

**Typical Features**

- ◆ Wide input voltage range: 85-305VAC/120-430VDC
- ◆ No load power consumption  $\leq 0.3W$
- ◆ Transfer Efficiency 83%(TYP.)
- ◆ Switching Frequency: 65KHz
- ◆ Protections: short circuit, over current
- ◆ Isolation voltage: 4000Vac
- ◆ Meet IEC62368/UL62368/EN62368 test standard
- ◆ Pass RoHS / CE certificate
- ◆ PCB Mounting



**Application Field**

**FA10-220SXXGA2N4(-T)(-TS) Series**----- a compact size, high efficient power module offered by Aipu. It features universal input voltage range, AC and DC dual-use, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation, good EMC performance. EMC and Safety standard meet international EN55032 ,IEC/EN61000. These series have important application for power, industry, instrument and smart home field. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

**Typical Product List**

Certificate	Part No.	Output Specifications			Max. Capacitive Load	Ripple& Noise 20MHz (Max)	Efficiency@ Full Load, 220Vac (Typical)
		Power	Voltage	Current			
		(W)	Vo(V)	Io(m A)			
--	FA10-220S3V3GA2N4	8.6	3.3	2600	5000	100	73
--	FA10-220S05GA2N4	10	5	2000	5000	100	76
--	FA10-220S12GA2N4	10	12	833	3000	120	82
--	FA10-220S12V5GA2N4	10	12.5	800	3000	120	82
--	FA10-220S15GA2N4	10	15	667	3000	120	82
--	FA10-220S24GA2N4	10	24	416	700	150	84

Note 1: "\*" are models being developing.

Note 2: The typical value of output efficiency is based on module is full loaded and burned-in after half an hour.

Note 3: The fluctuation range of full load efficiency(% ,TYP) in table is  $\pm 2\%$ , full load efficiency= output power/module's input power.

Note 4: Due to space limitations, above is only a part of our product list, please contact our sales team for more items.

Note 5: -T is for chassis mounting, -TS is for din-rail mounting.

**Input Specifications**

Item	Operating Condition	Min	Typ.	Max	Unit
Input Voltage Range	AC input	85	220	305	VAC
	DC input	120	310	430	VDC
Input Frequency range	-	47	50	63	Hz

Input Current	115VAC	-	-	0.25	A
	220VAC	-	-	0.15	
Surge Current	115VAC	-	-	15	
	220VAC	-	-	30	
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
Recommended External Input Fuse	-	2A/300VAC 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	Vo	-	±2.0	±3.0	%
Line Regulation		Nominal load	Vo	-	±0.5	±1.0	%
Load Regulation		Nominal input voltage, 20%~100% load	Vo	-	±1.0	±2.0	%
No Load Power Consumption		Input 115VAC	-	-	0.3	W	
		Input 220VAC	-	-			
Minimum Load		Single Output	0	-	-	%	
Start up Delay Time		Nominal input voltage (full load)	-	1000	-	mS	
Power-off Holding Time		Input 115VAC (full load)	-	50	-	mS	
		Input 220VAC (full load)	-	80	-		
Dynamic Response	Overshoot range	25%~50%~25%	-5.0	-	+5.0	%	
	Recovery time	50%~75%~50%	-5.0	-	+5.0	mS	
Output Overshoot		Full input voltage range	≤10%Vo			%	
Short circuit Protection			Continuous, self-recovery			Hiccup	
Temperature Drift		-	-	±0.03%	-	%/°C	
Over Current Protection		Input 220VAC	≥120% Io, self-recovery			Hiccup	
Ripple & Noise		Full input voltage range	-	80	150	mV	
Ripple and noise is tested by Twisted Pair method, for details please check at back of datasheet.							

**General Specifications**

Item		Operating Condition	Min	Typ.	Max	Unit
Switching Frequency		-	-	65	-	KHz
Operating Temperature		-	-40	-	+85	°C
Storage Temperature		-	-40	-	+85	
Soldering Temperature		Wave soldering	260±4°C, time 5-10S			
		Manual soldering	360±8°C, time 4-7S			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	Input-Output	Test 1min, leakage current≤5mA	4000	-	-	VAC

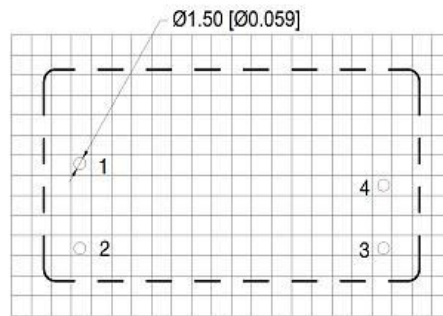
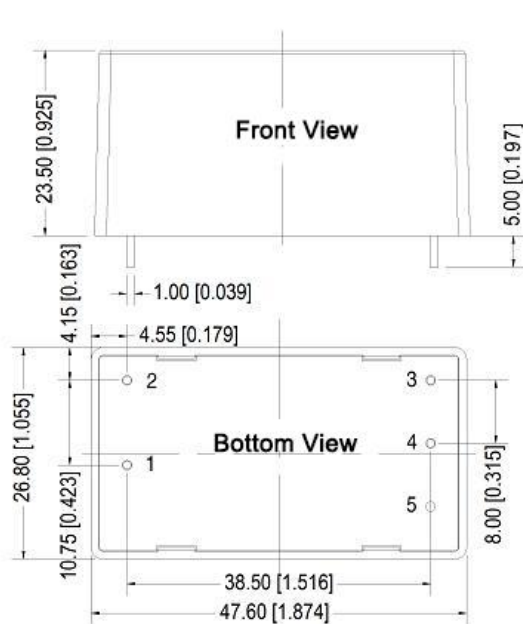
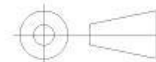
Insulation Resistance	Input-Output	@ DC500V	100	-	-	MΩ
Safety Standard		-	EN60950、IEC60950			
Vibration		-	10-55Hz,10G,30Min,alongX,Y,Z			
Safety Standard		-	CLASS II			
MTBF		-	MIL-HDBK-217F@25°C > 300,000H			

**EMC Characteristics**

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

**Dimension**

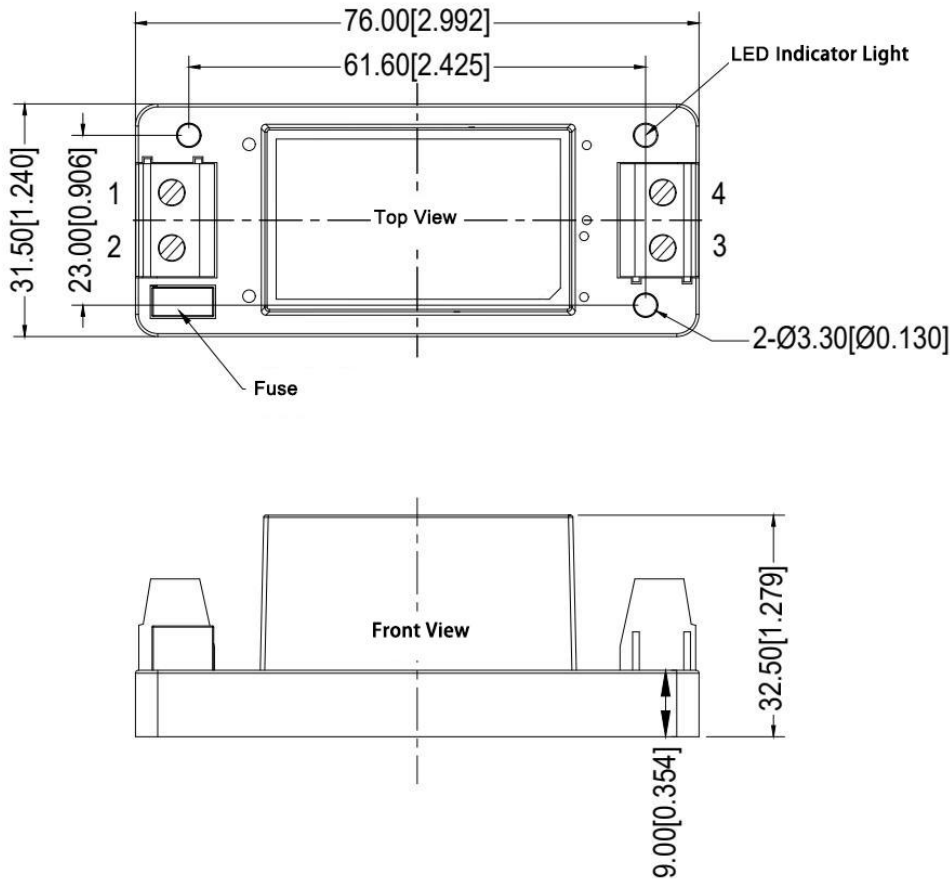
Third Angle Projection



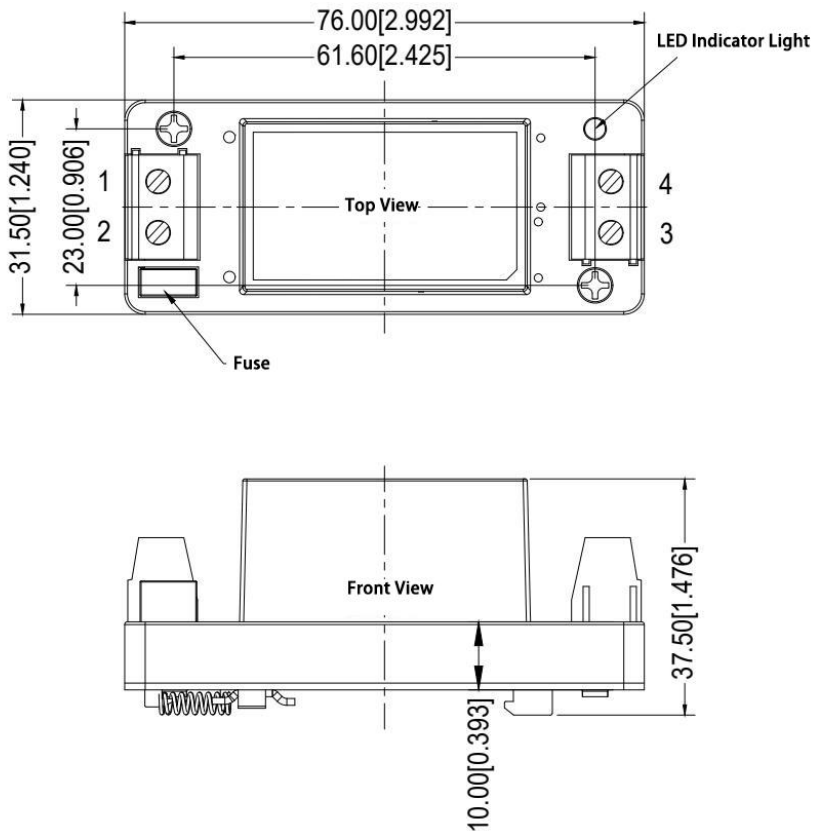
Note:  
 Grid: 2.54\*2.54mm  
 Unit: mm[inch]  
 Pin tolerance: ±0.10mm[±0.004inch]  
 General tolerance: ±0.50mm[±0.019inch]

	Pin-Out
1	AC(L)
2	AC(N)
3	-Vo
4	+Vo
5	NP

**Dimension(-T)**



**Dimension(-TS)**



Packing Code	L x W x H	
-	47.60 x 26.8 x 23.50 mm	1.874 x 1.055 x 0.925 inch
-T	76.00 x 31.50 x 32.50 mm	2.992 x 1.240 x 1.279 inch
-TS	76.00 x 31.50 x 37.50 mm	2.992 x 1.240 x 1.476 inch

**Pin Specification**

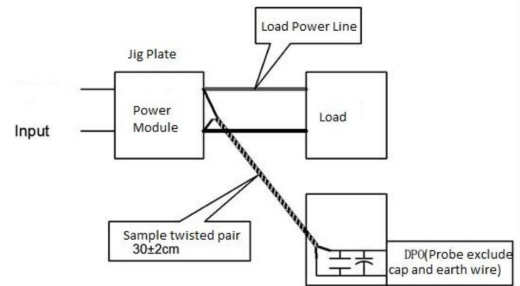
Pin	1	2	3	4	5
<b>Single(S)</b>	AC(L)	AC(N)	-Vo	+Vo	NP

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

**Test Method:**

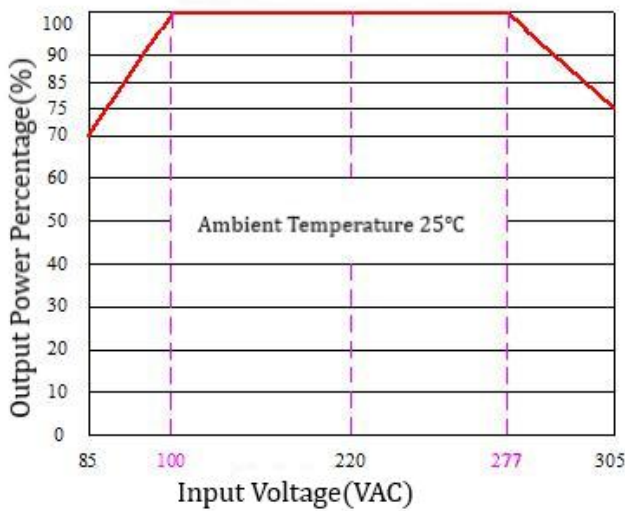
(1) 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

(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.

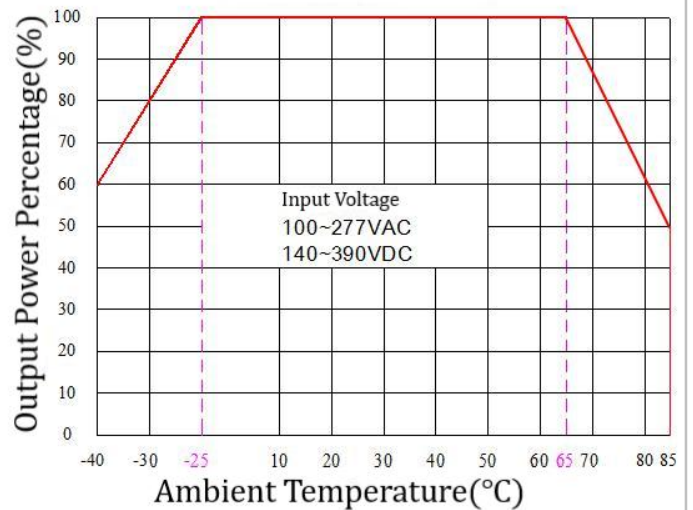


**Product Characteristic Curve**

**Input Voltage Derating Curve**



**Temperature Derating Curve**

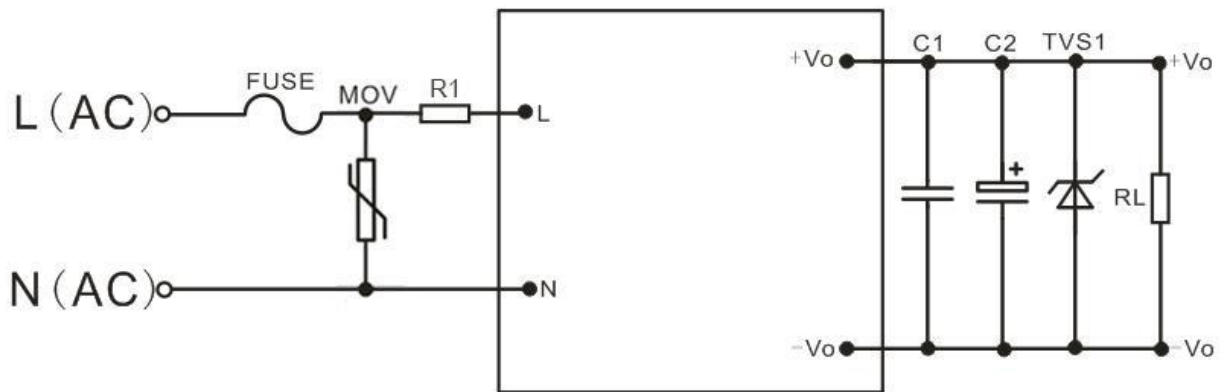


Note 1: Input Voltage should be derated based on Input voltage derating curve when it is 85~100VAC/277~305VAC/120~140VDC/390~430VDC.

Note 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**



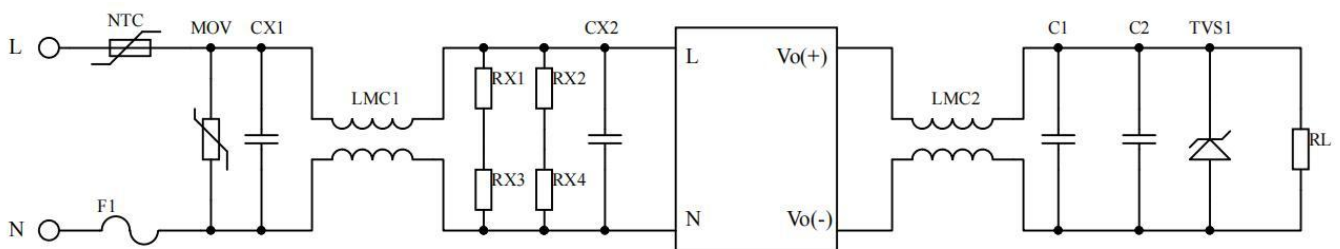
Recommended Circuit 1

Part Number	FUSE (necessary)	MOV	R1	C1	C2	TVS Tube
FA10-220S3V3GA2N4	2.0A/300V	14D561K	6.8 Ω/3W (winding resistor)	1uF/50V	220uF/16V	SMBJ7.0A
FA10-220S05GA2N4						SMBJ20A
FA10-220S12GA2N4						SMBJ30A
FA10-220S15GA2N4						
FA10-220S24GA2N4						

Note:

1. The output filter capacitor C2 is an electrolytic capacitor. It is recommended to use a high-frequency low-resistance electrolytic capacitor. Please refer to the technical specifications provided by each manufacturer for the capacity and current flowing through. Capacitor withstand voltage should be derated to at least 80%.
2. C1 is a ceramic capacitor to remove high frequency noise.
3. TVS tube protects the subsequent circuit when the module is abnormal, it is recommended to use it.

**2. EMC recommended circuit (Used Under high EMC requirement)**



Recommended Circuit 2

- 1) FUSE, recommended type is 2A~250VAC slow-break, square type.
- 2) MOV is a varistor, the recommended model is 14D561K.
- 3) NTC is a thermistor, recommended model: 10D-11, to protect the module from damage in the event of a lightning surge.
- 4) LMC1,LCM2 are common mode inductors, LCM1 recommended inductance 30mH, LCM2 recommended inductance 40uH.
- 5) CX1 is X-capacitor, the recommended model is 0.22uF/275Vac; CX2 is X-capacitor, the recommended model is 0.1uF/275VAC.
- 6) RX1, RX2, RX3, RX4 are chip resistors, the recommended model is 1206, 1MΩ.
- 7) C1 is a high-frequency, low-impedance electrolytic capacitor with a capacitance value less than that of the capacitive load, and the withstand voltage is more than 1.5 times the output voltage.
- 8) C2 is a 0.1uF ceramic chip capacitor with a withstand voltage of more than 1.5 times the output voltage.
- 9) TVS1 is TVS tube; 5V output recommended: SMBJ7.0A, 9V output recommended: SMBJ12.0A, 12V output recommended: SMBJ20A, 15V output recommended: SMBJ20A. 24V output recommended: SMBJ30.0A, 48V output recommended: SMBJ64A.

Note 1:

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 worked under the minimum requested load, 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, please follow up with our website for newest manual.

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