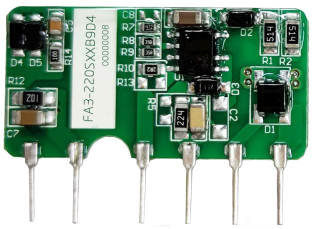
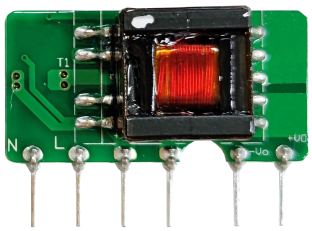
AC/DC Converter

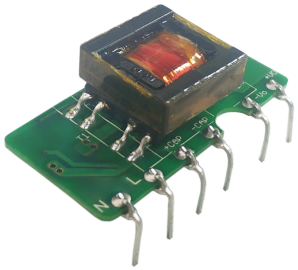
FA3-220SXXB9D4(-1) Series

Typical Features

- Wide input voltage range 85-265VAC/120-380VDC
- No load power consumption ≤0.4W
- Efficiency 76% (Typ.)
- Operating temperature from -40°C to +75°C
- Switching Frequency 65KHz
- Short circuit, over-current & over-voltage protections
- Isolation voltage 3000VAC
- Altitude during operation 4000m Max
- Compliant with IEC/EN62368/UL62368
- Mini size open frame, industry level design
- PCB SIP mounting







Application Field

FA3-220SXXB9D4(-1) Series *---- Mini size open frame high efficiency power supplies with global adapted input voltage range (both AC & DC available), low ripple, low temperature raise, 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 EMC circuit diagram is recommended in this data sheet for the application with high EMC requirement.*

Typical Product List

Certificate	Part No.	Output Specifications			Capacitive Load @220VAC	Ripple & Noise 20MHz (Max)	Efficiency @Full Load 220VAC
		Power	Voltage	Current			
		(W)	Vo(V)	Io(mA)	uF(Max)	mVp-p	% (Typ.)
-	FA3-220S3V3B9D4(-1)	2	3.3	600	700	80	68
-	FA3-220S05B9D4(-1)	3	5	600	680	80	72
-	FA3-220S09B9D4(-1)	3	9	333	200	100	73
-	FA3-220S12B9D4(-1)	3	12	250	470	120	73
-	FA3-220S12V6B9D4(-1)	3	12.6	238	200	120	76
-	FA3-220S15B9D4(-1)	3	15	200	200	120	76
-	FA3-220S24B9D4(-1)	3	24	125	68	120	77

Note 1: The suffix -1 indicates the series parts with pins 90° bent.

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: The Ripple and Noise are tested by the twisted pair method according to the test instruction in the datasheet.

Note 5: Please contact Aipu sales for other output voltages requirements in this series but not in this table.

Input Specifications

Item	Operating Condition	Min	Typ.	Max	Unit
Input Voltage Range	AC input	85	220	265	VAC
	DC input	120	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	
No Load Power Consumption	Input 115VAC	-	-	0.4	W
	Input 220VAC	-	-		
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
External Fuse Recommended	-	1A-3A/250VAC Time-delay fuse			
Hot-plug	-	Unavailable			
Remote Control	-	Unavailable			

Output Specifications

Item		Operating Condition	Min	Typ.	Max	Unit
Voltage Accuracy		Full input voltage range, 15-100% load (Works stably at 0%-15% load)	-	±2.0	±5.0	%
Line Regulation		Nominal load	-	±1.0	±3.0	%
Load Regulation		Nominal input voltage, 20%~100% load	-	±1.0	±5.0	%
Minimum Load		Single Output	15	-	-	%
Turn-on Delay Time		Input 115VAC (full load)	-	600	-	mS
		Input 220VAC (full load)	-		-	
Power-off Hold up Time		Input 115VAC (full load)	-	30	-	mS
		Input 220VAC (full load)	-	70	-	
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 Coefficient		-	-	±0.03%	-	%/℃
Over Current Protection		Input 220VAC	≥130% Io, self-recovery			Hiccup
Ripple & Noise		-	-	-	120	mV

General Specifications

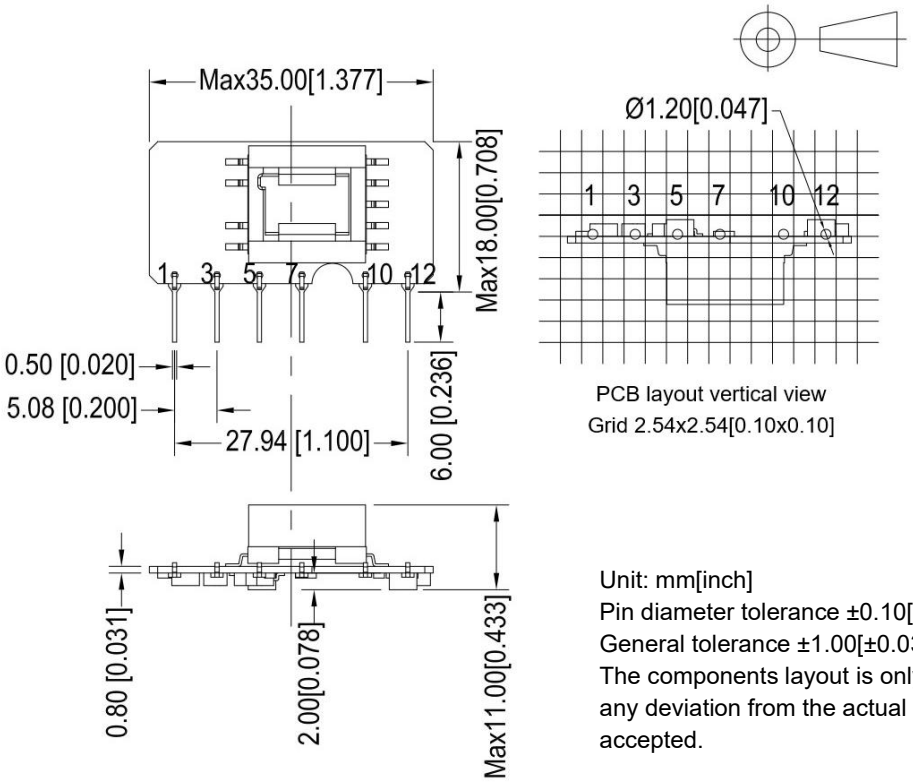
Item	Operating Condition	Min	Typ.	Max	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Refer to the temperature derating graph	-40	-	+75	℃
Storage Temperature	-	-40	-	+85	
Soldering Temperature	Wave-soldering	260±4℃, timing 5-10S			
	Manual-soldering	360±8℃, timing 4-7S			
Relative Humidity	-	10	-	90	%RH
Isolation Voltage	I/P-O/P, Test 1min, leakage current ≤5mA	3000	-	-	VAC
Insulation Resistance	Input-Output @ DC500V	100	-	-	MΩ
Safety Standard	-	EN62368, IEC62368			
Vibration	-	10-55Hz, 10G, 30Min, along X, Y, Z			
Safety Class	-	CLASS Ⅱ			
Flame Class of Case	-	UL94-V0			
MTBF	MIL-HDBK-217F@25℃	＞300,000H			
Unit Weight	-	5g (Typ.)			

EMC Performances

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR22/EN55032	CLASS B (with the Recommend Circuit 2)
		RE	CISPR22/EN55032	CLASS B (with the Recommend Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (with the Recommend Circuit 1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (with the 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 & interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Mechanical Dimensions

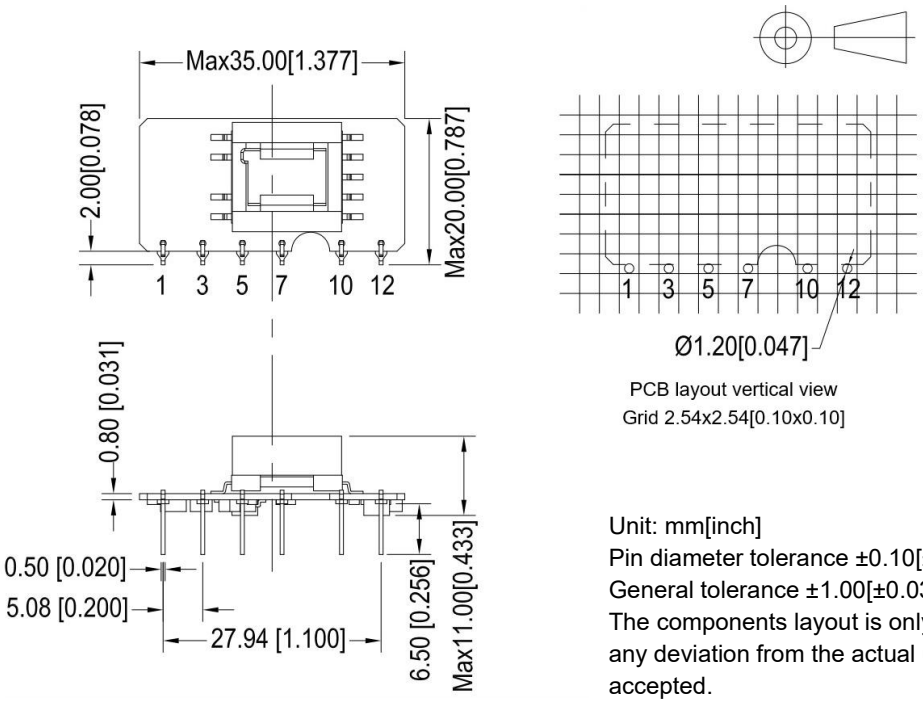
FA3-220SXXB9D4



Pin No.	Function
1	AC(N)
3	AC(L)
5	+Cap
7	-Cap
10	-Vout
12	+Vout
2/4/6/8/9/11	No Pin

Unit: mm[inch]
Pin diameter tolerance ±0.10[±0.004]
General tolerance ±1.00[±0.039]
The components layout is only for reference, any deviation from the actual unit should be accepted.

FA3-220SXXB9D4-1



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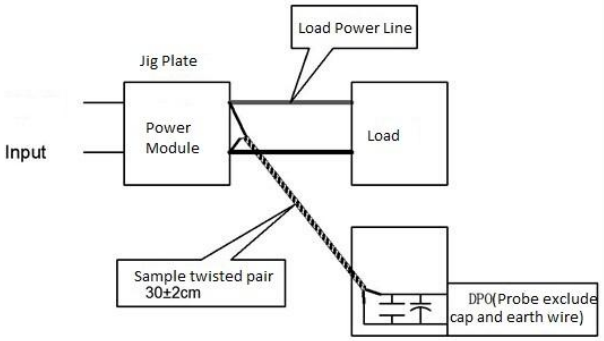
Unit: mm[inch]
Pin diameter tolerance ±0.10[±0.004]
General tolerance ±1.00[±0.039]
The components layout is only for reference, any deviation from the actual unit should be accepted.

Package Code	Dimensions L x W x H	
-	35.00 x 18.00 x 11.00 mm	1.377 × 0.708 × 0.433 inch

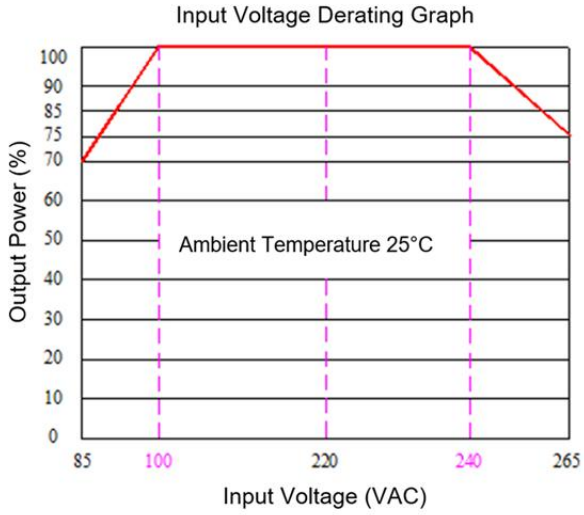
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)

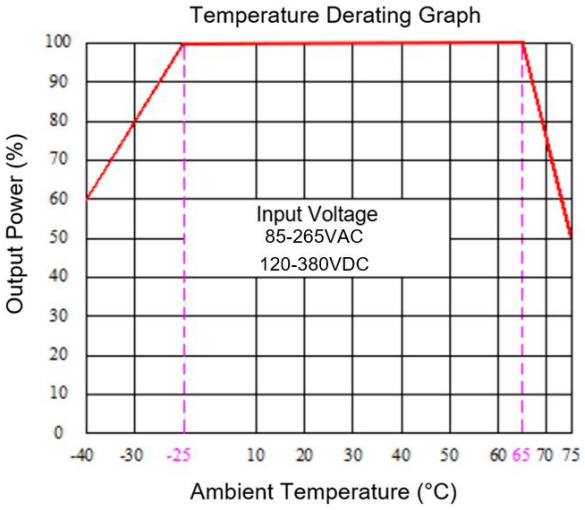
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitors are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at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

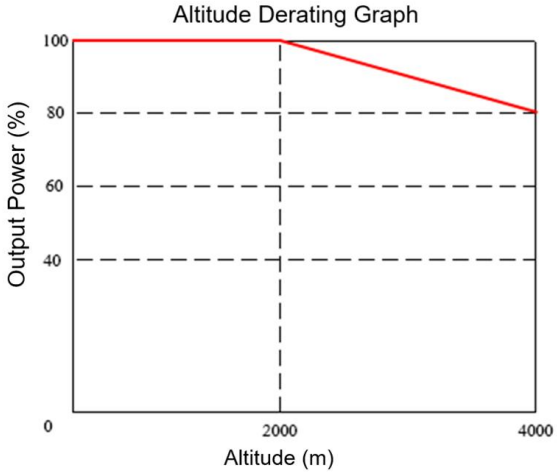
2) The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible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



Product Characteristics Graphs







Note 1: The output power should be derated based on the input voltage derating graph at 85~100VAC/240~265VAC/120~140VDC/ 340~380VDC.

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

Recommendation for Typical Application & EMC

1, Typical application circuit diagram

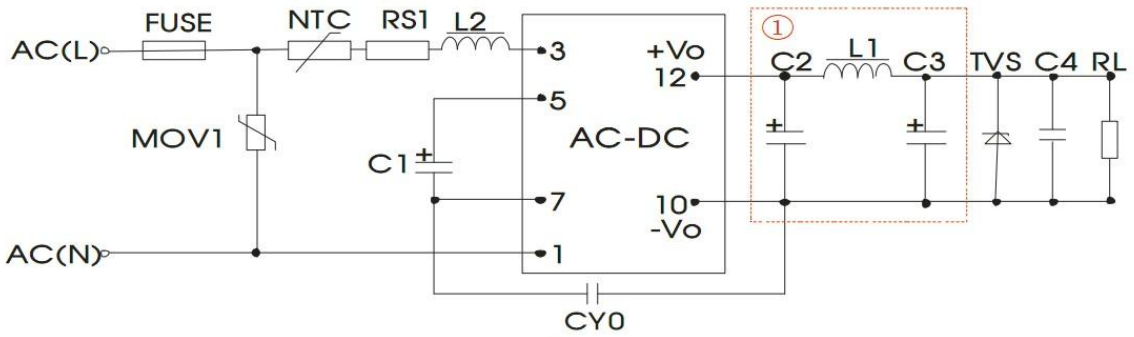


Figure – Circuit 1 (① is a Pi type filter)

Part No.	C1 (*)	C2 (*)	L1	C3 (*)	C4	L2	NTC	RS1	CY0	FUSE (*)	TVS
FA3-220S3V3B9D4	10uF /400V	470uF/16V	4.7uH /1A	220uF/16V	0.1uF/ 50V	4.7mH /0.2A	5D-9	10Ω/ 2W Wire-wound resistor	Y1 102M 400VAC	3.15A/ 250V Time Delay Fuse	SMBJ7.0A
FA3-220S05B9D4		470uF/16V									
FA3-220S09B9D4		330uF/16V	2.0uH /0.5A	330uF/16V							SMBJ15A
FA3-220S12B9D4		330uF/16V		330uF/16V							SMBJ15A
FA3-220S12V6B9D4		330uF/16V		330uF/16V							SMBJ15A
FA3-220S15B9D4		220uF/25V		220uF/25V							SMBJ20A
FA3-220S24B9D4		100uF/35V		47uF/35V							SMBJ30A

Note: The * marked components are necessary for the application, not optional.

2, Recommended circuits diagrams for high EMC requirement

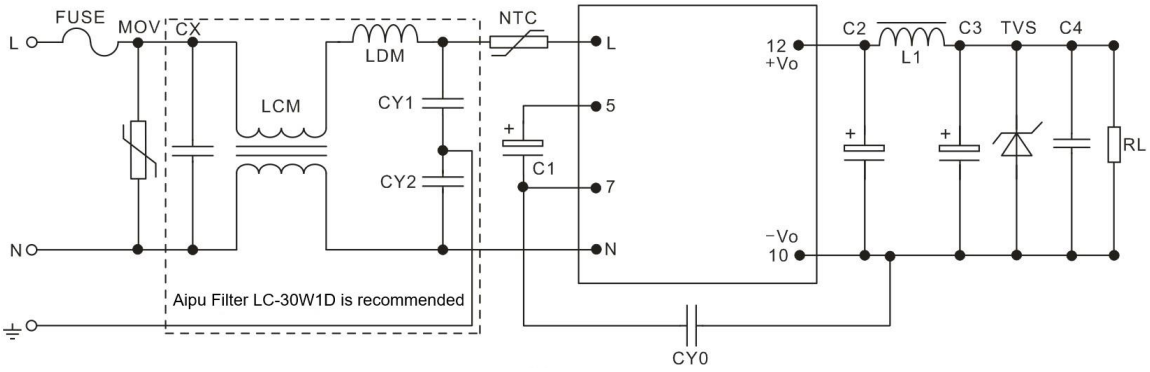


Figure – Circuit 2/1

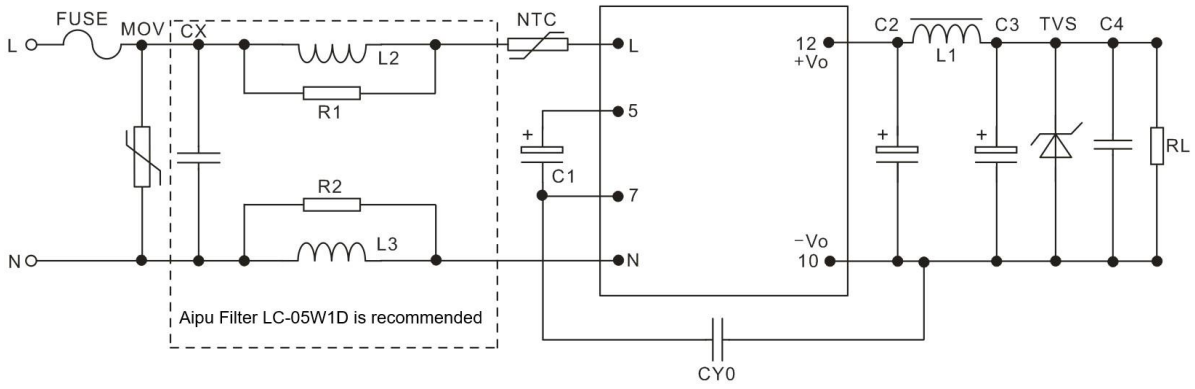


Figure – Circuit 2/2

FUSE	3.15A/250V Time-delay fuse (necessary)	NTC	5D-9	R1,R2	2.2KΩ/ >1/8W
MOV	10D561K/4500A	CY1, CY2	Y1/102M/400VAC	--	--
CX	X2/474K/310VAC	LDM	330uH/0.3A	--	--
LCM	50mH/0.3A	L2, L3	Color-ring choke 1mH/1W	--	--

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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