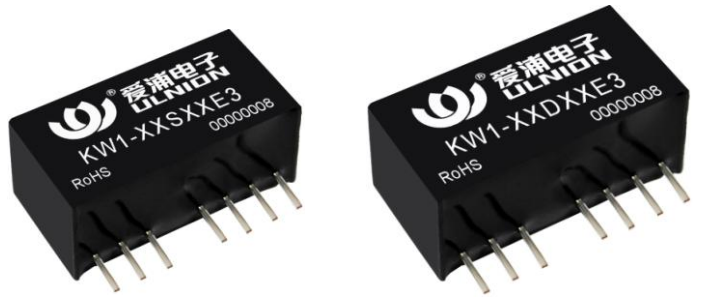
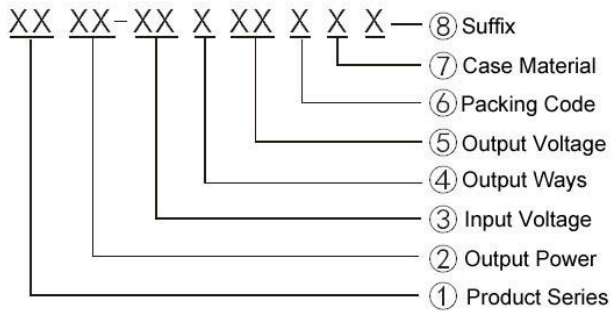


Typical Features

- ◆ Wide Input Voltage Range (2:1), Output Power 1W
- ◆ Conversion Efficiency up to 82%
- ◆ With remote control Switch-off function
- ◆ Continuous Short Circuit protection, Self-recovery
- ◆ No Overshooting when turn-on or off
- ◆ Isolation Voltage 3000VDC
- ◆ Operating Temperature: -40℃ ~ +85℃
- ◆ Plastic Case, meet UL94-V0 standard


Product Named Method


Test Condition: Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25℃.

Input Specifications

| Item | Test Condition | Min. | Typ. | Max. | Unit |
|--|------------------|------|------|------|------|
| Max Input Overshoot Voltage (1Second) | 4.5-9V Input | -0.7 | - | 16 | VDC |
| | 9-18V Input | -0.7 | - | 25 | |
| | 18-36V Input | -0.7 | - | 50 | |
| | 36-75V Input | -0.7 | - | 100 | |
| Turn-on Voltage | 4.5-9V Input | 3.5 | 4 | 4.5 | VDC |
| | 9-18V Input | 4.5 | 8 | 9 | |
| | 18-36V Input | 11 | 16 | 18 | |
| | 36-75V Input | 24 | 33 | 36 | |
| Stand-by Power Consumption | 0.3W (Max.) | | | | |
| Input Filter | Capacitor Filter | | | | |

Output Specifications

| | | | |
|----------------------------------|--|--|--|
| Positive Output Voltage Accuracy | Full voltage full load | +Vo | $\leq \pm 2.0\%$ |
| Negative Output Voltage Accuracy | | -Vo | $\leq \pm 3.0\%$ |
| No Load Output Voltage Accuracy | | Vo | Primary Output: $\leq \pm 3.0\%$, Secondary Output: $\leq \pm 5.0\%$ |
| Line Regulation | Nominal load, full voltage range | Vo | Primary Output: $\leq \pm 0.2\%$, Secondary Output: $\leq \pm 0.5\%$ |
| Load Regulation | 10% ~ 100% nominal load | Vo | Primary Output: $\leq \pm 0.5\%$, Secondary Output: $\leq \pm 0.75\%$ |
| Cross Regulation | Dual output, Primary output 50% load, secondary output 10%-100% load | | $\leq \pm 5.0\%$ |
| Ripple & Noise | Nominal load, nominal voltage | $\leq 150\text{mVp-p}$ (20MHz bandwidth) | |
| Temperature Drift Coefficient | 100% full load | $\pm 0.03\%/^{\circ}\text{C}$ | |
| Output Short Circuit Protection | Continuous, Self-recovery | | |
| Dynamic Response | 25% nominal load step change | $\Delta\text{Vo}/\Delta\text{t}$ | $\leq \pm 5.0\%/0.5\text{ms(Typ.)}$ |

Note: 1.un-balancing loads of dual output: $\pm 5\%$;

2. Ripple & Noise Tested by twisted-pair method, for details please check Design and Application Circuit.

General Specifications

| | | |
|-----------------------|-------------------------------------|---|
| Switching Frequency | typical | 250KHz |
| Operating Temperature | Refer to Temperature Derating Curve | $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ |
| Storage Temperature | | $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$ |
| Max Case Temperature | Within Temperature Derating Curve | $+105^{\circ}\text{C}$ |
| Relative Humidity | No condensing | 5%~95% |
| Case Material | | Black flame-retardant heat-resistant Plastic(UL94-V0) |
| Product Weight | | 4.37g(Typ.) |
| Isolation Voltage | Input to Output | 3000Vdc $\leq 0.5\text{mA} / 1\text{min}$ |
| MTBF | MIL-HDBK-217F@25 $^{\circ}\text{C}$ | 2X10 ⁵ Hrs |

Typical Product List

| Model | Input Voltage Range (VDC) | | Output Voltage/Current (Vo/Io) | | Input Current(mA) Nominal Voltage | | Max. Capacitive Load | Ripple & Noise (Max.) | Efficiency (%) |
|-------------|---------------------------|---------|--------------------------------|-------------|-----------------------------------|--------------|----------------------|-----------------------|----------------|
| | Nominal | Range | Voltage(V) | Current(mA) | Full load Typ. | No Load Typ. | μF | mVp-p | Typ. |
| KW1-05S05E3 | 5 | 4.5 - 9 | 5 | 200 | 278 | 22 | 2200 | 150 | 72 |
| KW1-05S12E3 | | | 12 | 83 | 270 | 32 | 680 | | 74 |
| KW1-05S15E3 | | | 15 | 67 | 270 | 34 | 470 | | 74 |
| KW1-05S24E3 | | | 24 | 42 | 270 | 36 | 330 | | 74 |

Single Output:

Guangzhou Aipu Electron Technology Co., Ltd

Add: B Building ,No.4 Courtyard, Qixing Gang, Shiliu Gang, Haizhu Dis, GZ,CN

Email: market@aipu-elec.com

Tel: 86-20-84206763

Fax: 86-20-84206762

HOTLINE: 400-811-8032

Website: <http://en.aipulnion.com/>

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| | | | | | | | | | |
|-------------|----|---------|----|-----|-----|----|------|-----|----|
| KW1-12S05E3 | 12 | 9 - 18 | 5 | 200 | 107 | 10 | 2200 | 150 | 78 |
| KW1-12S12E3 | | | 12 | 83 | 107 | 12 | 680 | | 78 |
| KW1-12S15E3 | | | 15 | 67 | 104 | 15 | 470 | | 80 |
| KW1-12S24E3 | | | 24 | 42 | 107 | 15 | 330 | | 78 |
| KW1-24S05E3 | 24 | 18 - 36 | 5 | 200 | 53 | 6 | 2200 | 150 | 78 |
| KW1-24S12E3 | | | 12 | 83 | 52 | 7 | 680 | | 80 |
| KW1-24S15E3 | | | 15 | 67 | 52 | 7 | 470 | | 80 |
| KW1-24S24E3 | | | 24 | 42 | 53 | 8 | 330 | | 78 |
| KW1-48S05E3 | 48 | 36 - 75 | 5 | 200 | 26 | 3 | 2200 | 150 | 80 |
| KW1-48S12E3 | | | 12 | 83 | 25 | 4 | 680 | | 82 |
| KW1-48S15E3 | | | 15 | 67 | 25 | 4 | 470 | | 82 |
| KW1-48S24E3 | | | 24 | 42 | 26 | 5 | 330 | | 80 |

Positive Negative Dual Output:

| | | | | | | | | | |
|--------------|----|---------|----------|-----------|-----|----|------|-----|----|
| *KW1-05D05E3 | 5 | 4.5 - 9 | ± 5 | ± 100 | 278 | 22 | 1000 | 150 | 72 |
| *KW1-05D12E3 | | | ± 12 | ± 42 | 270 | 32 | 470 | | 74 |
| *KW1-05D15E3 | | | ± 15 | ± 34 | 270 | 34 | 330 | | 74 |
| *KW1-05D24E3 | | | ± 24 | ± 21 | 270 | 36 | 100 | | 74 |
| *KW1-12D05E3 | 12 | 9 - 18 | ± 5 | ± 100 | 107 | 10 | 1000 | 150 | 78 |
| *KW1-12D12E3 | | | ± 12 | ± 42 | 107 | 12 | 470 | | 78 |
| *KW1-12D15E3 | | | ± 15 | ± 34 | 104 | 15 | 330 | | 80 |
| *KW1-12D24E3 | | | ± 24 | ± 21 | 107 | 15 | 100 | | 78 |
| *KW1-24D05E3 | 24 | 18 - 36 | ± 5 | ± 100 | 53 | 6 | 1000 | 150 | 78 |
| *KW1-24D12E3 | | | ± 12 | ± 42 | 52 | 7 | 470 | | 80 |
| *KW1-24D15E3 | | | ± 15 | ± 34 | 52 | 7 | 330 | | 80 |
| *KW1-24D24E3 | | | ± 24 | ± 21 | 53 | 8 | 100 | | 78 |
| *KW1-48D05E3 | 48 | 36 - 75 | ± 5 | ± 100 | 26 | 3 | 1000 | 150 | 80 |
| *KW1-48D12E3 | | | ± 12 | ± 42 | 25 | 4 | 470 | | 82 |
| *KW1-48D15E3 | | | ± 15 | ± 34 | 25 | 4 | 330 | | 82 |
| *KW1-48D24E3 | | | ± 24 | ± 21 | 26 | 5 | 100 | | 80 |

Note: 1. "*" are models under developing.

2. To ensure this module operate efficiently and reliably, the minimum output load could not be less than 10% of the nominal load during operation. If the actual output power is too small, please connect a resistor in parallel at the output, the resistance recommended equal to 10% nominal power.

Characteristic Curve

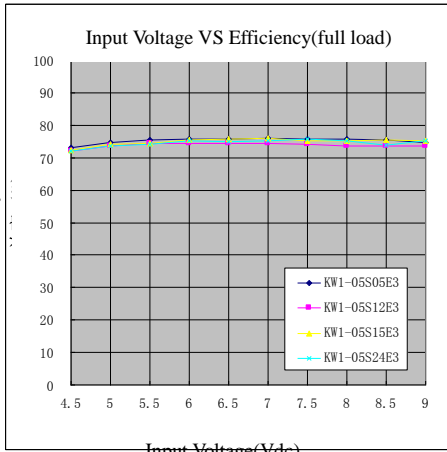


Photo 1

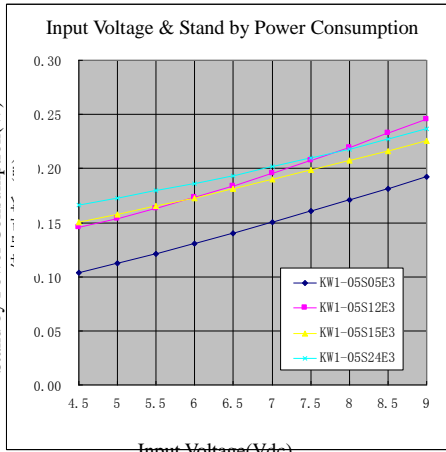


Photo 2

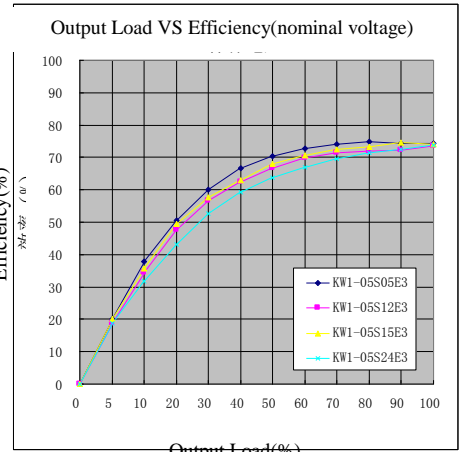


Photo 3

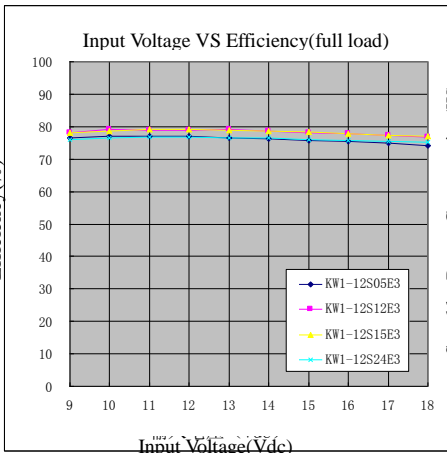


Photo 4

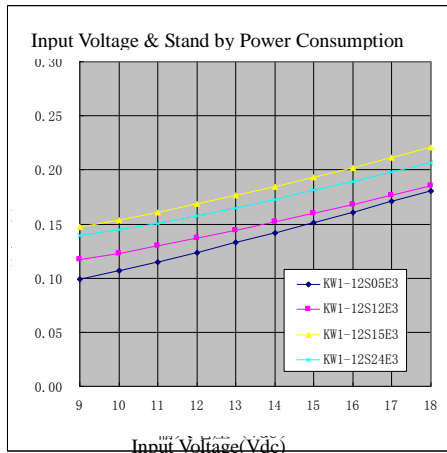


Photo 5

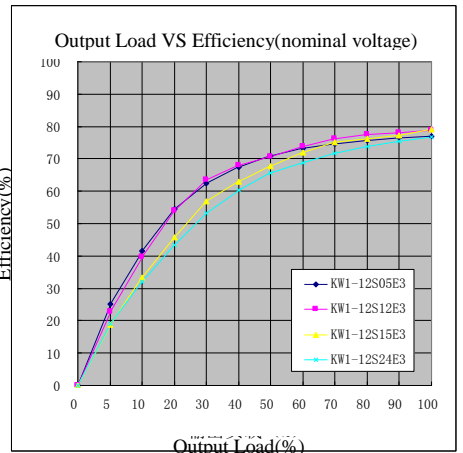


Photo 6

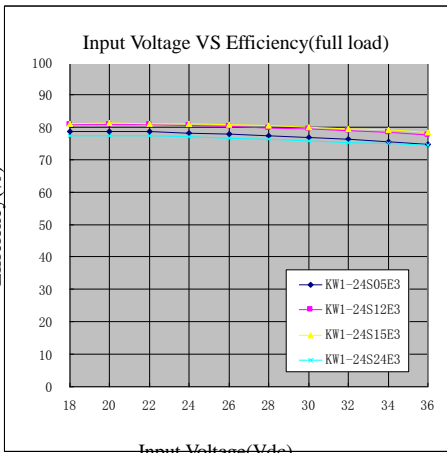


Photo 7

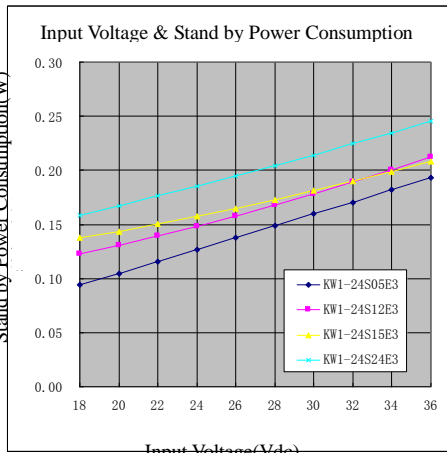


Photo 8

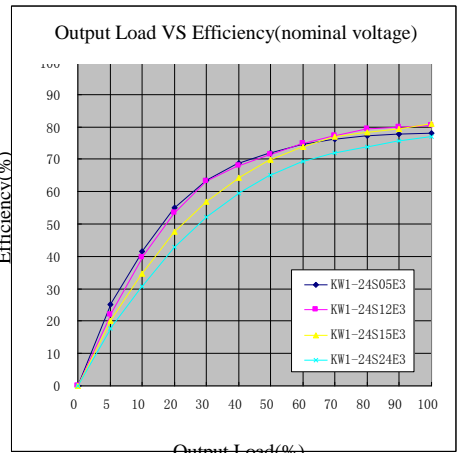


Photo 9

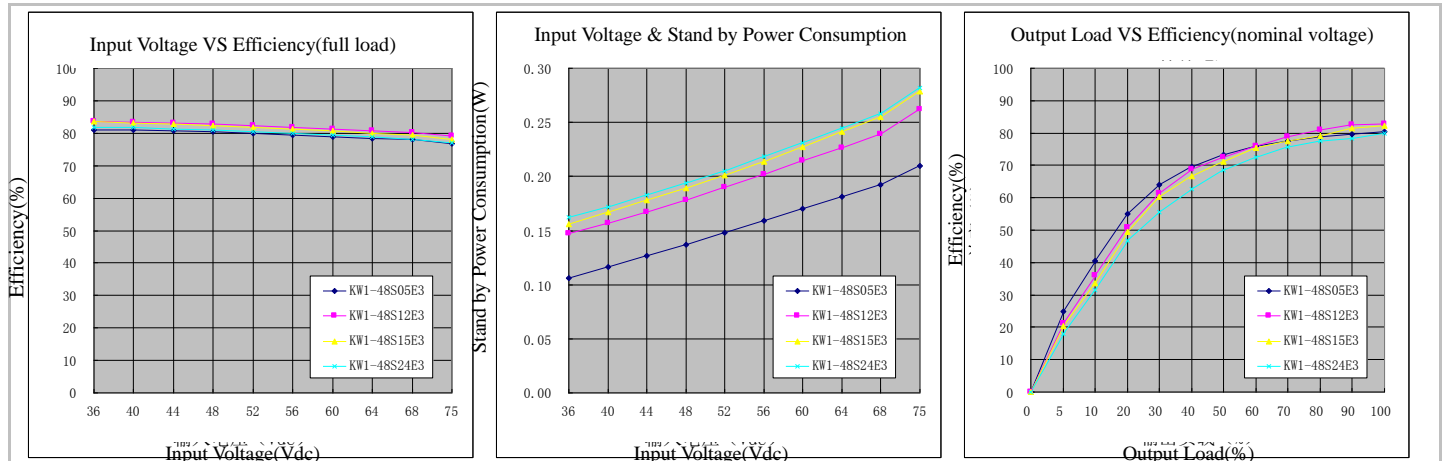


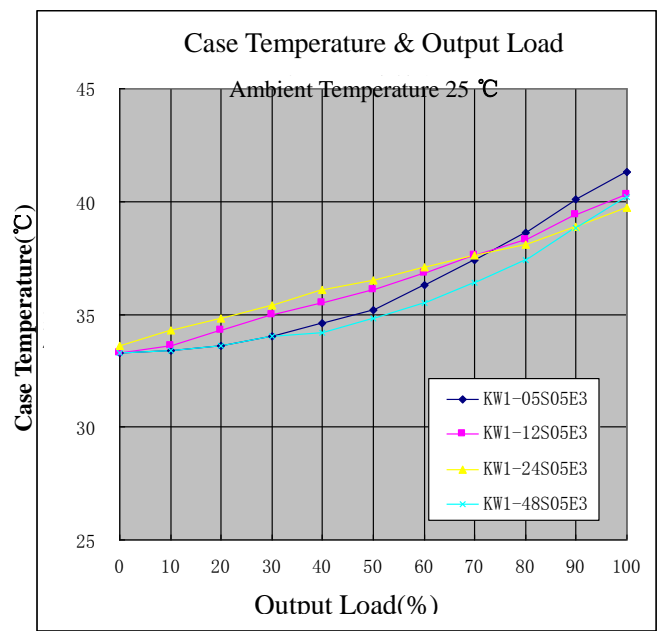
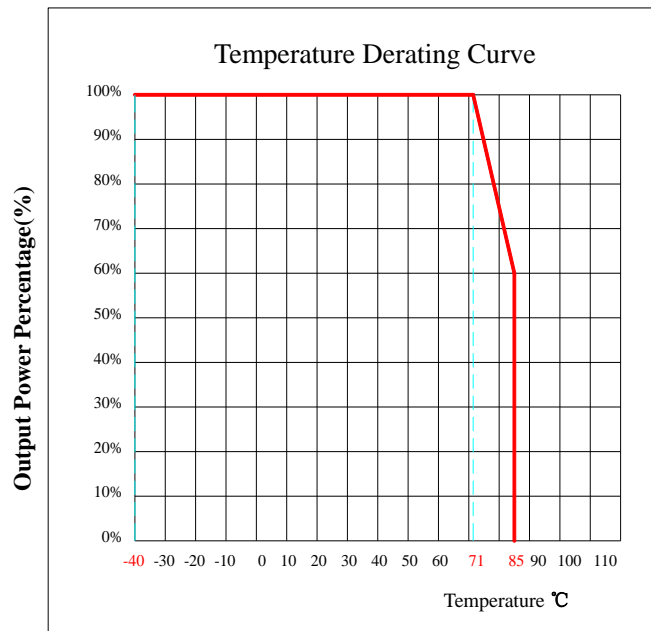
Photo 10

Photo 11

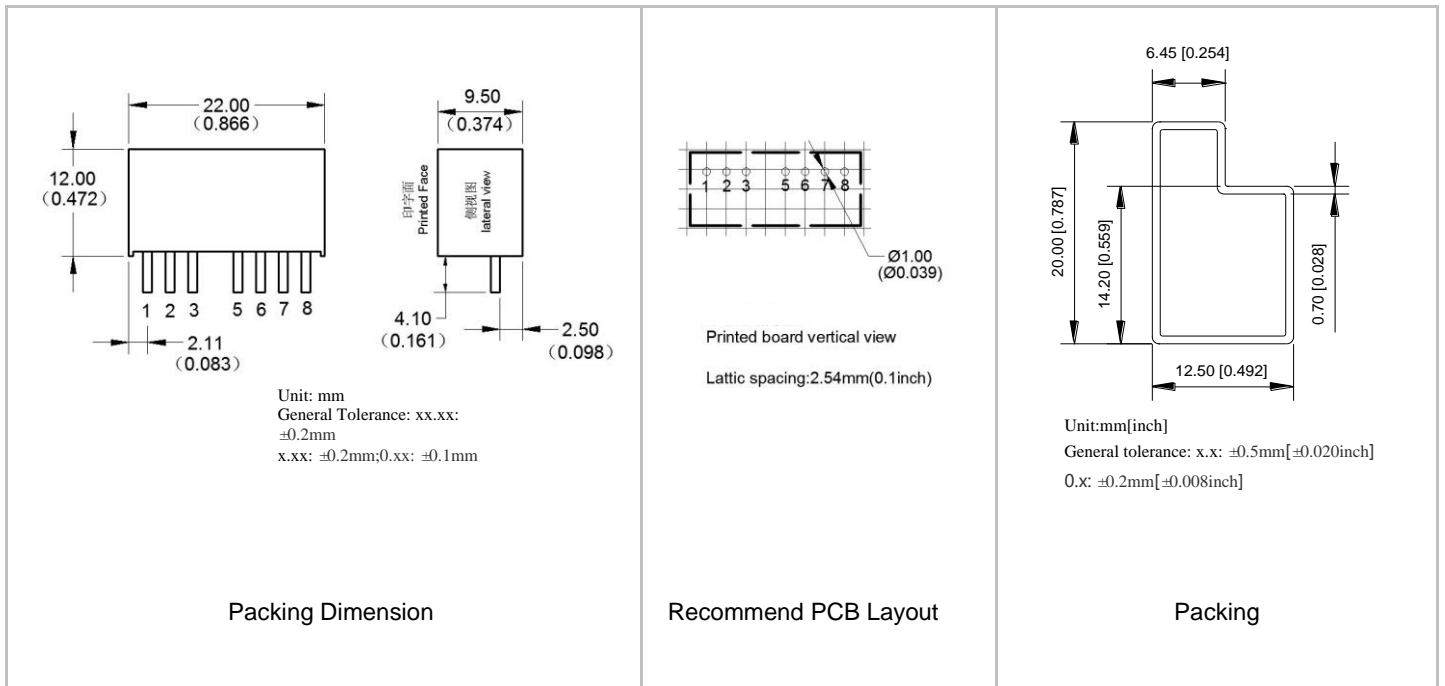
Photo 12

Note: Photo 1,2,3 are 5V input series ; Photo 4,5,6 are 12V input series ; Photo 7,8,9 are 24V input series; Photo 10,11,12 are 48V input series.

Temperature Curve



Packing Dimension, Pin Function, Recommended PCB layout



| | | | | | | | | | |
|--------------|---------------------|-----|------|------|-----|----|-----|----|-----|
| Pin Function | Single(S) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | GND | +Vin | Ctrl | --- | NC | +Vo | 0V | CS |
| | ±Dual Output (D) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | GND | +Vin | Ctrl | --- | NC | +Vo | 0V | -Vo |

* Note: if the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

Packing Dimension

| | | |
|--------------|-----------------|--------------------------|
| Packing Code | L x W x H | |
| E | 22 x 9.5 x 12mm | 0.866x 0.374 x 0.472inch |

Design and Application Circuit Recommended

1. CS terminal

This terminal provides a connection point to connect the inside main filter capacitor of output terminal for the DC/DC converter(capacitor positive) , and can further improve the output ripple and noise through connecting a low ESR capacitor(Normal CS≤47uF) between this terminal and the 7 pin (capacitor negative).

2. Output Load Request

a. To ensure this module operate efficiently and reliably, the minimum load recommended not to be less than 10% of the nominal load. If the actual power is too small, please connect a resistor in parallel at output terminal, the resistance equal to 10% nominal load. If use positive negative dual output product, please try to avoid big unbalances between loads, or the original output voltage accuracy cannot be ensured.

b. The maximum capacitive load is tested under nominal input full load; if use it under no load condition, should try to decrease the output capacitive load or connect a resistor in parallel at output terminal, the resistance equal to 10% nominal load, otherwise it may cause the output voltage be un-stable or even exceed the original output voltage accuracy range

3.Recommended Circuit

DC/DC test circuit: If customers want to further decrease input& output ripple, the capacitance of external capacitor can be increased properly, but the maximum capacitance of the filter capacitor should be less than the maximum capacitive load, otherwise it will make it difficult to turn-on the module.

Normal Recommend: Ci:100uF (5V&12V) / 10uF (24V&48V)

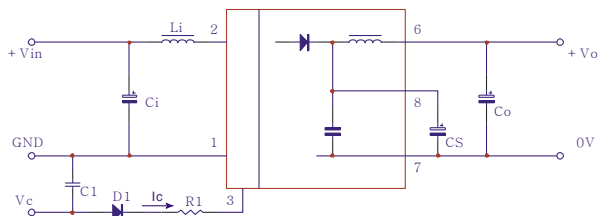
Li:4.7uH~120uH

CS:10uF~22uF

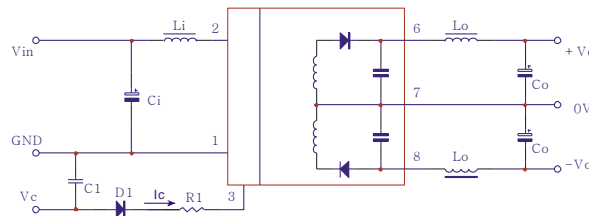
Co:100uF (Typ.)

Lo:2.2uH~10uH

C1:47nF/100V



Single Output



Positive Negative Dual Output

Photo 13

4.CTRL Terminal

Suspended or high resistance, output of module runs normally; Connect to high level(relative to input ground), module turns off.

Note: The proper current flowing into this pin is 5-10mA, It will cause permanent damage to module if the current exceed its maximum value(typically 20mA). The R is calculated according to the following formula:

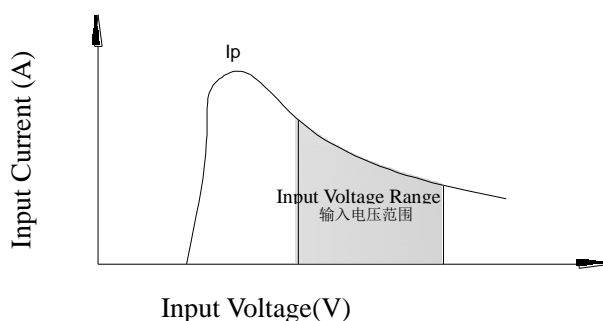
$$R = \frac{V_c - V_d - 0.7}{I_c} - 330 \quad (\text{See Photo 13})$$

Vc is input voltage of Ctrl pin, Vd is forward voltage drop of D1, 0.7V and 330Ω are module's bipolar junction transistor voltage drop and inside connecting resistor of input terminal for control pin respectively, Ic is the input current of control terminal.

5.Input Current

When unstable power supply connected, please ensure that the output voltage fluctuating range of power supply and the ripple voltage is within the module's index, output current of input power supply must be able to meet instant turn-on current Ip of the DC/DC converter(see below picture)

Normally: $I_p \leq 1.4 * I_{in_max}$

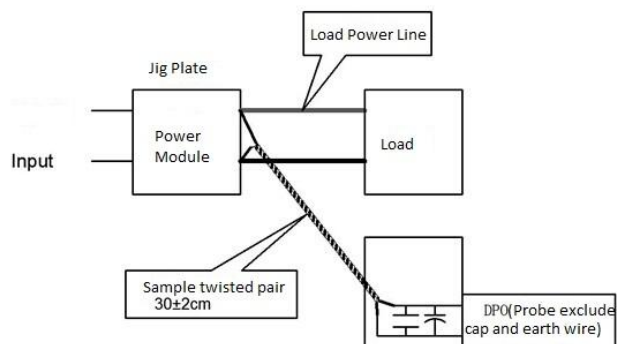


6. Ripple & Noise Test: (Twisted Pair Method 20MHz bandwidth)

Test Method:

a. 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



Note:

1. This product cannot be used in parallel, and do not support hot-plugging;
2. All index testing methods in this datasheet are based on our Company's corporate standards
3. The product specification may be changed at any time without prior notice.