

Typical Characteristics

- Wide input range: 85-305VAC/40-432VDC
- No-load power consumption  $\leq 0.1W$
- Conversion efficiency (Typ. 82%)
- Switching frequency: 65KHz
- Protection: Short-circuit, overcurrent, overvoltage, and overtemperature
- Isolation voltage: 4000Vac
- Fully enclosed plastic housing, compliant with UL94 V-0
- Through-hole mounting on a PCB
- Compliant with CE and RoHS certifications

5W, Wide-Voltage Input, Isolated Single-Channel/Dual-Channel AC-DC Power Module



*HAW5\_S-B2 and HAW5\_D-B2 series are compact, high-efficiency module power supplies offered by Huizhi Electronics.*

*This series of power supplies offers a wide input voltage range, AC/DC compatibility, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, high safety isolation, and excellent EMC performance. The EMC and safety specifications comply with international standards EN55032 and IEC/EN61000. This series of products is widely used in various fields, including power, industrial, instrumentation, and smart home applications. When the product is used in environments with poor electromagnetic compatibility, please refer to the EMC application circuit provided by our company.*

Model Number Description



Product selection table

| Cer<br>tif<br>ica<br>tio<br>n | Model number   | Output specifications |            |             |            |             | Maximum<br>capacit<br>y<br>sexual<br>load<br>Max.<br>u F | ripple<br>and noise<br>20MHz<br>(Max)<br>Typ.<br>mVp-p | Efficiency<br>@ full<br>load,<br>220Vac<br>(Typical)<br>Typ.<br>% |
|-------------------------------|----------------|-----------------------|------------|-------------|------------|-------------|--|--|---|
|                               |                | Power                 | Vol. 1     | Io 1        | Vol. 2     | Io 2        |  |  |   |
|                               |                | (W)                   | Vo1<br>(V) | Io1<br>(mA) | Vo2<br>(V) | Io2<br>(mA) |  |  |   |
|                               | HAW5-220S03B2  | 5                     | 3.3        | 1200        | -          | -           | 2200   | 80   | 73  |
|                               | HAW5-220S3V6B2 | 5                     | 3.6        | 1200        | -          | -           | 2200   | 80   | 75  |
|                               | HAW5-220S05B2  | 5                     | 5          | 1000        | -          | -           | 1000   | 80   | 78  |
|                               | HAW5-220S09B2  | 5                     | 9          | 555         | -          | -           | 1000   | 80   | 78  |
|                               | HAW5-220S12B2  | 5                     | 12         | 416         | -          | -           | 680  | 80   | 80  |
|                               | HAW5-220S15B2  | 5                     | 15         | 333         | -          | -           | 470  | 100  | 80  |

|               |   |     |     |     |     |         |     |    |
|---------------|---|-----|-----|-----|-----|---------|-----|----|
| HAW5-220S24B2 | 5 | 24  | 208 | -   | -   | 220     | 100 | 80 |
| HAW5-220D05B2 | 5 | +5  | 500 | -5  | 500 | 470/470 | 80  | 78 |
| HAW5-220D12B2 | 5 | +12 | 208 | -12 | 208 | 220/220 | 100 | 80 |
| HAW5-220D15B2 | 5 | +15 | 166 | -15 | 166 | 220/220 | 100 | 80 |
| HAW5-220D24B2 | 5 | +24 | 104 | -24 | 104 | 100/100 | 100 | 80 |

Note 1: Due to space limitations, the above is only a partial list of products. For products not included in the list, please contact our Sales Department.

Note 2: "\*" indicates models currently under development.

Note 3: Typical output efficiency values are based on measurements taken after the product has been aged under full load for 30 minutes.

Note 4: The full-load efficiency (% TYP) in the table has a tolerance of  $\pm 2\%$ . Full-load efficiency is calculated as the total output power divided by the module's input power.

### Input characteristics

| Items  | Working conditions | Minimum                      | Typical | Maximum | Unit |
|--|--------------------|------------------------------|---------|---------|------|
| Input voltage range                                | AC Input           | 85                           | 220     | 305     | VAC  |
|  | DC Input           | 40                           | 310     | 432     | VDC  |
| Input frequency range                              | -                  | 47                           | 50      | 63      | Hz   |
| Input current                                      | 115VAC             | /                            | /       | 0.14    | A    |
|  | 220VAC             | /                            | /       | 0.07    |      |
| Surge current                                      | 115VAC             | /                            | /       | 10      |      |
|  | 220VAC             | /                            | /       | 20      |      |
| Leakage current                                    | -                  | 0.5mA TYP/230VAC/50Hz        |         |         |      |
| External insurance management recommendation value | -                  | 1A-2A/250VAC slow-break fuse |         |         |      |
| Hot-swappable                                      | -                  | Not supported                |         |         |      |
| Remote control                                     | -                  | There is no remote control   |         |         |      |

### Output characteristics

| Items                     | Working conditions                | Minimum | Typical | Maximum   | Unit      |   |
|---------------------------|-----------------------------------|---------|---------|-----------|-----------|---|
| Voltage accuracy          | Full input voltage range Any load | Vo1     | -       | $\pm 1.0$ | $\pm 2.0$ | % |
|                           |                                   | Vo2     | -       | $\pm 3.0$ | $\pm 5.0$ | % |
| Line regulation rate      | Rated load                        | Vo1     | -       | -         | $\pm 0.5$ | % |
|                           |                                   | Vo2     | -       | -         | $\pm 1.5$ | % |
| Load regulation           | Input rated voltage 20%~100% load | Vo1     | -       | -         | $\pm 1.0$ | % |
|                           |                                   | Vo2     | -       | -         | $\pm 3.0$ | % |
| No-load power consumption | Input 115VAC                      | -       | -       | 0.1       | W         |   |
|                           | Input 220VAC                      | -       | -       |           |           |   |
| Minimum load              | Single output                     | 0       | -       | -         | %         |   |

|                          |  |   |              |     |              |
|--------------------------|--|---|--------------|-----|--------------|
|                          | Positive and negative dual co-ground output  | -   | -            | 10  | %            |
|                          | Positive and negative dual isolated outputs  | -   | -            | 10  |              |
| Startup delay time       | Input rated Voltage (Full Load)  | -   | 1000         | -   | mS           |
| Power down hold time     | Input 115VAC (Full Load)   |   | 10           |     | mS           |
|                          | Input 220VAC (Full Load)   | --  | 60           | -   |              |
| Dynamic response         | 25%~50%~25%<br>50%~75%~50%   | Overshoot amplitude (%): $\leq \pm 5.0$                       |              |     | %            |
|                          |  | Recovery time (mS): $\leq 5.0$                                |              |     | mS           |
| Output overshoot         | Input full voltage range   | $\leq 10\%V_o$  |              |     | %            |
| Short-circuit protection | Input full voltage range   | It can be short-circuited for a long time and self-recovering |              |     | Barrier type |
| Drift coefficient        | -  | -   | $\pm 0.03\%$ | -   | %/°C         |
| Overcurrent protection   | Input full voltage range   | $\geq 150\% I_o$ is self-recoverable                          |              |     | Barrier type |
| Ripple Noise             | -  | -   | 50           | 100 | mV           |
|                          | Note: The test method for ripple and noise uses the twisted-pair test method. For specific test procedures and equipment requirements, please refer to the section below (Ripple & Noise Test Instructions). |   |              |     |              |

Note: Products with dual outputs are tested under balanced load conditions (where the rated power of the two output loads varies in equal proportion);

### General characteristics

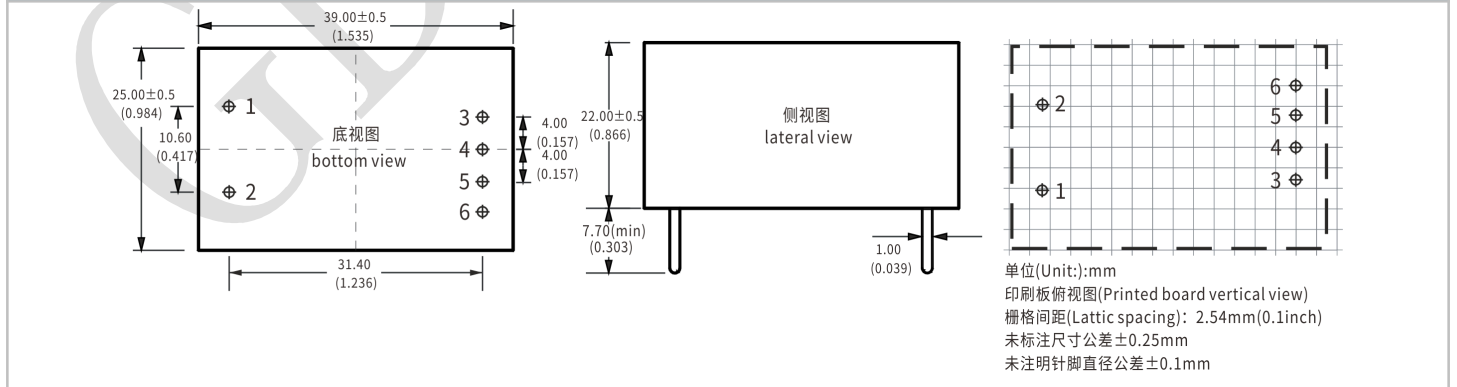
| Items                 | Working conditions  | Minimum                            | Typical | Maximum | Unit |
|-----------------------|---|------------------------------------|---------|---------|------|
| Switching frequency   | -   | -                                  | 65      | -       | KHz  |
| Operating temperature | -   | -25                                | -       | +75     | °C   |
| Storage temperature   | -   | -40                                | -       | +85     |      |
| Soldering temperature | Wave soldering  | 260±4°C, time: 5-10S               |         |         |      |
|                       | Hand soldering  | 360±8°C, interval 4-7S             |         |         |      |
| Relative humidity     | -   | 10                                 | -       | 90      | %RH  |
| Isolation voltage     | Input-output, test for 1 minute, leakage current $\leq 5mA$ | 4000                               | -       |         | VAC  |
| Insulation resistance | Input-output @ apply DC500V                                 | 100                                | -       |         | MΩ   |
| Safety standards      | -   | EN60950、IEC60950                   |         |         |      |
| Vibration             | -   | 10-55Hz, 10G, 30Min, along X, Y, Z |         |         |      |

|                                   |   |                               |
|-----------------------------------|---|-------------------------------|
| Safety level                      | - | CLASS II                      |
| Housing grade                     | - | UL94V-0                       |
| Mean Time Between Failures (MTBF) | - | MIL-HDBK-217F@25°C > 300,000H |

**EMC Electromagnetic Compatibility Characteristics**

| Total Project   | Sub-projects                                | Testing standards                        | Judgment grade  |
|---|---|--|---|
| EMC   | EMI   | Conducted Emission                       | CISPR22/EN55032<br>CLASS B (See Figure 3 for the recommended circuit)   |
|   |   | Radiated Emission                        | CISPR22/EN55032<br>CLASS B (See Figure 3 for the recommended circuit)   |
|   | EMS   | Radiation Immunity                       | IEC/EN61000-4-3<br>10V/m Perf. Criteria B (See Figure 3 for the recommended circuit)  |
|   |   | Conducted Susceptibility                 | IEC/EN61000-4-6<br>3Vr. m. s Perf. Criteria B (See Figure 3 for the recommended circuit)  |
|   |   | Electrostatic Discharge                  | IEC/EN61000-4-2<br>Contact ±6KV / Air ±8KV<br>Perf. Criteria B  |
|   |   | Surge Immunity                           | IEC/EN61000-4-5<br>±1KV Perf. Criteria B (See Figure 3 for the recommended circuit)   |
|   |   | Electrical Fast Transient (EFT) Immunity | IEC/EN61000-4-4<br>±2KV Perf. Criteria B (See Figure 3 for the recommended circuit)<br>±4KV Perf. Criteria B (See Figure 3 for the recommended circuit) |
| Immunity to Voltage Sag and Transient, Short Interruption | IEC/EN61000-4-11<br>0%~70% Perf. Criteria B |  |   |

**Package Dimensions**



|              |                       |                           |
|--------------|-----------------------|---------------------------|
| Package code | L x W x H             |                           |
| B2           | 39.0 x 25.0 x 22.0 mm | 1.535 × 0.984 × 0.866inch |

Pin Definition

| Pin        | 1          | 2                  | 3                          | 4               | 5                          |
|------------|------------|--------------------|----------------------------|-----------------|----------------------------|
| Single (S) | AC (L)     | AC (N)             | +Vo                        | NP              | -Vo                        |
|            | Input wire | Input neutral wire | Output positive terminal   | Bare pin        | Output negative terminal   |
| Dual (D)   | AC (L)     | AC (N)             | +Vo1                       | COM             | -Vo2                       |
|            | Input wire | Input neutral wire | Output positive terminal 1 | Common terminal | Output negative terminal 2 |

Note: If the pin assignments of the power module differ from those in the selection guide, refer to the labels on the actual unit.

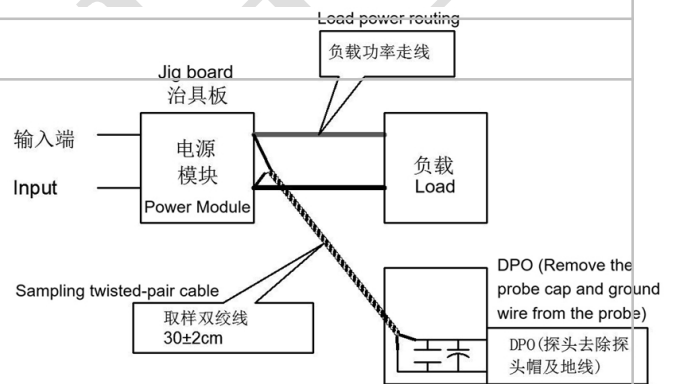
Ripple & Noise Test Instructions (Twisted Pair Me

Test Method:

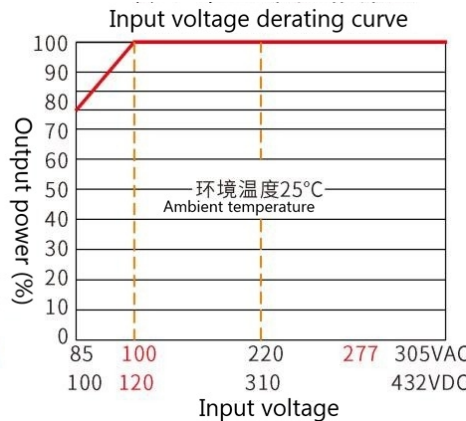
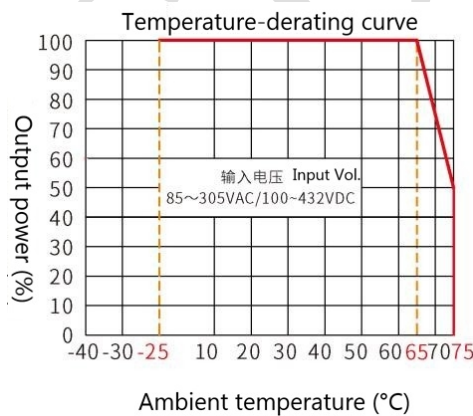
1. For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1 μF polypropylene capacitor and a 10 μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope to “Sample” mode.

2. Output Ripple Noise Test Diagram:

Connect the power supply input to the input power source. Connect the power supply output to the electronic load via the fixture board. For testing, use a 30 cm ± 2 cm sampling lead to take a direct sample from the power supply output port. Select insulated wires with appropriate gauge based on the magnitude of the output current.



Product characteristic curve



Note 1: The input voltage range is 85 - 100 VAC, 277 - 305 VAC, 120 - 140 VDC, or 392 - 432 VDC. Voltage derating must be performed based on the input voltage derating curve.

Note 2: This product is designed for use in naturally ventilated environments. Please contact us if you intend to use it in an enclosed environment.

Typical EMC Application Diagrams and Recommended Parameters

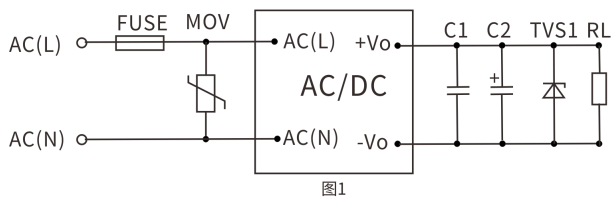


图1

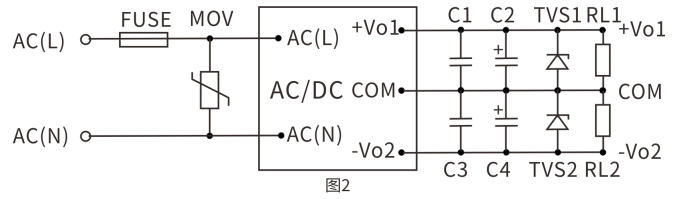


图2

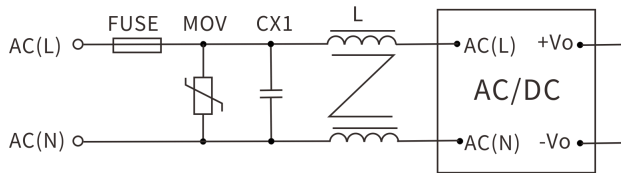


图3

For general application requirements, customers should use the circuit recommended in Figures 1 and 2;

If EMC requirements apply, please use the circuit recommended in Figure 3. The specific recommended values for Figure 3 are as follows:

- 1) Varistor (MOV): Recommended model: 14D-561K. Its function is to protect the module from damage during lightning surges.
- 2) Safety capacitors CY1 and CY2: 1000 pF/400 VAC;
- 3) Safety capacitor CX: 0.1  $\mu$ F/275 VAC;
- 4) Common-mode choke LCM: 20 mH - 30 mH;
- 5) FUSE (fuse): Mandatory; recommended specification is 2 A/250 V, slow-blow.

Note:

1. Output filter capacitors C1 and C3 eliminate high-frequency noise; 1  $\mu$ F ceramic capacitors are recommended, with a voltage rating derated by more than 80%.
2. Output filter capacitors C2 and C4 are electrolytic capacitors; high-frequency, low-resistance electrolytic capacitors are recommended, with a capacity of 220  $\mu$ F/1A output current. The voltage rating of the capacitors should be derated by more than 80%.
3. A TVS diode is recommended to protect the downstream circuitry (in case of module malfunction). Recommended 600W models: For 5V output, use SMBJ7.0A; for 9V output, use SMBJ12.0A; for 12V output, use SMBJ20A; for 15V output, use SMBJ20.0A; for 24V output, use SMBJ30.0A; for 48V output, use SMBJ64A
4. MOV stands for varistor. Recommended models: 10D561K (1000V surge) or 14D561K (2000V surge). Its function is to protect the module from damage during lightning surges.

Notes

1. The product must be used within its specified parameters; otherwise, it may be permanently damaged.
2. A fuse must be installed at the product's input terminal.
3. If the product operates below the minimum required load, we cannot guarantee that all performance specifications listed in this manual will be met;
4. If the product operates outside its rated load range, we cannot guarantee that all performance specifications listed in this manual will be met;
5. Unless otherwise specified, all data above was measured at  $T_a=25^\circ$  C, humidity <75%, with nominal input voltage and rated output load (pure resistive load);
6. All test methods for the above specifications are based on our company's standards;
7. The specifications listed above apply to the product models specified in this manual. Certain specifications for non-standard models may exceed the requirements stated above; please contact our technical staff directly for details;
8. We offer product customization;
9. Product specifications are subject to change without notice; please refer to the latest version of the manual published on our official website.

Contact

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