AC/DC Converter
FA10-220SXXG2N4(-T)(-TS) Series

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption ≤0.3W@220VAC
- ◆ Efficiency up to 83%(Typ.)
- ◆ Operating temperature from -40℃ to +85℃
- ◆ Switching frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operation 5000m Max
- ◆ Compliant with IEC/EN62368/UL62368, IEC61558-1/ IEC61558-2-16
- ◆ With TUV/CE, CB & UL Certificates
- ◆ PCB DIP Mounting

EN62368-1

IEC62368-1

UL62368-1

Application Field

FA10-220SXXG2N4(-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. Additional circuit for EMC is recommended for the application with high EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage		Output Specifications			Max. Capacitive Load @220VAC	Ripple & Noise 20MHz (Max)	Efficiency @Full load 220VAC (Typical)
		Nominal	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P(W)	Vo(VDC)	Io(mA)	uF	mVp-p	%
CE	FA10-220S3V3G2N4	220	85-305	8.6	3.3	2600	5000	100	73
CE/CB/UL	FA10-220S05G2N4			10	5	2000	5000	100	76
CE/CB/UL	FA10-220S09G2N4				9	1111	2000	100	80
CE/CB/UL	FA10-220S12G2N4				12	833	3000	120	82
CE/CB/UL	FA10-220S12V5G2N4				12.5	800	3000	120	82
CE/CB/UL	FA10-220S15G2N4				15	667	3000	120	82
CE/CB/UL	FA10-220S24G2N4				24	416	2000	150	83

Note 1: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 2: 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 3: Please contact Aipu sales for other output voltages requirement of this series but not listed in this table.

Note 4: The suffix -T indicates the chassis package, -TS indicates the package of DIN Rail.

Input Specifications

Item	Test 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
Standby power consumption	Input 115VAC	-	-	0.3	W
	Input 220VAC				
Input current	Input 115VAC	-	-	0.25	A
	Input 220VAC	-	-	0.15	
Surge current	Input 115VAC	-	-	15	
	Input 220VAC	-	-	30	
Leakage current	-	0.5mA TYP/230VAC/50Hz			
Recommended external fuse	-	2A/300VAC Time-delay fuse			
Hot-plug	-	Unavailable			
ON/OFF Control	-	Unavailable			

Output Specifications

Item		Test Condition	Min	Typ.	Max	Unit
Output 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	%
Dynamic response	Overshoot range	25%~50%~25%	-5.0	-	+5.0	%
	Recovery time	50%~75%~50%	-	-	+5.0	mS
Minimum load		Single Output	0	-	-	%
Temperature drift coefficient		-	-	-	±0.03	%/℃
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	-	
Output start-up overshoot		Full input voltage range	≤10			%Vo
Short circuit protection			Continuous, self-recovery			Hiccup
Over current protection		Input 220VAC	120%Io	-	250%Io	Hiccup
Ripple & Noise		5%-100% load, 20MHz bandwidth	-	80	150	mVp-p

Note: The Ripple & Noise is tested by the Parallel-line method, please refer to the following test instructions.

General Specifications

Item	Test Condition	Min	Typ.	Max	Unit
Switching frequency	-	-	65	-	KHz
Operating temperature	Refer to the temperature derating graph	-40	-	+85	℃
Storage temperature	-	-40	-	+110	℃

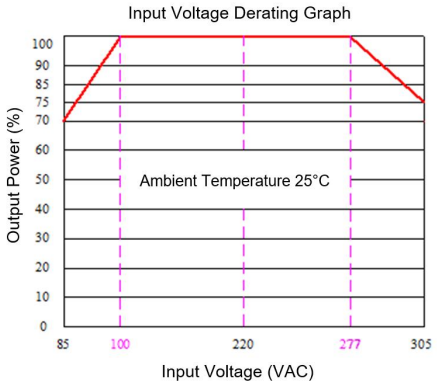
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity	-		10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	4000	-	-	VAC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K hours
Safety standard	-		EN/IEC62368/UL62368/IEC61558			
Vibration	-		10-55Hz,10G, 30Min, along X, Y, Z			
Flame class of case	-		CLASS Ⅱ			

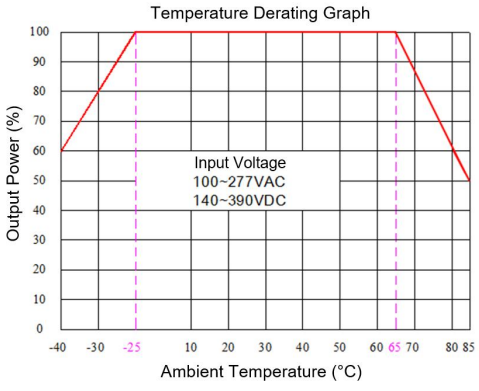
Weights & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	FA10-220SXXG2N4	35g	40.00 x 25.40 x 21.00 mm	1.575 × 1.000 × 0.827 inch
	FA10-220SXXG2N4-T	50g	76.00 x 31.50 x 30.00 mm	2.992 x 1.240 x 1.181 inch
	FA10-220SXXG2N4-TS	70g	76.00 x 31.50 x 35.00 mm	2.992 x 1.240 x 1.377 inch

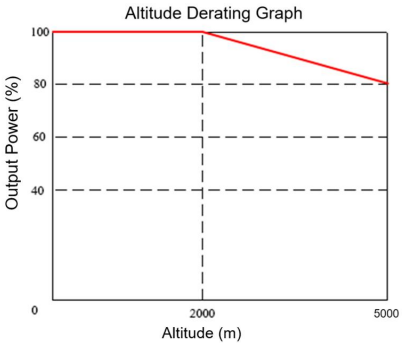
EMC Performance

Items			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 (with the Recommended Circuit 2)
		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

Product Characteristics Graphs







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

Note 2: This product should operate under the condition of natural air, please contact us if it could be used at a closed space.

Recommended Circuits for Application

1. Typical application circuit diagram

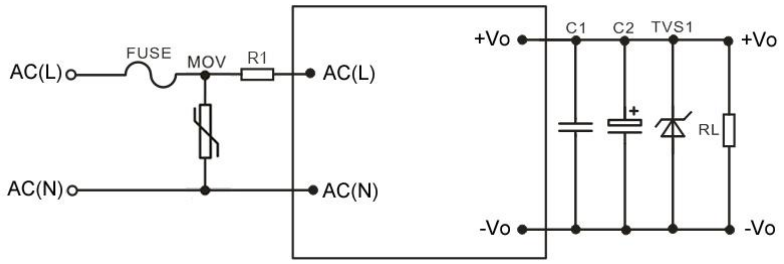


Figure - Circuit 1

Part Number	FUSE (required)	MOV	R1	C1	C2	TVS1
FA10-220S3V3G2N4	2.0A/300VAC Time-delay fuse	14D561K/ 4500A	6.8 Ω/3W (Wire-wound resistor)	1uF/50V	220uF/16V	SMBJ7.0A
FA10-220S05G2N4						
FA10-220S09G2N4					100uF/25V	SMBJ15A
FA10-220S12G2N4						SMBJ20A
FA10-220S12V5G2N4						
FA10-220S15G2N4						
FA10-220S24G2N4					100uF/35V	SMBJ30A

Note:

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

2. EMC recommended circuit diagram (for high EMC requirement)

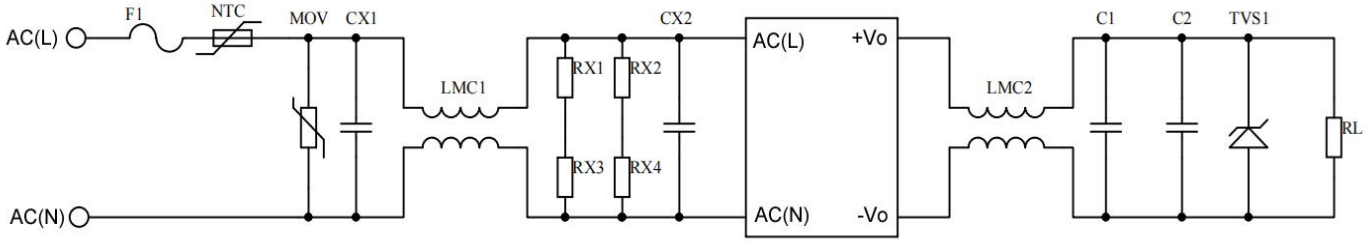


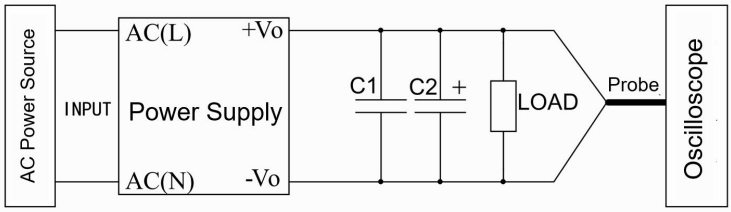
Figure - Circuit 2

FUSE	2.0A/300VAC time-delay fuse (required)	LMC2	40uH/3.5A
MOV	14D561K/4500A	CX1	X2/224K/310VAC
NTC	10D-11	CX2	X2/104K/310VAC
LMC1	30mH/0.4A	RX1, RX2, RX3, RX4	1206/1MΩ/0.25W

Note:

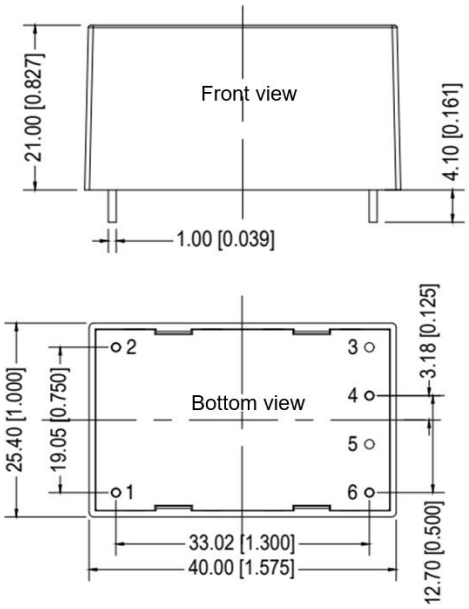
1) A high frequency low impedance electrolytic capacitor is recommended for C1 which capacitance should be less than the max capacitive load, the withstanding voltage should be more than 1.5X of the output voltage.
2) A 0.1uF ceramic SMD capacitor for C2, the withstanding voltage should be more than 1.5X of the output voltage.
3) TVS1: SMBJ7.0A is recommended for 3.3V & 5V outputs; SMBJ15A for 9V; SMBJ20A for 12V, 12.5V & 15V outputs; SMBJ30.0A for 24V output.

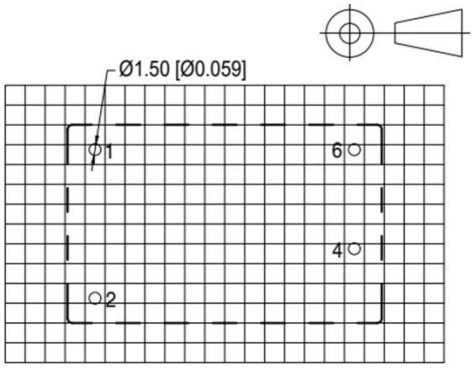
Ripple & Noise Test Instructions (Parallel-line Method, 20MHz Bandwidth)



1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high frequency low impedance electrolytic capacitor C2(10uF) are connected in parallel with the probe.
2. Refer to the test diagram, 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 test can start at the converter output terminals after the input power on.

Mechanical Dimensions





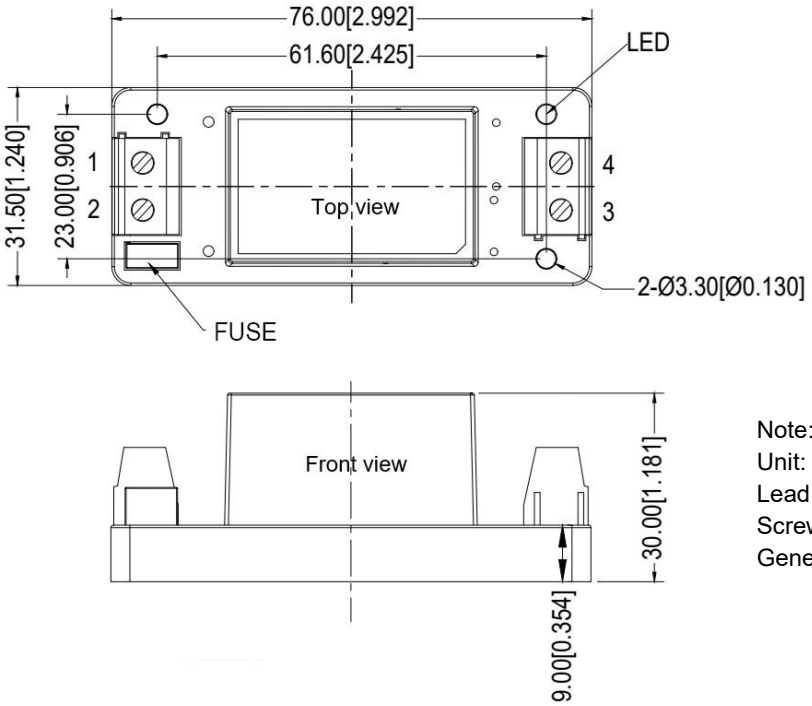
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

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

Pin-out Function Description

Pin No.	1	2	3	4	5	6
Function	AC(L)	AC(N)	No Pin	+Vo	No Pin	-Vo

-T Mechanical Dimensions

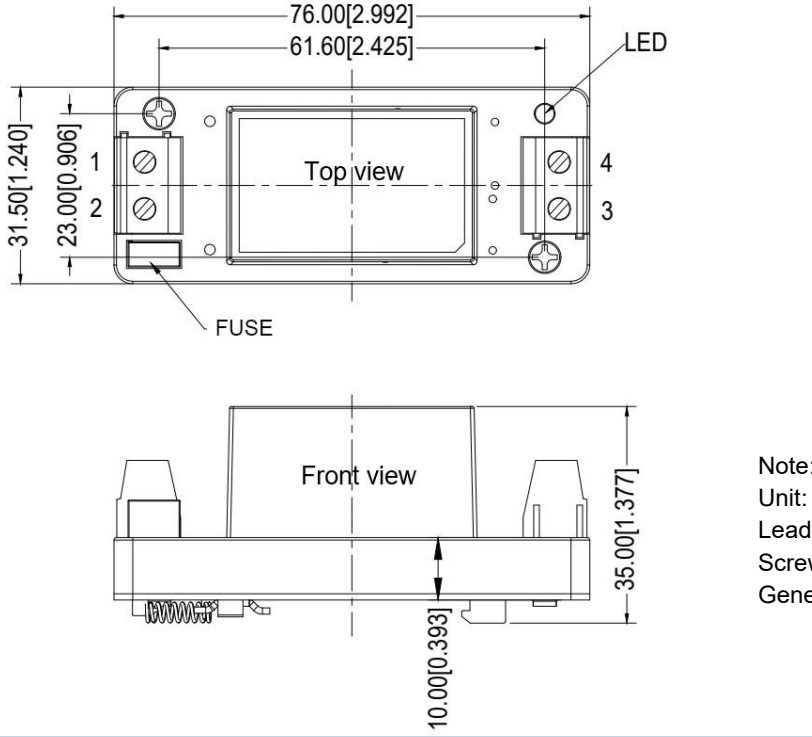


Note:
Unit: mm[inch]
Lead wires gauge: 24-12 AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00[±0.039]

Terminal Function Description

Terminal No.	1	2	3	4
Function	AC(L)	AC(N)	-Vo	+Vo

-TS Mechanical Dimensions



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

Terminal Function Description

Terminal No.	1	2	3	4
Function	AC(L)	AC(N)	-Vo	+Vo

Application Notice

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

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