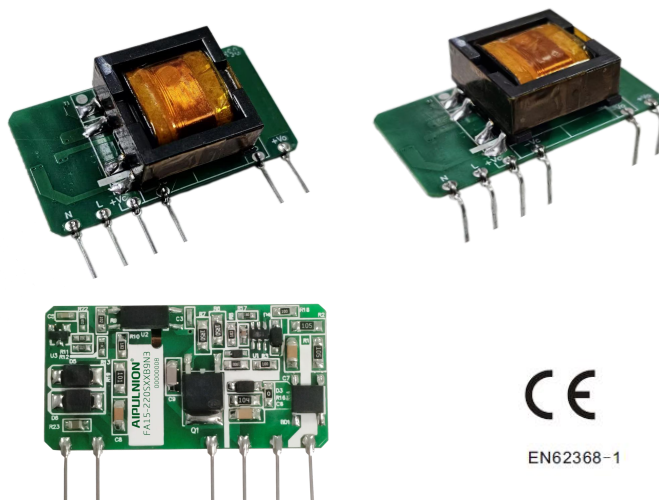


Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption $\leq 0.25\text{W}$ (Typ.)
- ◆ Efficiency up to 85% (Typ.)
- ◆ Operating temperature from -40°C to $+85^{\circ}\text{C}$
- ◆ 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



CE

EN62368-1



CONFORMS TO UL STD. 62368-1
CERTIFIED TO CSA STD.
C22.2 No. 62368-1

Application Field

The FA15-220SXXB9N3(-1) Series -----is a series of compact, high-efficiency power modules from Aipu Power. This series features a universal input voltage range (AC/DC dual-use) with key advantages including low ripple, minimal temperature rise, ultra-low power consumption, and high reliability. With reinforced safety isolation and excellent EMC performance, the series fully complies with international EN55032 and IEC/EN61000 standards. This series of products can be widely used in the fields of Electric power, Industrial, 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 (uF)	Ripple & Noise 20MHz (Max) mVp-p	Efficiency @full load 220VAC (Typ.) (%)
		Nominal	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P (W)	Vo(VDC)	Io(mA)			
CE/ETL	FA15-220S3V3B9N3(-1)	220	85-305	9.9	3.3	3000	2000	120	76
CE/ETL	FA15-220S05B9N3(-1)			15	5	3000	2000	120	77
CE/ETL	FA15-220S12B9N3(-1)				12	1250	1000	120	83
CE/ETL	FA15-220S12V7B9N3(-1)				12.7	1181	1000	120	82
CE/ETL	FA15-220S15B9N3(-1)				15	1000	1000	120	83
CE/ETL	FA15-220S24B9N3(-1)				24	625	800	150	85

Note 1: Please contact Aipu sales for other output voltages requirements of 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: "*" indicates models currently under development.

Note 4: The full-load efficiency (% , TYP) listed in the table has a tolerance of $\pm 2\%$. It is calculated as the total output power divided by the module's input power.

Note 5: The suffix -1 indicates the parts 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 range	-	47	50	63	Hz
Input current	Input 115VAC	-	-	0.40	A
	Input 220VAC	-	-	0.30	
Surge current	Input 115VAC	-	-	10	
	Input 220VAC	-	-	20	
Standby power consumption	Input 115VAC	-	-	0.25	W
	Input 220VAC	-	-		
Leakage current	-	0.5mA TYP/230VAC/50Hz			
Recommended external fuse	-	1-3.15A/300VAC Slow-blow fuse			
Hot-plug	-	N/A			
ON/OFF Control	-	N/A			

Output Specifications

Item		Test Condition	Min	Typ.	Max	Unit
Voltage accuracy		Full input voltage range, any load	-	±2.0	±3.0	%
Line regulation		Nominal load	-	-	±1.0	%
Load regulation		Nominal input voltage, 20%~100% load	-	-	±1.0	%
Minimum load		Single Output	0	-	-	%
Temperature drift coefficient		-	-	-	±0.03	%/°C
Turn-on delay time		Input 115VAC (full load)	-	-	1500	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
Over current protection		Input 220VAC	130%Io	-	200%Io	mA
Ripple & Noise		5%-100% load, 20MHz bandwidth	-	50	150	mVp-p

Note 1: Ripple and noise are measured using the parallel cable method. Please refer to the "Ripple & Noise Test Instructions" below for detailed methodology and setup.

General Specifications

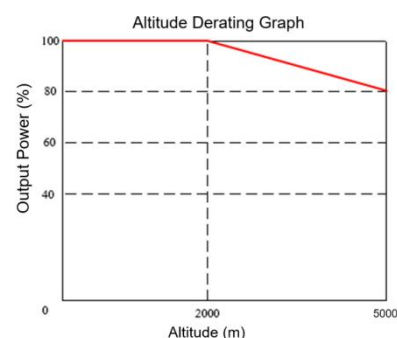
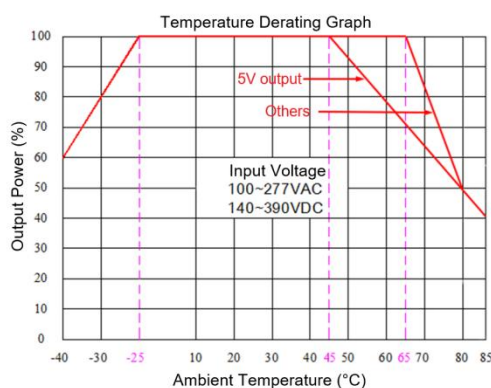
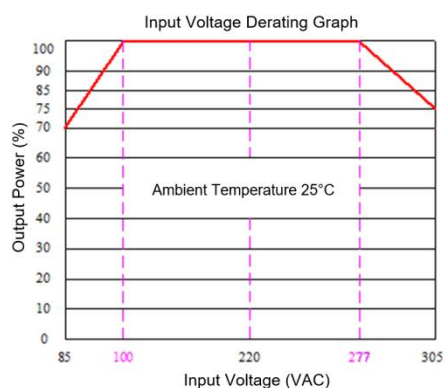
Item	Test Condition	Min	Typ.	Max	Unit
Switching frequency	-	-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph	-40	-	+85	°C

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
MTBF	MIL-HDBK-217F@25℃		300	-	-	K Hours
Safety standard	-		IEC/EN62368			
Vibration	-		10-55Hz, 10G, 30Min, along X, Y, Z			
Safety standard	-		CLASS II			
Weight & Dimensions	Part No.	Weight (Typ)	Dimensions L x W x H			
	FA15-220SXXB9N3(-1)	15g	45.00x23.00x15.00 mm	1.772×0.906×0.591 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 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 & 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.

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

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

Note 3: ETL certification allows the operating temperature 80℃ Max, TUV CE-LVD certificate allows the operating temperature 85℃ Max.

Recommended Circuits for Application

1. Typical application circuit diagram

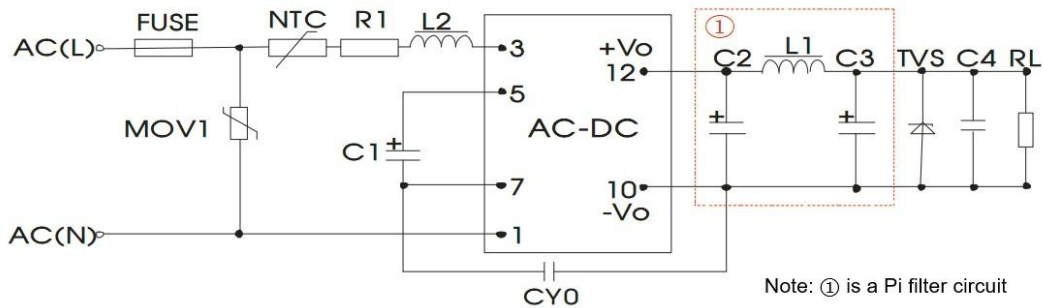


Figure - Circuit 1

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

Note:

1. C1: For AC input, C1 is an input filter electrolytic capacitor (required). The recommended value is 33uF/450V. For DC input, C1 acts as a bulk filter capacitor in the EMC filter (required). The recommended value is 33uF/450V.
2. R1: Current-limiting resistor. The recommended value is 12 ohms, 5W.
3. MOV1: Varistor. The recommended model is 10D561K/3500A.
4. NTC: Thermistor. The recommended model is 5D-9.

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

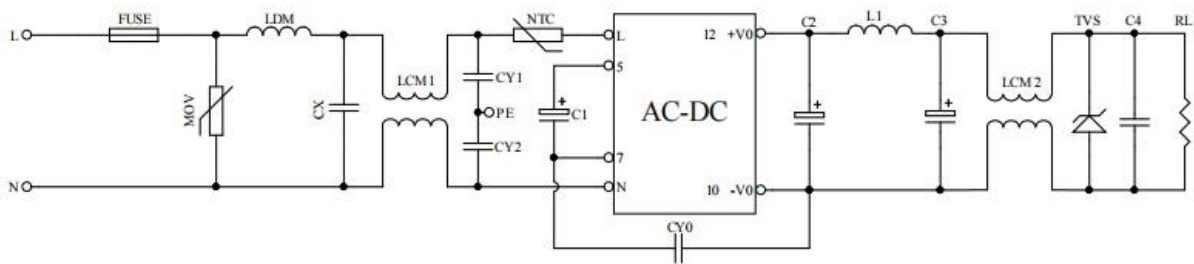


Figure – Circuit 2/1

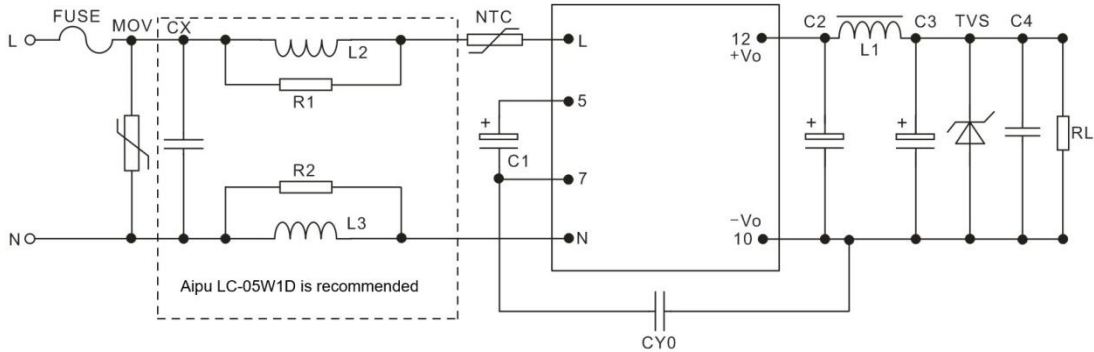
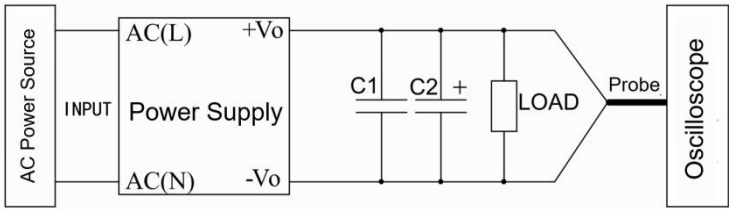


Figure – Circuit 2/2

FUSE	3.15A/300V slow-blow fuse, required	NTC	5D-9	R1, R2	2.2KΩ/>1/8W
MOV	10D561K/3500A	CY0, CY1, CY2	Y1/102M/400VAC	LCM2	40μH/4A
CX	X2/224K/310VAC	LDM	820μH/0.5A		
LCM1	40mH/0.5A	L2, L3	Color-ring choke 1mH/0.5A		

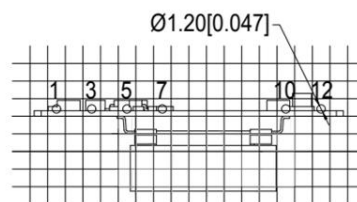
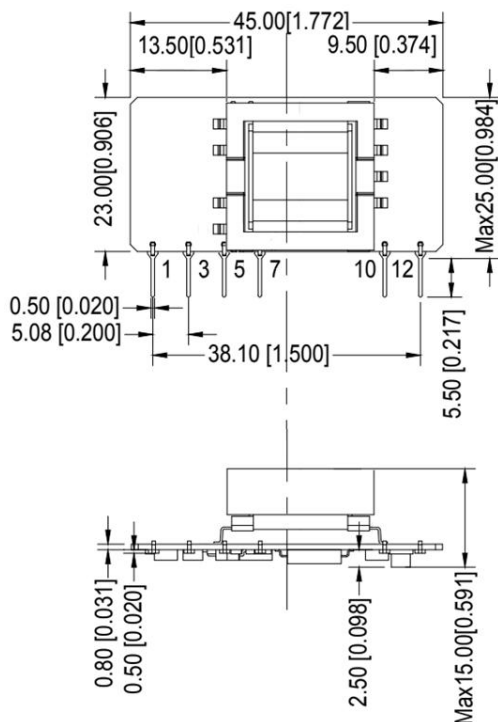
Note: Please refer to the typical application recommendation for all the other components which are not in above table.

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(0.1μF) and one high frequency low impedance electrolytic capacitor C2(10μF) are connected in parallel with the probe.
2. Output ripple and noise test setup: Connect the input terminal of the module to the power supply, and connect the output to the electronic load via a test fixture board. Use separate sampling wires directly from the output ports for measurement. Select insulated power cables with an appropriate wire gauge based on the output current.

FA15-220SXXB9N3 Mechanical Dimensions



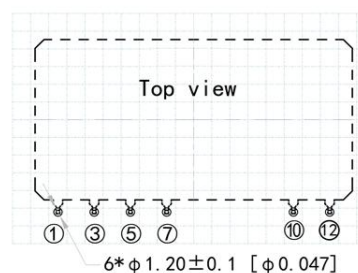
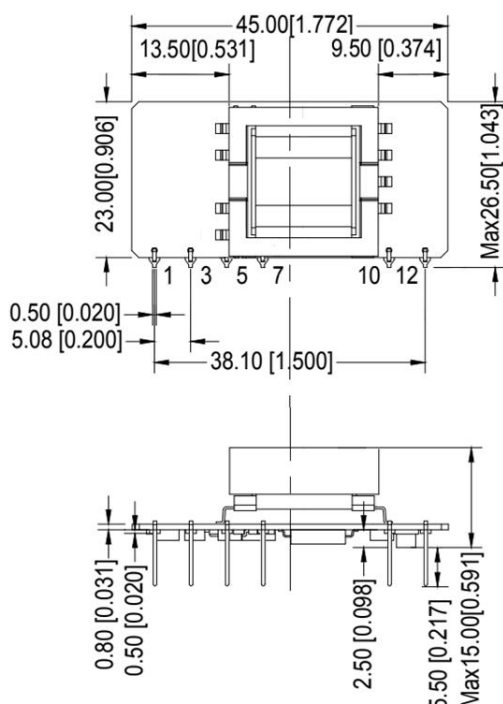
PCB layout vertical view
Grid 2.54x2.54 [0.10x0.10]

Unit: mm[inch]
Lattice Spacing: 2.54*2.54mm[0.1 inch]
General tolerance: $\pm 0.50[\pm 0.020]$
Pin diameter tolerance: $\pm 0.10[\pm 0.004]$
Component layout is for reference only;
please refer to the actual product.

Pin-out Function Description

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

FA15-220SXXB9N3-1 Mechanical Dimensions



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

Unit: mm[inch]
Lattice Spacing: 2.54*2.54mm[0.1 inch]
General tolerance: $\pm 0.50[\pm 0.020]$
Pin diameter tolerance: $\pm 0.10[\pm 0.004]$
Component layout is for reference only;
please refer to the actual product.

Pin-out Function Description

Pin No.	1	3	5	7	10	12
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°C, 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.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: <https://www.aipupower.com>