AIPULNION®

# DC/DC converter
# BK15-500SXXH2N6

CE RoHS

## typical character

- ◆ Ultra Wide input voltage range：100- 1000VDC
- ◆ no load power consumption≤0.4W
- ◆ switch frequency：65KHz
- ◆ Transfer efficiency ： 85% (Typ)
- ◆ protection：Against reverse protection，output over-voltage protection, short circuit、、over-current
- ◆ isolation：4000VAc
- ◆ meet IEC/EN62368 test standard
- ◆ meet CE 、RoHS certification standard
- ◆ Fully enclosed plastic case，meet UL94V-0


## Application

BK15-500SXXH2N6 series---is a 100-1000VDC ultra-wide ultra-high voltage input high-efficiency and high-reliability DC-DC switching regulated power supply module, which can be widely used in photovoltaic power generation and high-voltage frequency conversion and other occasions to provide stable power for load equipment Working voltage, and its own multiple protection functions can improve the safety performance of the power supply and its load when the module power supply works abnormally.

## product list

| - | Part number | output | | | | | Capacitive load ( MAX) | Ripple & noirse 20MHz ( MAX) | efficiency@full load 150VDC (typ) |
|---|---|---|---|---|---|---|---|---|---|
| | | power | Voltage 1 | Current 1 | Voltage 2 | Current2 | | | |
| | | ( W) | Vo1 (V) | Io 1 (m A) | Vo2 (V) | Io2 (m A) | u F | mVp-p | % |
| | BK15-500S12H2N6 | 15 | 12 | 1250 | -- | -- | 2000 | 200 | 82 |
| | *BK15-500S24H2N6 | 15 | 24 | 625 | -- | -- | 680 | 200 | 85 |

Note 1: Due to limited space, the above is only a partial list of products. If you need products other than the list, please contact our sales department.

Note 2: The typical value of output efficiency is based on half an hour of full-load aging of the product.

Note 3: The fluctuation range of full load efficiency (%,TYP) in the table is ±2%, and the full load output efficiency is equal to the total output power divided by the input power of the power module.

Note 4: "*" indicates a model under development.

Note 5: The test method of ripple and noise adopts the twisted pair test method, and the specific test method and collocation can be found in the following (ripple & noise test description).

## input characteristic

| item | Work condition | min | typ | max | unit |
|---|---|---|---|---|---|
| Switch frequency | -- | -- | 65 | 70 | KHZ |
| Input voltage range | Dc input | 100 | 500 | 1000 | VDC |
| Input current | 100VDC | - | 0.305 | - | A |
| | 500VDC | - | 0.06 | - | |
| Surge current | 200VDC | - | 7 | - | |
| | 600VDC | - | 20 | - | |

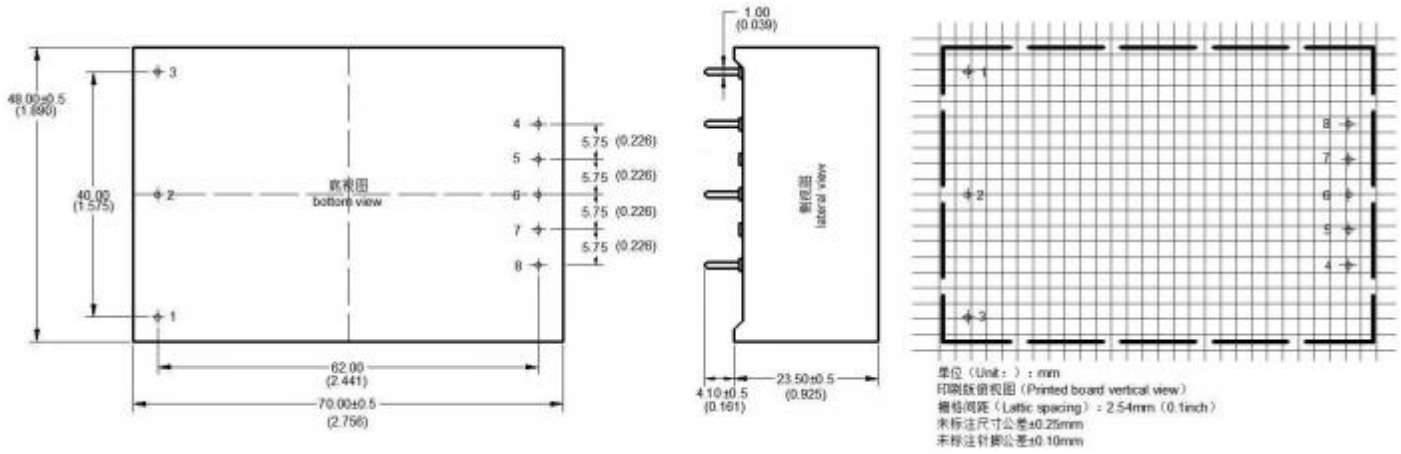
| | | | | | | |
|---|---|---|---|---|---|---|
| No load power consumption | input 500VDC | | - | - | 0.40 | W |
| Recommended value of external fuse | - | | 2A / 1000V， necessary | | | |
| hot plug | - | | Not support | | | |
| Remote control | - | | No remote control | | | |
| **Output characteristic** | | | | | | |
| **item** | **Work condition** | | min | typ | max | unit |
| voltage accuracy | Input full voltage range, any load | Vo1 | - | ±2.0 | ±3.0 | % |
| | | Vo2 | - | - | - | % |
| line regulation | Norminal laod | Vo1 | - | ±0.5 | ±1.2 | % |
| | | Vo2 | - | - | - | % |
| load regulation | Input nominal voltage 20%~100% load | Vo1 | - | ±1.0 | ±2.0 | % |
| | | Vo2 | - | - | - | % |
| Min load | Single output | | 10 | - | - | % |
| | Positive and negative dual common ground output | | - | - | - | % |
| | Positive and negative isolation output | | - | - | - | |
| Start delay time | input 100VDC (full load) | | - | 5000 | - | S m |
| | input 1000VDC (full load) | | - | 1000 | - | |
| Power off holding time | input 500VDC (full load) | | 10 | | | mS |
| Dynamic Response | 25%~50%~25% 50%~75%~50% | | overshoot amplitude (%)： ≤±6.0 | | | % |
| | | | recover time (mS)： ≤500 | | | mS |
| Output overshoot | Input full range | | ≤10%Vo | | | % |
| Short circuit | input 100-700VDC | | Long - term short circuit, self - recovery | | | hiccup |
| Drift coefficient | - | | - | ±0.05% | - | %/℃ |
| Over current protection | input 200- 1000VDC | | ≥110% Io self - recovery | | | hiccup |
| Output over voltage protection | 12V | | ≤16 | | | VDC |
| **General characteristics** | | | | | | |
| item | **Work condition** | | **min** | **typ** | max | unit |

| | | | | | |
|---|---|---|---|---|---|
| Operating temperature | - | -30 | - | +70 | ℃ |
| | Perform temperature derating based on the temperature derating curve. For the derating curve, see the following (Product feature curve) | | | | |
| Storage temperature | - | -25 | - | +85 | |
| Soldering temperature | Wave soldering | 260±5℃，time 5- 10S | | | |
| | manual soldering | 380± 10℃，time 4-7S | | | |
| Relative humidity | No condensing | - | - | 90 | %RH |
| Isolation voltage | input-output<br>Test 1 min，leakage current≤5mA | 4000 | - | - | VAC |
| insulation resistance | input-output@add DC500V | 100 | - | - | MΩ |
| Safety standard | - | IEC/EN62368 | | | |
| vibration | - | 10-55Hz, 10G,30Min,alongX,Y,Z | | | |
| Safety level | - | CLASS Ⅱ | | | |
| case level | - | UL94V-0 | | | |
| (MTBF) | - | MIL-HDBK-217F@25℃＞300,000H | | | |

## physical characteristics

| | | |
|---|---|---|
| Case material | | Black flame retardant and heat resistant plastic(UL94V-0) |
| size | Horizontal package | 70.0X48.0X23.5 mm |
| weight | | 115g (TYP) |
| Cooling | | Air cooling |

## package size




| Package code | L x W x H | |
|---|---|---|
| H2 | 70.0X 48.0X23.5 mm | 2.756X1.890X0.925inch |

## pin definition

| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| single ( S) | NC | -Vin | +Vin | +Vo | NC | NC | NC | GND | NC |

Note: If the definition of each pin of the power module is inconsistent with the model selection manual, the marking on the physical label shall prevail.

## Ripple & Noise Test Description (Twisted Pair Method 20MHz Bandwidth)

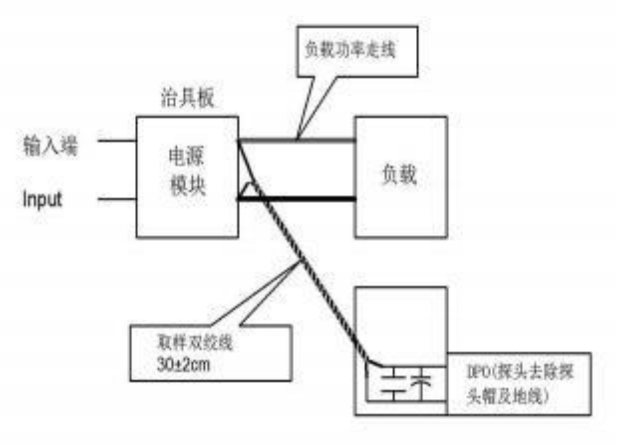
Test Methods:

1. Ripple noise is connected by 12# twisted pair, the oscilloscope

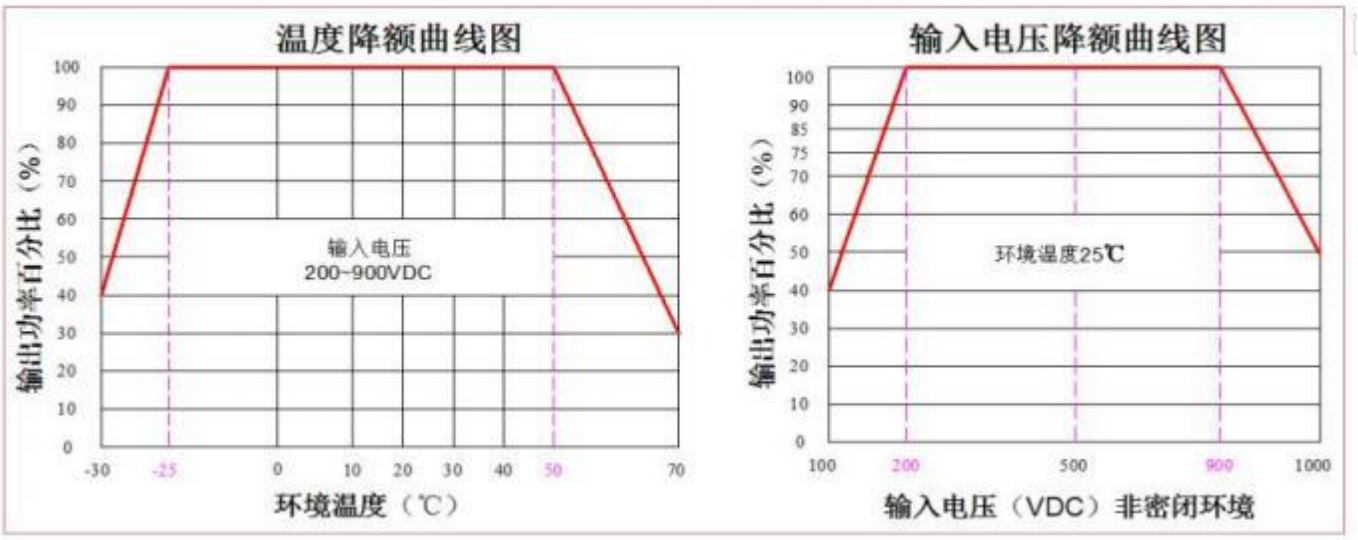
The bandwidth is set to 20MHz, 100M bandwidth probe, and a 0.1uF polypropylene capacitor and a 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel on the probe end, and the oscilloscope uses the Sample sampling mode for sampling.

2. Schematic diagram of output ripple noise test:

Connect the power input terminal to the input power supply, connect the power output to the electronic load through the fixture board, and use a 30cm±2 cm sampling line to directly sample from the power output port for testing. According to the size of the output current, select the wire with insulation of the corresponding wire diameter.



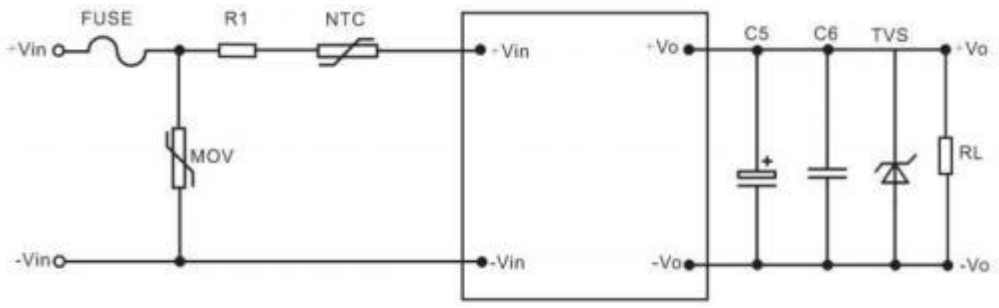

## Product characteristic curve




Note 1: When the input voltage is 100~1000VDC and the temperature is -30~70℃, the voltage derating needs to be performed on the basis of the input voltage derating curve.

Note 2: This product is suitable for use in a natural air cooling environment, if it is used in a closed environment, please contact our company.

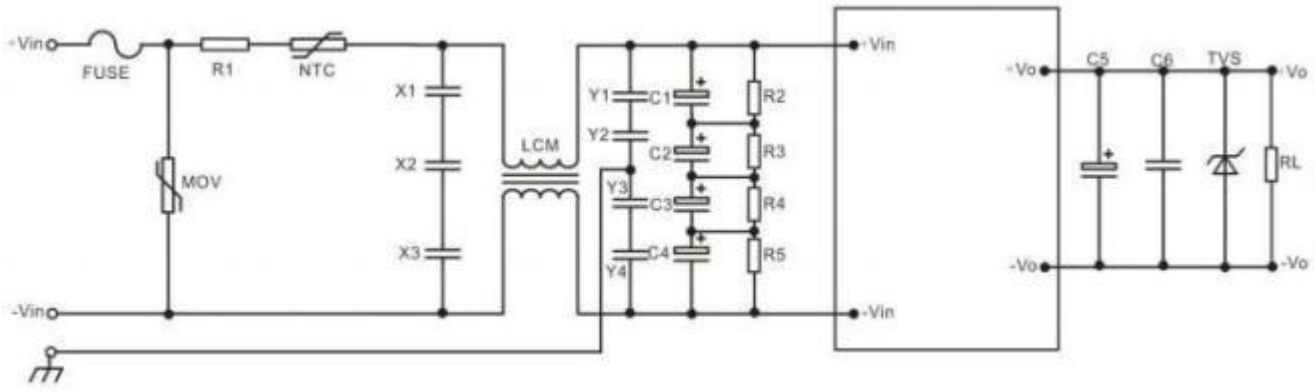
## Typical application circuit




| Output voltage | C5 | C6 | TVS |
|---|---|---|---|
| 12V | 330uF/35V | 0.2uF/50V/1206 | SMBJ18A |
| 24V | 220uF/50V | 0.1uF/50V/1206 | SMBJ28A |

Note: The output filter capacitor C5 is an electrolytic capacitor. It is recommended to use a high-frequency low-resistance electrolytic capacitor. For capacity and current flow, please refer to the technical specifications provided by each manufacturer. The withstand voltage derating of the capacitor is greater than 80%. C6 is a ceramic capacitor to remove high frequency noise. It is recommended to use the TVS tube to protect the subsequent circuit when the module is abnormal.

## EMC external recommended circuit




| Ic components name | usage | Recommend value | note |
|---|---|---|---|
| FUSE - (fuse) | When the module is abnormal, it will fuse and cut off the fault | Select according to the actual input current | necessary |
| R1 - (current-limiting resistance) | Suppresses the instantaneous surge current at startup | 300Ω/10W metal oxide film resitance | |
| NTC - (thermistor) | suppress surge current | 5D-15 | |
| MOV - (varistor) | absorb lightning surge | 20D 152K | According to the actual application needs to choose additional |
| X1/X2/X3 - (CBB capacitor) | Suppression of Differential Mode Interference | 1.0uF/450V | |
| LCM - (common mode choke) | Suppression of common mode interference | 8mH/0.8A | |
| Y1/Y2/Y3/Y4 - (Y capacitor) | | 2.2nF/400V | |
| C1/C2/C3/C4 - (electrolytic capacitor) | low frequency filter | 200uF/400V | |
| R1/R2/R3/R4 - (SMD resistor) | For voltage equalization, to ensure equal capacitor voltage division | 1MΩ/2W | |

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;

2. The input terminal of the product must be connected with insurance;

3. If the product works under the minimum required load, the performance of the product cannot be guaranteed to meet all the performance indicators in this manual;

4. If the product works beyond the load range of the product, the performance of the product cannot be guaranteed to meet all the performance indicators in this manual;

5. Unless otherwise specified, the above data are measured at Ta=25℃, humidity<75%, input nominal voltage and output rated load (pure resistance load);

6. The test methods of all the above indicators are based on the company's standards;

7. The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard model products will exceed the above requirements. For specific conditions, please contact our technical personnel directly.

8. Our company can provide product customization;

9. Product specifications are subject to change without prior notice, please pay attention to the latest manual published on our official website.