Typical Features

- Wide input voltage range 4:1
- High efficiency up to 91%
- Low no-load power consumption
- Operating Temperature: -40℃ to +105℃
- High isolation voltage, input-output 3000VDC, input-case 2100VDC
- Protection: Input under voltage, output over voltage, short circuit, over current, over temp
- Standard 1/4 brick

ZBD150-110S12A is a high-performance power supply designed for the railway field. It has a rated input voltage of 110VDC and an output of 12V/150W. It does not have a minimum load requirement and supports a wide input voltage range of 43-160VDC. It features a single-channel stable output with high isolation voltage. It can operate at temperatures up to 105℃ and includes functions such as input undervoltage protection, output overcurrent protection, overvoltage protection, over-temperature protection, short circuit protection, remote control and compensation, and output voltage regulation. It complies with the EN50155 railway standard and is widely used in railway systems and associated equipment.

Typical Product List

Part no	Input voltage range (VDC)	Output power (W)	Output voltage (VDC)	Output current (A)	Ripple & Noise (mV)	Full load efficiency(%) Min/Typ.	Note
ZBD150-110S12AC	43-160	150	12	12.5	120	89/91	Standard positive logic
ZBD150-110S12AN							Standard negative logic
ZBD150-110S12AC-H							Heatsink positive logic
ZBD150-110S12AN-H							Heatsink negative logic

Input Specification

Item	Operating conditions	Min.	Typ.	Max.	Unit
Max input current	43V input voltage, full load output	--	--	5	A
No load input current	Rated input voltage	--	--	15	mA
Input surge voltage (1sec. max.)	Inputs above this range may cause permanent damage	-0.7	--	185	VDC
Start up voltage		--	--	43	
Input under voltage protection	No-load test, full-load test will have overcurrent protection in advance	--	--	42	
Control Pin(CNT)	Positive logic: CNT is suspended or connected to 3.5-15V to turn on, connected to 0-1.2V to turn off				Reference voltage-VIN
	Negative logic: CNT is suspended or connected to 3.5-15V to turn off, connected to 0-1.2V to turn on				

Output Specification

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Item	Working condition	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Nominal input voltage, 0%-100% load	--	±0.2	±1.0	%
Line Regulation	Full load, input voltage from low to high	--	±0.1	±0.2	
Load Regulation	Nominal input voltage, 10%-100% load	--	±0.1	±0.2	
Output voltage setting accuracy	Full input voltage range, 0%-100% load	--	200	250	uS
Transient recovery time		-5	--	5	%
Transient Response Deviation	25% load step change (step rate 1A/50uS)	-0.02	--	+0.02	%/℃
Temperature Drift Coefficient	Full load	--	80	120	mVp-p
Ripple & Noise		-10	--	+10	%
Output voltage adjustment (TRIM)		--	--	5	%
Output voltage remote compensation (Sense)	Maximum temperature of product metal substrate surface	105	115	125	℃
Over temp protection		125	--	140	%
Output over voltage protection		14	--	20	A
Output over current protection		Hiccup, continuous, self-recovery			

General Specification

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	I/P-O/P	Test 1min, leakage current < 3mA	--	--	3000	VDC
	I/P-Case	Test 1min, leakage current < 3mA	--	--	2100	VDC
	O/P-Case	Test 1min, leakage current < 3mA	--	--	500	VDC
Insulation resistance	I/P-O/P	Insulation voltage 500VDC	100	--	--	MΩ
Switching frequency			--	500	--	KHz
MTBF			150	--	--	K hours

Environmental characteristics

Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See temperature derating curve	-40	--	+105	℃
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	℃
Soldering resistance of pins	The solder joint is 1.5mm away from the shell, and the soldering time< 1.5S	--	--	+350	
Cooling requirements		EN60068-2-1			
Dry heat requirement		EN60068-2-2			
Damp heat requirement		EN60068-2-30			
Shock and vibration		IEC/EN 61373 车体 1 B 级			

EMC Characteristics(EN50155)

EMI	CE	EN50121-3-2	150kHz-500kHz 79dBuV	
		EN55016-2-1	500kHz-30MHz 73dBuV	
	RE	EN50121-3-2	30MHz-230MHz 40dBuV/m at 10m	
		EN55016-2-1	230MHz-1GHz 47dBuV/m at 10m	
EMS	ESD	EN50121-3-2	Contact ±6KV/Air ±8KV	perf. Criteria A

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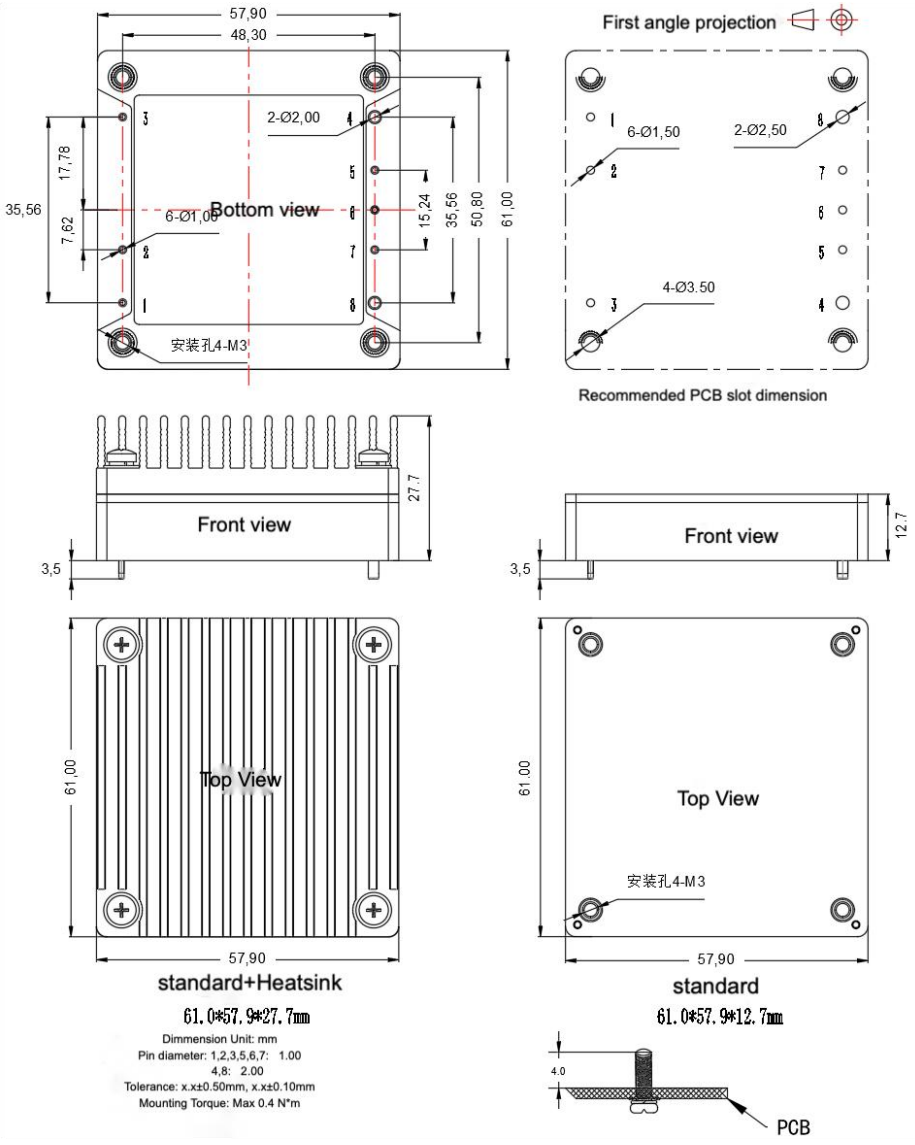
	RS	**EN50121-3-2**	**10V/m**	**perf. Criteria A**
	EFT	**EN50121-3-2**	**±2kV 5/50ns 5kHz**	**perf. Criteria A**
	Surge	**EN50121-3-2**	**line to line ± 1KV (42Ω, 0.5μF)**	**perf. Criteria A**
	CE	**EN50121-3-2**	**0.15MHz-80MHz 10 Vr.m.s**	**perf. Criteria A**

Physical Characteristics

Case Materials	Metal bottom shell + black flame retardant material shell (UL94 V-0)
Heat sink	Dimension 61*57.9*15mm, weight 65g, aluminum alloy, anodized black
Cooling method H	Conduction cooling or forced air cooling
Product Weight	Standard 120g, with heatsink 188g

Dimension and Pin-Out



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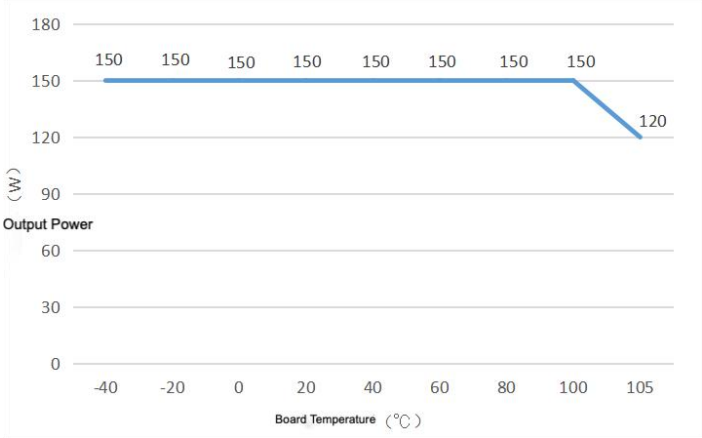
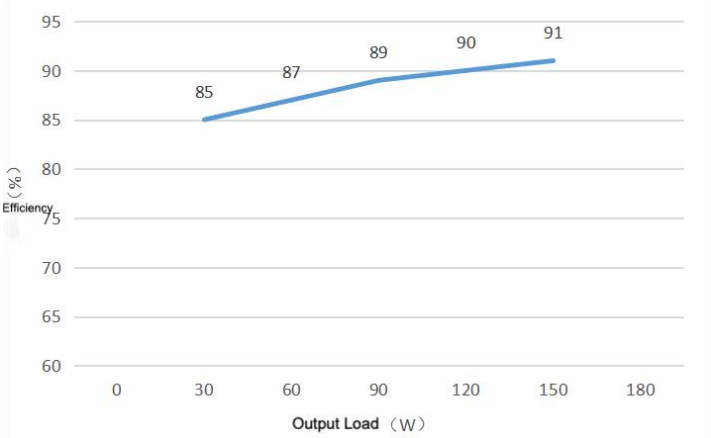
No.	1	2	3	4	5	6	7	8
Pin out	**Vin+**	**CNT**	**Vin-**	**Vout-**	**-S**	**TRIM**	**+S**	**Vout+**
Usage	Positive input	Remote control	Input Negative	Output Negative	Remote compensation negative terminal	Output voltage fine-tuning	Remote compensation positive terminal	Output positive terminal

Product Characteristic Curve



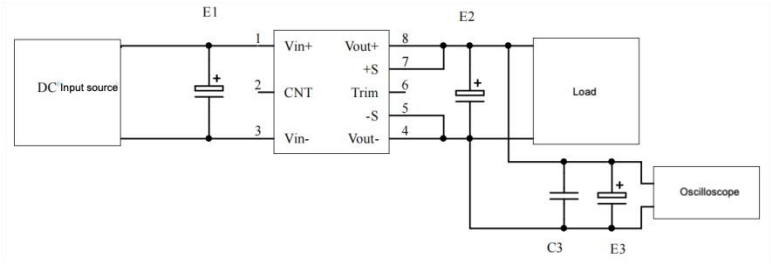


Note:
1. Both the temperature derating curve and the efficiency curve are tested with typical values;
2. The temperature derating curve is tested according to our laboratory test conditions. If the actual environmental conditions used by customers are inconsistent, it is necessary to ensure that the temperature of the aluminum casing of the product does not exceed 105 °C, and it can be used within any rated load range.

Design Reference

1. Ripple and Noise

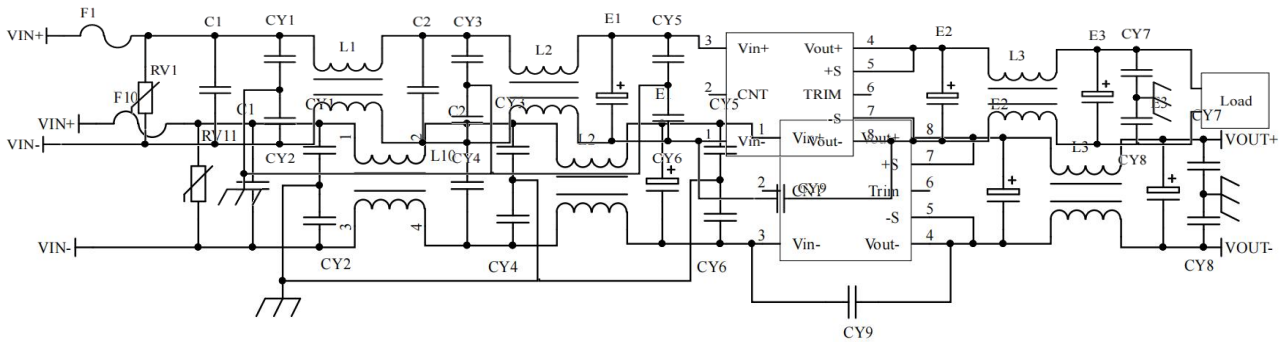
All DC/DC converters in this series are tested according to the recommended test circuit shown in the following diagram before leaving the factory.



Capacitor value / Output Voltage	E1 (μF)	E2 (μF)	C1 (μF)	E3 (μF)
3.3VDC	100	1000	1	10
5VDC		680		
12VDC		220		
.....				
48VDC				
.....	68	68		
110VDC				

2. Recommended application circuit

If customer does not use the circuit recommended by our company, please be sure to connect an electrolytic capacitor of at least 100 μF in parallel at the input end to suppress the possible surge voltage at the input end.



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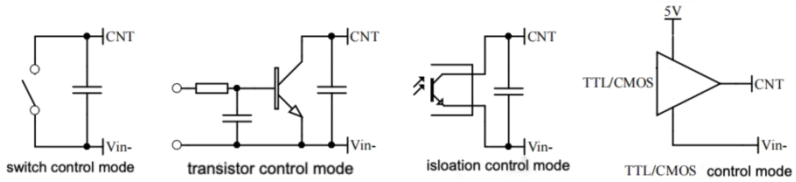
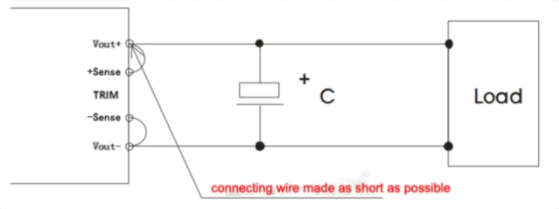
F1	T10A/250V Vac fusing
RV1	14D 200V Varistor
C1,C2	105/450V Polyester Film Capacitor
CY1,CY2,CY3,CY4,CY5,CY6	102/250Vac safety Y2 capacitor
CY7,CY8	103/2KV Ceramic Capacitor
CY9	471/250Vac safety Y1 capacitor
E1	220μF/200V Electrolytic Capacitor
E2，E3	470μf/16V Low ESR Capacitor
L1,L2	inductance is greater than 6mH, and the over current 5A temperature rise is less than 25℃
L3	inductance is greater than 220uH, and the over current 12.5A temperature rise is less than 25℃

3. Remote control terminal (CNT) control method application recommendation



4. Sense usage and precautions

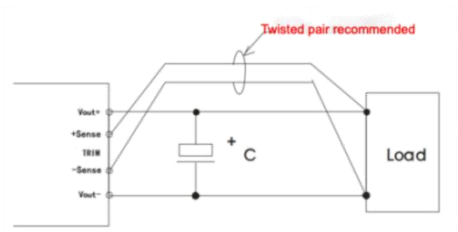
（1）Without far-end compensation:



Precautions:

1. Do not use remote compensation, make sure Vout+ and Sense+, Vout- and Sense- are short-circuited;
2. The connection between Vout+ and Sense+, Vout- and Sense- should be as short as possible and close to the pins, otherwise the module may become unstable.

（2）Using remote compensation:

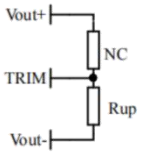


Precautions:

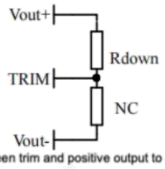
1. When the long-end compensation lead is used, the output voltage may be unstable;
2. If remote compensation is used, please use twisted pair or shielded wire, and keep the lead wire as short as possible;
3. Please use wide PCB leads or thick wires between the power module and the load, and keep the line voltage drop below 0.3V to ensure that the power output voltage remains within the specified range;
4. The impedance of the leads may cause the output voltage to oscillate or have larger ripples. Please verify it before use.

5. Use of TRIM and calculation of TRIM resistance

The relationship between output change voltage △U and resistance is as follows:



Voltage boost: add resistor rup between trim and negative output to increase the voltage



Voltage drop: add resistor between trim and positive output to decrease voltage Rdown

Rup=31/△U-5.1（KΩ）

Rdown=12.4*（12-2.5-△U）/△U -5.1（KΩ）

6. This product does not support the use of direct parallel connection to increase the power. If you need to

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use it in parallel, please consult our technical staff.

Others

1. The warranty period of this product is two years. During the normal damage, it will be repaired free of charge. Damages caused by errors in the use method or manufacturing technology, a paid service is provided.
2. Our company can provide product customization and matching filter modules. For details, please contact our technical staff directly.

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