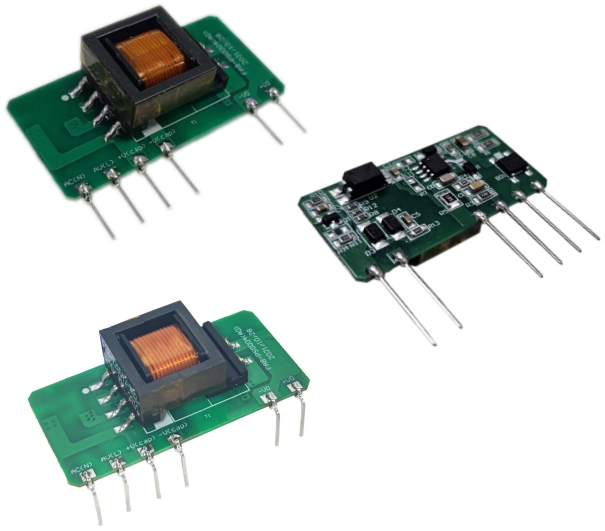
Typical Features

- Wide input voltage range 85-305VAC/120-430VDC
- No load power consumption ≤0.2W@220VAC
- Efficiency up to 82%(Typ.)
- Operating temperature from -40°C to +75°C
- Switching Frequency 65KHz
- Short circuit & over current protections
- Isolation voltage 3000VAC
- Altitude during operating 4000m Max
- Compliant with IEC/EN62368/UL62368
- PCB SIP mounting



Application Field

FA8-220SXXB9N3 Series ----- Mini size open-frame AC-DC power supplies with global adapted input voltage range (both AC and 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, Industry, Instrument and Smart home devices, etc. Additional circuit diagram for EMC is recommended for the application with high EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Specifications			Max Capacitive Load @220VAC	Ripple & Noise 20MHz (Max)	Efficiency @full load 220VAC (Typ.)
		Nominal	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P(W)	Vo (VDC)	Io(mA)	(uF)	mVp-p	%
-	FA8-220S05B9N3(-1)	220	85 - 305	8	5	1600	5000	80	76
-	FA8-220S12B9N3(-1)				12	667	3000	100	80
-	FA8-220S24B9N3(-1)				24	333	1000	120	82

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 requirements of this series but not listed in this table.

Note 4: The part number suffix -1 indicates the part with pins 90° bent.

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	-	47	50	63	Hz
Input current	115VAC input	-	-	0.20	A
	220VAC input	-	-	0.15	

Surge current	115VAC input	-	-	10	A
	220VAC input	-	-	20	
Standby power consumption	115VAC input	-	-	0.2	W
	220VAC input	-	-		
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	%
Load regulation		Nominal input voltage, 20%~100% load	-	-	±1.0	%
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	-	
Dynamic response	Overshoot range	25%~50%~25% 50%~75%~50%	-5.0	-	+5.0	%
	Recovery time		-	-	+5.0	mS
Output start-up overshoot		Full input voltage range	≤10			%Vo
Short circuit protection			Continuous, self-recovery			Hiccup
Over current protection		Input 220VAC	120%Io	-	230%Io	mA
Ripple & Noise		Full input voltage range, 20MHz bandwidth	-	-	120	mVp-p
Note: The Ripple and Noise is tested by the Parallel-line method (please refer to the following test instruction).						

General Specifications

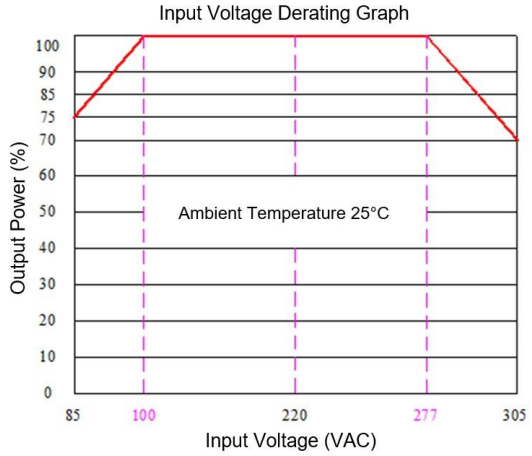
Item	Test Condition		Min	Typ.	Max	Unit
Switching frequency			-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-40	-	+75	℃
Storage temperature			-40	-	+105	
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity			10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	3000	-	-	VAC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K hours
Safety standard			IEC/EN62368			

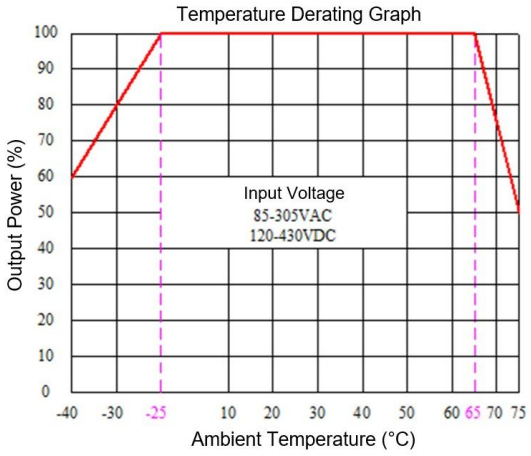
Vibration			10-55Hz, 10G, 30 Min, along X, Y, Z	
Safety standard			CLASS Ⅱ	
Weights & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	FA8-220SXXB9N3(-1)	10g	44.50X22.00X15.00 mm	1.752X0.866X0.590 inch

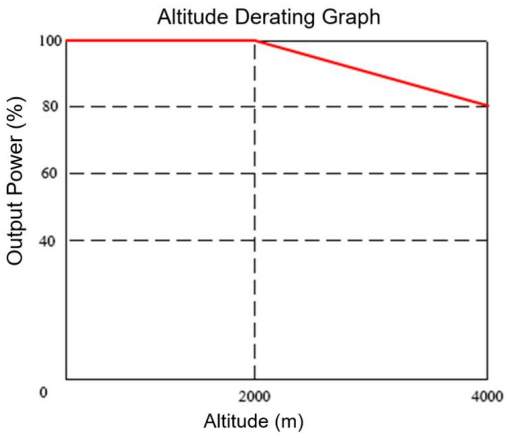
EMC Performance

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 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the Recommended Circuit 1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf. Criteria B
		Surge	IEC/EN61000-4-5	Line to line ±1KV Perf. Criteria B
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B
		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

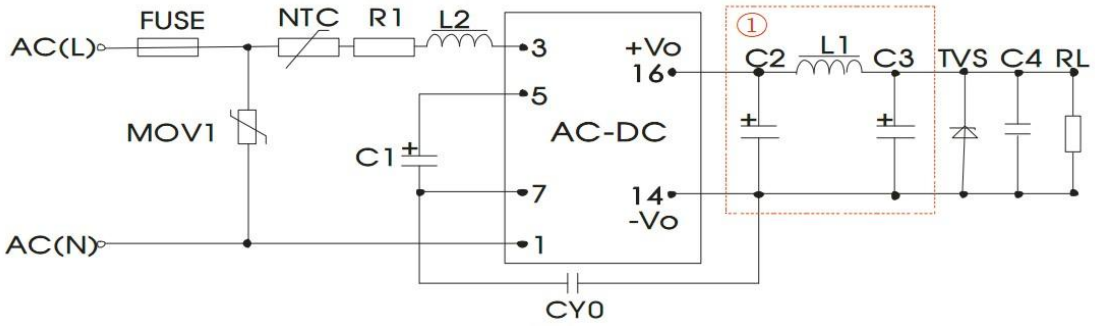


Figure - Circuit 1 (① is a Pi type filtering circuit)

Part No.	C1 (*)	C2(*) Solid-state capacitor	L1 (*)	C3(*) Electrolytic capacitor	C4	L2	NTC	CY0	FUSE (*)	TVS
FA8-220S05B9N3	22uF 450V	470uF/16V	2.0uH	220uF/16V	0.1uF 50V	4.7mH	5D-9	Y1 102M 400V	2A/300V Time-delay fuse	SMBJ7.0A
FA8-220S12B9N3		220uF/16V		100uF/16V						SMBJ20A
FA8-220S24B9N3		220uF/35V		100uF/35V						SMBJ30A

Note:

1) All the * marked components are required for the application, not optional.
2) 22uF/450V electrolytic capacitor is recommended for C1 which works for input filtering at AC input and for EMC filtering at DC input.
3) 12Ω/5W wire-wound resistor is recommended for R1.
4) 10D561K/3500A varistor is recommended for MOV1.

2. Recommended EMC circuit diagram (for higher EMC requirement)

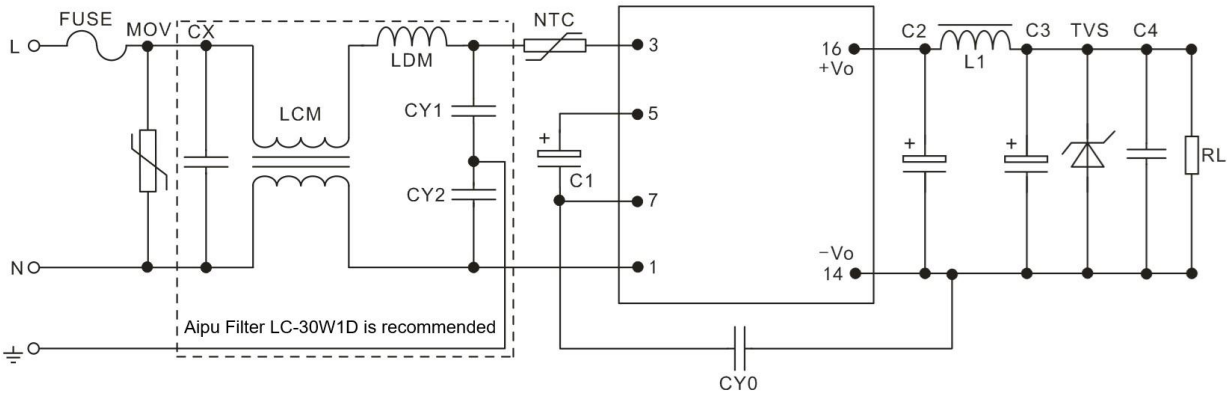
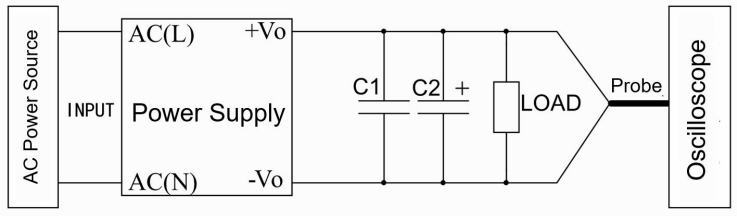


Figure - Circuit 2

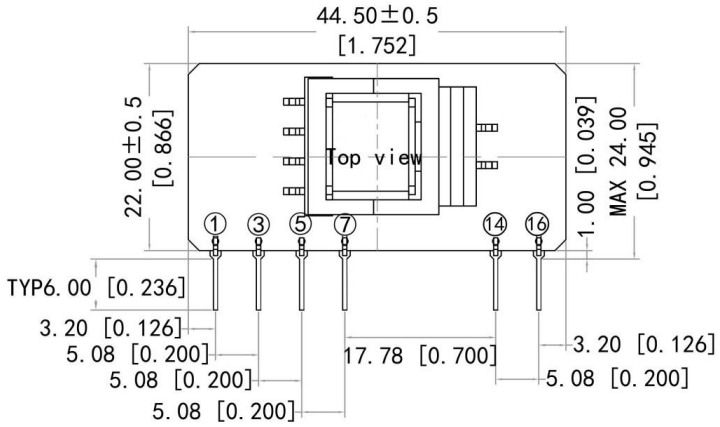
FUSE	2.0A/300VAC Time-delay fuse (Required)	NTC	5D-9
MOV	10D561K/3500A	CY1, CY2	Y1/102M/400VAC
CX	X2/224K/310VAC	LDM	330uH/0.3A
LCM	40mH Min/0.3A		

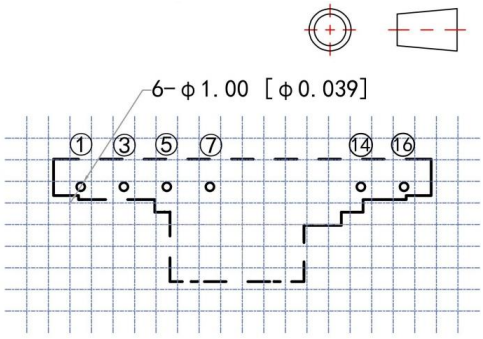
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)



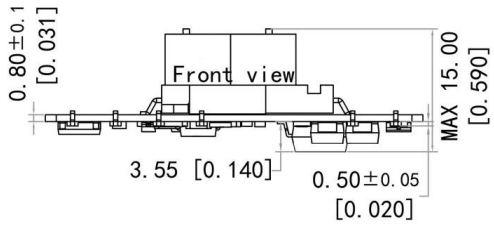
1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high frequency low impedance electrolytic capacitor C2(10uF) are connected in 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]

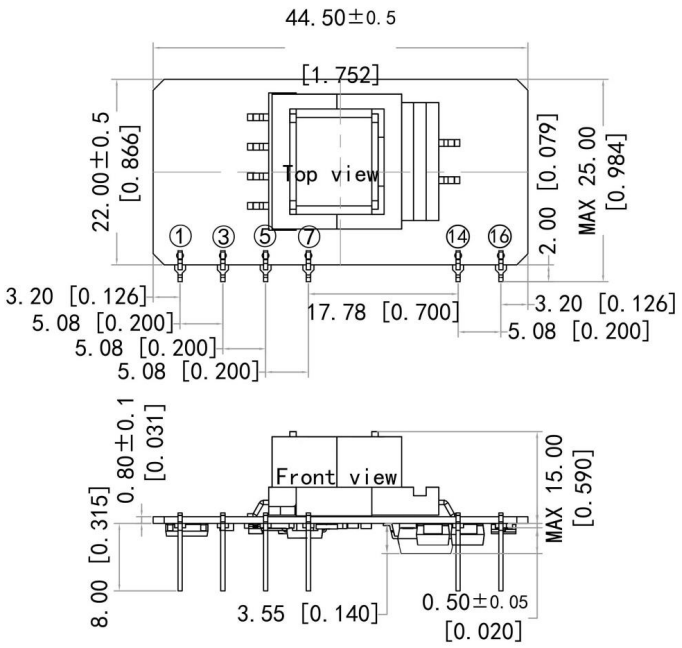


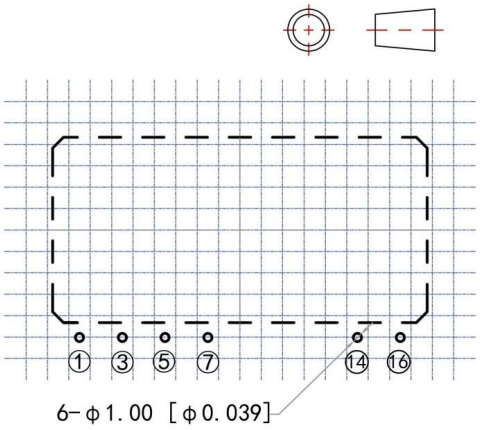
Unit: mm[inch]
General tolerance: ±0.5[±0.020]
Pin size SQ 0.5x0.5 ±0.05[0.02x0.02 ±0.002]

Pin-out Function Description

Pin No.	1	3	5	7	14	16
Function	AC(N)	AC(L)	+Vcap	-Vcap	-Vo	+Vo

(-1) Mechanical Dimensions





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

Unit: mm[inch]
General tolerance: ±0.5[±0.020]
Pin size SQ 0.5x0.5 ±0.05[0.02x0.02 ±0.002]

Pin-out Function Description

Pin No.	1	3	5	7	14	16
Function	AC(N)	AC(L)	+Vcap	-Vcap	-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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