DC/DC Converter 1/4 Brick
ZCD150-24S15A Series

Conform to CE

Typical Features

◆Wide input voltage range 4:1
◆Efficiency up to 88%
◆Low standby power consumption
◆Operating Temperature from -40℃ to +105℃
◆High isolation voltage 2100VDC(input-output) & 2100VDC(input-case)
◆Input under voltage protection, output over voltage, short circuit, over current and over temp. protections
◆Standard 1/4 brick size

ZCD150-24S15A is a good performance DC-DC converter specially designed for the railway field. Its rated input voltage 24VDC (full range from 9V to 36VDC), regulated single output 15V/150W without minimum load limit. It has the advantages of high isolation voltage, Max operating temperature 105°C, with input under-voltage protection, output over-current, over-voltage, over-temperature and short circuit protections, input remote control, output voltage distal end compensation and Trim, etc. It is compliant with the railway standard EN50155 and widely used in the railway systems related equipment.

Typical Product List

Part No.	Input voltage range (VDC)	Output power (W)	Output voltage (VDC)	Output current (A)	Ripple & Noise (mVp-p)	Full load efficiency (%) Min/Typ.	Remarks
ZCD150-24S15AC	9 - 36	150	15	10	150	88/90	Standard Positive Logic
ZCD150-24S15AN							Standar Negative Logic
ZCD150-24S15AC-H							Heatsink Positive Logic
ZCD150-24S15AN-H							Heatsink Negative Logic

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Max input current	Input voltage 9V, output 100W	--	--	23	A
No load input current	Rated input voltage	--	--	30	mA
Input Inrush voltage (1sec. max.)	The unit could be permanently damaged by input over this voltage	-0.7	--	50	VDC
Start-up voltage		--	--	9	
Input under voltage protection	Half-load test	--	--	8.5	
Remote Control (CNT)	Positive logic - CNT no connection or connect to 3.5-15V to turn on, connect to 0-1.2V to shut off the converter				Reference voltage -Vin
	Negative logic - CNT no connection or connect to 3.5-15V to shut off, connect to 0-1.2V to turn on the converter				

Output Specifications

Item	Operating conditions	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	--	±0.2	±0.5	
Load Regulation	Nominal input voltage, 10%-100% load	--	±0.2	±0.5	
Transient recovery time	25% load step change (step rate 1A/50μS)	--	200	250	uS
Transient Response Deviation		-5	--	+5	%
Temperature Drift Coefficient	Full load	-0.02	--	+0.02	%/℃
Ripple & Noise	20M bandwidth, test with capacitor ≥470μF	--	100	150	mVp-p
Output voltage adjustment（TRIM）		-20	--	+10	%
Output voltage remote sense(Sense)		--	--	105	%
Over temperature protection	Maximum temperature of the metal base	105	115	125	℃
Over voltage protection		125	--	140	%
Over current protection		11	--	18.7	A
Short circuit protection		Hiccup, continuous, self-recovery			

General Specifications

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	I/P-O/P	Test 1min, leakage current < 3mA	--	--	2100	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	@ 500VDC	100	--	--	MΩ
Switching frequency			--	210	--	KHz
MTBF			150	--	--	K hours

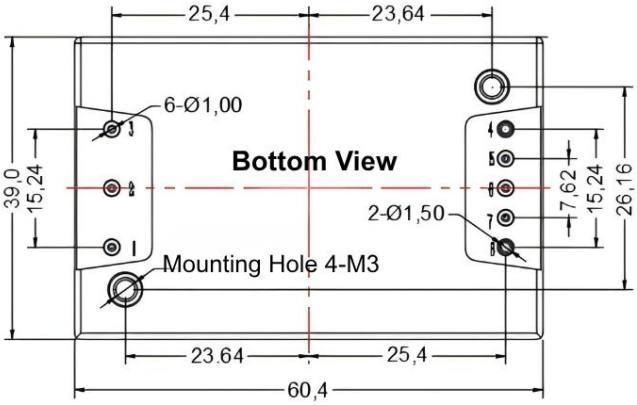
Environmental characteristics

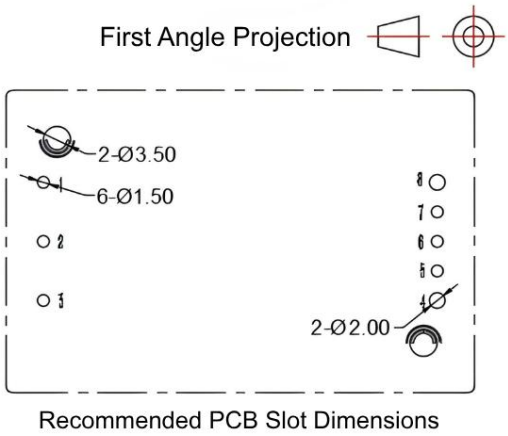
Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	Refer to the temperature derating curve	-40	--	+105	℃
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	℃
Pin Soldering temperature	1.5mm from the case, soldering time < 1.5S	--	--	+350	
Cooling requirement		EN60068-2-1			
Dry heat requirement		EN60068-2-2			
Damp heat requirement		EN60068-2-30			
Shock and vibration		IEC/EN 61373 C1/Body Mounted Class B			

EMC Performances (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	IEC/EN61000-4-2/GB/T 17626.2-2006	Contact ±6KV / Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3/GB/T 17626.3-2006	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4/GB/T 17626.4-2008	±2kV 5/50ns 5kHz	Perf. Criteria A
	Surge	IEC/EN61000-4-5/GB/T 17626.5-2008	Line to line ± 1KV (42Ω, 0.5μF)	Perf. Criteria A
	CS	IEC/EN61000-4-6/GB/T 17626.6-2008	0.15MHz-80MHz 10 Vr.m.s	Perf. Criteria A

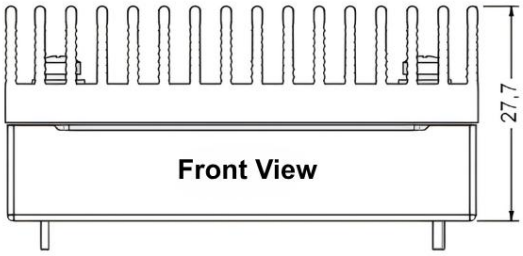
Physical Characteristics	
Case Materials	Metal bottom shell + plastic case in black, flame class UL94 V-0
Heat sink	Dimension 61.0x39.0x15.0 mm, weight 52g, aluminum alloy, anodized black
Cooling method	Conduction cooling or forced air cooling with fan
Product Weight	Standard 72g, with heatsink 125g

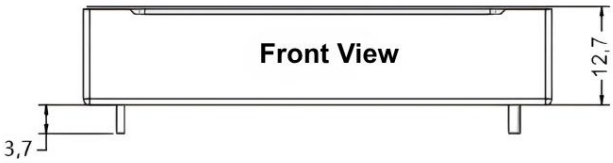
Mechanical Dimensions and Pin-Out Description

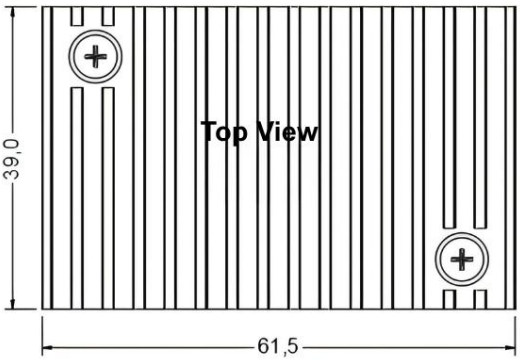




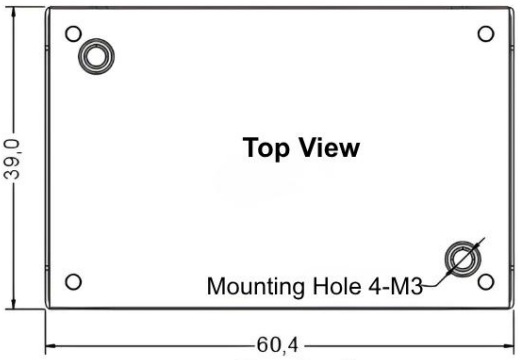
Recommended PCB Slot Dimensions







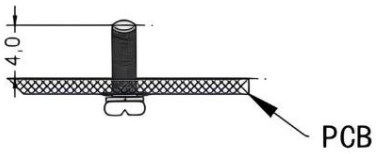
Standard + Heat sink
61.5*39.0*27.7mm



Standard
60.4*39.0*12.7mm

Note:

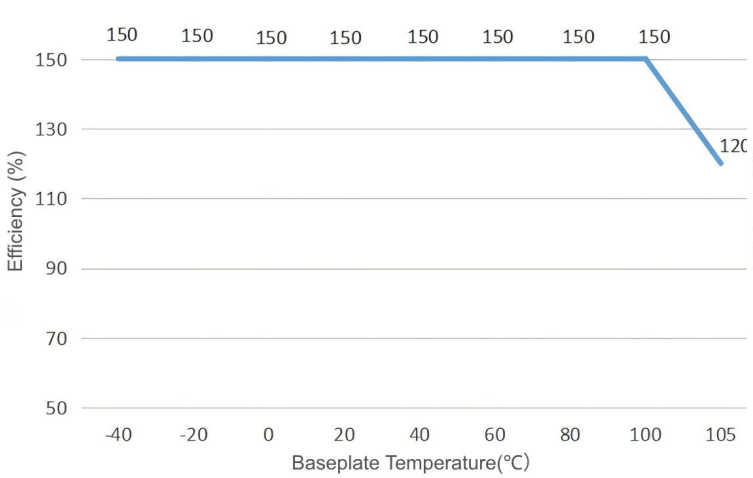
- **Unit: mm**
- **Pin 1, 2, 3, 5, 6, 7 diameter: 1.00mm**
- **Pin 4, 8 diameter: 1.50mm**
- **Tolerance: X.X ±0.50 mm, X.XX ±0.10 mm**
- **Mounting Torque: 0.4 N·m (Max.)**

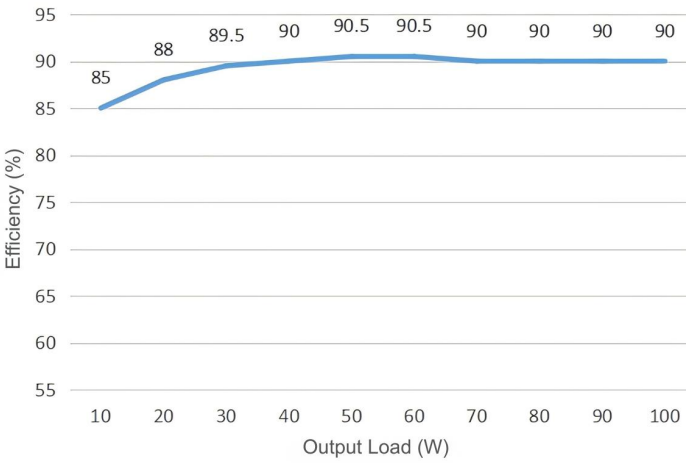


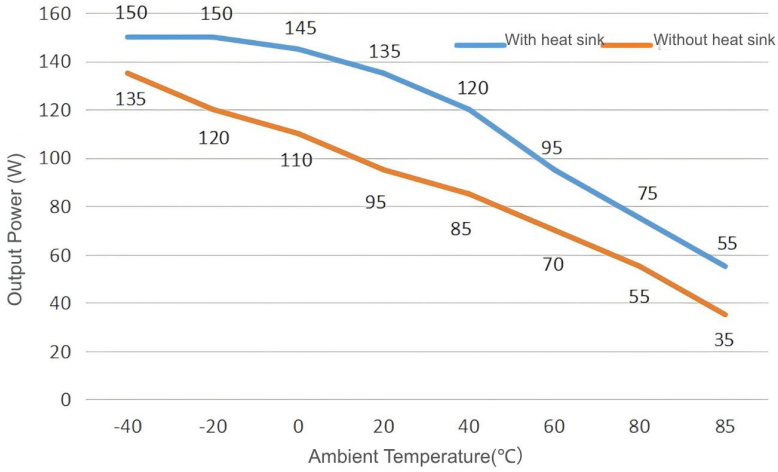
Pin length L=3.7mm

No.	1	2	3	4	5	6	7	8
Pin-out	Vin+	CNT	Vin-	Vout-	-Sense	TRIM	+Sense	Vout+
Description	Input Positive	Remote Control	Input Negative	Output Negative	Remote Sense Negative	Output Voltage Trim	Remote Sense Positive	Output Positive

Product Performance Curves





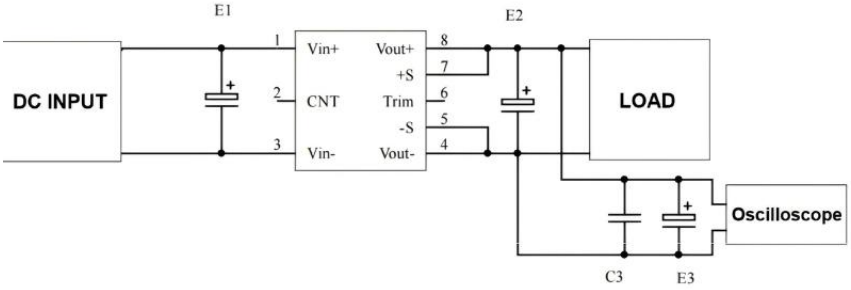


Note:
1. The output power and the efficiency in the curves are tested with typical values.
2. The data in temperature derating curve is tested at Aipu laboratory test conditions. It is recommended to keep the temperature of the Metal base not more than 100 °C while the converter operates at the rated load for the customer application.

Recommended circuits for application

1. Ripple and Noise

All this series of converters will be tested according to the circuit below before shipping.

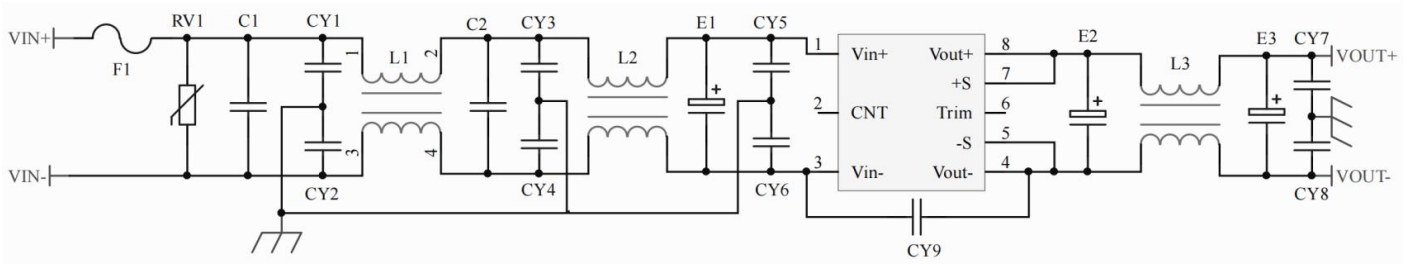


Capacitance / Output Volt.	E1(μF)	E2(μF)	C3(μF)	E3(μF)
3.3VDC	100	1000	1	10
5VDC		680		
12VDC				
.....				
48VDC		470		
.....	68	68		
110VDC				

2. Typical application circuit

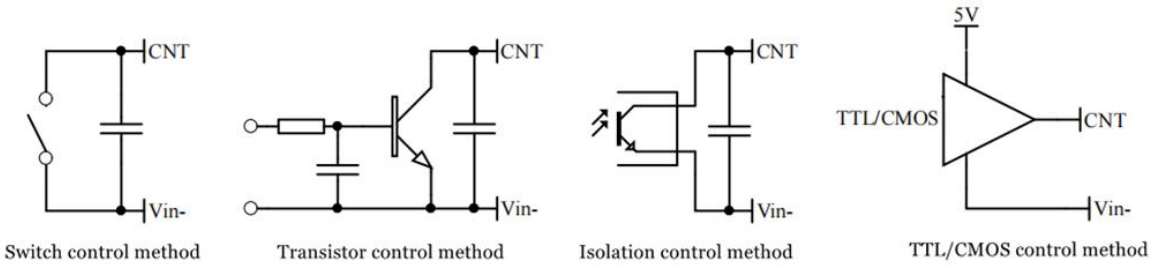
If this circuit recommended below is not adopted, please connect an electrolytic capacitor ⩾100 μF in parallel at the input to suppress the

possible surge voltage.



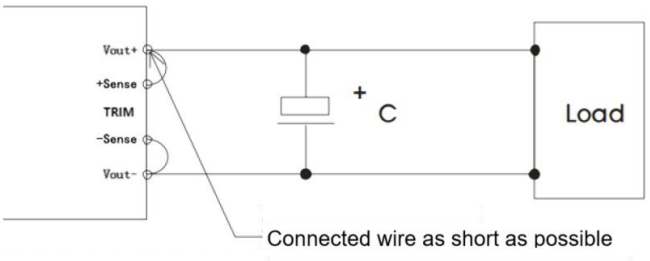
F1	T40A/63V Time-delay fuse
RV1	14D 62V Varistor
C1, C2	105/63V Polyester Film Capacitor
CY1, CY2, CY3, CY4, CY5, CY6	102/250Vac Y2 capacitor
CY7, CY8	103/2KV Ceramic Capacitor
CY9	471/250Vac Y2 capacitor
E1	220μF/50V Electrolytic Capacitor
E2，E3	470μF/25V Electrolytic Capacitor
L1,L2	>1mH, temperature rise less than 25°@23A
L3	>47μH, temperature rise less than 25°@10A

3. Remote control (CNT) application



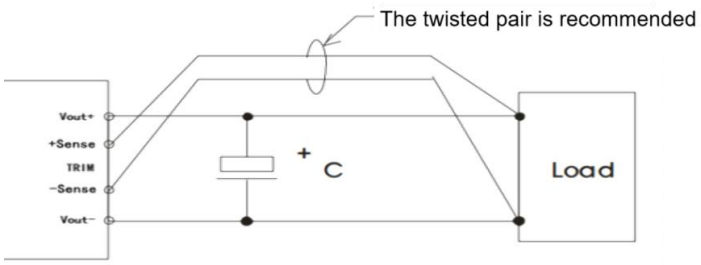
4. Application for Sense

1) **With NO distal end compensation**



Notes:
1. Vout+ & Sense+, Vout- & Sense- should be shorted when distal compensation is not needed
2. The lead wire between Vout+ and Sense+, Vout- and Sense- should be as short as possible, and close to the pins, or else the output may be unstable.

2) **With distal end compensation**



Notes:
1. Long remote sense leads may cause output voltage instability.
2. When using remote sense, use twisted-pair or shielded wire and keep the leads as short as possible.
3. Use wide PCB traces or heavy-gauge wire between the power module and the load. Ensure the total line voltage drop is below 0.3V to maintain the output voltage within the specified range.

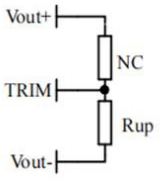
4. Lead impedance may cause output oscillations or high ripple; please verify performance before final application.

5. TRIM & TRIM resistance calculation

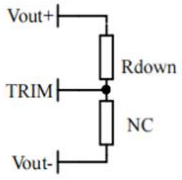
The calculation of △U and Rup & Rdown:

Rup=31/△U-5.1(KΩ)

Rdown=12.4*(15-2.5-△U)/△U – 5.1(KΩ)



Voltage-up: Add Rup between Trim and Vout-



Voltage-down: Add Rdown between Trim and Vout+

6. Direct parallel connection for higher power is not supported. For parallel applications, please contact our technical support team.

Others

1. This product is covered by a two-year warranty. Any failure or damage that occurs under normal use will be repaired free of charge. In the event of damage caused by improper use, incorrect application, or manufacturing process errors not attributable to our product, paid repair services can be provided.

2. We offer custom product design services as well as matching filter modules. For details, please contact our technical support team directly.

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