



Typical Features

- ◆ Wide input voltage range 4:1
- ◆ Efficiency up to 89%
- ◆ Low no-load power consumption
- ◆ Operating Temperature from -40°C to +105°C
- ◆ 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

Conform to CE

ZCD150-48S24A is a high-performance 1/4 Brice size modular DC-DC converter with the rated input voltage 48VDC (full range from 18V to 75VDC), regulated single output 24V/150W without minimum load limit. It has the advantages of high isolation voltage, operating temperature of the metal base up to 105°C Max; with the input under-voltage protection, output over-current, over-voltage, over-temperature and short circuit protections, input remote control, output voltage distal end compensation and output Trim functions, etc.

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 |
|------------------|---------------------------|------------------|----------------------|--------------------|------------------------|-----------------------------------|-------------------------|
| ZCD150-48S24AC | 18 - 75 | 150 | 24 | 6.25 | 240 | 87/89 | Standard Positive logic |
| ZCD150-48S24AN | | | | | | | Standard Negative logic |
| ZCD150-48S24AC-H | | | | | | | Heatsink Positive logic |
| ZCD150-48S24AN-H | | | | | | | Heatsink Negative logic |

Note - The output power should be derated linearly when the input is within the range of 18-36V. The maximum output power is 100W at input 18Vdc.

Input Specifications

| Item | Operating conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|------|------|------|------------------------|
| Max input current | Input voltage 18V, output 100W | -- | -- | 8.5 | A |
| No load input current | Rated input voltage | -- | -- | 10 | mA |
| Input Inrush voltage (1sec. max.) | The unit could be permanently damaged by input over this Voltage | -0.7 | -- | 100 | VDC |
| Start-up voltage | | -- | -- | 18 | |
| Input under voltage protection | With No-load (over current protection will work in advance at full load) | -- | -- | 16 | |
| 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 | | | | 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 | | | | |

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 | -- | ±0.1 | ±0.2 | |
| Load Regulation | Nominal input voltage, 10%-100% load | -- | ±0.2 | ±0.5 | |
| Transient recovery time | 25% load step change (step rate 1A/50uS) | -- | 200 | 250 | uS |
| Transient Response Deviation | | -5 | -- | +5 | % |
| Temperature Drift Coefficient | Full load | -0.02 | -- | +0.02 | %/°C |
| Ripple & Noise | 20M bandwidth, external capacitor above 220uF | -- | 120 | 240 | mVp-p |
| Output voltage adjustment (TRIM) | | -20 | -- | +10 | % |
| Output voltage distal end compensation (Sense) | | -- | -- | +5 | % |
| Over temp protection | Maximum temperature of the metal base | 105 | 115 | 125 | °C |
| Over voltage protection | | 125 | -- | 140 | % |
| Over current protection | | 6.8 | -- | 8.8 | 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 | | | -- | 250 | -- | KHz |
| MTBF | | | 150 | -- | -- | K hours |

Environmental characteristics

| Item | Operating conditions | Min. | Typ. | Max. | Unit |
|---------------------------|--|--------------------------------------|------|------|------|
| Operating Temperature | Refer to the temperature derating curve | -40 | -- | +105 | °C |
| Storage Humidity | No condensing | 5 | -- | 95 | %RH |
| Storage Temperature | | -40 | -- | +125 | °C |
| 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 | | | |

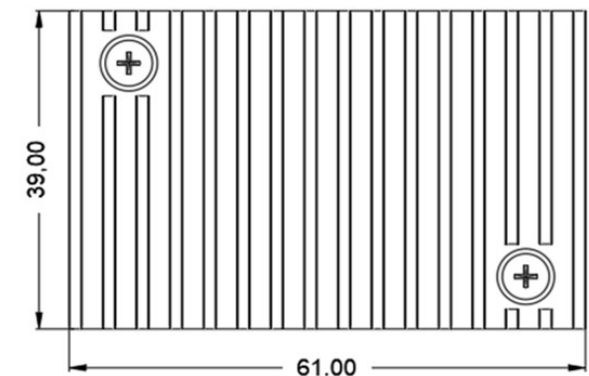
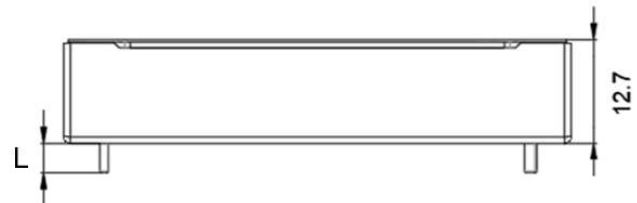
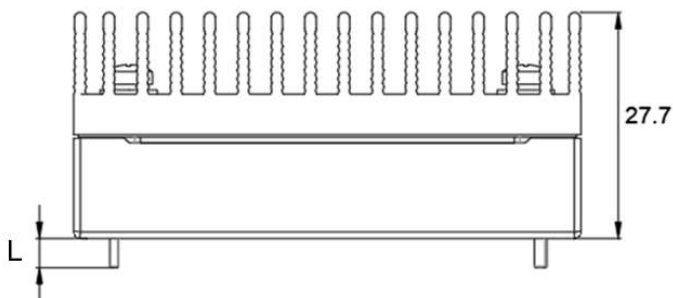
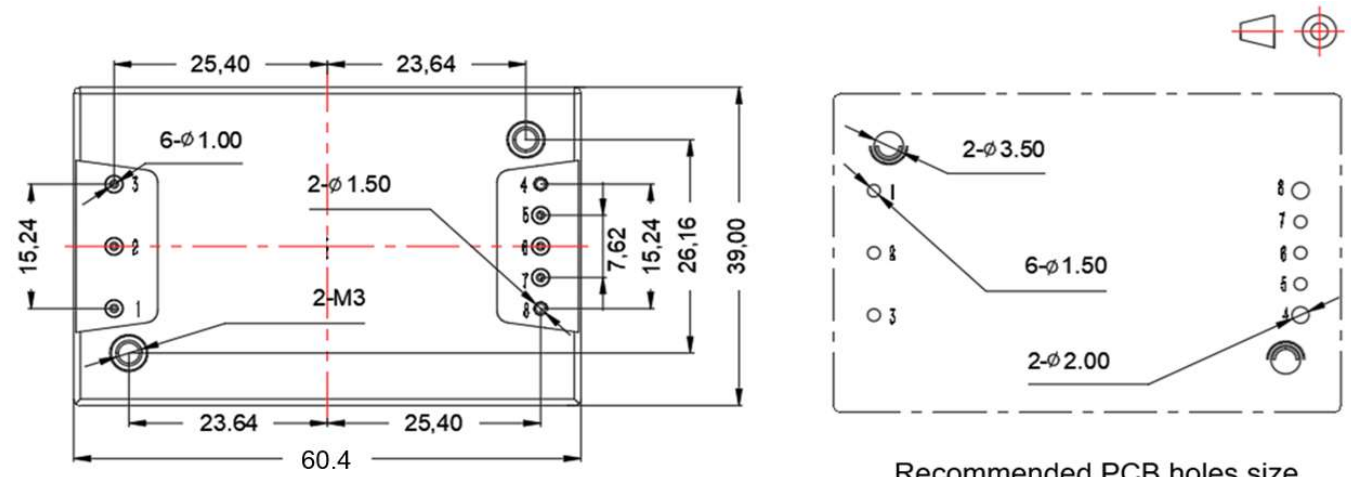
EMC Performances

| | | | | |
|-----|-------|-----------------|-----------------------------|------------------|
| EMI | CE | EN55032-3-2 | 150kHz-500kHz 66dBuV | |
| | | EN55032-2-1 | 500kHz-30MHz 60dBuV | |
| | RE | EN55032-3-2 | 30MHz-230MHz 50dBuV/m at 3m | |
| | | EN55032-2-1 | 230MHz-1GHz 57dBuV/m at 3m | |
| EMS | 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 5/50ns 5kHz | perf. Criteria A |
| | Surge | IEC/EN61000-4-5 | Line to line ± 2KV | perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 10 Vr.m.s | perf. Criteria A |

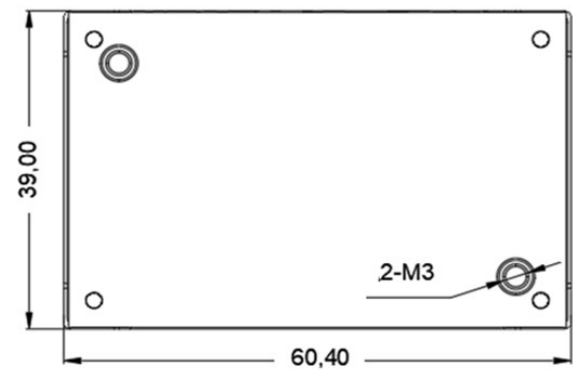
Physical Characteristics

| | |
|------------------|---|
| 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 H | Conduction cooling or forced air cooling with fan |
| Product Weight | Standard 72g, with heatsink 125g |

Mechanical Dimensions and Pin-Out description

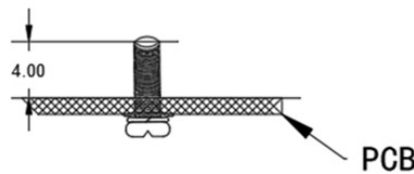


Standard+Heatsink
61.0x39.0x27.7mm



Standard
60.4x39.0x12.7mm

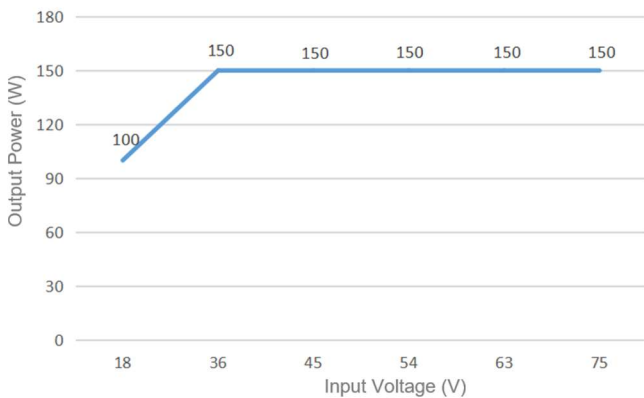
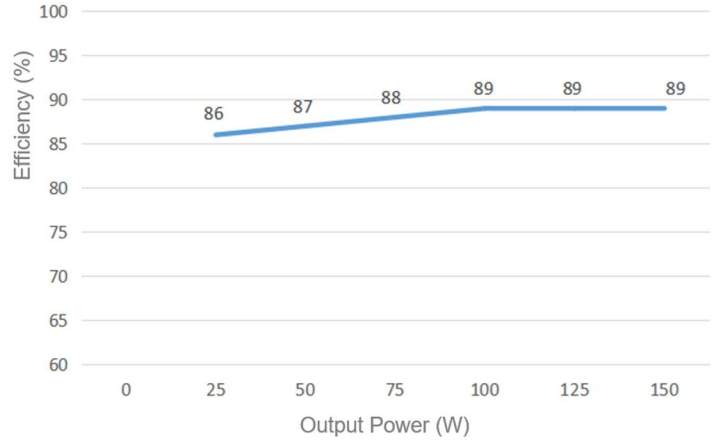
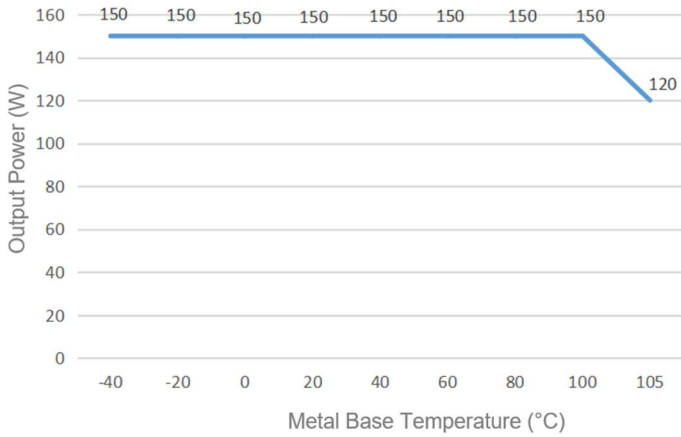
Note:
Unit: mm
Pin 1,2,3,5,6,7 diameter: 1.00
Pin 4,8 diameter: 1.50
Tolerance: X.X ±0.50mm, X.XX ±0.10mm
Screwing torque: 0.4N.m Max



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 V+ | Remote Control | Input V- | Output V- | Output distal end compensation S- | Output Voltage Trim | Output distal end compensation S+ | Output V+ |

Product Performance Curves



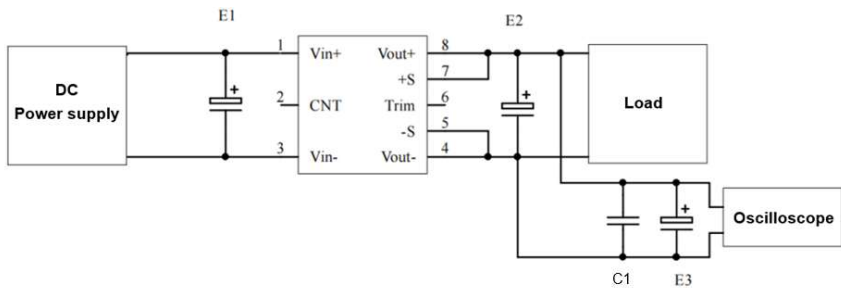
Note:

1. The output power and the efficiency in the curves are tested with typical values.
2. The data in temperature derating curve is tested under 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

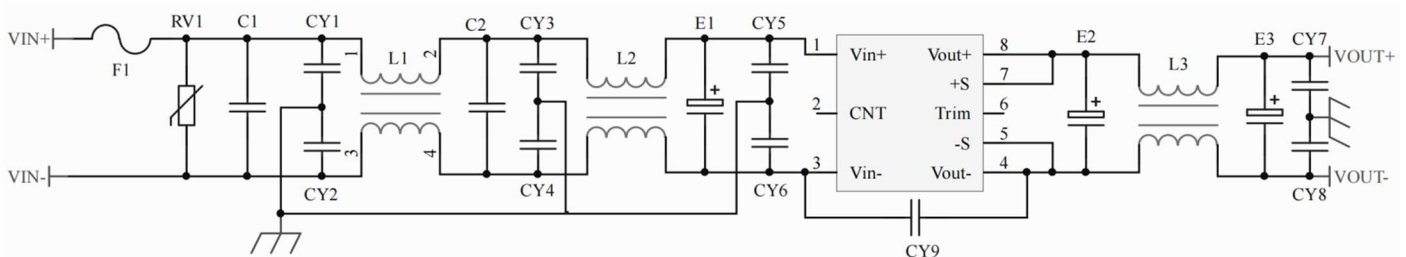
All this series of converters will be tested according to the circuit below before shipping.



| Capacitance Output Volt. | E1 (μF) | E2 (μF) | C1 (μF) | E3 (μF) |
|-----------------------------|---------|---------|---------|---------|
| 3.3VDC | 100 | 1000 | 1 | 10 |
| 5VDC | | 680 | | |
| 12VDC | | 220 | | |
| | 68 | 68 | 1 | 10 |
| 48VDC | | 68 | | |
| | | | | |
| 110VDC | | | | |

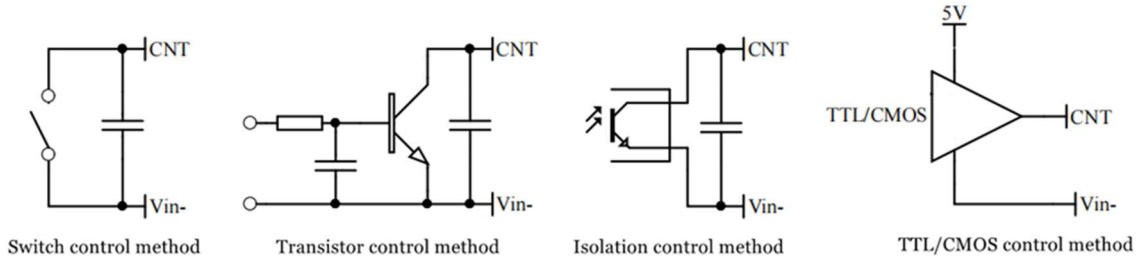
2. Typical application circuit

If this circuit recommended is not adopted, please connect an electrolytic capacitor $\geq 100 \mu\text{F}$ in parallel at the input to suppress the possible surge voltage.



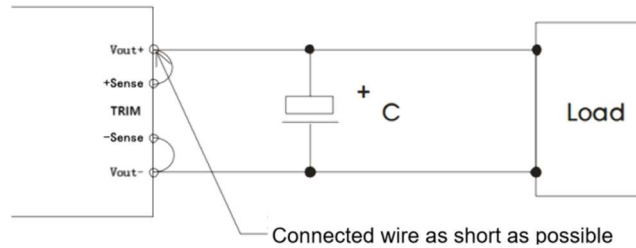
| | |
|------------------------------|--|
| F1 | T15A/250V Time-delay fuse |
| RV1 | 14D 100V Varistor |
| C1, C2 | 105/250V Polyester Film Capacitor |
| CY1, CY2, CY3, CY4, CY5, CY6 | 102/250Vac Y2 capacitor |
| CY7, CY8 | 103/2KV Ceramic SMD Capacitor |
| CY9 | 471/250Vac Y2 capacitor |
| E1 | 100μF/100V Electrolytic Capacitor |
| E2, E3 | 220μF/35V Electrolytic Capacitor |
| L1, L2 | >3mH, temperature rise less than 25°@8.5A |
| L3 | >220uH, temperature rise less than 25°K@6.3A |

2. Remote control (CNT) application



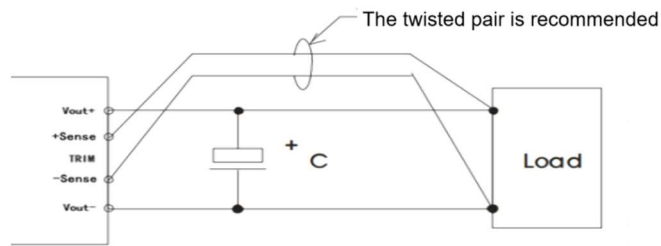
3. Application for Sense

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



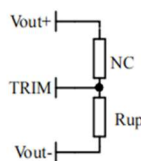
- Notes:
1. The output voltage may be unstable if the compensation cables are too long.
 2. The Twisted pair or shielded cables are recommended, the cable length should be as short as possible.
 3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage drop <0.3V. The target is to keep output voltage within the specified range.
 4. The leads wire resistance may create the output voltage oscillation or larger ripples. Please verify it before to use.

4. TRIM & TRIM resistance calculation

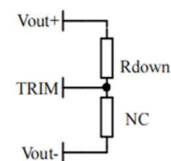
The calculation of ΔU and Rup & Rdown:

$$R_{up} = 70 / \Delta U - 5.1 (K\Omega)$$

$$R_{down} = 28 * (24 - 2.5 - \Delta U) / \Delta U - 5.1 (K\Omega)$$



Voltage-up: Add Rup between Trim and Vout-



Voltage-down: Add Rdown between Trim and Vout+

5. This converter is not available for connection in parallel to increase the output power. Please contact Aipu technician for this kind of requirement.

Others

1. The product warranty period is two years. The failed product can be repaired/replaced free of charge if it operates at normal condition. A paid service shall be also provided if the product failed after operating under wrong or unreasonable conditions.
2. Aipupower can provide customization design and filter modules for matching, please contact our technician for details.

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