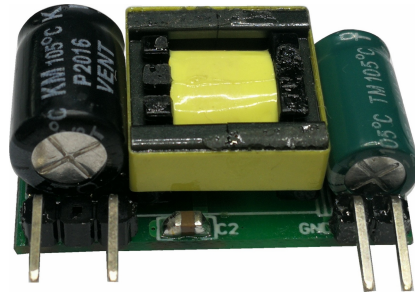


Typical Characteristics

3W, wide-range input voltage, isolated regulated single-output, DIP package, AC-DC open-frame power supply

- Wide input range: 85-265VAC/100-380VDC
- No-load power: 0.1W (TYP)
- Conversion efficiency: (typ. 72%)
- Switching frequency: 65KHz
- Output short circuit, overcurrent; over-temperature protection
- Isolation voltage: 2500Vac
- Open-frame type
- Installation method: Through-hole mounting on a PCB
- Standards: Complies with CE and RoHS requirements



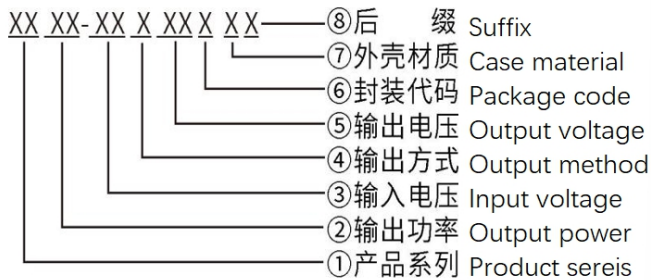
Vertical

RoHS

*HAL3\_S-C Series-----is a compact, high-efficiency, isolated, single-output regulated power supply module with a 3W 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 product series has significant applications in a wide range of fields, including industry, office settings, smart furniture, and residential use.
- When using this product series in environments with poor electromagnetic compatibility, the application circuit must be consulted.

Model Number Description



Product selection table

Certification	Model number	Output specifications					Maximum capacity sexual load	ripple and noise 20MHz (Max)	Efficiency @ full load, 220Vac (Typical)
		Power	Voltage 1	Current 1	Voltage 2	Current 2			
		(W)	Vo1 (V)	Io1 (mA)	Vo2 (V)	Io2 (mA)			
	HAL3-220S05C	3	5	600	-	-	1000	100	70
	HAL3-220S09C	3	9	340	-	-	470	120	71
	HAL3-220S12C	3	12	200	-	-	470	120	71

HAL3-220S15C	3	15	250	-	-	470	120	71
HAL3-220S24C	3	24	125	-	-	220	120	72

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	265	VAC
	DC input	120	310	380	VDC
Input frequency range	-	47	50	63	Hz
Input current	115VAC	/	/	0.06	A
	220VAC	/	/	0.03	
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 5%~100% load	Vo1	-	$\pm 2.0$	$\pm 5.0$	%
		Vo2	-	-	-	%
Line regulation rate	Rated load	Vo1	-	-	$\pm 2.0$	%
		Vo2	-	-	-	%
Load regulation	Input rated voltage 20%~100% load	Vo1	-	-	$\pm 2.0$	%
		Vo2	-	-	-	%
No-load power consumption	Input 115VAC	-	-	0.1	W	
	Input 220VAC	-	-			
Minimum load	Single output	5%	-	-	%	
Startup delay	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 (%): $\leq \pm 5.0$			%	
		Recovery time (mS): $\leq 5.0$			mS	

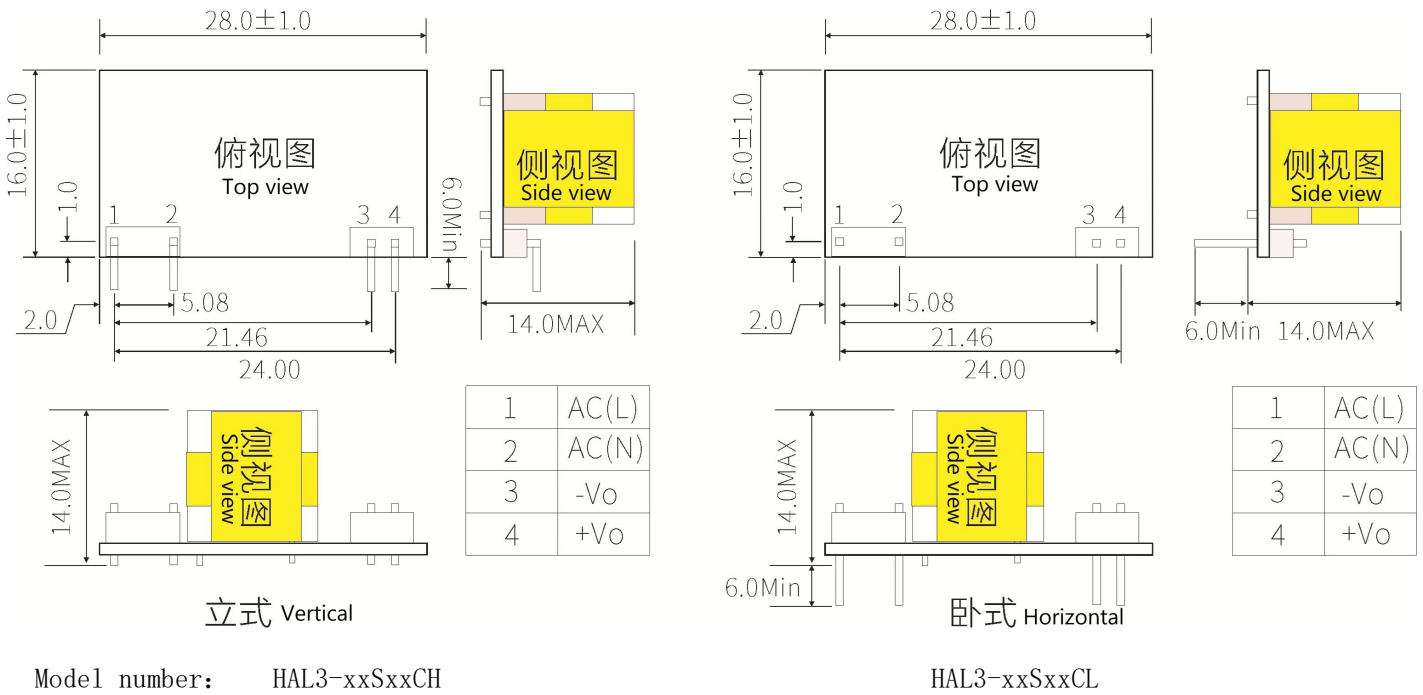
Output overshoot	Input full voltage range	$\leq 10\%V_o$			%
Short-circuit protection		It can be short-circuited for a long time and self-recovering			Barrier type
Drift coefficient	-	-	$\pm 0.03\%$	-	%/°C
Overcurrent protection	Input full voltage range	$\geq 110\% I_o$ is self-recoverable			Barrier type
Ripple Noise	-	-	100	200	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  $\leq 5\%$ , the output voltage accuracy is  $\pm 8\%$ ;

### 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	$260 \pm 4^\circ\text{C}$ , time: 5-10S			
	Hand soldering	$360 \pm 8^\circ\text{C}$ , interval 4-7S			
Relative humidity	-	10	-	90	%RH
Isolation voltage	Input-output, test for 1 minute, leakage current $\leq 5\text{mA}$	1500	-		VAC
Insulation resistance	Input-output @ apply DC500V	100	-		MΩ
Safety standards	-	-			
Vibration	-	10-55Hz, 10G, 30Min, along X, Y, Z			
Safety level	-	CLASS II			
Enclosure grade	-	-			
Mean time between failures MTBF	-	MIL-HDBK-217F@25°C > 300,000H			

Appearance Dimensions, Recommended Printing Layout



Package code	L x W x H	
CH(立式)	28.0 × 14.0 × 16.0mm	1.102 × 0.551 × 0.630inch
CL(卧式)	28.0 × 16.0 × 14.0 mm	1.102 × 0.630 × 0.551inch

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

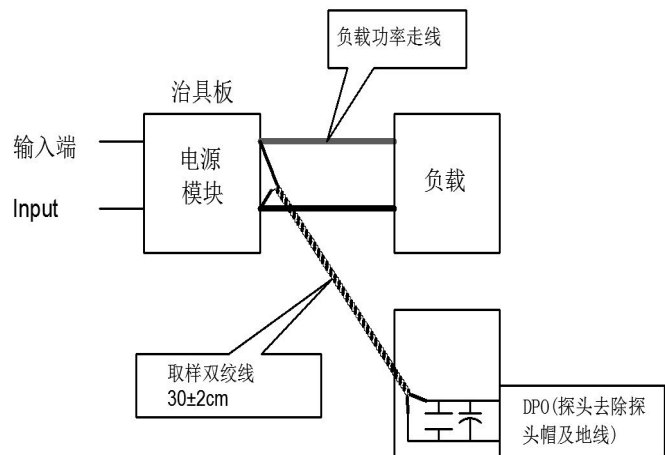
Ripple & Noise Test Specifications (Twisted-Pair Method, 20 MHz Bandwidth)

Test Method:

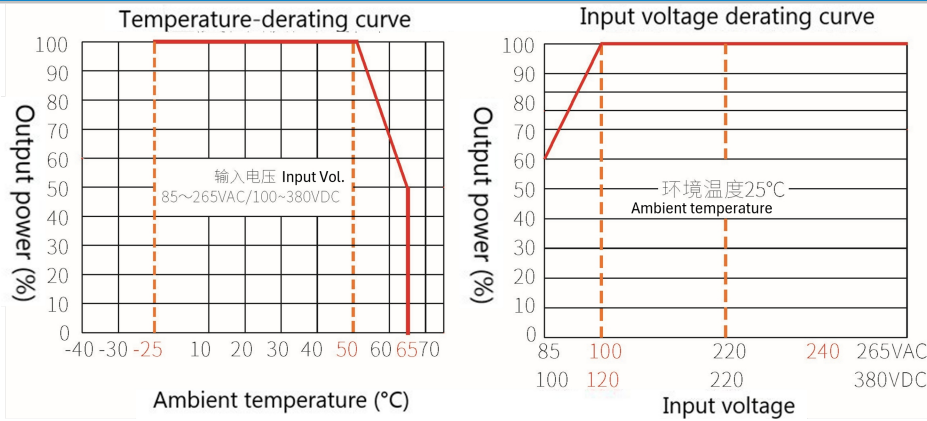
1. For ripple and noise testing, use a Category 12 twisted-pair cable. Set the oscilloscope bandwidth to 20 MHz and use a 100 MHz bandwidth probe. Connect a 0.1 μF polypropylene capacitor and a 10 μF high-frequency, low-impedance electrolytic capacitor in parallel at the probe tip. Set the oscilloscope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

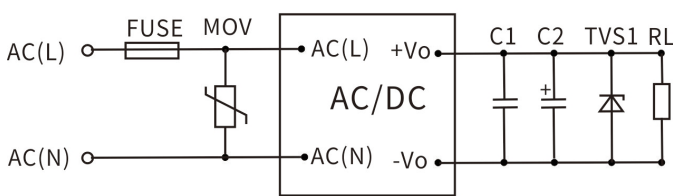


图1

Figure 1 shows a typical application circuit.

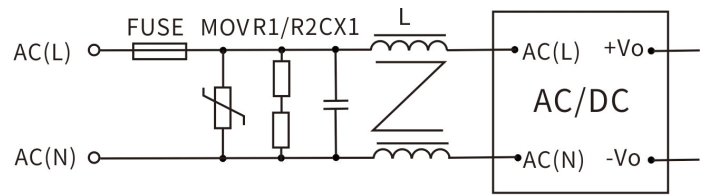


图2

Figure 2 shows an EMC application circuit

Note:

1. The output filter capacitor C1 is used to eliminate high-frequency noise. A 1  $\mu$ F ceramic capacitor is recommended, with a voltage rating derated by more than 80%.
2. The output filter capacitor C2 is an electrolytic capacitor. A high-frequency, low-impedance electrolytic capacitor with a capacity of 100  $\mu$ F 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: 0.1  $\mu$ F/275VAC;
  - 3) Common-mode choke LCM: 20mH - 30mH;
  - 4) Differential-mode choke L1: 10  $\mu$ H
  - 5) Metal film resistor R1: 27  $\Omega$ /1 W
  - 6) Y-capacitors C3/C4: 1 nF/400 V
  - 7) FUSE (fuse): Mandatory; recommended specification is 2 A/250 V, 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  $T_a=25^{\circ}\text{C}$ , 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

GDHUIZHI®

广东汇智电子科技有限公司

[Guangdong Huizhi Electronic Technology Co., Ltd.](http://www.huizhi-elec.com)

地址：广东省肇庆市端州区 11 区肇庆大道北侧厂房、办公楼(二期)3 楼

**Add.:** 3rd floor, factory and office building (phase II) on the north side of Zhaoqing Avenue, District 11, Duanzhou District, Zhaoqing City, Guangdong Province, China

**Homepage:** [www.huizhi-elec.com](http://www.huizhi-elec.com)/[www.chinaebizal.com](http://www.chinaebizal.com)

Tel.: +86 - 758- 2566 585

**E-mail:** [sales@huizhi-elec.com](mailto:sales@huizhi-elec.com)