AC/DC Converter

FA15-220SXXF2N4(-T)(-TS) Series

Typical Features

- ◆ Wide input voltage range:85-305VAC/120-430VDC
- ◆ No-load power consumption≤0.35W
- ◆ Transfer efficiency (typ. 86%)
- ◆ Switching frequency: 65KHz
- ◆ Protection: Short Circuit, Over Current
- ◆ Isolation voltage: 4000Vac
- ◆ Complies with IEC/UL/EN 62368 testing standards
- ◆ Fully enclosed plastic housing, compliant with UL 94 V-0
- ◆ PCB Through-hole Mounting

Application Fields

FA15-220SXXF2N4 Series*-----is a small size, high efficiency module power supply provided by Aipu to customers. This series of power supplies has the advantages of global input voltage range, AC and DC dual-use, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, high safety isolation, and good EMC performance. EMC and safety standards meet international EN55032 and IEC/EN61000 standards. This series of products are widely used in many fields such as power, industry, instrumentation and smart home. When the product is used in a harsh environment with electromagnetic compatibility, please refer to the application circuit given by our company.*

Selection Guide

Certificate	Model	Output Specifications			Max. Capacity Load	Ripple and Noise 20 MHz (Max)	Efficiency @ Full Load, 220 VAC (Typical)
		Power	Voltage	Current			
		(W)	Vo (V)	Io (mA)	μF	mVp-p	%
-	FA15-220S3V3F2N4	10	3.3	3000	3000	80	71
	FA15-220S05F2N4	15	5	3000	1000	80	74
	FA15-220S5V4F2N4	15	5.4	2778	1000	80	75
	FA15-220S09F2N4	15	9	1667	1000	80	82
	FA15-220S12F2N4	15	12	1250	800	80	84
	FA15-220S15F2N4	15	15	1000	800	80	84
	FA15-220S24F2N4	15	24	625	500	100	86

Note 1: -T denotes a through-hole package; -TS denotes a DIN rail package with a rail width of 35 mm;

Note 2: "*" indicates models currently under development;

Note 3: Typical output efficiency values are based on the product after 30 minutes of full-load aging;

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

Input Specifications

Item	Operating Conditions	Minimum	Typical	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	115 VAC	-	-	0.3	A
	220 VAC	-	-	0.2	
Inrush current	115 VAC	-	-	10	
	220 VAC	-	-	20	
Leakage current	-	0.5 mA (typ.) / 230 VAC / 50 Hz			
Recommended external fuse rating	-	1A–2A/250VAC slow-blow fuse			
Hot Plug	-	N/A			
Remote Control (CNT)	-	N/A			

Output Specifications

Item		Operating Conditions		Minimum	Typical	Max	Unit
Voltage Accuracy		Full Input Voltage Range, any load	Vo	-	±2.0	±4.0	%
Line Regulation		Rated load	Vo	-	-	±0.5	%
Load regulation		20%–100% of Nominal Input Voltage load	Vo	-	-	±1.0	%
No-load Power Consumption		Input 115 VAC		-	-	0.35	W
		Input 220 VAC		-	-		
Minimum load		Single-channel output		0	-	-	%
Start-up time		Input Nominal Voltage (Full Load)		-	1000	-	ms
Hold-up time		Input 220 VAC (full load)		-	200	-	mS
Dynamic response	Overshoot	25%–50%–25% 50%–75%–50%		-10	-	+10	%
	Recovery time			-	5	-	ms
Output Overshoot		Full Input Voltage Range		≤10% Vo			%
Short-circuit protection				Continuous, self-recovery			Isolated
Drift coefficient		-		-	±0.03%	-	%/°C
Overcurrent protection		Full Input Voltage Range		≥130% Io, Self-recovery			Isolated
Ripple & Noise		-		-	50	100	mV
		Note: The test method for ripple and noise uses the twisted-pair test method. For specific test procedures and equipment configurations, please refer to the section below (Ripple & Noise Test Instructions).					

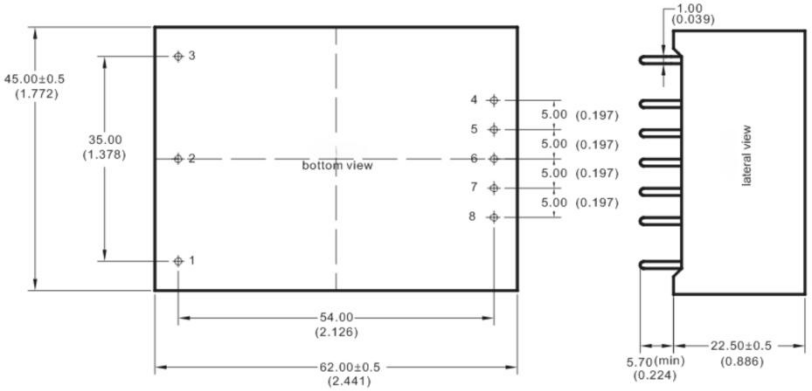
General Specifications

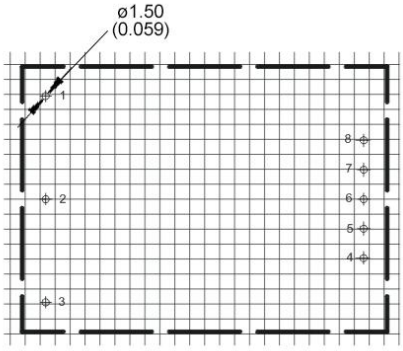
Item		Operating Conditions	Min.	Typical	Max	Unit
Switching Frequency		-	-	65	-	kHz
Operating temperature		-	-40	-	+105	°C
Storage temperature		-	-40	-	+110	
Soldering temperature		Wave soldering	260±4°C, duration 5–10 s			
		Manual soldering	360±8°C, duration 4–7 s			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	Input-Output	Test for 1 minute; leakage current ≤ 5 mA	4000	-	-	VAC
Insulation Resistance	Input-Output	@Applied DC 500 V	100	-	-	MΩ
Safety Standards		-	EN 62368/IEC 62368			
Vibration		-	10–55 Hz, 10G, 30 min, along X, Y, Z			
Safety Rating		-	CLASS II			
Enclosure Rating		-	UL 94 V-0			
MTBF		-	MIL-HDBK-217F @ 25°C > 300,000 hours			
Weight		Package Type	Weight (Typ)			
		FA15-220SXXF2N4	55 g			
		FA15-220SXXF2N4-T	98g			
		FA15-220SXXF2N4-TS	140g			

EMC Performance

Component		Sub-item	Technical Standard	Performance Criteria
EMC	EMI	CE	CISPR 22/EN 55032	CLASS B
		RE	CISPR 22/EN 55032	CLASS B
	EMS	RI	IEC/EN 61000-4-3	10 V/m Performance Criteria B (See Figure 1 for recommended circuit)
		CS	IEC/EN 61000-4-6	3 V r.m.s Performance Criteria B (See Figure 1 for recommended circuit)
		ESD	IEC/EN 61000-4-2	Contact ±6 kV / Air ±8 kV Performance Criteria B
		Surge	IEC/EN 61000-4-5	±1 kV Perf. Criteria B
		EFT/Burst	IEC/EN 61000-4-4	±2 kV Perf. Criteria B
		Voltage Dips, Short Interruptions and Voltage Variations Immunity	IEC/EN 61000-4-11	0%–70% Perf.Criteria B

F2 Package Dimensions

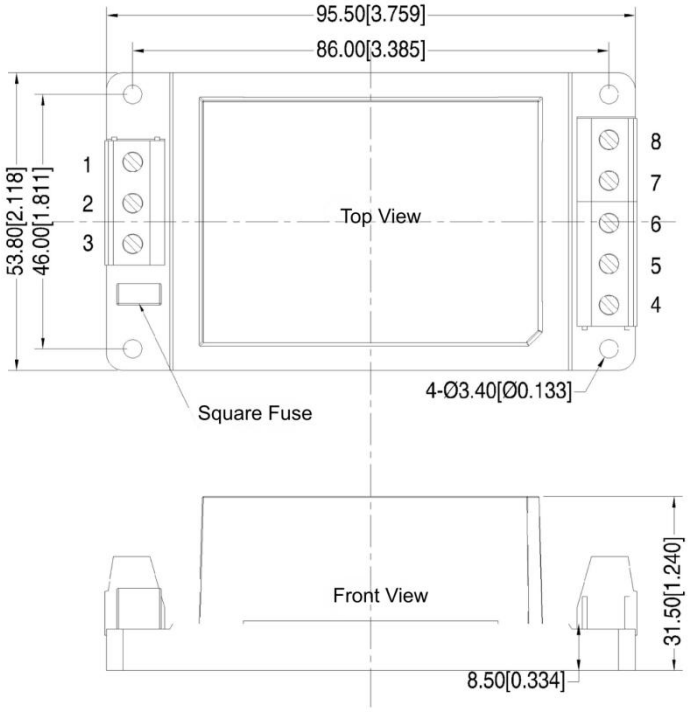




Pin Description		
Pin	Function	
1	FG	Input Ground
2	AC(N)	Neutral input
3	AC(L)	Live input
4	+Vo	Output Positive
5	NP	Unused pin
6	NP	Empty Foot
7	NP	Empty Foot
8	-Vo	Output Negative

PCB Board Vertical View
Unit: mm[inch]
Lattic Spacing: 2.54mm(0.1 inch)
General tolerance: ±0.10mm(±0.004 inch)
Pin diameter tolerance: ±0.50mm(±0.019 inch)

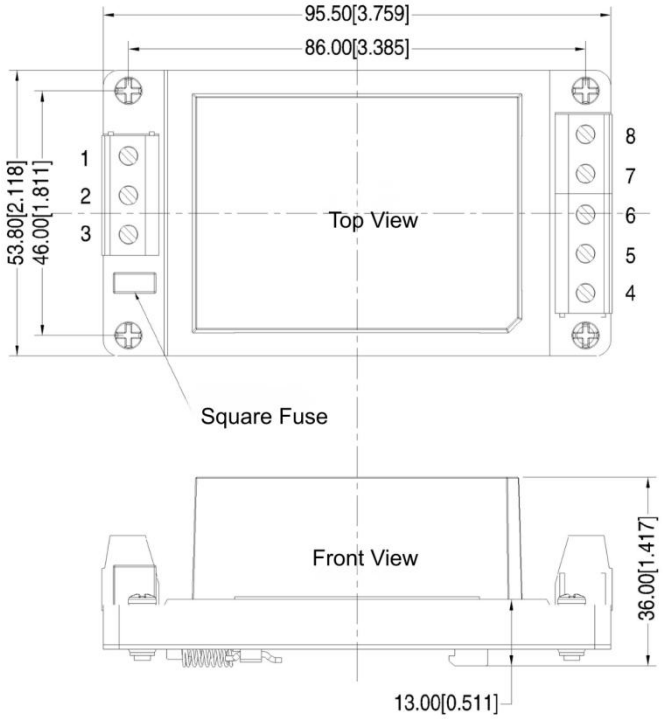
F2-T Dimensions



Pin Description		
Pin	Function	
1	FG	Input Ground
2	AC(N)	Neutral input
3	AC(L)	Live input
4	+Vo	Output Positive
5	NC	No function
6	NC	No function
7	NC	No function
8	-Vo	Output Negative

Note:
Unit: mm[inch]
Wire Gauge: 24-12 AWG
Tightening torque: 0.4 N • m (Max.)
General tolerances: ±1.00 mm [±0.039 inch]

F2-TS Dimensions

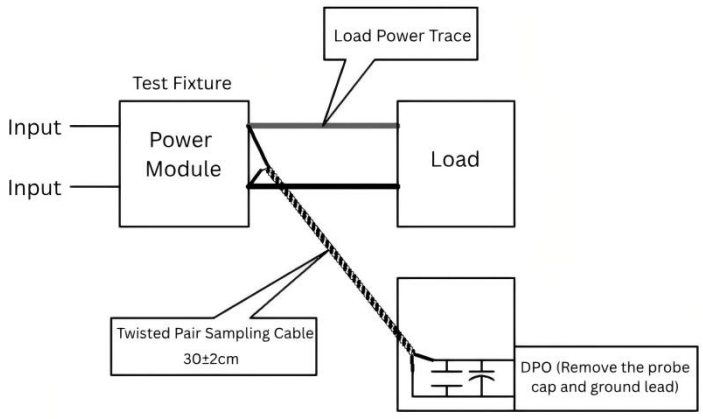


Pin Description		
Pin	Function	
1	FG	Input Ground
2	AC(N)	Neutral input
3	AC(L)	Live input
4	+Vo	Output Positive
5	NC	No function
6	NC	No function
7	NC	No function
8	-Vo	Output Negative

Note:
Unit: mm[inch]
Wire Gauge: 24-12 AWG
Tightening torque: 0.4 N • m (Max.)
General tolerances: ±1.00 mm [±0.039 inch]

Package Code	L x W x H	
F2	62.0 x 45.0 x 22.5 mm	2.441 x 1.772 x 0.885 in
F2-T	95.5 x 53.8 x 31.5 mm	3.759 x 2.118 x 1.240 in
F2-TS	95.5 x 53.8 x 36.0 mm	3.759 x 2.118 x 1.417 in

Ripple & Noise Test Specifications (Twisted-pair Method, 20 MHz Bandwidth)

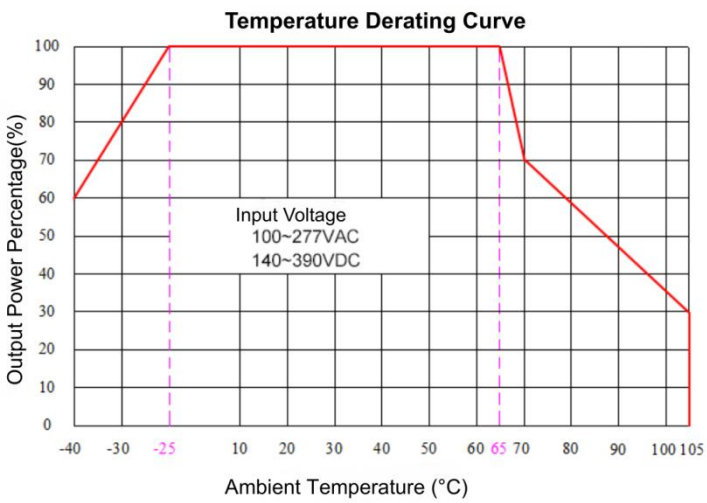


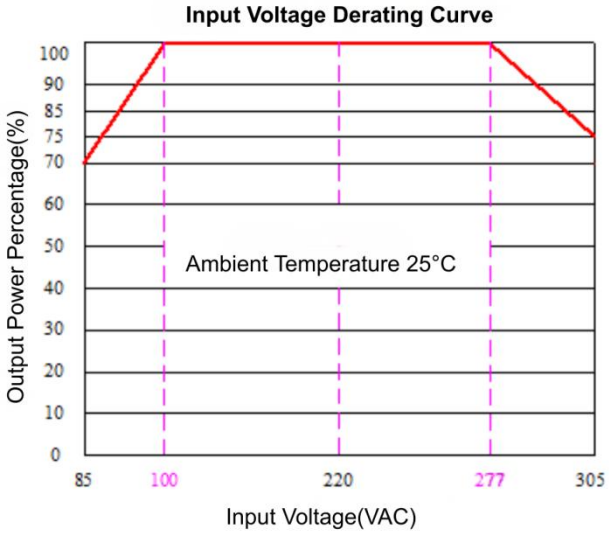
Testing Methods:

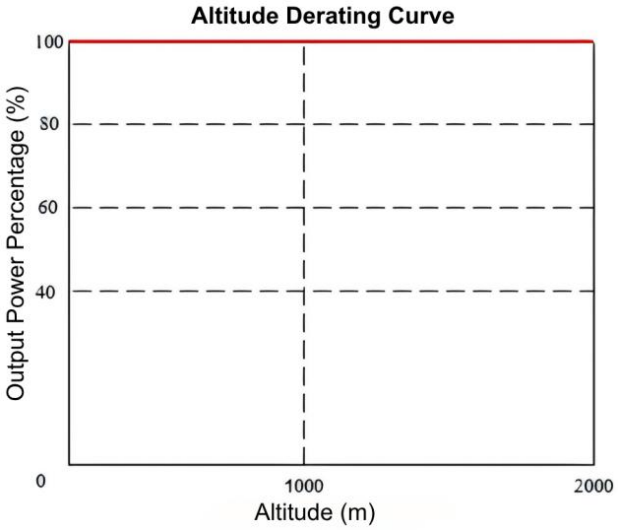
1. Ripple & Noise: Measured using the 12# twisted pair method with oscilloscope bandwidth set to 20MHz (or 100MHz). A 0.1 μ F polypropylene capacitor and a 10 μ F high-frequency low-impedance electrolytic capacitor are connected in parallel at the probe tip. The oscilloscope is set to Sample mode.
2. Ripple & Noise Test Setup:

Connect the module input to the power source and the output to the electronic load via a test fixture. Sampling is performed directly at the output ports using a 30cm ± 2cm [11.81 ± 0.79 inch] sampling wire. Power cables with appropriate gauges and insulation should be selected based on the output current.

Product Characteristic Curves







Note 1: The input voltage ranges from 85–100 VAC, 277–305 VAC, 120–140 VDC, and 390–430 VDC. Operation must be based on the Derating Curve.

Note 2: This product is suitable for use in environments with natural convection cooling; please contact us if using it in enclosed environments.

Typical Application Circuit Diagram and EMC Recommended Parameters

1. Typical Application Circuit Diagram

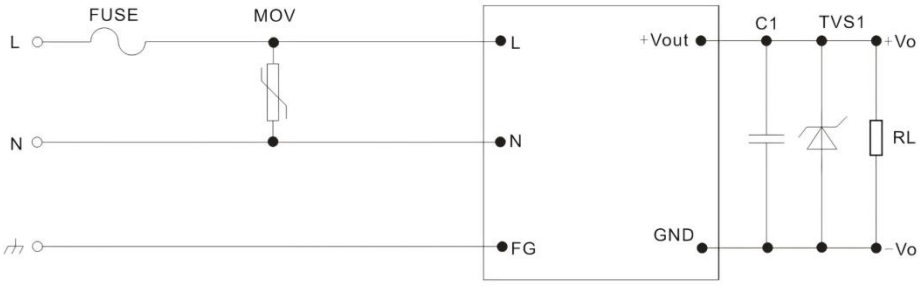


Figure 1

2. Recommended EMC Circuit Diagram

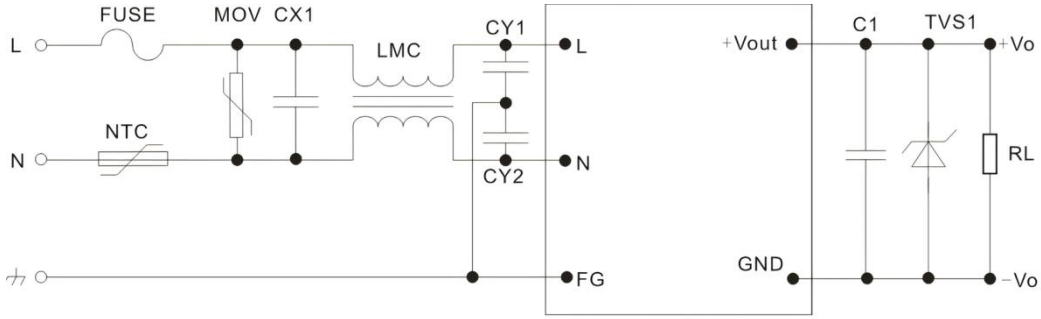


Figure 2

Component Model	Recommended Value	Component Model	Recommended Value
MOV	14D511K/4500A	NTC	5D-9
CX1	X2/0.1μF/305VAC	LMC	15 mH, 0.5 A
FUSE	2A/300V, slow-blow, must be external	-	-
CY1, CY2	Y1/102M/400VAC	-	-

Output Voltage	5V	9V	12V	15V	24V	48V
Recommended TVS Diode Values	SMBJ7.0A	SMBJ12A	SMBJ20A	SMBJ20A	SMBJ30A	SMBJ64A

Notes:

C1 is a ceramic capacitor used to filter high-frequency noise. A TVS is recommended to protect downstream circuits in case of module abnormality.

Notes:

1. The product must be used within the specified operating range; otherwise, it may be permanently damaged;
2. A fuse must be installed at the product's input;
3. If the product operates below the minimum required load, performance compliance with all Performance Specifications in this manual cannot be guaranteed;
4. If the product operates outside its rated load range, performance compliance with all Performance Specifications in this manual cannot be guaranteed.
5. Unless otherwise specified, the data above was measured at Ta = 25°C, humidity < 75%, with the input at Nominal Input Voltage and the output at rated load (resistive load);
6. All test methods for the above specifications are based on our company's standards;
7. The Performance Specifications listed above apply to the product models included in this manual. Certain specifications for non-standard models may exceed the requirements stated above; please contact our technical staff directly for specific details;
8. We offer product customization services.

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