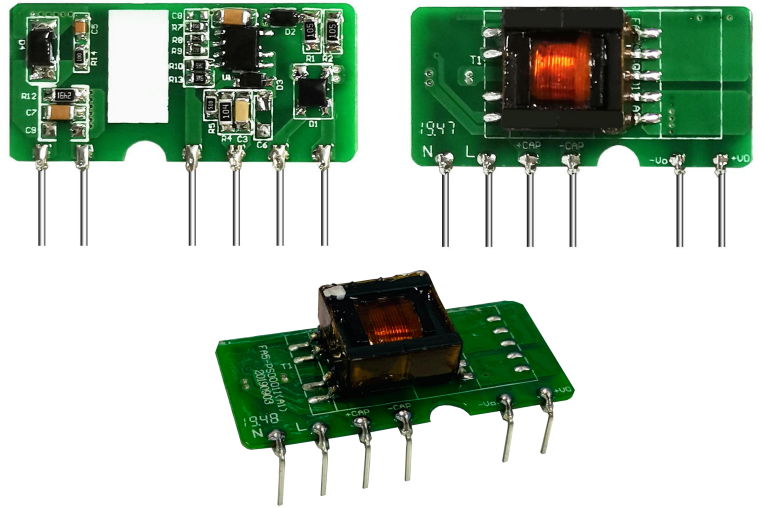


### Typical Features

- ◆ 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:3000Vac
- ◆ 4000m altitude application
- ◆ 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: The note -1 after the name is the bent-foot model;

Note 2: The typical value of output efficiency is based on the product being aged at full load for half an hour;

Note 3: The full-load efficiency (% , TYP) in the table fluctuates by ±2%, and the full-load efficiency is the total output power divided by the input power of the module;

Note 4: The ripple and noise test method uses the twisted-pair test method. For specific test methods and matching, please see the following (Ripple & Noise Test Instructions);

Note 5: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

### 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, 15-100% load (0%~15% load could work if output is stable)		Vo	-	±2.0	±5.0	%
Line Regulation	Nominal Load		Vo	-	±1.0	±3.0	%
Load Regulation	Nominal input voltage, 20%~100% load		Vo	-	±1.0	±5.0	%
No Load Power Consumption	Input 115VAC		-	-	0.3	W	
	Input 220VAC		-	-			
Minimum Load	Single Output		15	-	-	%	
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**

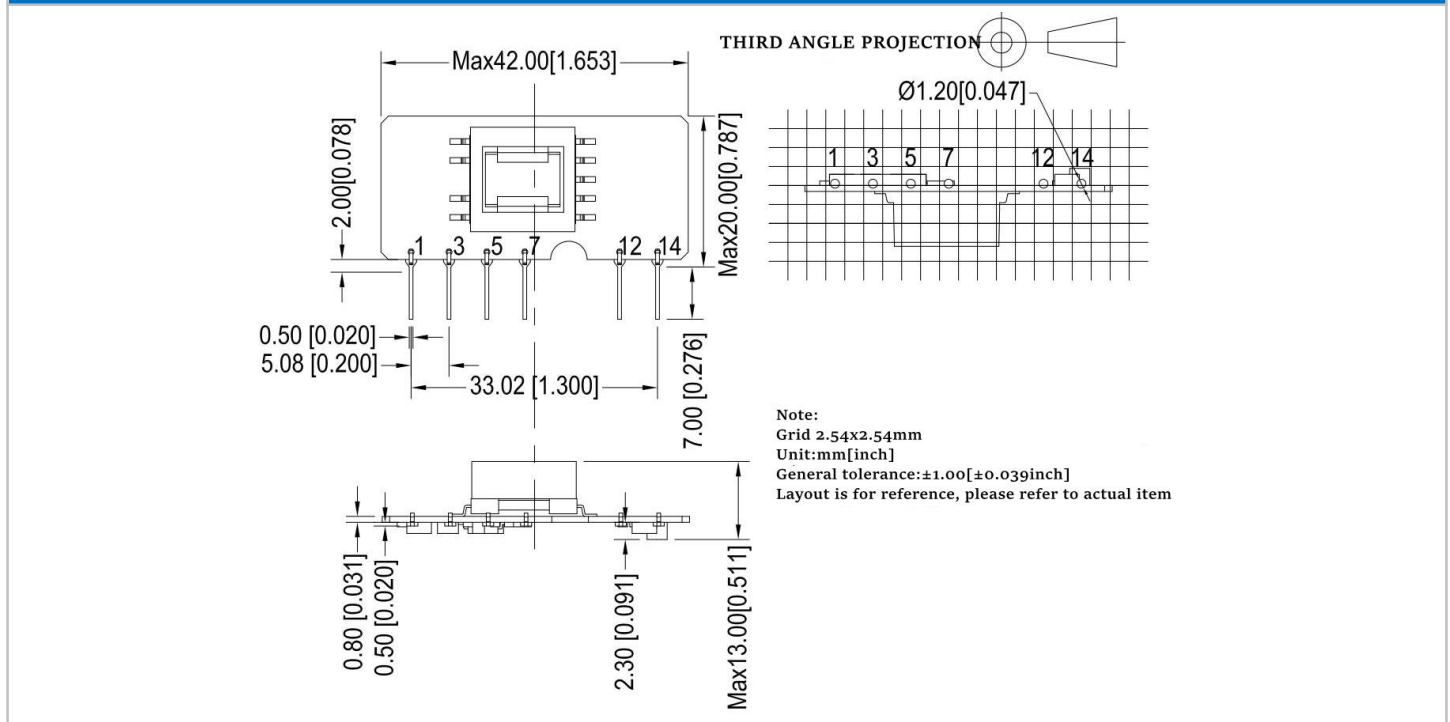
Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	-	-40	-	+105	°C
Storage Temperature	-	-40	-	+110	

Soldering Temperature		Wave-soldering	260±4℃, timing 5-10S			
		Manual-soldering	360±8℃, timing 4-7S			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	I/P-O/P	Test 1min, leakage current≤5mA	3000	-		VAC
Insulation Resistor			@DC500V	100	-	
Safety Standard		-	EN62368, IEC62368			
Vibration		-	10-55Hz,10G,30Min,along X,Y,Z			
Safety Class		-	CLASS II			
Class of Case		-	UL94 V-0			
MTBF		-	MIL-HDBK-217F@25℃ > 300,000H			

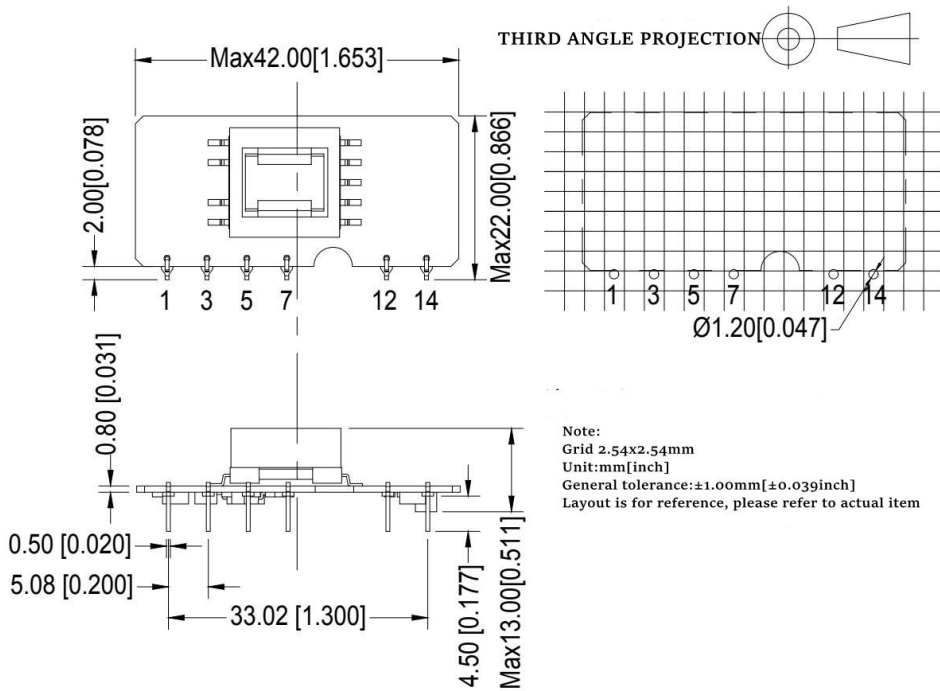
**EMC Characteristics**

Total Item	Sub Item	Test Standard	Class
EMC	EMI	CE	CISPR32/EN55032 CLASS B (Recommend Circuit 2)
		RE	CISPR32/EN55032 CLASS B (Recommend Circuit 2)
	EMS	RS	IEC/EN61000-4-3 10V/m Perf.Criteria B (Recommend Circuit 1)
		CS	IEC/EN61000-4-6 3Vr.m.s Perf.Criteria B(Recommend Circuit 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 -1**



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

**Pin Definition**

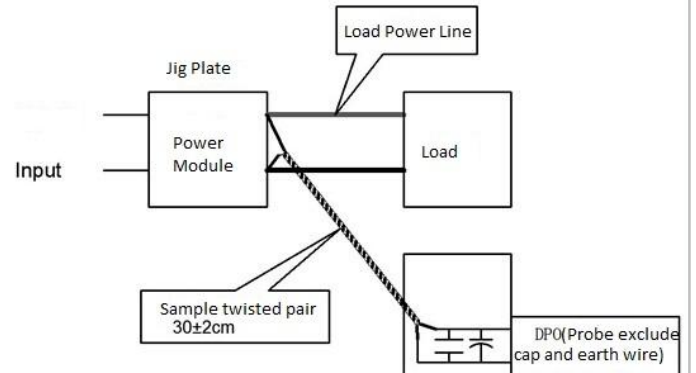
Pin	1	3	5	7	12	14
Single(S)	AC(N)	AC(L)	+Cap	-Cap	-Vo	+Vo

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

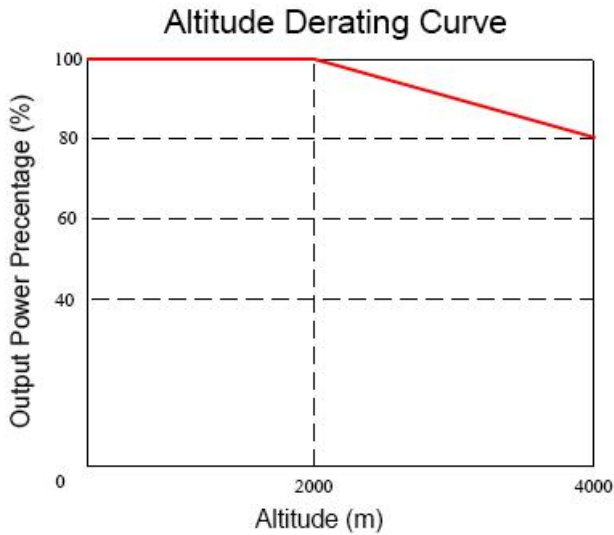
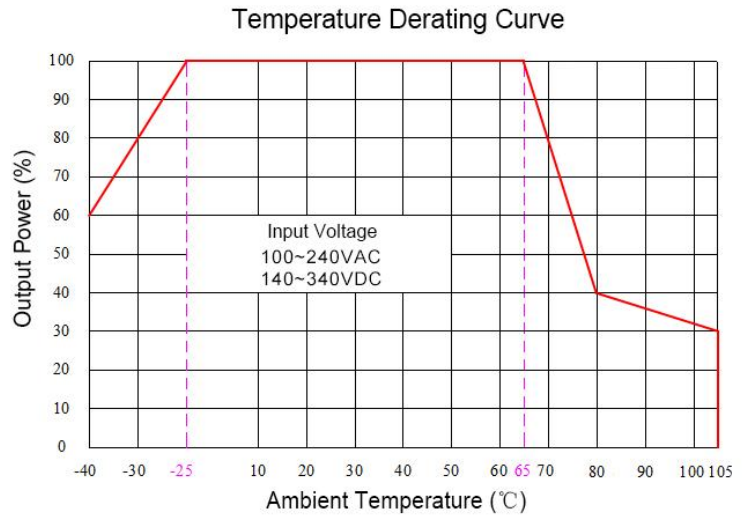
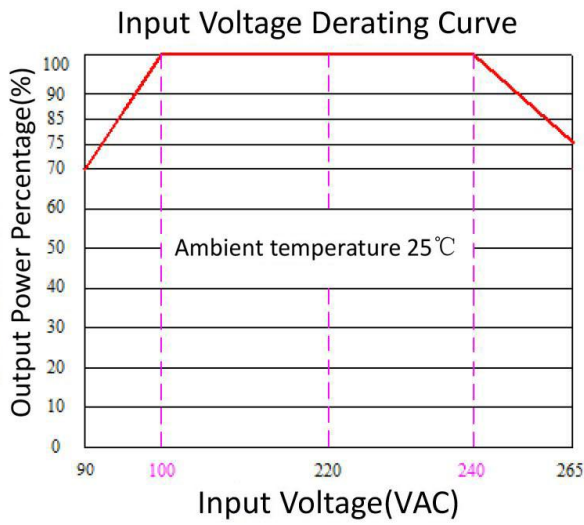
Test Method:

(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.



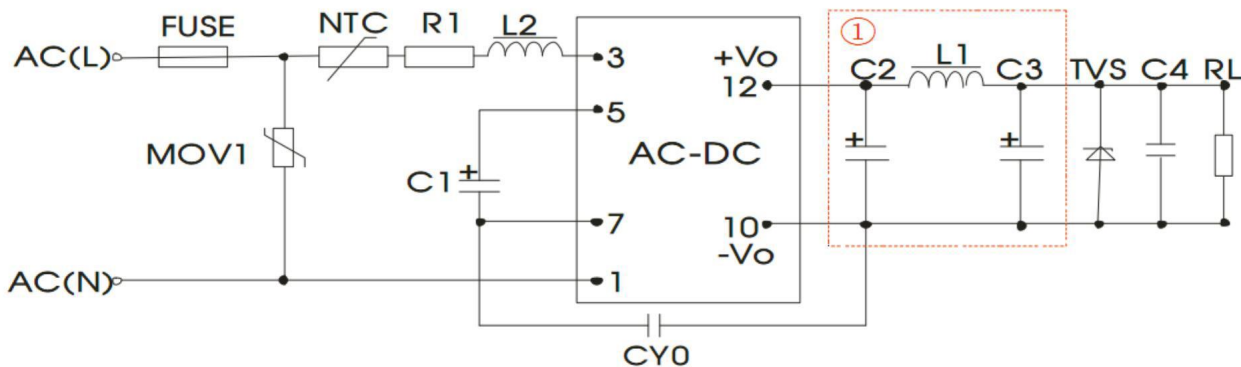
### Product Characteristic Curve



- 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



Recommended Circuit 1

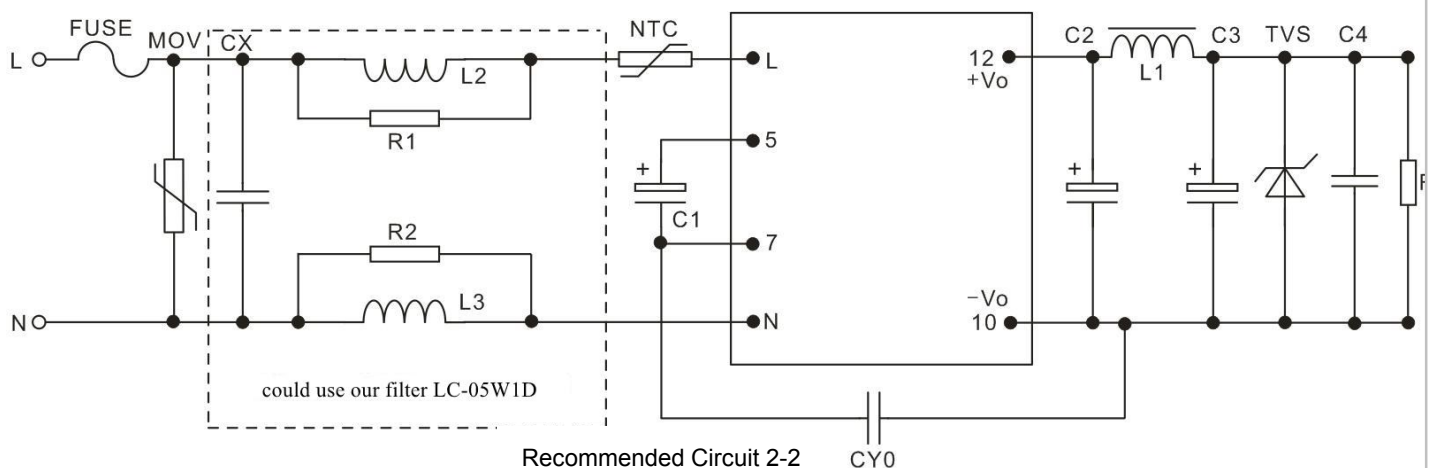
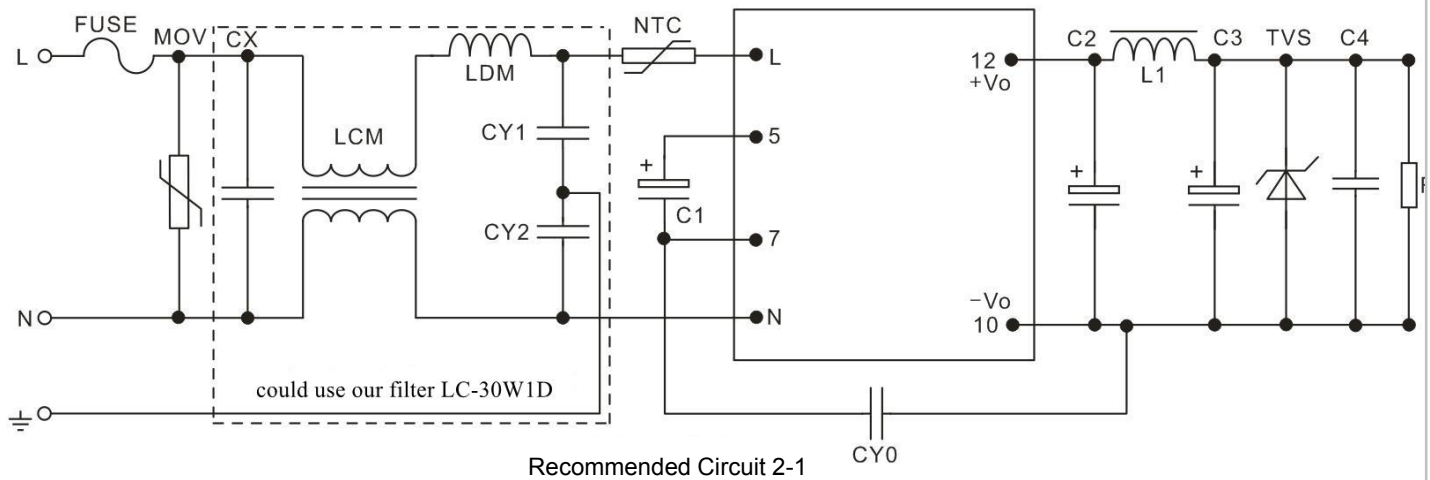
Nota: ① as Pi filter circuit

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:**

- C1: When AC input, C1 is the input filter electrolytic capacitor (must be external), the recommended value is 10uF/400V.  
When DC input, C1 is a large filter capacitor in the EMC filter (must be external), the recommended value is 10uF/400V.
- R1: is a current limiting resistor, the recommended value is 12 ohms, 5W.
- MOV1 is a varistor, the recommended model is 10D561K.

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



<b>FUSE</b>	Recommended 3.15A, 250Vac ( required)	NTC	5D-9	R1,R2	Resistance 2.2K, above 1/8W
<b>MOV</b>	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 Ta=25°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.

**Guangzhou Aipu Electron Technology Co., Ltd**

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.  
 Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821  
 E-mail: sales@aipu-elec.com Website: <https://www.aipupower.com>