Typical Characteristics

- Wide input range: 85-305VAC/100-432VDC
- No-load power: 0.1W(Typ.)
- Conversion efficiency: (Typ. 81%)
- Switching frequency: 65KHz
- Protection: Short circuit, overcurrent, overvoltage, overtemperature
- Isolation voltage: 4000Vac
- Plastic housing, compliant with UL94 V-0
- Installation method: Through-hole mounting on a PCB
- Complies with CE and RoHS requirements

5W, wide-range input, isolated regulated single-output, DIP package, AC-DC power module

RoHS

HAW5_S-A2C Series-----is a compact, high-efficiency, isolated, single-output regulated power supply module with a 5W output, provided by Huizhi Electronics for its customers.

- 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, and high-level safety isolation. The products are safe and reliable.
- This series of products has significant applications in various fields, including industrial, office, smart home, and consumer electronics.
- When using this series of products in environments with poor electromagnetic compatibility, the application circuit must be consulted.

Model Number Description

Product selection table

Certification	Model number	Output specifications					Max. capacity sexual load	ripple and noise 20MHz (Max)	Efficiency @ full load, 220Vac (Typical)
		Power	Vol. 1	Io 1	Vol. 2	Io 2	Max.	Typ.	Typ.
		(W)	Vo1 (V)	Io1 (m A)	Vo2 (V)	Io2 (m A)	u F	mVp-p	%
	HAW5-220S03A2C	3.3	3.3	1000	-	-	1000	80	60
	HAW5-220S05A2C	5	5	1000	-	-	1000	80	73
	HAW5-220S09A2C	5	9	555	-	-	470	80	75
	HAW5-220S12A2C	5	12	416	-	-	470	80	78
	HAW5-220S24A2C	5	24	208	-	-	220	80	81

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 ±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	120	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	Input full voltage range any load	Vo1	-	±2.0	±5.0	%
		Vo2	-	±3.0	±5.0	%
Linear regulation rate	Rated load	Vo1	-	-	±0.5	%
		Vo2	-	-	±1.5	%
Load regulation rate	Input nominal voltage 20%~100% load	Vo1	-	-	±1.0	%
		Vo2	-	-	±3.0	%
No-load power consumption	Input 115VAC	-		-	0.1	W
	Input 220VAC	-		-		
Minimum load	Single output	5%		-	-	%
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% 50%~75%~50%	Overshoot amplitude (%): ≤±5.0				%
		Recovery time (mS): ≤5.0				mS

Output overshoot	Input full voltage range	≤10%Vo			%
Short-circuit protection		It can be short-circuited for a long time and self-recovering			Barrier type
Drift coefficient	-	-	±0.03%	-	%/℃
Overcurrent protection	Input full voltage range	≥150% IO 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). Voltage Accuracy: When the output load is ≤5%, the output voltage accuracy is ±8%;				

General characteristics

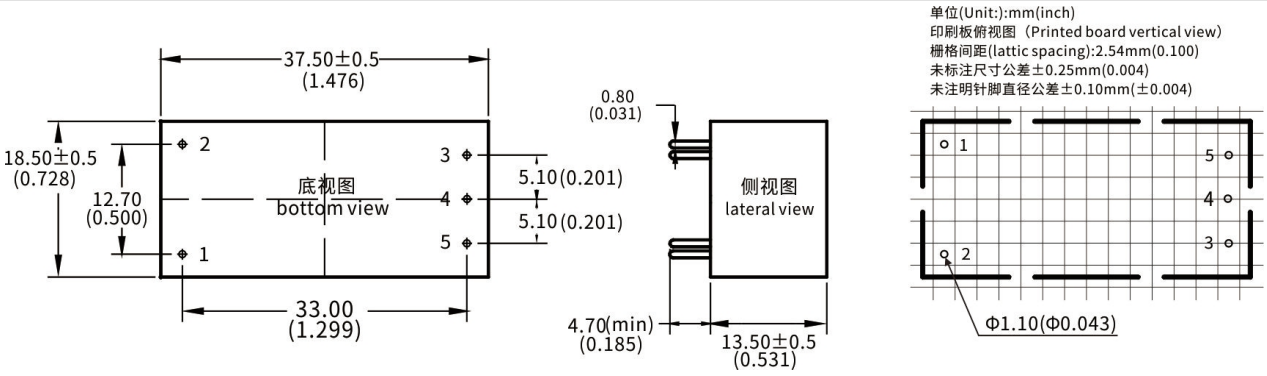
Items	Working conditions	Minimum	Typical	Maximum	Unit
Switching frequency	-	-	65	-	KHz
Operating temperature	-	-25	-	+75	℃
Storage temperature	-	-40	-	+85	
Soldering temperature	Wave soldering	260±4℃, time: 5-10S			
	Hand soldering	360±8℃, interval 4-7S			
Relative humidity	-	10	-	90	%RH
Isolation voltage	Input-output, test for 1 minute, leakage current ≤ 5mA	3750	-		VAC
Insulation resistance	Input-output @ apply DC500V	100	-		MΩ
Safety standards	-	EN60950、IEC60950			
Vibration	-	10-55Hz, 10G, 30Min, alongX, Y, Z			
Safety level	-	CLASS II			
Enclosure grade	-	UL94V-0			
Mean Time Between Failures (MTBF)	-	MIL-HDBK-217F@25℃＞300,000H			

MC Electromagnetic Compatibility Characteristics

Total Project		Sub-projects	Testing standards	Judgment grade
EMC	EMI	Conducted Emission	CISPR22/EN55032	CLASS B (See Figure 3 for the recommended circuit)
		Radiated Emission	CISPR22/EN55032	CLASS B (See Figure 3 for the recommended circuit)
	EMS	Radiation Immunity	IEC/EN61000-4-3	10V/m Perf.Criteria B (See Figure 3 for the recommended circuit)
		Conducted Susceptibility	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (See Figure 3 for the recommended circuit)
		Electrostatic Discharge	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B

		Surge Immunity	IEC/EN61000-4-5	±1KV Perf.Criteria B （See Figure 3 for the recommended circuit）
		Electrical Fast Transient (EFT) Immunity	IEC/EN61000-4-4	±2KV Perf.Criteria B （See Figure 3 for the recommended circuit）
		Immunity to Voltage Sag and Transient, Short Interruption	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Appearance Dimensions, Recommended Printing Layout



Package code	L x W x H	
A2C	37.5×18.5 × 13.5mm	1.476×0.728×0.531inch

Pin Definition

Pin	1	2	3	4	5
Single（S）	AC（N）	AC（L）	+Vo	NC	-Vo
	Input neutral wire	Input wire	Output positive terminal	Bare pin	Output negative terminal

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

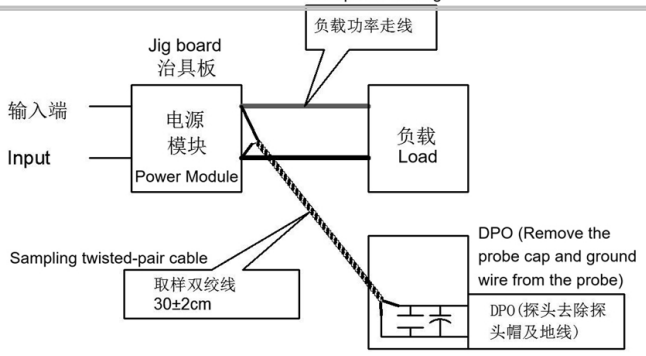
Ripple & Noise Test Specifications (Twisted-Pair Method, 20 MHz Bandwidth)

Test Method:

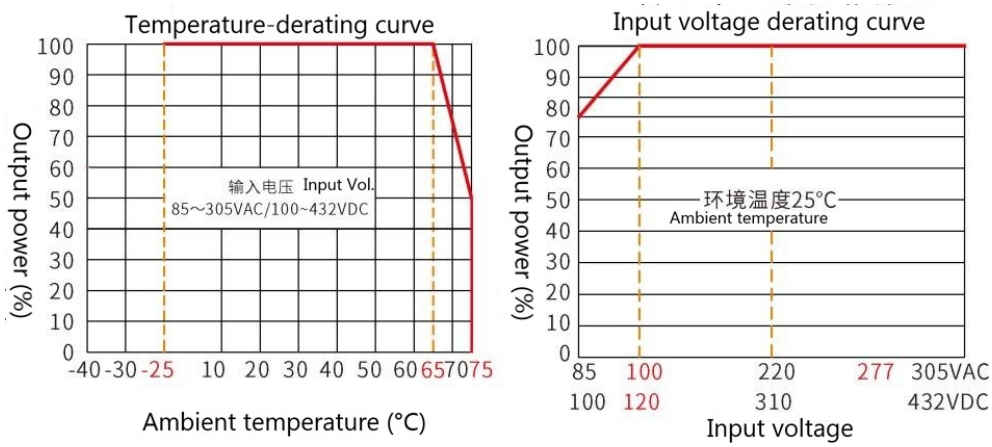
1. For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1μF polypropylene capacitor and a 10μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope 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 is 85 - 100 VAC. 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

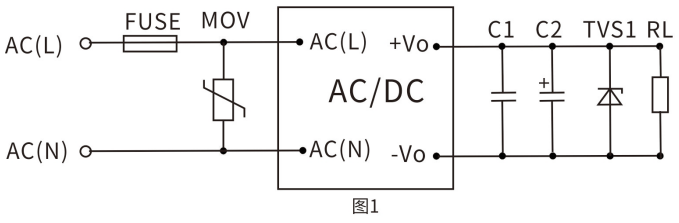


Figure 1 shows a normal application circuit

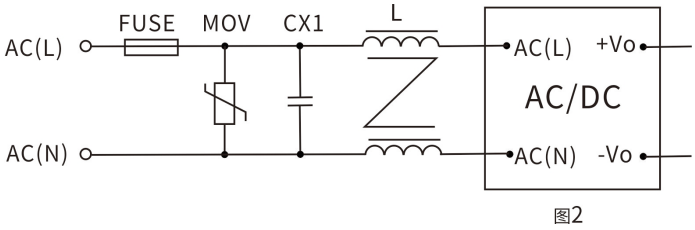


Figure 2 shows an EMC application circuit

Note:

1. Output filter capacitor C1 is used to eliminate high-frequency noise. A 1μF ceramic capacitor is recommended, with a voltage rating derated by more than 80%.

2. Output filter capacitor C2 is an electrolytic capacitor. A high-frequency, low-impedance electrolytic capacitor with a capacity of 100μF and a current rating of 1A is recommended. The capacitor's voltage rating 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 Metal Oxide Varistor. Recommended models: 10D561K (1000V surge) or 14D561K (2000V surge). Its function is to protect the module from damage during lightning surges.

5. For general applications, customers should use the circuit recommended in Figure 1. If EMC requirements apply, please use the circuit recommended in Figure 2. The specific recommended values for Figure 2 are as follows:

1) Varistor (MOV): Recommended model: 10D-561K; its function is to protect the module from damage during lightning surges.
2) Safety capacitor (CX): 0.1μF/275VAC;
3) Common-mode choke (LCM): 20mH - 30mH;
4). FUSE: Mandatory; recommended specification: 2A/250V, slow-blow.

Notes

1. The product must be used within the 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 Ta=25° 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 above specifications apply to the product models listed in this manual. Certain specifications for non-standard models may exceed the requirements listed 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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