Typical Features

- ◆ Input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption ≤0.5W@220VAC
- ◆ Efficiency up to 86% (Typ.)
- ◆ Operating temperature from -40℃ to +85℃
- ◆ Switching frequency 65KHz
- ◆ Short-circuit & over current protections
- ◆ Isolation voltage 4200VAC
- ◆ Altitude during operation 5000m Max
- ◆ Compliant with IEC/EN62368/UL62368/GB4943.1
- ◆ With CE & CQC certificates
- ◆ Enclosed plastic case, flame class UL94-V0
- ◆ PCB DIP Mounting



Application Field

FA25-220SXXH2D4 Series ---- Compact size & high efficiency modular power supplies with global adapted input voltage range (both AC & DC available), low ripple & noise, low temperature rise, low no load power consumption, high reliability, safety isolated and good EMC performance. 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		Output Specification			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	%
CE/CQC	FA25-220S05H2D4	220	85-305	21	5.0	4200	8000	100	78
CE/CQC	FA25-220S09H2D4			25	9.0	2780	7000	100	85
CE/CQC	FA25-220S12H2D4				12	2083	5000	120	85
CE/CQC	FA25-220S15H2D4				15	1667	5000	120	85
CQC	FA25-220S18H2D4				18	1389	2000	120	85
CE/CQC	FA25-220S24H2D4				24	1042	700	150	85
CE/CQC	FA25-220S26V5H2D4				26.5	943	500	150	86
CE/CQC	FA25-220S28H2D4				28	893	500	150	86
CE/CQC	FA25-220S29H2D4				29.3	853	400	150	86
CQC	FA25-220S30H2D4				30	833	400	150	86
CE/CQC	FA25-220S48H2D4				48	520	400	150	86

Note 1: The suffix -T indicates the chassis package, -TS indicates the package of DIN Rail which width is 35mm.

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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: Please contact Aipu sales for other output voltages requirement of this series but not listed in the table.

Input Specifications

Item	Test Conditions	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	-	-	0.52	A
	Input 220VAC	-	-	0.30	
Surge current	Input 115VAC	-	-	15	
	Input 220VAC	-	-	25	
Standby power consumption	Input 115VAC	-	0.10	0.50	W
	Input 220VAC	-			
Leakage current	-	0.5mA TYP/230VAC/50Hz			
External fuse recommended	-	3.15A/300VAC Time-delay fuse			
Input capacitor EC1	-	47uF/450V			
Hot plug	-	Unavailable			
ON/OFF Control	-	Unavailable			

Output Specifications

Item		Test Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy		Full input voltage range, any load	-	±1.0	±3.0	%
Line regulation		Rated Load	-	-	±1.0	%
Load regulation		Nominal input voltage, 20%~100% load	-	-	±1.0	%
Minimum load		Single Output	5	-	-	%
Temperature drift coefficient		-	-	-	±0.03	%/℃
Turn-on delay time		Input 115VAC (full load)	-	-	2500	mS
		Input 220VAC (full load)	-	-		
Power-off hold-up time		Input 115VAC (full load)	-	50	-	mS
		Input 220VAC (full load)	-	100	-	
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 100-305VAC	130% Io	-	280%Io	Hiccup
Ripple & Noise		5%-100% load, 20MHz bandwidth	-	50	150	mVp-p

Note: The Ripple & Noise is tested by the Parallel-line method, please refer to the following test Instruction.

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General Specifications

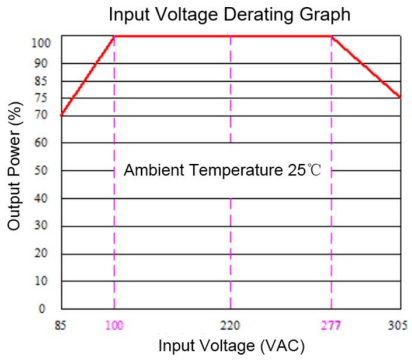
Items	Test Conditions		Min.	Typ.	Max.	Unit
Switching frequency	-		-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-40	-	+85	℃
Storage temperature	-		-40	-	+90	
Soldering temperature	Wave-soldering		260±4℃, timing 5-10S			
	Manual-soldering		360±8℃, timing 4-7S			
Relative humidity	-		10	-	90	%RH
Isolation voltage	I/P-O/P, Test 1 min, leakage current ≤5mA		4200	-	-	VAC
	I/P-FG, Test 1 min, leakage current ≤5mA		1500	-	-	VAC
Insulation resistance	I/P-O/P, @DC500V		100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K hours
Safety standard	-		IEC/EN62368/GB4943.1			
Vibration	-		10-55Hz,10G, 30 Min, along X, Y, Z			
Safety class	-		CLASS II			
Flame class of case	-		UL94-V0			
Weight & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H			
	FA25-220SXXH2D4	120g	70.00X48.00X23.50 mm	2.756X1.890X0.925 inch		
	FA25-220SXXH2D4-T	165g	96.00X53.80X32.50 mm	3.779X2.118X1.279 inch		
	FA25-220SXXH2D4-TS	200g	96.00X53.80X37.00 mm	3.779X2.118X1.456 inch		

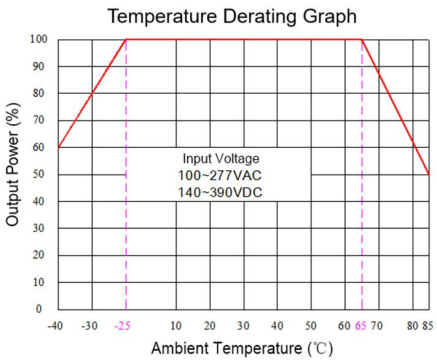
EMC Performances

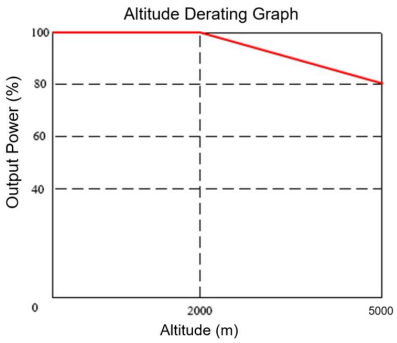
Item			Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B
		RE	CISPR32/EN55032	CLASS B
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B (with the Recommended Circuit 2)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the Recommended Circuit 2)
		ESD	IEC/EN61000-4-2	Contact ±8KV / Air ±15KV Perf. Criteria B
		Surge	IEC/EN61000-4-5	Line to line ±2KV / line to ground ±4KV Perf. Criteria B
				Line to line ±4KV / line to ground ±6KV 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

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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 the Application

1. Typical application circuit diagram

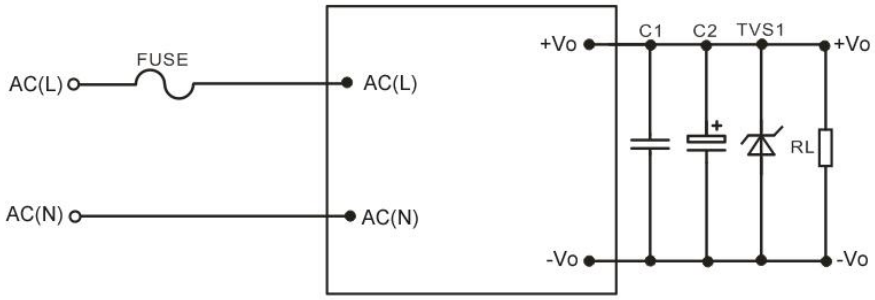


Figure - Circuit 1

Note:

A high-frequency, low-resistance electrolytic capacitor is recommended for C2 which capacitance and current should refer to the technical specifications of its manufacturer. The withstand voltage of C2 should be derated to be at least 80%. C1 is used to suppress the high-frequency noise, ceramic SMD capacitor 0.1uF/50V/1206 is recommended. TVS1 is to protect the output circuit when the power supply operates under abnormal condition. An external FUSE (3.15A/300V Time-delay fuse) is recommended.

Part No.	C2	TVS1
FA25-220S05H2D4	680uF/10V	SMBJ9A
FA25-220S09H2D4	330uF/16V	SMBJ12A
FA25-220S12H2D4	330uF/16V	SMBJ15A
FA25-220S15H2D4	330uF/25V	SMBJ20A
FA25-220S18H2D4	330uF/25V	SMBJ30A
FA25-220S24H2D4	220uF/35V	SMBJ30A
FA25-220S26V5H2D4	220uF/35V	SMBJ30A
FA25-220S28H2D4	220uF/35V	SMBJ30A
FA25-220S29H2D4	220uF/35V	SMBJ33A
FA25-220S30H2D4	220uF/35V	SMBJ33A
FA25-220S48H2D4	100uF/63V	SMBJ58A

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2. Recommended circuit diagram for EMC

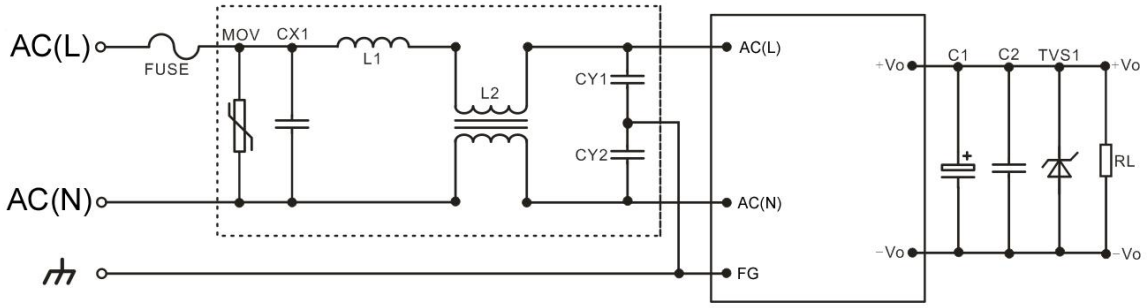
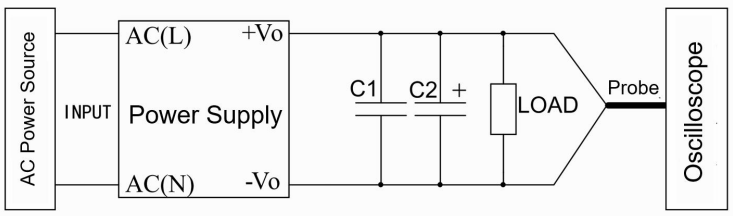


Figure - Circuit 2

Component No.	Description	Parameters
FUSE	Time-delay Fuse	3.15A/300VAC (required)
MOV	Metal Oxide Varistor	14D561K/4500A
CX1	X Capacitor	X2/224K/310VAC
L1	Differential mode Choke	2.0uH/2.5A Drum choke
L2	Common mode Choke	Green-ring choke 15mH/2.5A T12X6X4mm
CY1, CY2	Y Capacitor	Y1/102M/400VAC

Note: C1, C2, TVS1 values should refer to the typical application circuit recommendation.

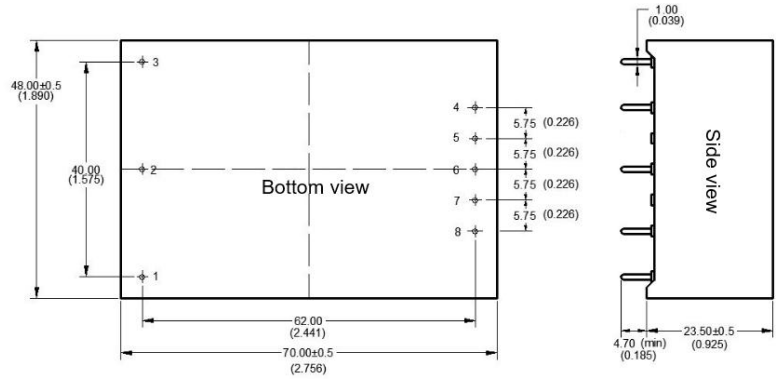
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)

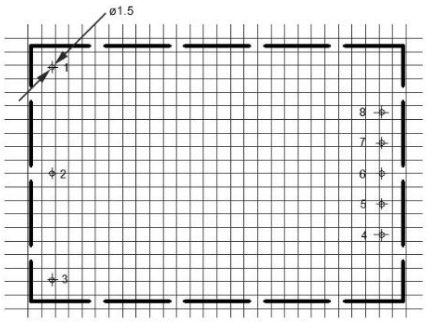


1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high-frequency low-resistance electrolytic capacitor C2(10uF) are connected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

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Mechanical Dimensions





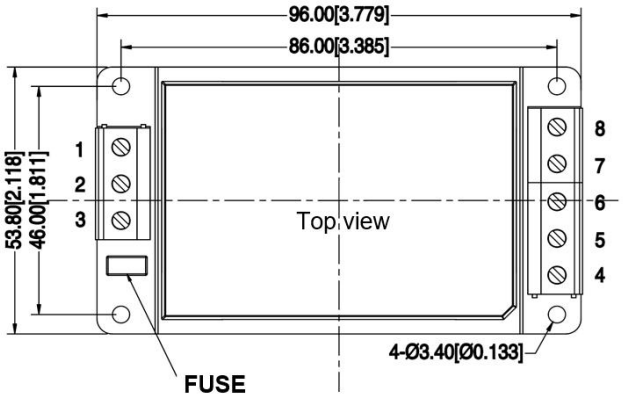
PCB layout vertical view
Grid 2.54x2.54(0.10x0.10)

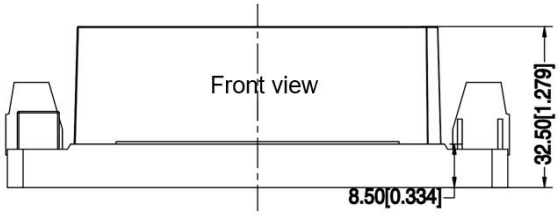
Unit: mm(inch)
General tolerance: ±0.50(±0.020)
Pin diameter tolerance: ±0.10(±0.004)

Pin-out Function Description

Pin No.	1	2	3	4	5	6	7	8
Function	FG	AC(N)	AC(L)	+Vo	No Pin	No Pin	No Pin	-Vo

-T Mechanical Dimensions





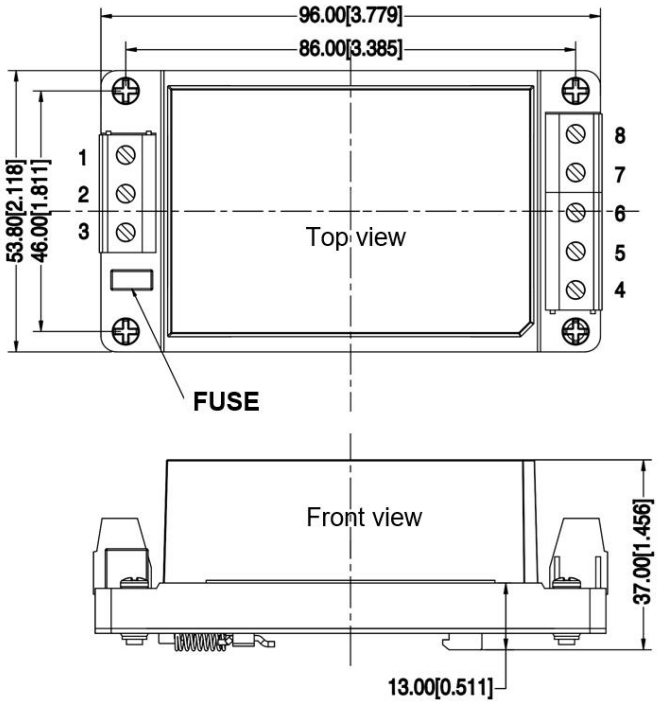
Note:
Unit: mm[inch]
Lead wires gauge: 24-12 AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.0 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	FG	AC(N)	AC(L)	+Vo	NC	NC	NC	-Vo

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-TS Mechanical Dimensions



Note:
Unit: mm[inch]
Lead wires gauge: 24-12 AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.0 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	FG	AC(N)	AC(L)	+Vo	NC	NC	NC	-Vo

Application Notice

1.The product should be used according to the specifications, otherwise it could be permanently broken.

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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