AC/DC Converter

FA10-220SXXGA2N4(-T)(-TS) Series

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption ≤0.3W
- ◆ Efficiency 83%(TYP.)
- ◆ Operating Temperature from -40℃ to 85℃
- ◆ Switching Frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operation 4000m Max
- ◆ Compliant with IEC62368/EN62368/UL62368
- ◆ With CE, CB & UL Certificates
- ◆ PCB DIP Mounting

Application Field

FA10-220SXXGA2N4(-T)(-TS) Series ----- *Compact size & high efficiency modular power supplies with global adapted input voltage range (both AC & DC available), low ripple, low temperature rise, low standby power consumption, high efficiency, high reliability, safety isolated and good EMC performance. This series of products can be widely used in the fields of electric power, industrial, instrument, smart home devices, etc. The additional circuit for EMC is recommended in this data sheet for the application with high EMC requirement.*

Typical Product List

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

Note 1 - * marked part has been developed in process.

Note 2 - The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 3 - The full load efficiency should be in ±2% of the typical value in this table. The efficiency is calculated by the way that the full output power is divided by the input power.

Note 4 - Please contact Aipu sales for other output voltages requirement in this series but not listed in this table.

Note 5 - The suffix -T is for a kind of chassis packaging with terminals, -TS is for a kind of packaging of DIN Rail.

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	
No-load Consumption	Input 115VAC	-	-	0.3	W
	Input 220VAC	-	-		
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
Recommended External Fuse	-	2A/300VAC Time-delay fuse			
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	±3.0	%
Line Regulation		Rated load	-	±0.5	±1.0	%
Load Regulation		Nominal input voltage, 20%~100% load	-	±1.0	±2.0	%
Minimum Load		Single Output	0	-	-	%
Turn-on Delay Time		Input 115VAC (full load)	-	1000	-	mS
		Input 220VAC (full load)	-		-	
Power-off Hold-up Time		Input 115VAC (full load)		50		mS
		Input 220VAC (full load)	-	80	-	
Dynamic Response	Overshoot range	25%~50%~25% 50%~75%~50%	-5.0	-	+5.0	%
	Recovery time		-5.0	-	+5.0	mS
Output Overshoot		Full input voltage range	≤10%Vo			%
Short circuit Protection			Continuous, self-recovery			Hiccup
Temperature Drift		-	-	±0.03%	-	%/℃
Over Current Protection		Input 220VAC	⩾120% Io, self-recovery			Hiccup
Ripple & Noise		Full input voltage range	-	80	150	mV
		The ripple and noise are tested by the twisted pair method. For details understood, please refer to the following Ripple & Noise Test Instructions.				

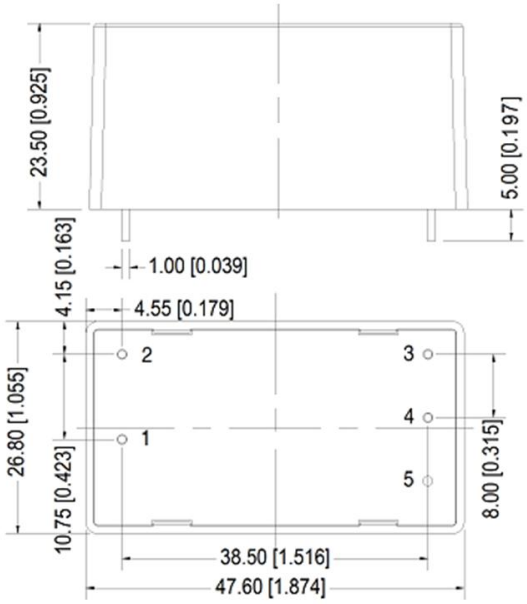
General Specifications

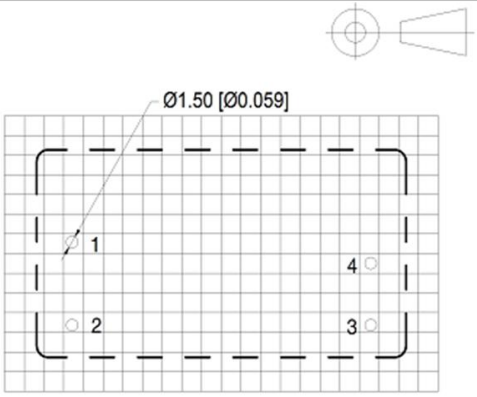
Item		Operating Condition	Min	Typ.	Max	Unit
Switching Frequency		-	-	65	-	KHz
Operating Temperature		Refer to the temperature derating curve	-40	-	+85	℃
Storage Temperature		-	-40	-	+85	℃
Soldering Temperature		Wave soldering	260±4℃, time 5-10S			
		Manual soldering	360±8℃, time 4-7S			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	Input-Output	Test 1min, leakage current ≤5mA	4000	-	-	VAC
Insulation Resistance	Input-Output	@ DC500V	100	-	-	MΩ
Safety Standard		-	EN/IEC62368/UL62368			
Vibration		-	10-55Hz,10G, 30Min, along X,Y,Z			
Flame Class of Case		-	CLASS Ⅱ			
MTBF		-	MIL-HDBK-217F@25℃＞300,000H			
Unit Weight		Part No.	Weight (Typ.)			
		FA10-220SXXGA2N4	45g			
		FA10-220SXXGA2N4-T	60g			
		FA10-220SXXGA2N4-TS	80g			

EMC Performance

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (with the Recommended Circuit 2)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (with the 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 (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B ±4KV Perf.Criteria A (with the Recommended Circuit 2)
		Voltage dips & interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Mechanical Dimensions



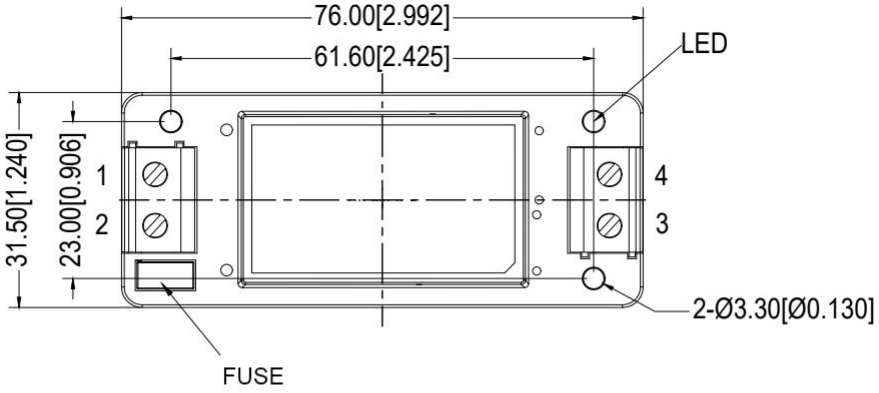


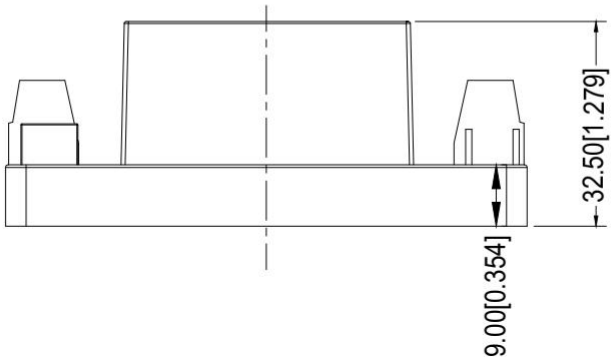
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

Note:
Unit: mm [inch]
Pin diameter tolerance: ±0.10 [±0.004]
General tolerance: ±0.50 [±0.020]

Pin No.	Description
1	AC(L)
2	AC(N)
3	-Vout
4	+Vout
5	No Pin

-T Mechanical Dimensions

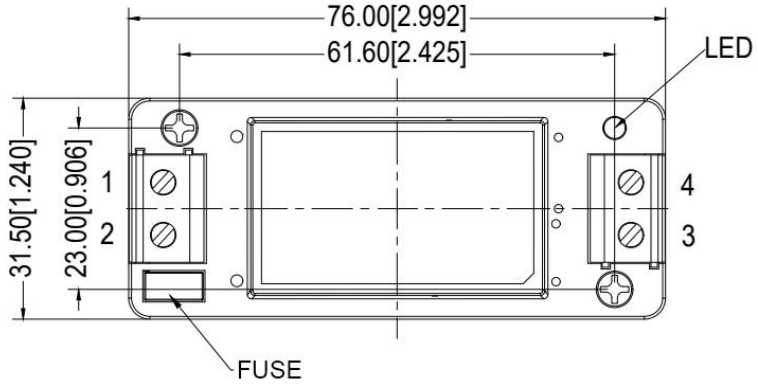




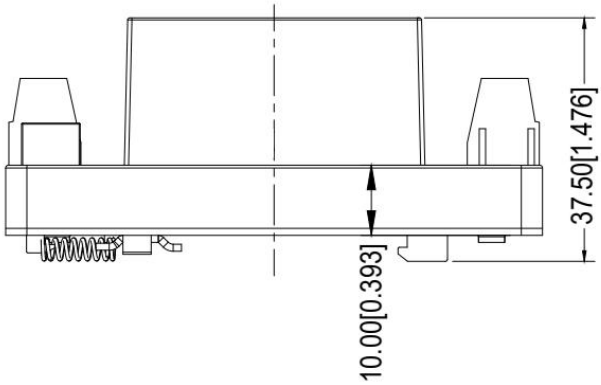
Terminal No.	Description
1	AC(L)
2	AC(N)
3	-Vout
4	+Vout

Note:
Unit: mm[inch]
Lead Wire Size: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

-TS Mechanical Dimensions



Terminal No.	Description
1	AC(L)
2	AC(N)
3	-Vout
4	+Vout



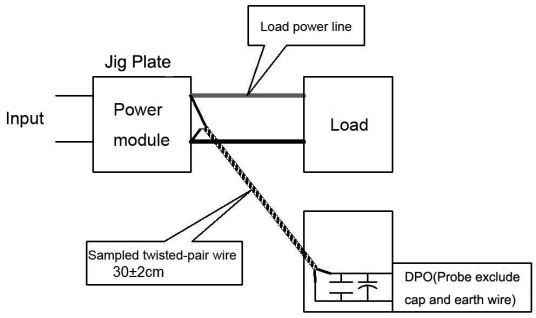
Note:
Unit: mm[inch]
Lead Wire Size: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

Packaging Code	Dimensions 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

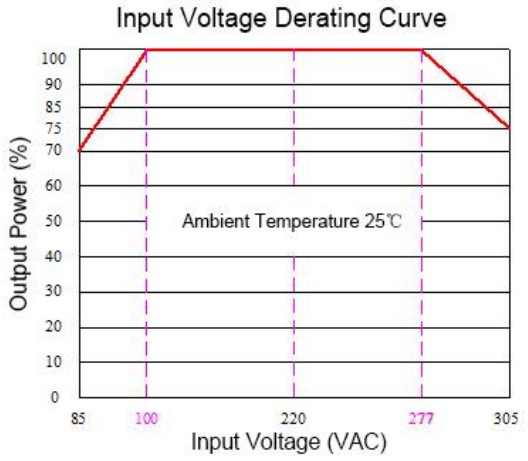
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)

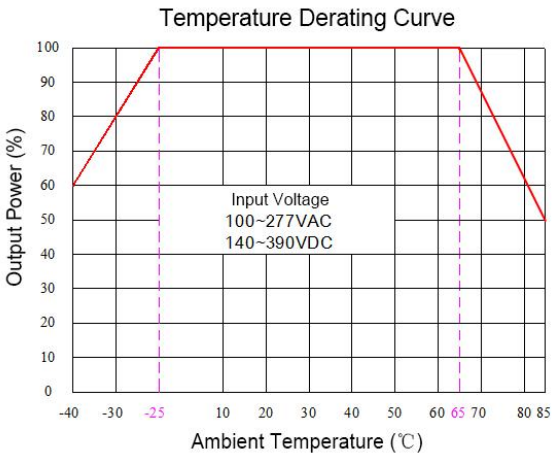
1) The Ripple & noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

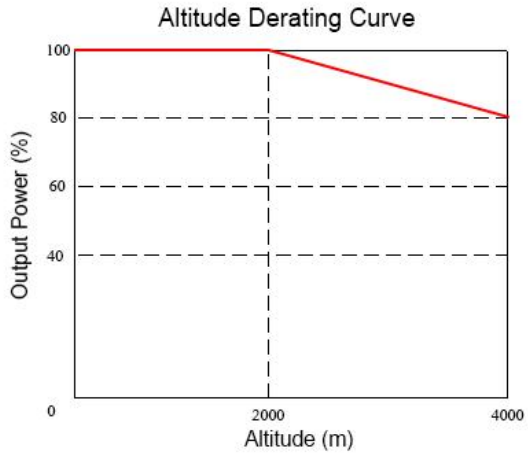
2) The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Product Performance Curves





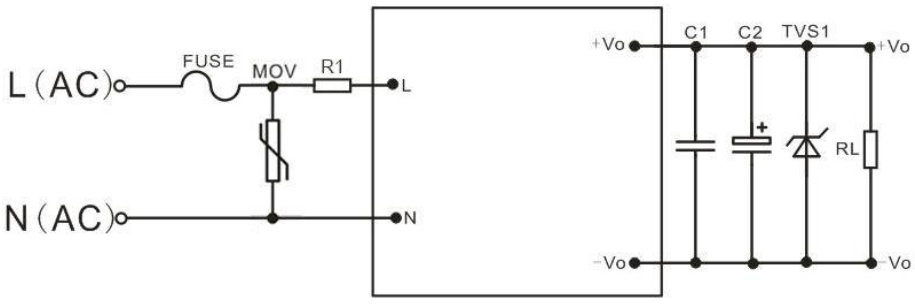


Note 1 - The output power should be derated based on the input voltage derating curve at 85~100VAC/277~305VAC/120~140VDC/390~430VDC.

Note 2 - This product should operate at a natural air condition, please contact us if it need be used at a closed space.

Recommended Circuits for Application

1. Typical Application Circuit



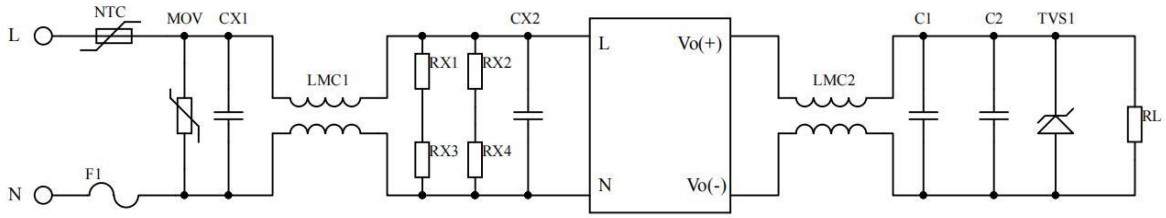
Circuit 1

Part Number	FUSE (necessary)	MOV	R1	C1	C2	TVS1
FA10-220S3V3GA2N4	2.0A/300V	14D561K	6.8 Ω/3W (Wire-wound resistor)	1uF/50V	220uF/16V	SMBJ7.0A
FA10-220S05GA2N4						
FA10-220S12GA2N4					100uF/25V	SMBJ20A
FA10-220S15GA2N4						
FA10-220S24GA2N4					100uF/35V	SMBJ30A

Note:

1. A high-frequency low-resistance electrolytic capacitor is recommended for C2 which capacitance and current should be referred to the manufacturer's technical specification, the withstand voltage should be derated to at least 80%.
2. Ceramic SMD capacitor is recommended for C1 which can suppress the high-frequency noise.
3. TVS is recommended to protect output circuit while the converter operating at abnormal condition.

2. EMC recommended circuit (for higher EMC requirement)



Circuit 2

Note:

1. 2A/300Vac time-delay fuse is recommended.
2. 14D561K is recommended for MOV.
3. 10D-11 is recommended for NTC to protect the converter against the lightning surge.
4. Both LMC1 & LCM2 are common mode chocks, 30mH recommended for LCM1 and 40uH for LCM2.
5. 0.22uF/275Vac X-capacitor is recommended for CX1, 0.1uF/275Vac X-capacitor is recommended CX2.
6. 1206/1MΩ SMD resistors are recommended for RX1, RX2, RX3, RX4.
7. A high-frequency low-resistance electrolytic capacitor is recommended for C1 which capacitance should be less than the max capacitive load, and the withstand voltage should be more than 1.5X of the output voltage.
8. 0.1uF ceramic SMD capacitor for C2, the withstand voltage should be more than 1.5X of the output voltage.
9. TVS1 - SMBJ7.0A is recommended for 5V output, SMBJ12.0A for 9V output, SMBJ20A for 12V/12.5V/15V outputs, SMBJ30.0A for 24V output and SMBJ64A for 48V output.

Application Notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.
2. A fuse should be connected at input.
3. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.
5. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
6. All values or indicators in this datasheet had been tested based on Aipupower test specifications.
7.The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
8. Aipupower can provide customization service.

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