Typical Features

- Wide input voltage range 85-305VAC/120-430VDC
- No load power consumption ≤0.3W@220VAC
- Efficiency up to 78%(Typ.)
- Operating temperature from -40 to +75℃
- Switching frequency 65KHz
- Short circuit, over current & over temp. protections
- Isolation voltage 3000VAC
- Altitude during operation 2000m Max
- With UL/FCC/CE certificates (@input voltage range 100-240VAC ±10%)
- Enclosed plastic case, flame class UL94-V0
- PCB DIP mounting

EN62368-1

UL62368-1

Application Field

FA2-220SXXN2 Series ----- Compact size & high-performance AC-DC modular 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		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	%
-	FA2-220S3V3N2	220	85-305	2	3.3	600	700	120	68
UL/FCC/CE	FA2-220S05N2			2	5	400	900	120	70
-	FA2-220S12N2			2	12	167	500	150	75
-	FA2-220S15N2			2	15	133	500	150	75
-	FA2-220S24N2			2	24	83	47	150	78

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 UL/FCC/CE certificates are validated by the input voltage range of 100-240VAC ±10%)

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	-	-	0.06	A
	220VAC input	-	-	0.04	
Surge current	115VAC input	-	-	10	
	220VAC input	-	-	20	
Standby power consumption	115VAC input	-	0.10	0.30	W
	220VAC input	-			
Leakage current	-	0.25mA TYP/ 230VAC/ 50Hz			
Recommended external fuse	-	1-2A/300VAC Time-delay fuse			
Hot plug	-	Unavailable			

Output Specifications

Item		Test condition	Min	Typ.	Max	Unit
Output voltage accuracy		Full input voltage range, 10-100% load (The unit can work stably at 0-10% load)	-	±2.0	±5.0	%
Line regulation		Rated load	-	±0.5	±1.0	%
Load regulation		Nominal input voltage, 10%~100% load	-	±1.5	±5.0	%
Ripple & Noise		10%-100% load, 20MHz bandwidth	-	80	150	mVp-p
Minimum load		Single Output	10	-	-	%
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)	-	10	-	mS
		Input 220VAC (full load)	-	60	-	
Dynamic response	Overshoot range	25%~50%~25%	-5.0	-	+5.0	%
	Recovery time	50%~75%~50%	-	-	5.0	mS
Output overshoot		Full input voltage range	≤10			%Vo
Short circuit protection			Continuous, self-recovery			Hiccup
Over current protection		Input 220VAC	120%Io	-	200%Io	Hiccup
Note: The Ripple & 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	-	+85	

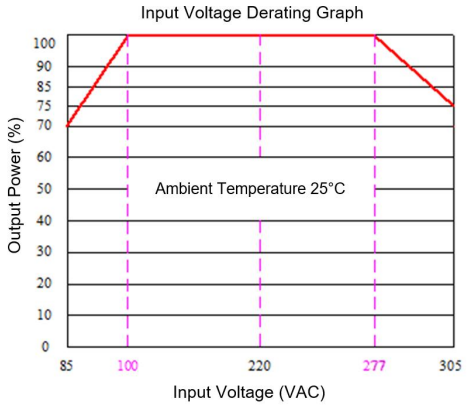
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity	-		10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	3000	-	-	VAC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K hours
Safety standard	-		IEC/EN62368			
Vibration	-		10-55Hz,10G,30Min, along X, Y, Z			
Safety standard	-		CLASS Ⅱ			
Flame class of case	-		UL94-V0			

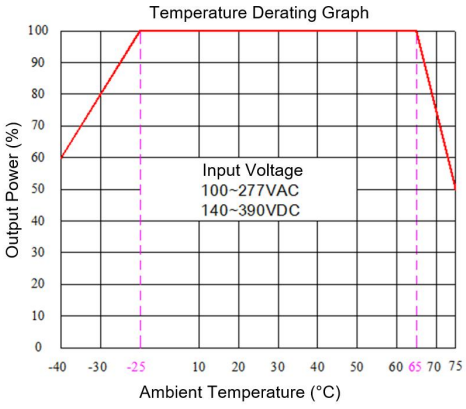
Weight & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	FA2-220SXXN2	15g	33.80 x 22.20 x 15.30 mm	1.331 X 0.874 X 0.602 inch

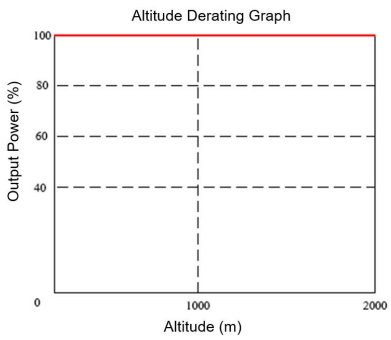
EMC Performance

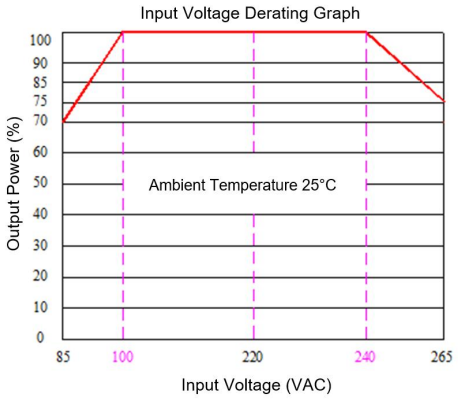
Items			Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf. Criteria B (with the Recommended Circuit 2)
		Surge	IEC/EN61000-4-5	±1KV Perf. Criteria B (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B (with the Recommended Circuit 2)
		Voltage dips & Interruptions	IEC/EN61000-4-11	0%~70% Perf. Criteria B

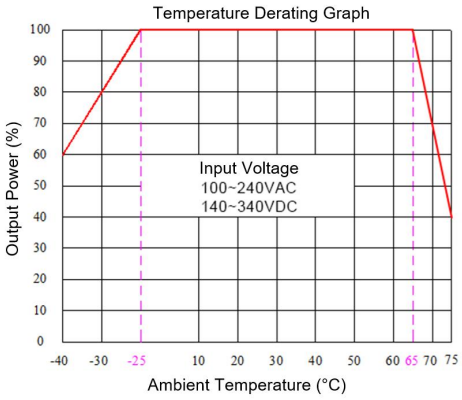
Product Characteristics Graphs











Note 1: The output power should be derated based on the input voltage derating graph at 85~100VAC/120~140VDC & 277~305VAC/390~430VDC. (FA2-220S05N2 certificates have been validated at the input voltage range of 100-240VAC, its output power should be derated at 85~100VAC/120~140VDC & 240~265VAC/340~375VDC)

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 Circuit for Application

1. Typical application circuit diagram

Figure - Circuit 1

Part No.	FUSE (Required)	MOV	RS1	C1	C2	TVS1
FA2-220S3V3N2	1A/300V Time-delay fuse	10D561K/3500A	2W/20Ω Wire-wound resistor	330uF/10V	0.1uF/50V Ceramic capacitor	SMBJ7.0A
FA2-220S05N2						
FA2-220S12N2				220uF/16V		SMBJ20A
FA2-220S15N2				220uF/25V		
FA2-220S24N2				47uF/35V		SMBJ30A

Note:

1) C2 is a ceramic capacitor to suppress the high frequency noise.
2) RS1 is the input plug-in resistor, wire-wound resistor is required, SMD or carbon-film resistors are not available.
3) TVS1 is to protect the output circuit under abnormal conditions, its rated voltage should be 1.2x of output voltage.

2. Recommended EMC circuit diagram for high EMC requirements

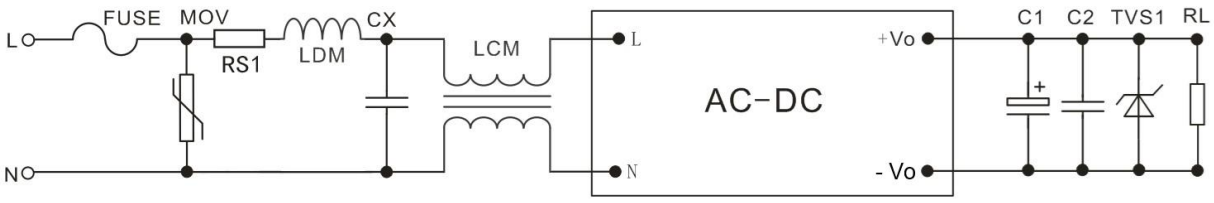
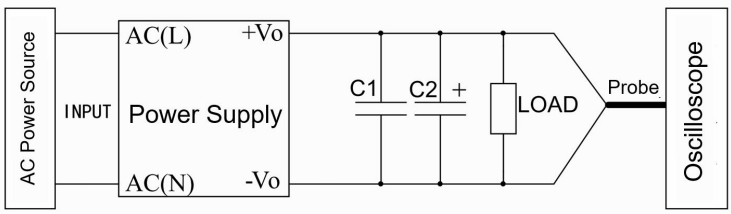


Figure - Circuit 2

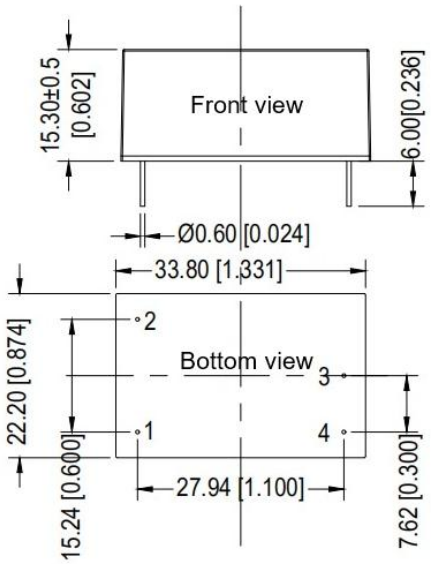
Component	Recommended value	Component	Recommended value
MOV	10D561K/3500A	RS1	2W/20Ω
CX	X2/104K/310VAC	LDM	330uH/0.2A
FUSE	1A/300V, time-delay fuse, required	LCM	UU9.8/25mH/0.2A

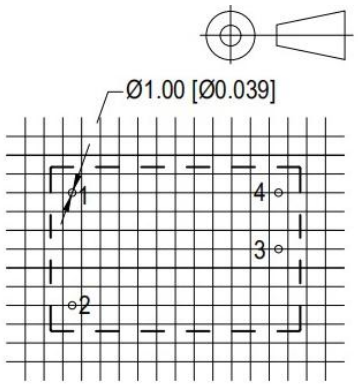
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)



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-resistance 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: ±0.50[±0.020]
Pin diameter tolerance: ±0.10[±0.004]

Pin-out Function Description

Pin No.	1	2	3	4
Function	AC(N)	AC(L)	+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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