Output voltage positive
-S	Output voltage negative end remote compensation
+S	Output voltage positive and remote compensation
TRIM	Output voltage adjustable terminal
IOG	Output status indicating terminal
AUX	Auxiliary power terminal for external signal
PC	Modules run in parallel
ON/OFF	Remote control switch
COM	Output signal reference ground (connecting to -Vo internally)
-BC	PFC output negative terminal
+BC	Output voltage positive terminal
R	Surge current suppression resistor external terminal

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2. Instructions For Use

2. 1. Input requirements

The AC input voltage and DC input voltage must be within the defined voltage range (refer to datasheet), otherwise the power supply may not work properly or even malfunction. There is no fuse inside the power module. For better protection, it is recommended that customers use a circuit breaker not greater than 15A.

To ensure the reliability of the product, hot plugging is prohibited.

2. 2. Output requirements

At any output voltage value, if the long-term normal operation, the maximum output current and power must not exceed the rated value, and ensure that the aluminum substrate temperature does not exceed the temperature derating curve requirements.

2. 3. Remote compensation (+S, -S terminals)

The +S/-S terminal is the output voltage sampling terminal. As shown in Figure 2, the +S and -S terminals are respectively connected to the load terminal (Out+ and Out-) through twisted-pair signal cables or differential signal cables (+S and -s) to compensate the line voltage drop between the module and the load. It should be noted that the +S and -S terminals must be connected to the load terminal through signal cables before the module is powered on, otherwise the module will enter over-voltage protection; If the remote compensation connection is not required, the +S and -S terminals can be shorted to the output positive and negative (+Vo and -Vo terminals) respectively.

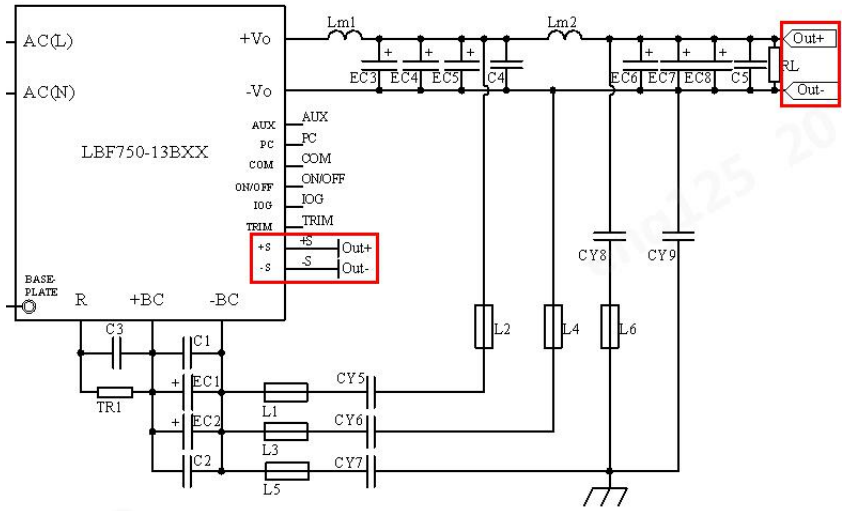

Figure 2: Schematic diagram of the remote compensation connection

2. 4. Output voltage adjustment (Trim terminal)

Trim terminal is the input end of the output voltage feedback signal. As shown in the wiring diagram in the red box in Figure 3, the output voltage of the module can be adjusted within ±10% of the rated output voltage by connecting the external resistor R3 and sliding rheostat RZ. When the output voltage is higher than the adjustable range, it may cause output over-voltage protection. When the output voltage increases, reduce the output current to ensure that the maximum output power of the module stays within the specified range. When the output voltage is lowered, the maximum output current remains unchanged.

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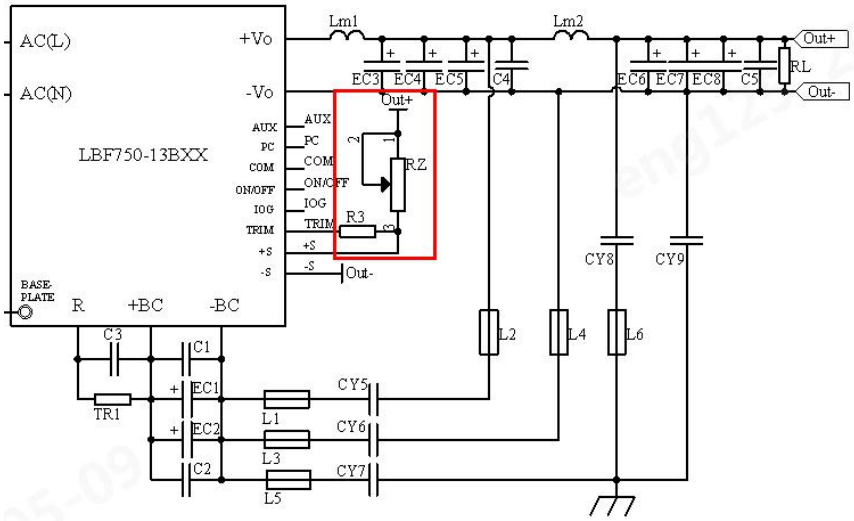

Figure 3: Schematic diagram of the output voltage regulation connection

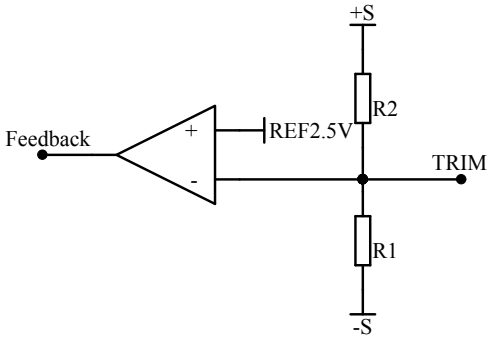

Figure 4: Internal circuit diagram

Trim resistance calculation formula:

$$Vo = \frac{V_{ref}}{R1} \cdot (R1 + R2 // R3 + RZ)$$

Part No.	R1	R2	R3	RZ (Adjustable resistor)	Output Voltage Adjustable Range
LBF750-13B12	2.629kΩ	10kΩ	56kΩ	0-2.9kΩ	10.8-13.2V
LBF750-13B24	3.83kΩ	33kΩ	220kΩ	0-8.6kΩ	21.6-26.4V
LBF750-13B28	2.35kΩ	24kΩ	150kΩ	0-6.4kΩ	25.2-30.8V
LBF750-13B48	5.4862kΩ	100kΩ	750kΩ	0-23.2kΩ	43.2-52.8V
LBF750-13B54	3.3kΩ	68kΩ	510kΩ	0-15.9kΩ	48.6-59.4V
Note: R1, R2 are built-in resistors, and Vref is 2.5V of internal reference.					

2. 5. Remote control switch (ON/OFF terminal)

Module built-in remote switch function. It can control the output on/off when the input voltage is on. The wiring diagram is shown in Figure 5 below. AUX terminals can be used to supply power to ON/OFF terminals. When the ON/OFF value is high, the power module shuts down the output. When external power supply is used, the power supply voltage is 3~14V to the COM pin. If the remote switch function is

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not used and the ON/OFF is suspended or the COM or low level (0~1VDC) is connected, the power module outputs normally.

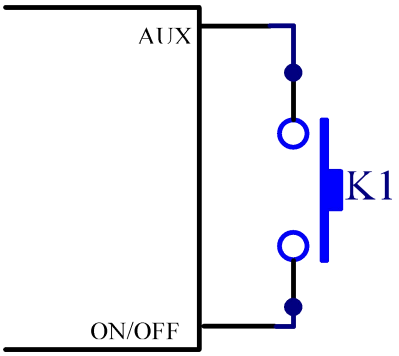

Figure 5: Schematic diagram of remote switch connection

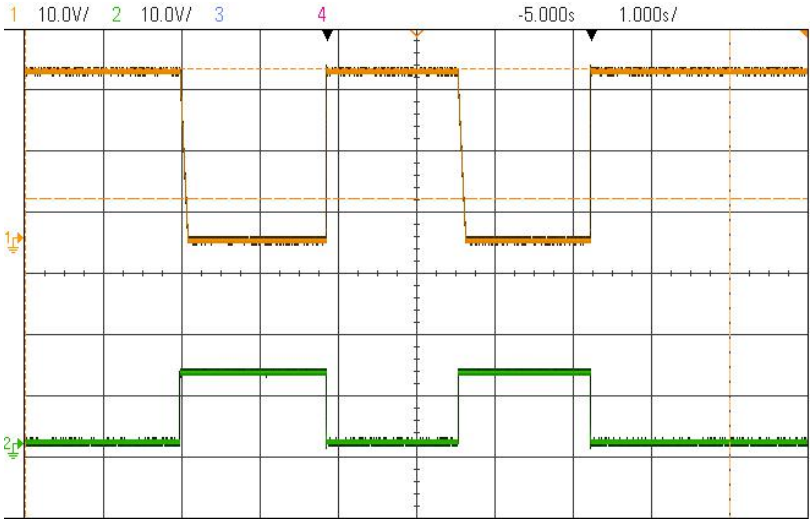

Figure 6: Output voltage diagram of ON/OFF function
(Channel 1 is the output voltage, channel 2 is the ON/OFF signal)

2. 6. Parallel operation (PC terminal)

The PC terminal is a parallel current sharing bus. Parallel-connect the PC and COM terminals of each power module to equalize the output current between modules. At the output end of the power supply, the output cable width and length of each module should be as consistent as possible, and the line impedance should be as similar as possible. After the output filtering of a single module, a load bus is drawn from the load end. After the output filtering, each module accesses the load bus nearby through the load line of the same specification and length, and the mobility is optimal. Parallel operation connection is shown in Figure 7 below. Laboratory verification 4+1 parallel OK.

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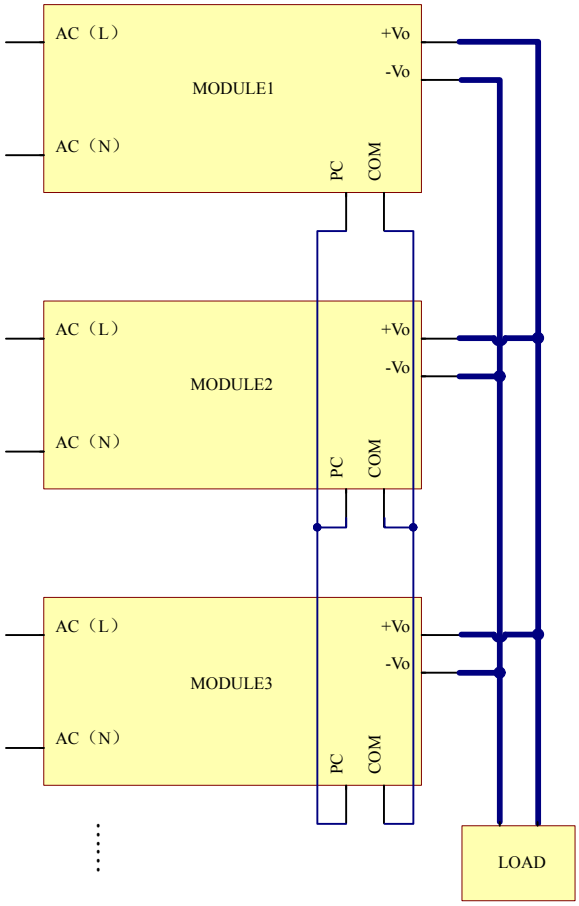

Figure 7: Diagram of parallel operation connection

2. 7. Auxiliary power supply for external signals (AUX terminal)

The AUX terminal output voltage ranges from 10-14VDC, and the maximum output current is 50mA. AUX terminal reference position COM terminal. Do not short-circuit the AUX terminal to a terminal other than the ON/OFF terminal. Otherwise, the power module may be damaged.

2. 8. IOG status indicator

The signal is the output signal of the module, and the reference ground is the COM terminal. By monitoring the signal from IOG terminal to COM terminal, it can detect whether the working status of the power module is normal.It is low when working normally and high when working abnormally. The following figure shows the waveform of IOG and output voltage in the process of full-load short-circuit cutting.

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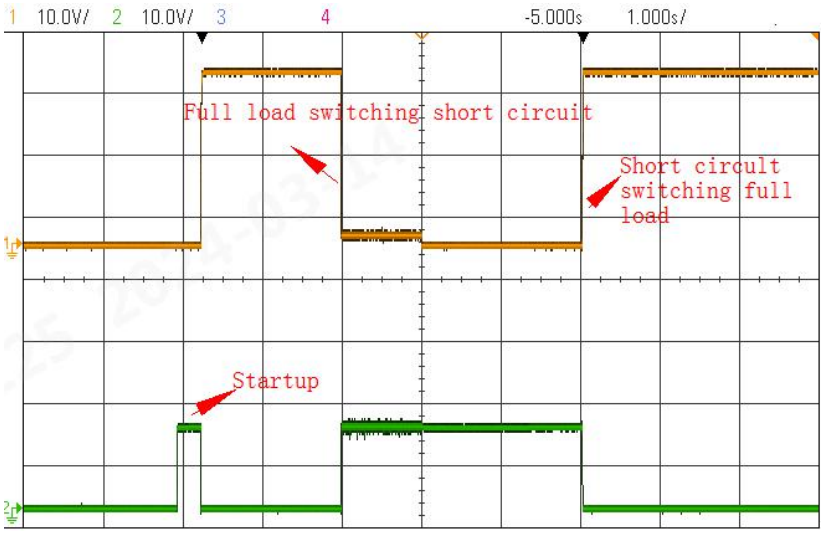

Figure 8: IOG status indication waveform
(Channel 1 is the output voltage waveform, channel 2 is the IOG waveform)

Note: The normal output is "low", when a fault occurs, the output is "high".

2. 9. Input under-voltage protection (UVP)

When the input voltage is lower than the under-voltage protection set value, the module output is closed; When the input voltage is higher than the under-voltage protection power-on set value, the module output is normal. The under-voltage protection has a return difference, that is, the shutdown setting value is lower than the start-up setting value, so as to prevent the module from being affected by external interference or the transient drop of input voltage when starting itself and working normally.

2. 10. Output over-voltage protection (OVP)

This module has output clamp type output over-voltage protection function. When the output end of the module is over-voltage, the output voltage clamped at a fixed value or hiccup. After the fault is rectified, the module output automatically recovers to normal.

2. 11. Over-current/short circuit protection

This module is designed with over-current/short circuit protection circuit, which can withstand over-current or short circuit at the output end. In short circuit state, the module is in belch state (200ms at work, 2s at rest), as shown in Figure 9. In case of short circuit with load cutting, the module can enter the rest state after constant current for 1s, as shown in Figure 9; After the over-current and short circuit faults are eliminated, the module output automatically recovers to normal.

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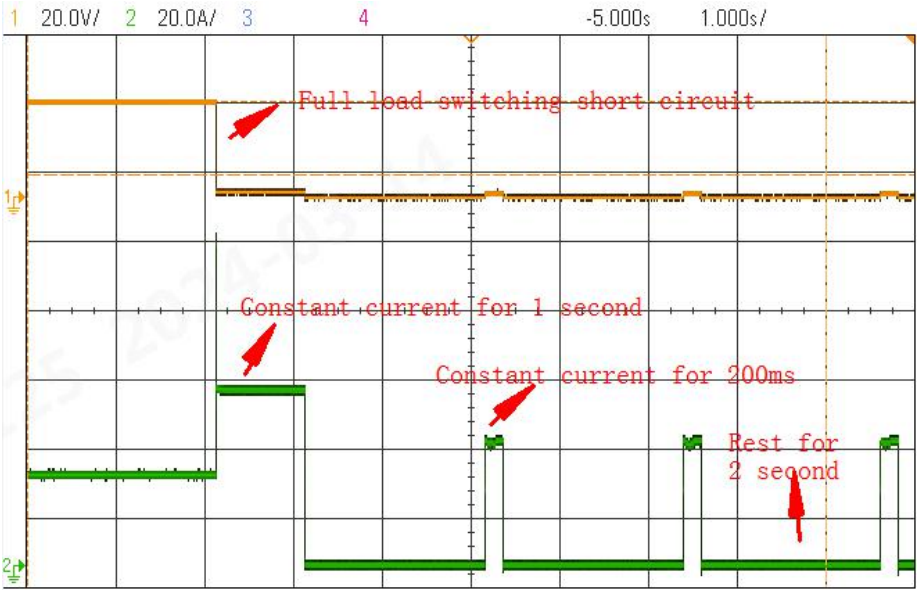


Figure 9: Diagram of full-load short-circuit cutting waveform
(Channel 1 is the output voltage waveform, channel 2 is the output current waveform)

2. 12. Over-temperature protection

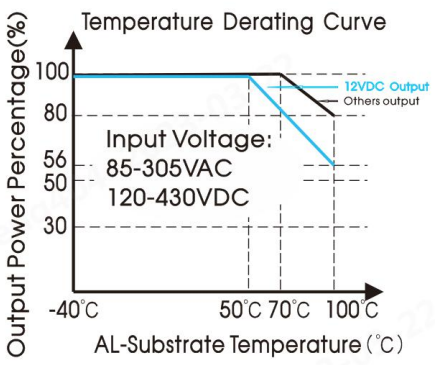
The module has built-in over-temperature protection circuit to prevent the module from being damaged due to excessive temperature rise such as overload and short circuit. When the temperature of the aluminum substrate exceeds the over-temperature protection setting value, the output of the module automatically shuts down. It needs to be powered off and reset to restore normal. Over-temperature protection circuit adopts thermistor sampling, instant overheating may not protect in time, resulting in product damage. Ensure good heat dissipation when using the product.

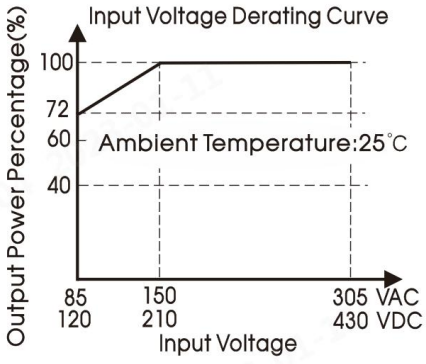
2. 13. Output power derating

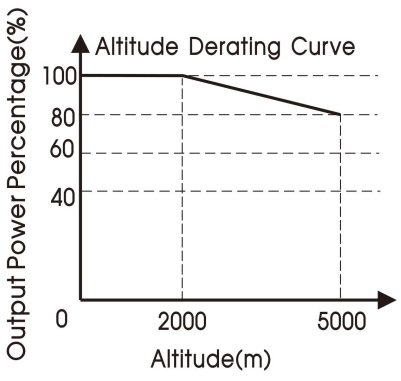
When the input voltage is greater than 150VAC(210VDC), only need to derate according to the temperature derating curve.

When the input voltage is lower than 150VAC(210VDC), the output power will be derated according to the following input voltage derating curve after temperature derating;

The temperature derating curve is a typical test value, the working condition is heat sink with air cooling.







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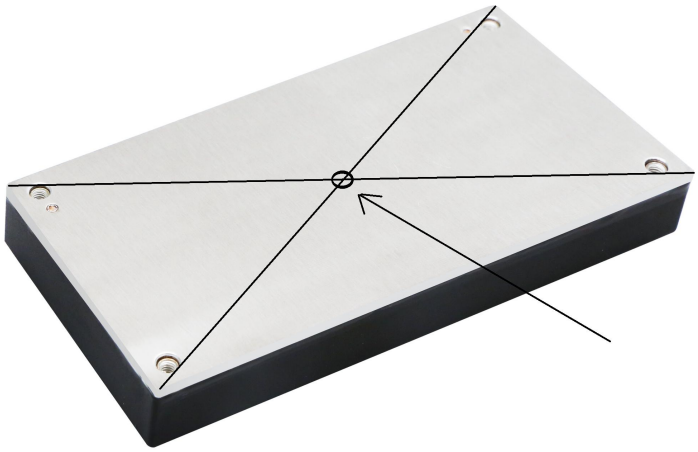

Figure 10: AL-Substrate temperature test point

Note: The test point of Al-Substrate temperature is the temperature of the center point of the substrate.

2. 14. Peripheral layout recommendation

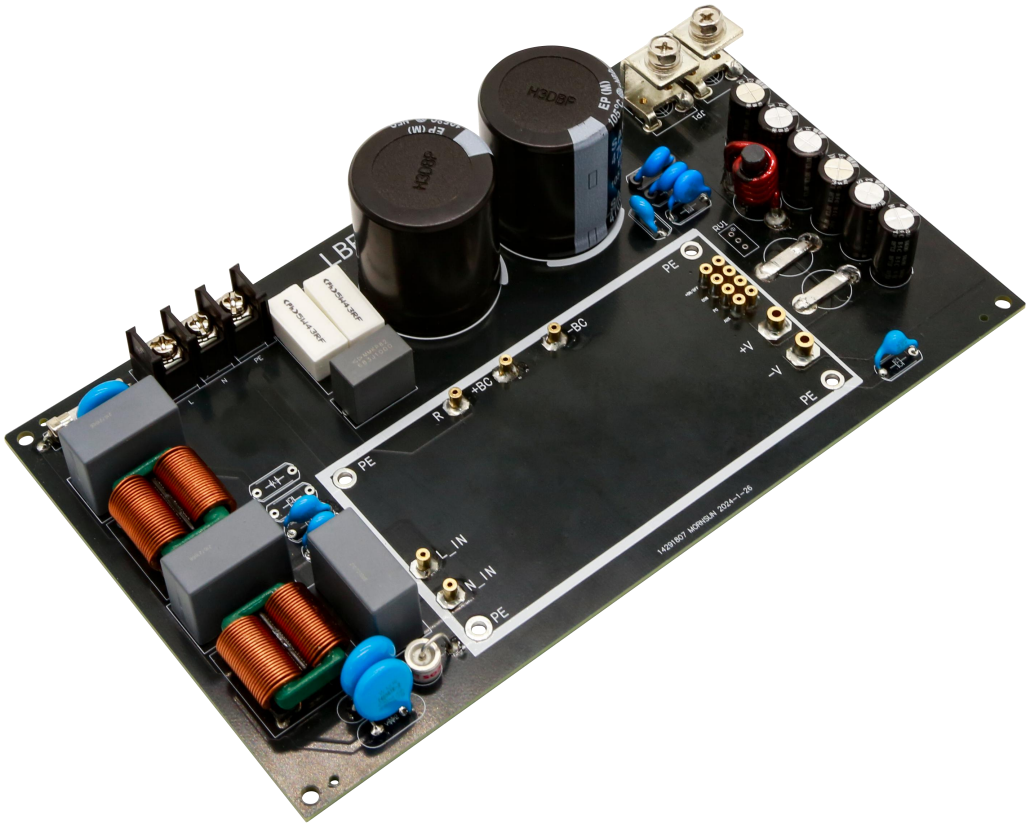

Figure 11: DEMO board physical drawing of recommended circuit 1

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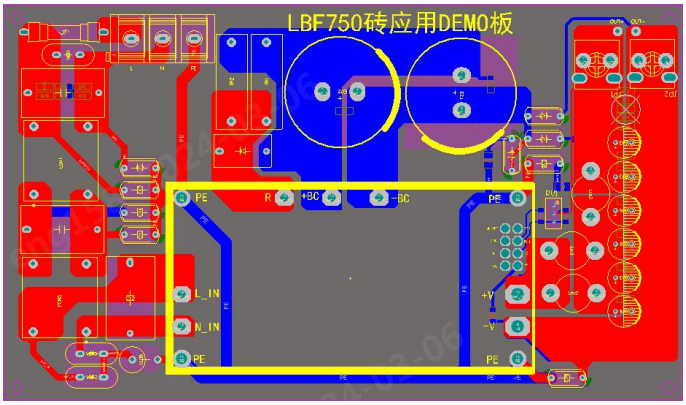
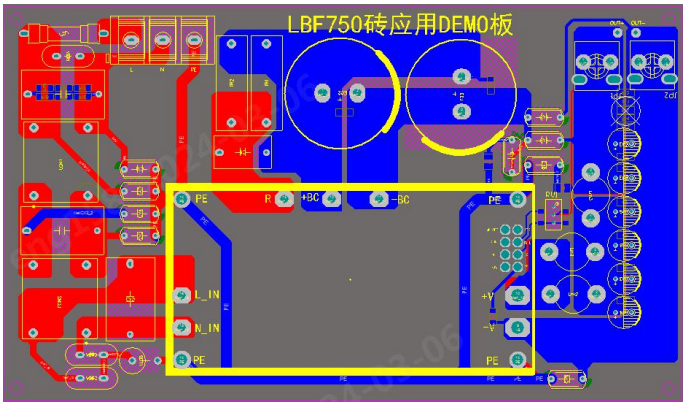


Top wiring



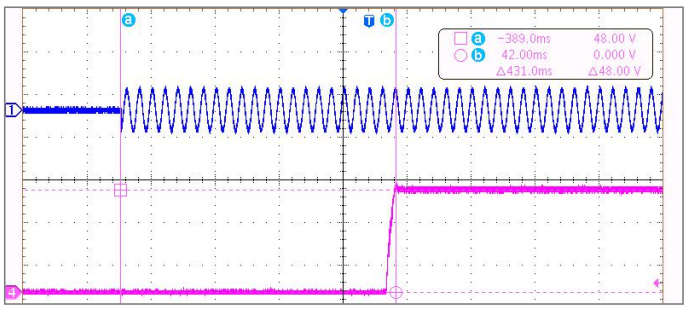
Bottom wiring

Figure 12: PCB routing diagram of recommended circuit 1

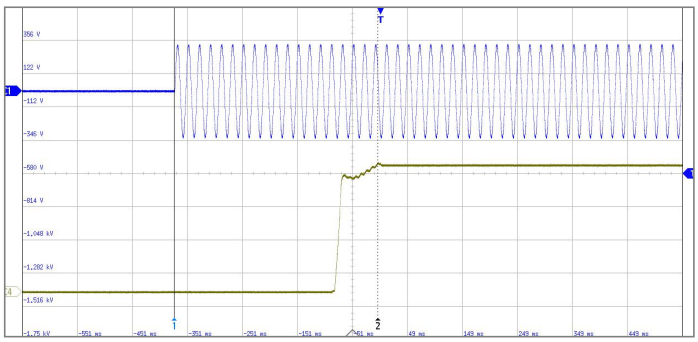
3. Test Waveform

3. 1. Switch ON/OFF

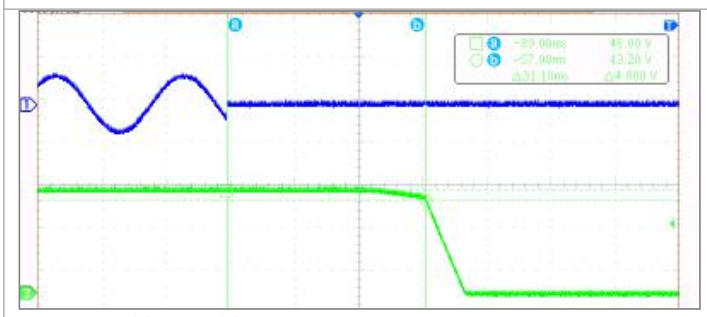
Test conditions: Tc=25℃, LBF750-13B48 products are tested based on recommended circuit 1, EC1=840uF.



Vin=85VAC Full load start (start delay 389ms)



Vin=230VAC Full load start (370ms)



Vin=115VAC Full load shutdown (31.1ms)

Vin=230VAC Full load shutdown (21.4ms)

Note: The power OFF hold-up time is related to the EC capacitance, and can be adjusted with reference to the following formula:

$$t = \frac{0.5 \cdot C_{EC} \cdot (U1^2 - U2^2)}{P_O}$$

U1=396VDC, U2=309VDC, Po=750W (based on actual power output).

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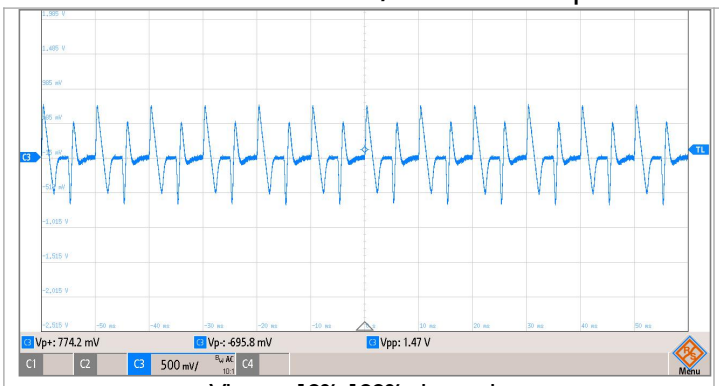
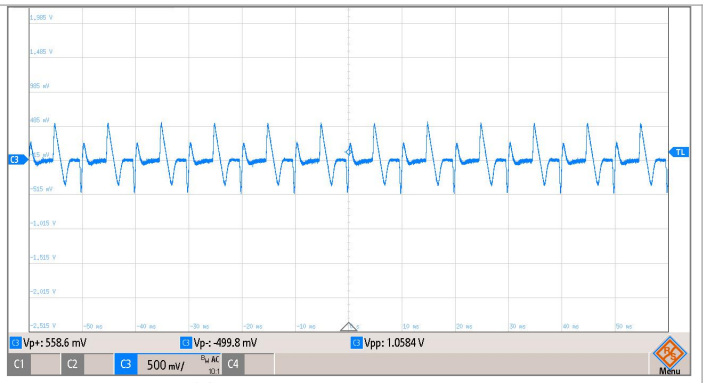
3. 2. Dynamic response

Test conditions: Tc=25℃, LBF750-13B48 products are tested based on recommended circuit 1.



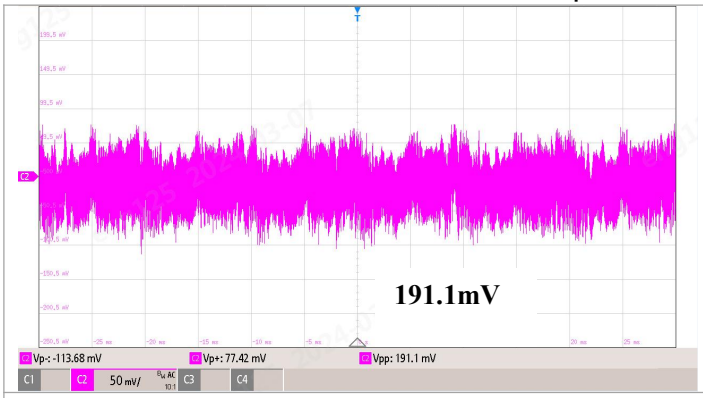
Vin-nor 10%-100% dynamic



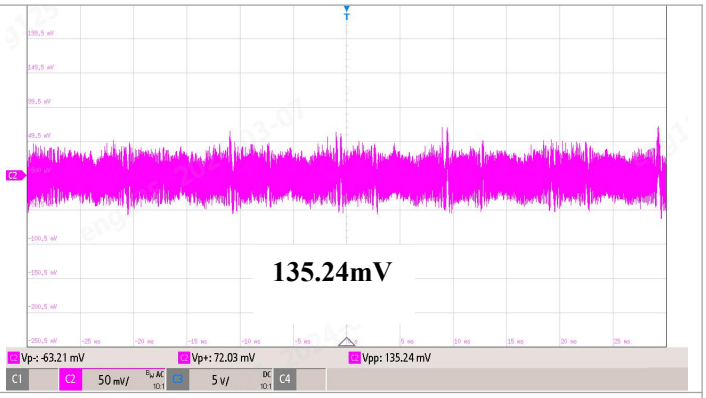
Vin-min 10%-100% dynamic

3. 3. Output ripple and noise

Test conditions: Tc=25℃, LBF750-13B28 products are tested based on recommended circuit 1.



Vin-nor full load ripple noise

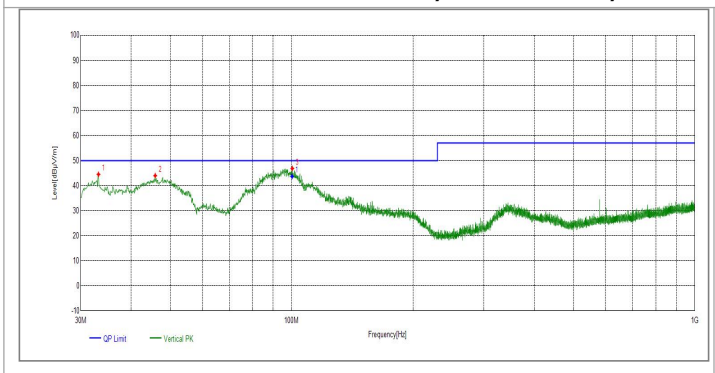


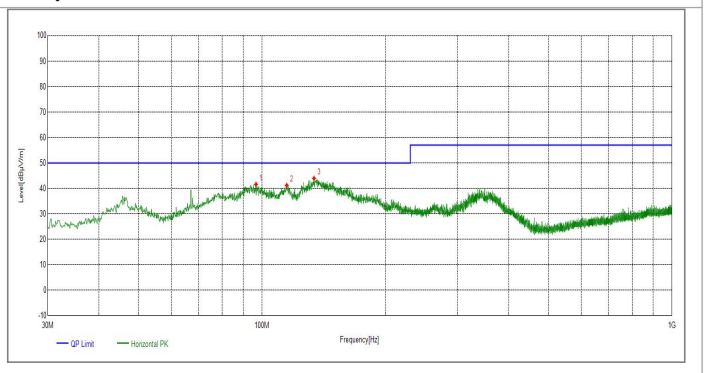
Vin-min full load ripple noise

3. 4. Conductive and radiation (EMI)

(1) Radiation (RE)：
Safety specifications: CISPR32/EN55032　CLASS A

RE Tc=25℃, Vin=115VAC, Pout= 640W, based on DEMO board test





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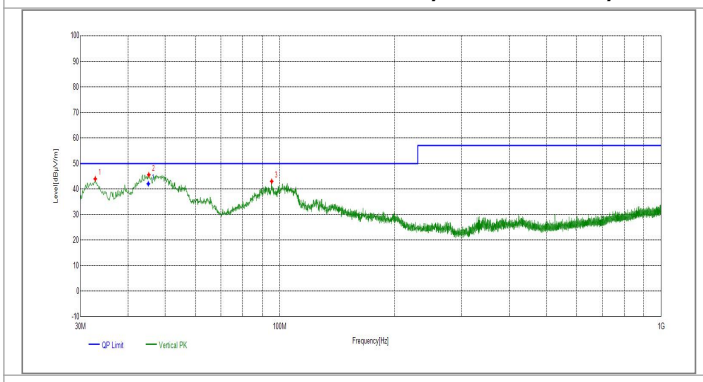
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
33.2013	Vertical	20.46	24.03	44.49	50.00	5.51	PK	100	138	PASS
45.9096	Vertical	20.82	23.16	43.98	50.00	6.02	PK	100	190	PASS
100.4290	Vertical	20.03	26.82	46.85	50.00	3.15	PK	100	203	PASS

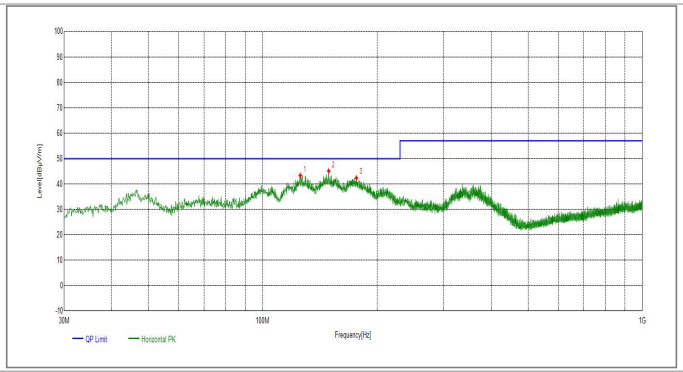
Vertical waveform

Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
96.6457	Horizontal	19.57	22.02	41.59	50.00	8.41	PK	100	118	PASS
114.8835	Horizontal	18.32	22.88	41.20	50.00	8.80	PK	100	111	PASS
133.8974	Horizontal	16.32	27.61	43.93	50.00	6.07	PK	100	92	PASS

Horizontal waveform

RE Tc=25℃, Vin=230VAC, Pout=750W, based on DEMO board test





Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
125.5546	Horizontal	17.16	26.21	43.37	50.00	6.63	PK	100	245	PASS
149.2249	Horizontal	15.83	29.30	44.93	50.00	5.07	PK	100	239	PASS
176.4846	Horizontal	16.79	25.60	42.39	50.00	7.61	PK	100	258	PASS

Vertical waveform

Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
32.8133	Vertical	20.42	23.56	43.98	50.00	6.02	PK	100	196	PASS
45.3275	Vertical	20.86	24.71	45.57	50.00	4.43	PK	100	242	PASS
95.1905	Vertical	19.35	23.63	42.98	50.00	7.02	PK	100	229	PASS

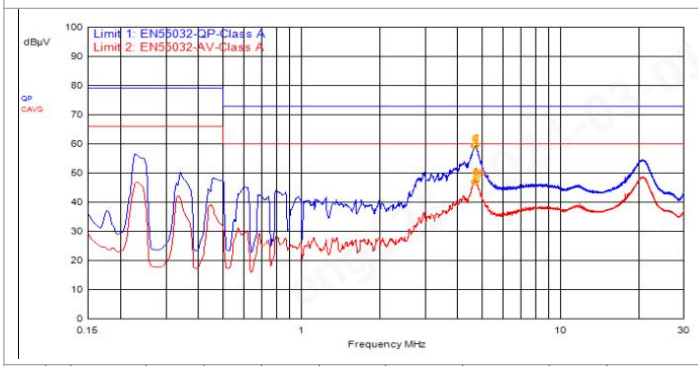
Horizontal waveform

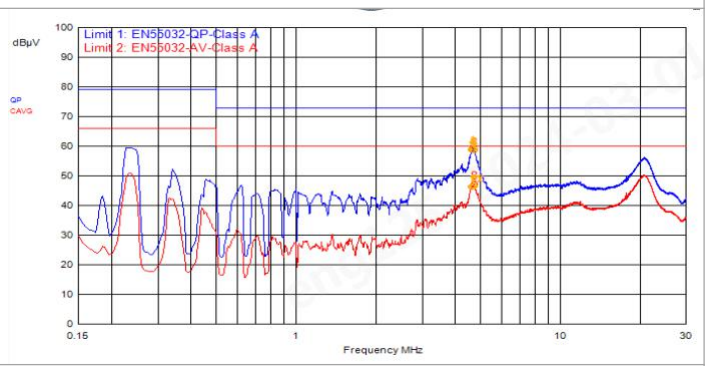
The test results meet CLASS A standards

(2) Conductive (CE)：

Safety specifications: CISPR32/EN55032　CLASS A

CE Tc=25℃, Vin=115VAC, Pout= 640W, based on DEMO board test





ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
11	4.707MHz	0.5	0.2	10.0	C_AVG	36.7	47.4	60.0	-12.6
10	4.695MHz	0.5	0.2	10.0	C_AVG	36.7	47.4	60.0	-12.6
7	4.737MHz	0.5	0.2	10.0	C_AVG	36.7	47.3	60.0	-12.7
8	4.749MHz	0.5	0.2	10.0	C_AVG	36.5	47.2	60.0	-12.8
12	4.656MHz	0.5	0.2	10.0	C_AVG	36.2	46.9	60.0	-13.1
9	4.644MHz	0.5	0.2	10.0	C_AVG	36.1	46.8	60.0	-13.2
1	4.737MHz	0.5	0.2	10.0	QPeak	48.9	59.6	73.0	-13.4
2	4.749MHz	0.5	0.2	10.0	QPeak	48.8	59.5	73.0	-13.5
3	4.644MHz	0.5	0.2	10.0	QPeak	48.6	59.2	73.0	-13.8

L line

ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
8	4.719MHz	0.5	0.2	10.0	C_AVG	36.5	47.2	60.0	-12.8
12	4.740MHz	0.5	0.2	10.0	C_AVG	36.0	46.7	60.0	-13.3
9	4.683MHz	0.5	0.2	10.0	C_AVG	35.9	46.6	60.0	-13.4
1	4.650MHz	0.5	0.2	10.0	QPeak	48.9	59.6	73.0	-13.4
7	4.650MHz	0.5	0.2	10.0	C_AVG	35.7	46.4	60.0	-13.6
10	4.632MHz	0.5	0.2	10.0	C_AVG	35.6	46.2	60.0	-13.8
11	4.662MHz	0.5	0.2	10.0	C_AVG	35.5	46.2	60.0	-13.8
2	4.719MHz	0.5	0.2	10.0	QPeak	48.3	59.0	73.0	-14.0
3	4.683MHz	0.5	0.2	10.0	QPeak	48.2	58.9	73.0	-14.1

N line

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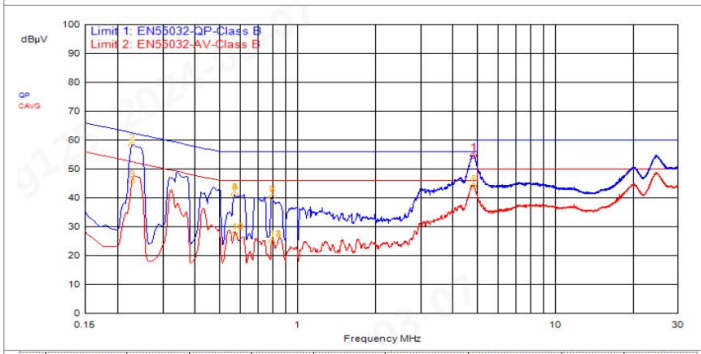
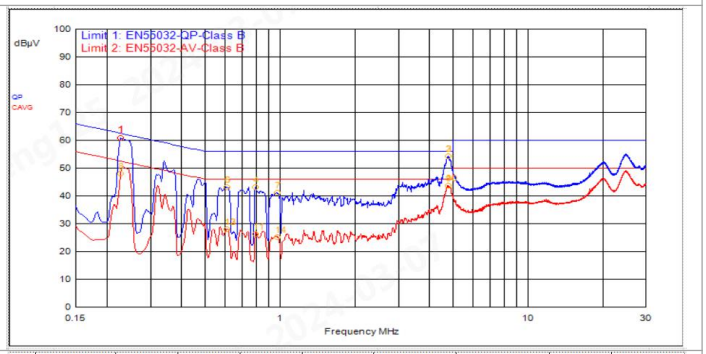
CE Tc=25℃, Vin=230VAC, Pout=750W, based on DEMO board test



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
1	4.836MHz	0.5	0.2	10.0	QPeak	44.0	54.7	56.0	-1.3
8	4.836MHz	0.5	0.2	10.0	C_AVG	33.4	44.1	46.0	-1.9
2	228.000kHz	0.2	0.2	10.0	QPeak	48.0	58.4	62.5	-4.1
9	228.000kHz	0.2	0.2	10.0	C_AVG	35.3	45.7	52.5	-6.8
3	567.000kHz	0.2	0.2	10.0	QPeak	30.7	41.1	56.0	-14.9
4	567.000kHz	0.2	0.2	10.0	QPeak	30.7	41.1	56.0	-14.9

L line



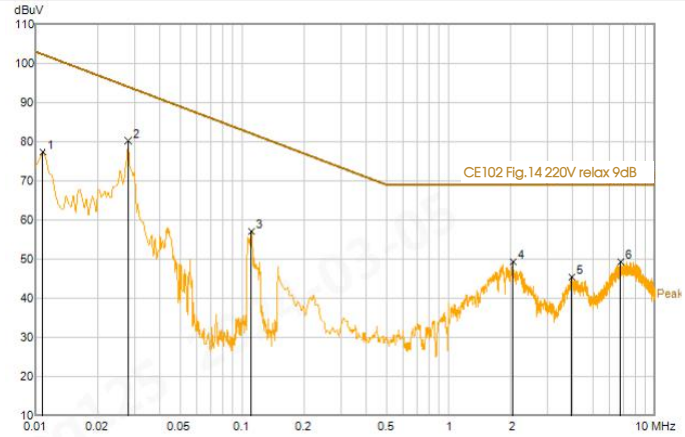
ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
1	228.000kHz	0.2	0.2	10.0	QPeak	50.6	61.0	62.5	-1.5
2	4.761MHz	0.5	0.2	10.0	QPeak	43.6	54.3	56.0	-1.7
3	4.761MHz	0.5	0.2	10.0	QPeak	43.6	54.3	56.0	-1.7
9	4.761MHz	0.5	0.2	10.0	C_AVG	33.0	43.7	46.0	-2.3
10	4.761MHz	0.5	0.2	10.0	C_AVG	33.0	43.7	46.0	-2.3
8	228.000kHz	0.2	0.2	10.0	C_AVG	37.7	48.1	52.5	-4.4

N line

At 230VAC input and full load, the test results meet the EN55032 CLASS B standard

Safety specifications: CE102 GJB151B

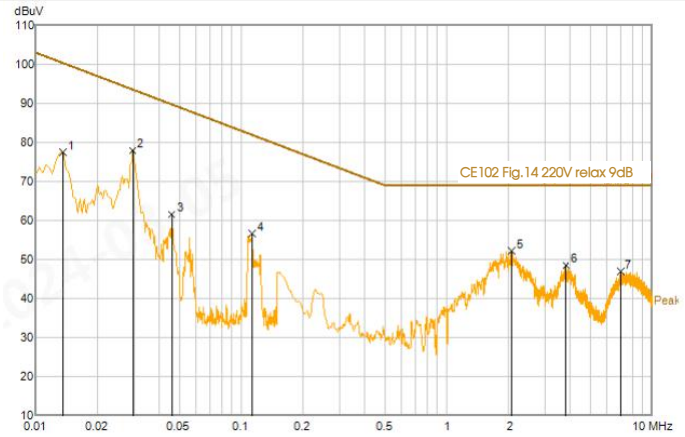
CE Tc=25℃, Vin=220VAC, Pout=750W, based on recommended circuit 2 test



SN	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Level (dBuV)	Margin (dB)	Note
1	0.0108	52.38	25.09	77.47	102.33	24.86	Peak value
2	0.208	59.02	21.24	80.26	94.05	13.79	Peak value
3	0.1108	37.1	20.03	57.13	82.1	24.97	Peak value

Note:Result=Reading+Factor, Margin=Level-Result

L line



SN	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Level (dBuV)	Margin (dB)	Note
1	0.0136	52.92	24.58	77.5	100.33	22.83	Peak value
2	0.0296	56.88	21.11	77.99	93.57	15.58	Peak value
3	0.046	41.07	20.49	61.56	89.74	28.18	Peak value

Note:Result=Reading+Factor, Margin=Level-Result

N line

The test results meet the CE102 GJB151B standard

4. Appearance Specifications

4. 1. Manufacturing data/dimensions

Length: 116.8mm ±0.5mm
Width: 61.0mm ±0.5mm
Height: 12.7mm ±0.5mm
Terminal length: 4.1mm ±0.5mm
Weight: 260g ±10%g

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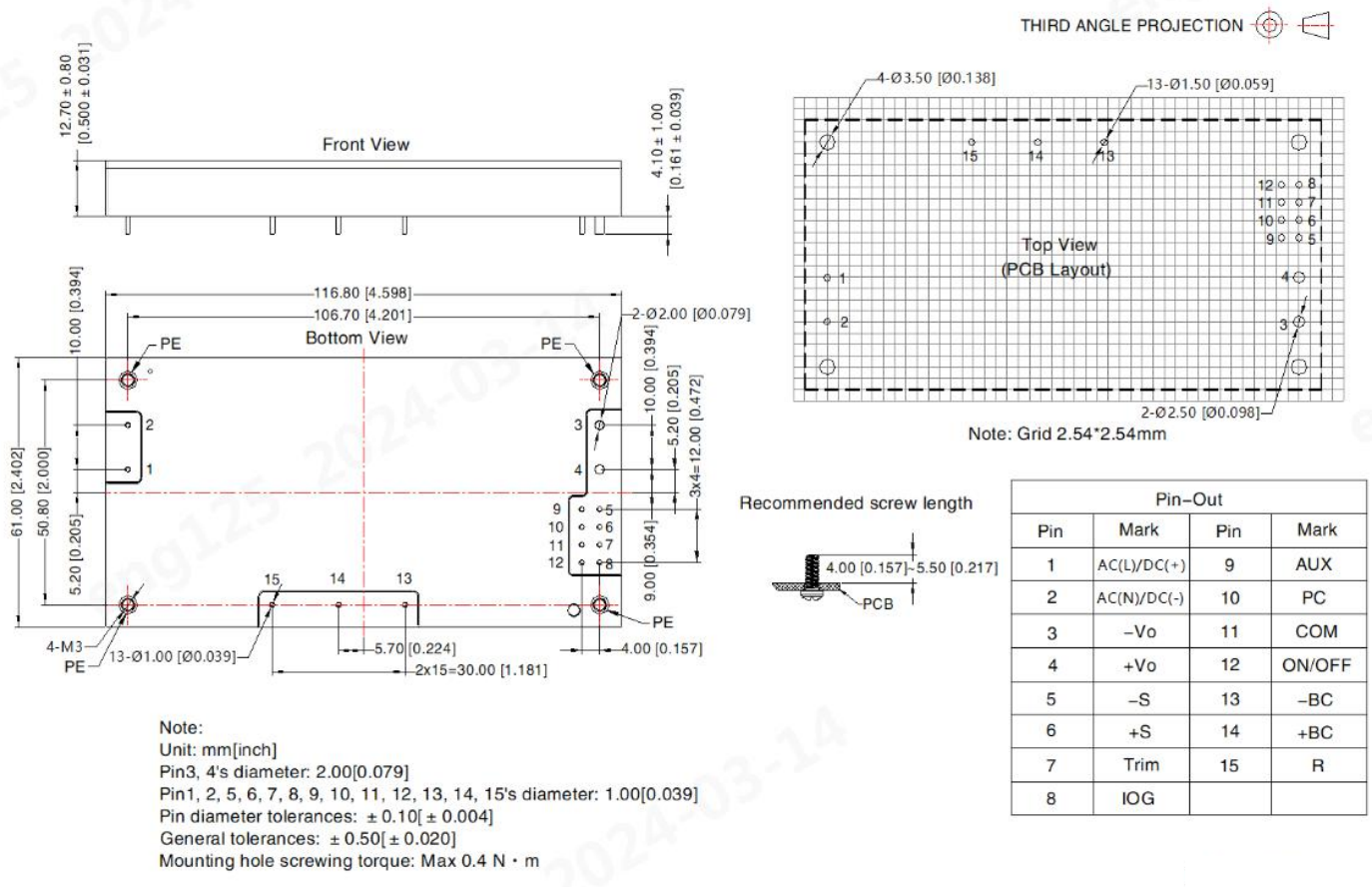

Pin–Out			
Pin	Mark	Pin	Mark
1	AC(L)/DC(+)	9	AUX
2	AC(N)/DC(-)	10	PC
3	–Vo	11	COM
4	+Vo	12	ON/OFF
5	–S	13	–BC
6	+S	14	+BC
7	Trim	15	R
8	IOG		

Figure 13: Manufacturing data/size diagram

4. 2. Installation and disassembly methods

Installation method: Place the heat sink on the aluminum base plate and fasten the heat sink to the product using four screws.

Removing method: Use a tool to separate the four screws from the heat sink.

Maximum mounting hole tightening torque: 0.4N.m.

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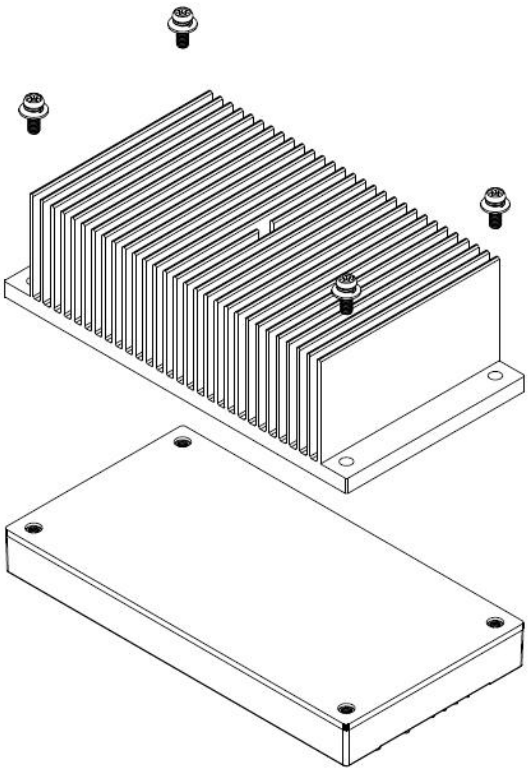

Figure 14: Product and heat sink installation and disassembly diagram

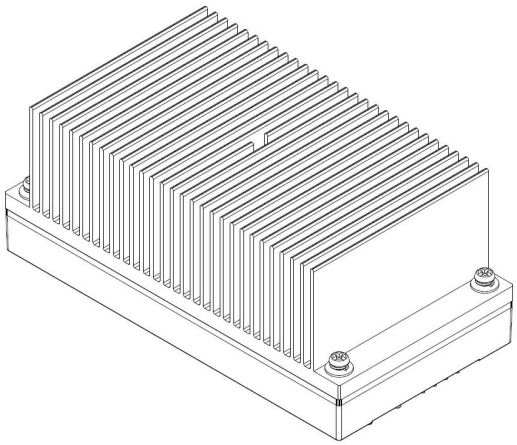

Figure 15: Schematic diagram of the finished product after installation

4. 3. Cooling method

Heat dissipation method	Surface heat sink	□
	Natural cooling	□
	Conduction heat dissipation	■
	In this document, "■" indicates selected, and "□" indicates not selected	

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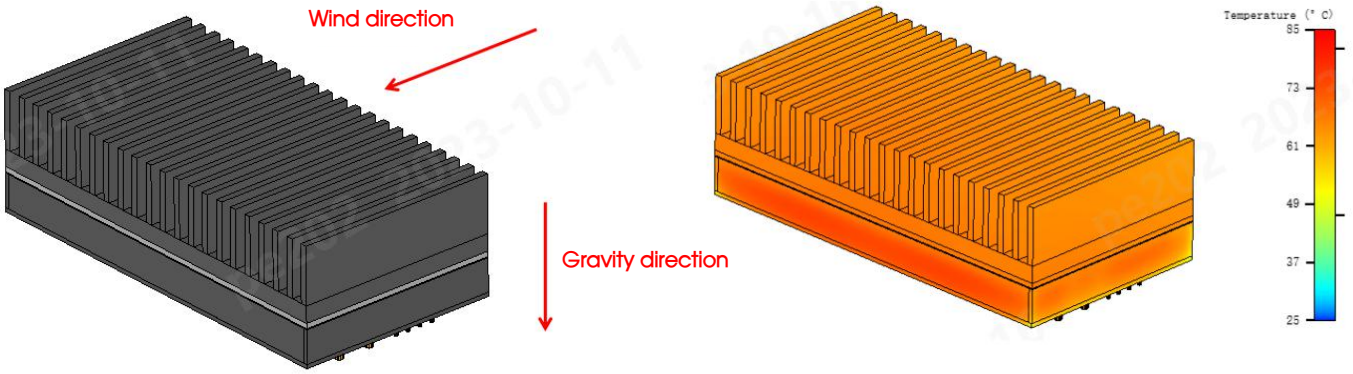

Figure 16: Thermal simulation diagram

Thermal simulation conditions: heat sink height 22mm, thermal conductivity 180W/mK; The ambient temperature is 25℃, and the prototype is in the state of maximum loss (90W).
The thermal simulation results: the surface temperature of aluminum substrate is less than 70℃.

For more details, please consult the MORNSUN FAE.

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