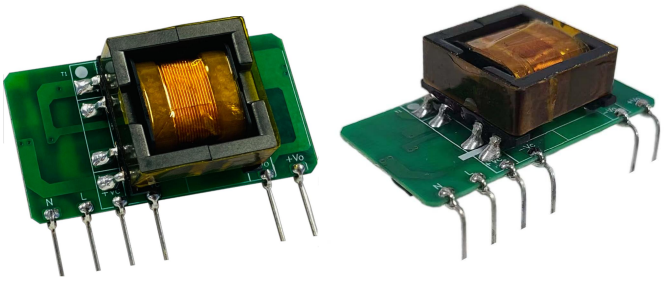
AC/DC Converter

FA15-220SXXB9N3(-1) Series

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption ≤0.25W@220VAC
- ◆ Efficiency 85%(TYP.)
- ◆ Operating temperature from -40℃ to +80℃
- ◆ Switching Frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operation 5000m Max
- ◆ With CE & ETL certificates
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ Mini size open frame, industrial grade design
- ◆ PCB SIP mounting



RECOGNIZED COMPONENT Intertek 5028278 CONFORMS TO UL STD. 62368-1 CERTIFIED TO CSA STD. C22.2 No. 62368-1

Application Field

FA15-220SXXB9N3(-1) Series ----- *Mini size open-frame high efficiency 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 diagram 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	%
CE/ETL	FA15-220S3V3B9N3(-1)	10	3.3	3000	2000	120	76
CE/ETL	FA15-220S05B9N3(-1)	15	5	3000	2000	120	77
CE/ETL	FA15-220S12B9N3(-1)	15	12	1250	1000	120	83
CE/ETL	FA15-220S12V7B9N3(-1)	15	12.7	1181	1000	120	82
CE/ETL	FA15-220S15B9N3(-1)	15	15	1000	1000	120	83
CE/ETL	FA15-220S24B9N3(-1)	15	24	625	800	150	85

Note 1 - Please contact Aipu sales for other output voltages requirement in this series but not listed in this table.

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

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	-	-	0.40	A
	220VAC	-	-	0.30	
Surge Current	115VAC	-	-	10	
	220VAC	-	-	20	
No-load power consumption	Input 115VAC	-	-	0.25	W
	Input 220VAC	-	-		
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
Recommended External Fuse	-	1A-3A/300VAC Time-delay fuse			
Hot Plug	-	Unavailable			
Remote Control	-	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	-	-	±1.0	%
Load Regulation		Nominal input voltage, 20%~100% load	-	-	±1.0	%
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	-	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	≥130% Io, self-recovery			Hiccup
Ripple & Noise		-	-	50	150	mV

General Specifications

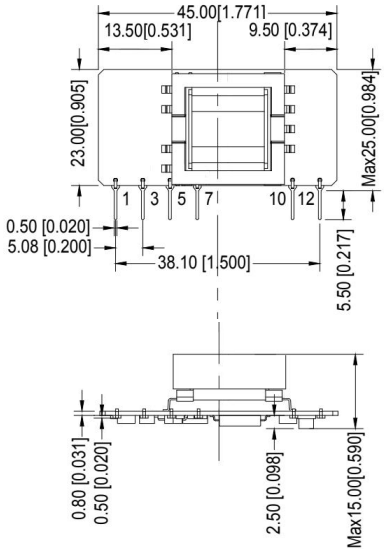
Item	Operating Condition	Min	Typ.	Max	Unit
Switching Frequency	-	-	65	-	KHz

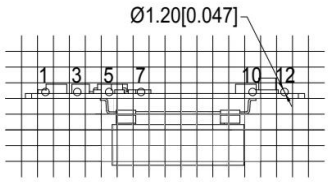
Operating Temperature	Refer to the Temperature Derating Graph	-40	-	+80	℃
Storage Temperature	-	-40	-	+105	
Soldering Temperature	Wave soldering	260±4℃, time 5-10S			
	Manual soldering	360±8℃, time 4-7S			
Relative Humidity	-	10	-	90	%RH
Isolation Voltage	I/P-O/P, Test 1min, leakage current ≤5mA	4000	-	-	VAC
Insulation Resistance	I/P-O/P, @ DC500V	100	-	-	MΩ
Safety Standard	-	IEC/EN62368/UL62368			
Vibration	-	10-55Hz,10G, 30Min, along X,Y,Z			
Safety Standard	-	CLASS Ⅱ			
MTBF	-	MIL-HDBK-217F@25℃＞300,000H			
Unit Weight	-	15g (Typ.)			

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 A (with the Recommended Circuit 1)
		CS	IEC/EN61000-4-6	10Vr.m.s Perf.Criteria A (with the Recommended Circuit 1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B ±4KV Perf.Criteria B (with the Recommended Circuit 2)
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

FA15-220SXXB9N3 Mechanical Dimensions



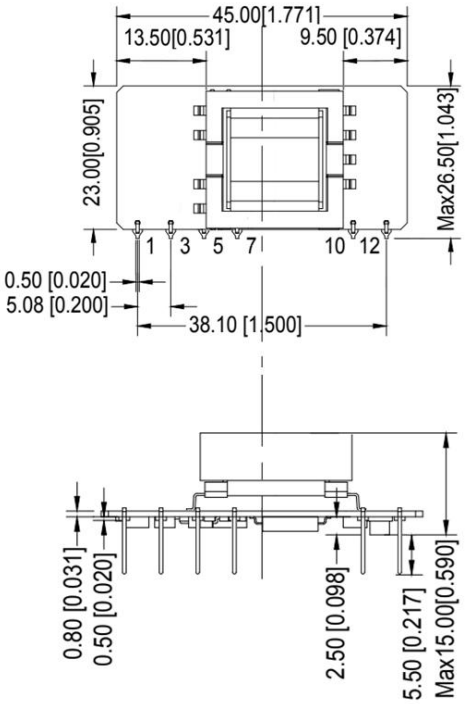


PCB layout vertical view
Grid 2.54x2.54 [0.10x0.10]

Pin No.	Function
1	AC(N)
3	AC(L)
5	+Vcap
7	-Vcap
10	-Vout
12	+Vout

Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]
The components layout is only for reference, any deviation from the actual unit should be accepted.

FA15-220SXXB9N3-1 Mechanical Dimensions



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

Pin No.	Function
1	AC(N)
3	AC(L)
5	+Vcap
7	-Vcap
10	-Vout
12	+Vout

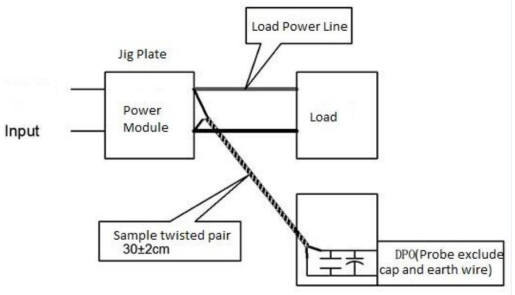
Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]
The components layout is only for reference, any deviation from the actual unit should be accepted.

Package Code	Dimensions L x W x H	
-	45.00X23.00X15.00 mm	1.771X0.905X0.590 inch

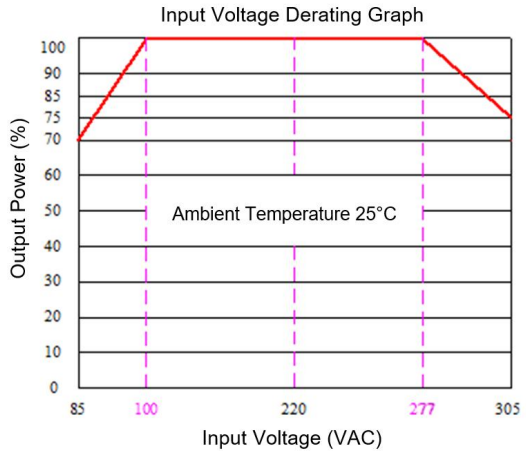
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)

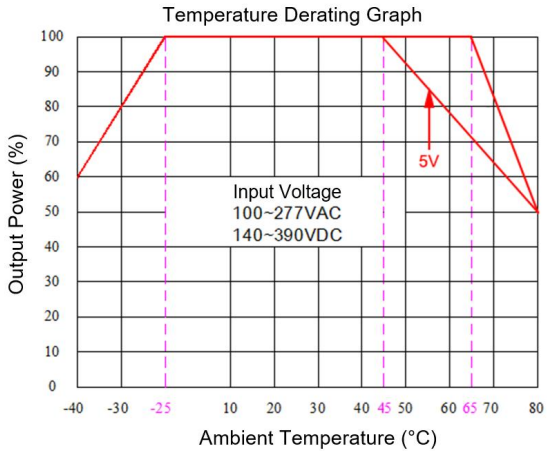
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the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

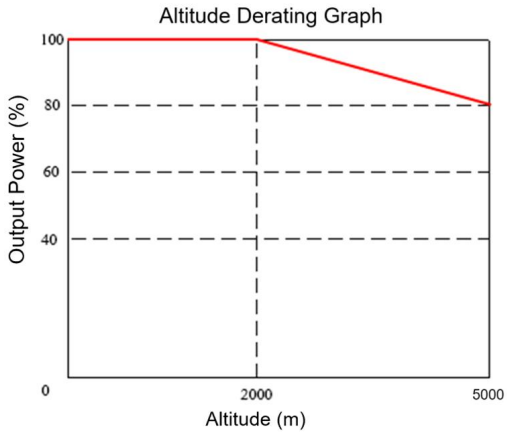
2) The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be 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/277~305VAC /120~140VDC /390~430VDC.

The output power of FA15-220S05B9N3(-1) should be derated at temperature >45℃.

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

Recommended Circuit Diagrams for Application

1.Typical application circuit diagram

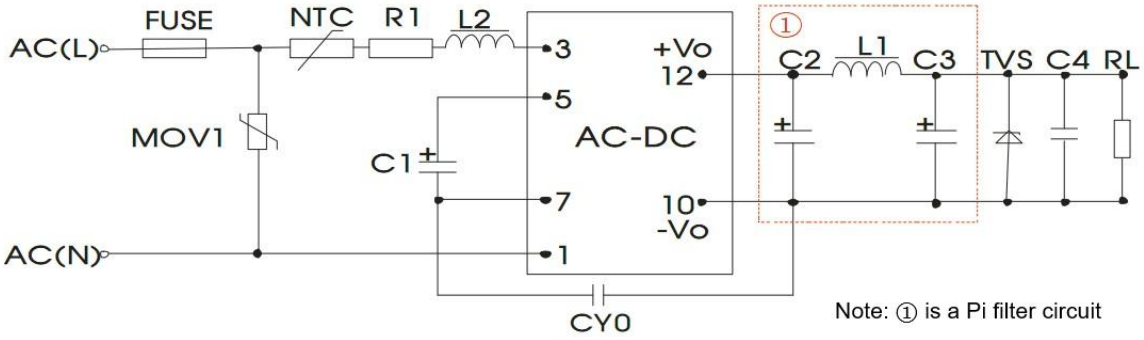


Figure - Circuit 1

Part No.	C1 (*)	C2 (*)	L1 (*)	C3 (*)	C4	L2	NTC	CY0	FUSE (*)	TVS
FA15-220S3V3B9N3(-1)	33uF /450V	1000uF/10V	2.0uH /4A	680uF/10V	0.1uF/ 50V	4.7mH /0.5A	5D-9	Y1/ 102M/ 400V	3.15A/ 300V Time-delay fuse	SMBJ7.0A
FA15-220S05B9N3(-1)										
FA15-220S12B9N3(-1)		470uF/16V		220uF/16V						SMBJ20A
FA15-220S12V7B9N3(-1)		470uF/16V		220uF/16V						SMBJ20A
FA15-220S15B9N3(-1)		470uF/25V		220uF/25V						SMBJ20A
FA15-220S24B9N3(-1)		470uF/35V		220uF/35V						SMBJ30A

Note:

1. The * marked components are necessary, not optional for the application.
2. 33uF/450V electrolytic capacitor is recommended for C1 which will work as the filtering capacitor at AC input, and work as one filter capacitor in the EMC filter at DC input.
3. 12Ω/5W is recommended for R1 which is a Current-Limiting Resistor.
4. 10D561K/3500A is recommended for MOV1 which is a Varistor.

2. Recommended EMC circuit diagrams (for high EMC requirement)

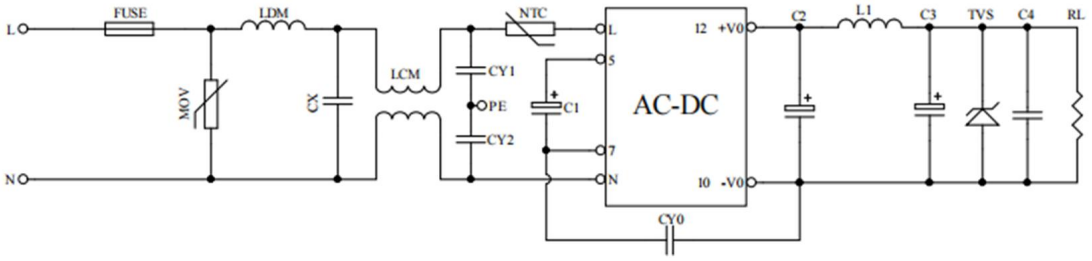


Figure - Circuit 2-1

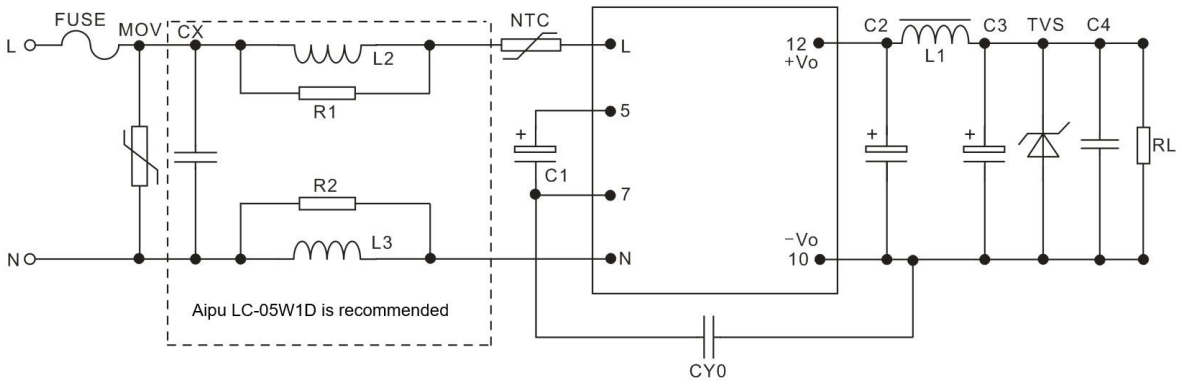


Figure - Circuit 2-2

FUSE	3.15A/300V, Time-delay fuse (necessary)	NTC	5D-9	R1, R2	2.2KΩ/>1/8W
MOV	10D561K/ 3500A	CY0, CY1, CY2	Y1/102M/400VAC		
CX	X2/224K/310Vac	LDM	820uH/0.5A		
LCM	40mH/0.5A	L2, L3	Color ring inductor 1mH/0.5A		

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.

9. There is high voltage at input side, it is recommended to place an insulation cover around the product to avoid direct touching.

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