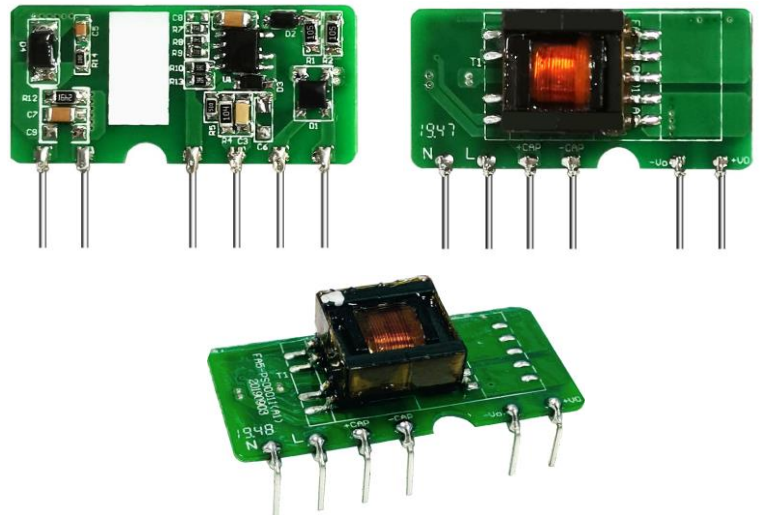




Typical Features	
◆	Wide input voltage range:90-265VAC/127-380VDC
◆	No load power consumption≤0.3W
◆	Transfer efficiency ( typ. 82%)
◆	Switching Frequency: 65KHz
◆	Protections: short circuit, over-current, over-voltage
◆	Isolation voltage:4000Vac
◆	Conform to IEC62368/UL62368/EN62368 test standard
◆	Ultra small bare board, industrial level design
◆	PCB mounting



**Application Field**

*FA5-220SXXB9D4(-1) Series----- a compact size, high efficient, power module offered by Aipu. It features universal input voltage range, DC and AC dual-use, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation. with good EMC performance, meet international EN55032, IEC/EN61000 standard. This series have very important application for power, industrial, instrument, smart home field. The application circuit in the datasheet is strongly recommended for harsh EMC environment.*

**Typical Product List**

Certificate	Item No.	Output Specifications			Max. Capacitive Load @220 Vac	Ripple& Noise 20MHz (Max)	Efficiency@ Full Load , 220Vac (Typical)
		Power	Voltage	Current			
		(W)	u F	Io1(m A)			
-	FA5-220S3V3B9D4(-1)	3	3.3	1000	800	90	67
-	FA5-220S05B9D4(-1)	5	5	1000	200	90	71
-	FA5-220S5V25B9D4(-1)	5	5.25	952	1500	90	72
-	FA5-220S09B9D4(-1)	5	9	556	200	120	77
-	FA5-220S12B9D4(-1)	5	12	416	200	120	79
-	FA5-220S15B9D4(-1)	5	15	333	200	150	79
-	FA5-220S24B9D4(-1)	5	24	208	33	120	82

Note 1: Suffix with "-1" is for item with pin bending by 90 degree.  
 Note 2: The typical value of output efficiency is based on full load and burn-in after half an hour.  
 Note 3: The fluctuation range of full load efficiency at table(% ,TYP) is ±2%, full load efficiency = total output power/module's input power.  
 Note 4: Ripple & Noise is tested by twisted pair method, for details please see(Ripple& Noise Test) at back.

**Input Specifications**

Item	Operating Condition	Min	Typ.	Max	Unit
Input Voltage Range	AC input	90	220	265	VAC
	DC input	127	310	380	VDC
Input Frequency Range	-	47	50	63	Hz



Input Current	115VAC	/	/	0.13	A
	220VAC	/	/	0.07	
Surge Current	115VAC	/	/	11	
	220VAC	/	/	21	
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
External Fuse Recommended Value	-	1A-3A/250VAC slow-fusing			
Hot-plug	-	unavailable			
Remote Control Terminal	-	unavailable			

**Output Specifications**

Item	Operating Condition	Min.	Typ.	Max.	Unit
Voltage Accuracy	Full input voltage range, Any load	-	±2.0	±5.0	%
Line Regulation	Nominal Load	-	±1.0	±3.0	%
Load Regulation	Nominal input voltage, 20%~100% load	-	±1.0	±5.0	%
No Load Power Consumption	Input 115VAC	-	-	0.3	W
	Input 220VAC	-	-		
Minimum Load	Single Output	10	-	-	%
Turn-on Delay Time	Nominal input voltage (full load)	-	600	-	mS
Power-off Holding Time	Input 115VAC (full load)	-	30	-	mS
	Input 220VAC (full load)	-	70	-	
Dynamic Response	Overshoot range 25%~50%~25%	-5.0	-	+5.0	%
	Recovery time 50%~75%~50%	-5.0	-	+5.0	mS
Output Over-shoot	Full input voltage range	≤10%Vo			%
Short circuit protection		Continuous, Self-recovery			Hiccup
Drift Coefficient	-	-	±0.03%	-	%/°C
Over Current Protection	Input 220VAC	≥110% Io Self-recovery			Hiccup

**General Specifications**

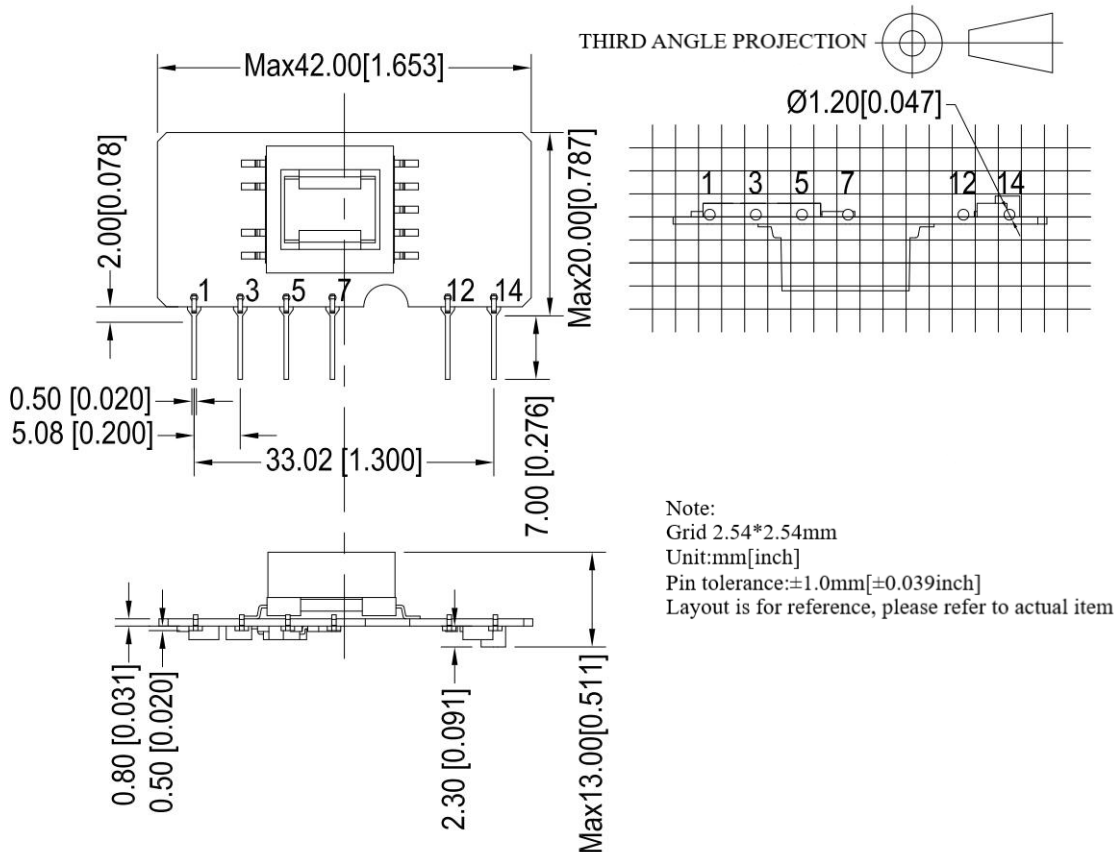
Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	-	-40	-	+75	°C
Storage Temperature	-	-40	-	+85	
Soldering Temperature	Wave-soldering	260±4°C, timing 5-10S			
	Manual-soldering	360±8°C, timing 4-7S			
Relative Humidity	-	10	-	90	%RH

Isolation Voltage	I/P-	Test 1min, leakage current ≤5mA	4000	-	VAC
Insulation Resistor	O/P	@DC500V	100	-	MΩ
Safety Standard		-	EN60950, IEC60950		
Vibration		-	10-55Hz, 10G, 30Min, along X, Y, Z		
Safety Class		-	CLASS II		
Class of Case			UL94 V-0		
MTBF		-	MIL-HDBK-217F @25°C >300,000H		

**EMC Characteristics**

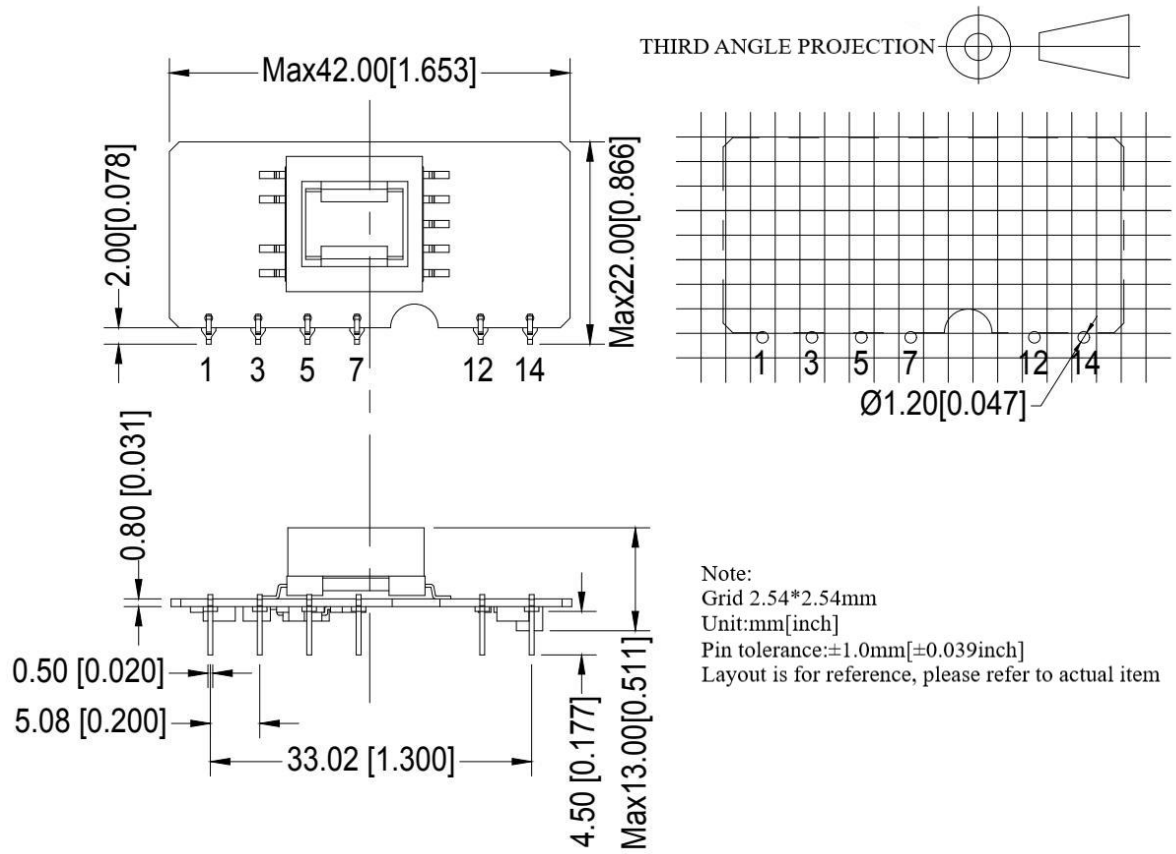
Total Item		Sub Item	Test Standard	Class
EMC	EMI	CE	CISPR22/EN55032	CLASS B (recommend circuit see photo 2)
		RE	CISPR22/EN55032	CLASS B (recommend circuit see photo 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (recommend circuit see photo 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B(recommend circuit see photo 1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±1KV Perf.Criteria B
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

**Dimension**





**Dimension(Suffix with -1)**



Packing Code	L x W x H	
B	42 x 20 x 13mm	1.654 x 0.788 x 0.531inch

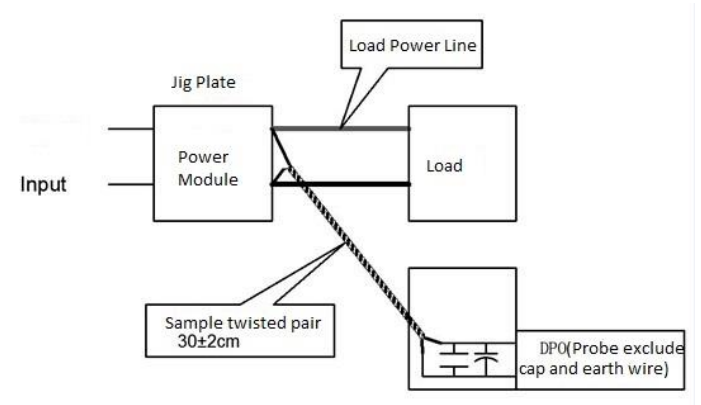
**Pin Definition**

Pin	1	3	5	7	12	14
Single(S)	AC(L)	AC(N)	+Cap	-Cap	-Vo	+Vo

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

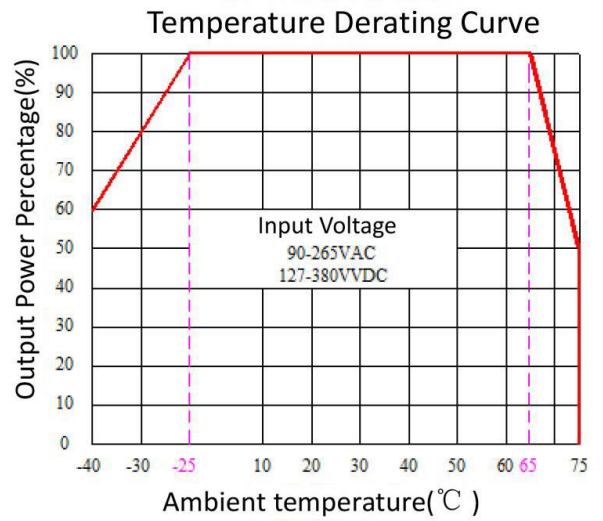
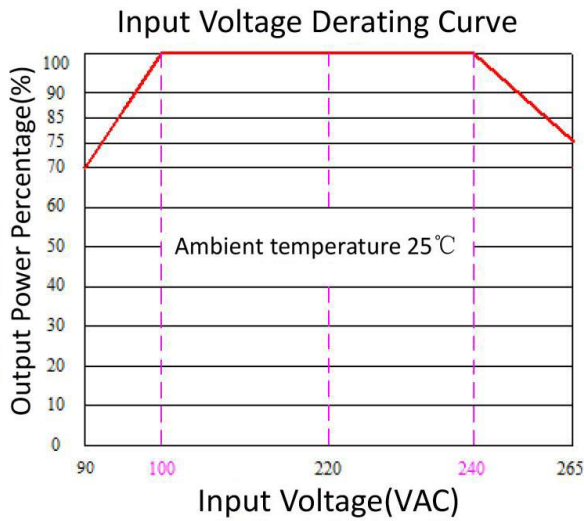
**Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)**

Test Method:  
 (1) 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.  
 (2) 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.





**Product Characteristic Curve**



- Note**
- 1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 90~100VAC/240~265VAC/127~140VDC/340~380VDC.
  - 2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

**Typical Application Circuit and EMC Recommended Circuit**

**1. Typical Application Circuit**

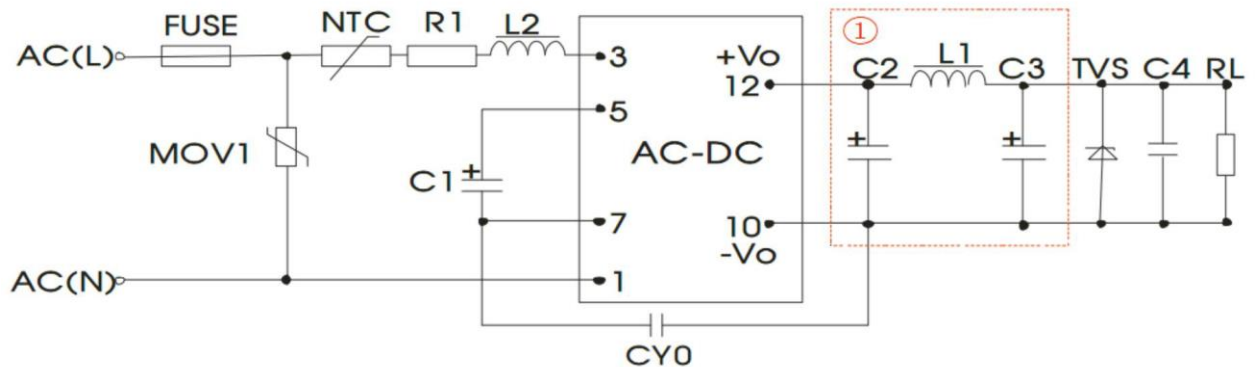


Photo 1

Nota: ① as Pi filter circuit

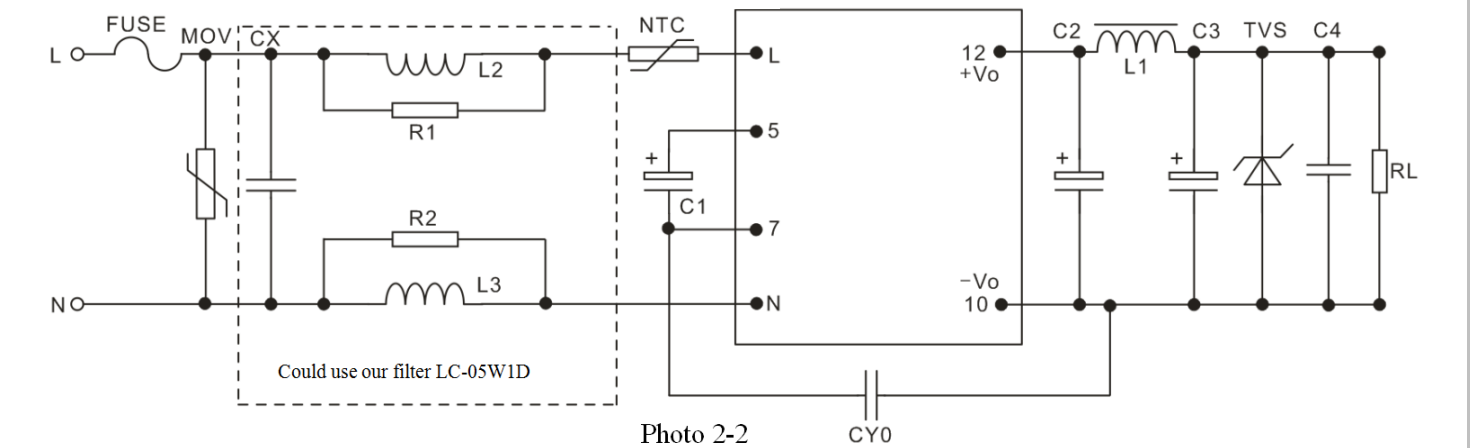
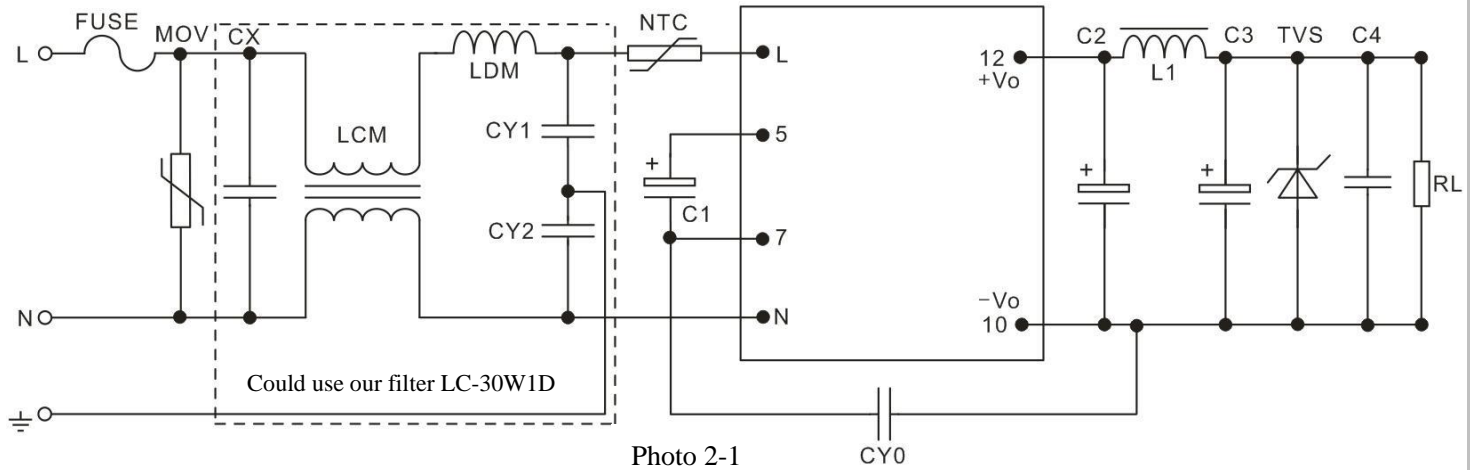
Model	C1 (required)	C2 (required)	L1	C3 (required)	C4	L2	NTC	CY0	FUSE (required)	TVS
FA5-220S3V3B9D4	10uF/ 400V	680uF/10V	2.0uH	680uF/10V	0.1uF/ 50V	4.7mH	5D-9	102M/ 400V	3.15A/ 250V	SMBJ7.0A
FA5-220S05B9D4		680uF/10V		680uF/10V						SMBJ7.0A
FA5-220S5V25B9D4		470uF/16V		330uF/10V						SMBJ9.0A
FA5-220S09B9D4		470uF/16V		220uF/16V						SMBJ12A
FA5-220S12B9D4		330uF/16V		100uF/16V						SMBJ20A
FA5-220S15B9D4		330uF/16V		100uF/16V						SMBJ20A
FA5-220S24B9D4		100uF/35V		47uF/35V						SMBJ30A



**Note:**

1. C1 : AC input, C1 is input filter electrolytic capacitor(which is required), C1 recommend value 10uF/400V.  
 DC input, C1 is a big filtering capacitor in EMC filter(which is required), recommend value 10uF/400V.
2. R1: is current-limiting resistance, recommend value is 12Ω, 5W.
3. MOV1:voltage dependent resistor, recommend value 10D561K.

**2.EMC solution-recommended circuit(under high EMC request)**



FUSE	Recommended 3.15A, 250Vac ( required)	NTC	5D-9	R1,R2	Resistance 2.2K, above 1/8W
MOV	10D561K	CY1,CY2	1nF/400VAC		
CX	0.22uF/275Vac	LDM	330uH		
LCM	40mH min	L2,L3	Color ring 1mH,1W		



**Note:**

1. The product should be used within the specification range, or it will cause permanent damage to it;
2. The input terminal should connect to fuse;
3. If the product is operated under the minimum load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
4. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity $<75\%$  with nominal input voltage and rated output load(pure resistance load);
6. All index testing methods in this datasheet are based on our Company's corporate standards;
7. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, please directly contact our technician for specific information;
8. We can provide product customization service,
9. Specifications are subject to change without prior notice.