AIPUPOWER®

RoHS Compliant | IATF16949 | ISO 9001

Typical Features

◆ Wide input voltage range 90-264VAC/122-370VDC

◆ No-load power consumption ≤0.5W@220VAC

◆ Efficiency 86%(Typ.)

◆ Operating temperature from -40°C to +70°C

◆ Output short circuit & over current protections

◆ Isolation voltage 4000VAC

◆ Switching frequency 65KHz

◆ PCB DIP mounting

CE EN62368-1

Application Field

FA60-220SXXG2N4 Series --- Compact size & high efficiency AC-DC modular power supplies with global adapt input voltage range (both AC&DC available), low ripple, low temperature rise, low standby power consumption, high efficiency & 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 Range		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	FA60-220S12G2N4	220	90-264	60	12	5000	14000	150	86
	FA60-220S24G2N4			60	24	2500	4000	150	86
	FA60-220S36G2N4			60	36	1666	1500	150	86
	FA60-220S37G2N4			60	37	1622	1500	150	86

Note 1: Please contact Aipu sales for other output voltages requirement 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: 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 Ripple and Noise is tested by the Parallel-line method (please refer to the following test instruction).

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input voltage range	AC Input	90	220	264	VAC
	DC Input	122	310	370	VDC
Input frequency range	-	47	50	63	Hz
Input current	Input 115VAC	-	-	1.4	A
	Input 220VAC	-	-	0.7	
Surge current	Input 115VAC	-	-	30	

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	Input 220VAC	-	-	50	
Standby power consumption	Input 115VAC	-	-	0.5	W
	Input 220VAC	-	-		
Leakage current	-	0.5mA TYP/230VAC/50Hz			
External fuse recommended	-	3.15A/250VAC Time-delay fuse			
Hot-plug	-	N/A			
ON/OFF control	-	N/A			

Output Specifications

Item		Test Condition	Min.	Typ.	Max.	Unit
Output voltage accuracy		Full input voltage range, any load	-	±2.0	±3.0	%
Line regulation		Nominal Load	-	-	±0.5	%
Load regulation		Nominal input Voltage, 20%~100% load	-	-	±1.0	%
Ripple & Noise		5%-100% load, 20MHz bandwidth	-	-	150	mVp-p
Minimum load		Single Output	0	-	-	%
Temperature drift coefficient		-	-	±0.03	-	%/℃
Turn-on delay time		Nominal input voltage (Full load)	-	-	800	mS
Power-off hold up Time		Nominal input voltage (Full load)	50	-	-	mS
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	110%Io	-	200%Io	Hiccup

General Specifications

Item		Test Condition	Min.	Typ.	Max.	Unit
Switching frequency		-	-	65	-	KHz
Operating temperature		Refer to the Temperature Derating Graph	-40	-	+70	℃
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	4000	-	-	VAC
	I/P-FG	Test 1min, leakage current ≤5mA	1500	-	-	VAC
	O/P-FG	Test 1min, leakage current ≤5mA	500	-	-	VAC
Insulation resistance	I/P-O/P	@DC500V	100	-	-	MΩ
MTBF		MIL-HDBK-217F@25℃	300	-	-	K Hours
Safety standard		-	EN62368, IEC62368			
Vibration		-	10-55Hz,10G, 30 Min, along X, Y, Z			
Safety class		-	CLASS II			
Case flame class		-	UL94-V0			

Weight & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	FA60-220SXXG2N4	360g	109.00x58.50x30.00 mm	4.291x2.303x1.181 inch

EMC Performances

| Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended EMC Circuit)
		RE	CISPR32/EN55032	CLASS B (with the Recommended EMC Circuit)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B (with the Recommended EMC Circuit)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the Recommended EMC Circuit)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf. Criteria B
		Surge	IEC/EN61000-4-5	Line to line ±2KV / line to ground ±4KV Perf. Criteria B (with the Recommended EMC Circuit)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B
		Voltage dip & interruption	IEC/EN61000-4-11	0%~70% Perf. Criteria B

Product Characteristics Graphs
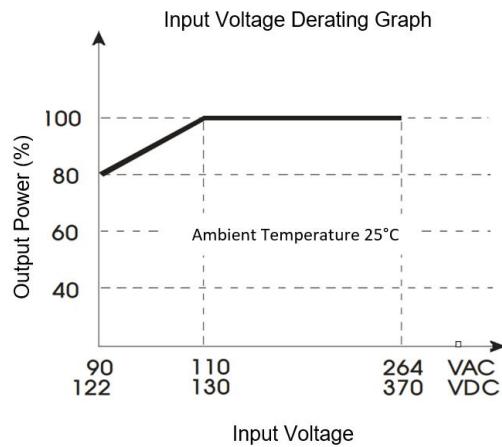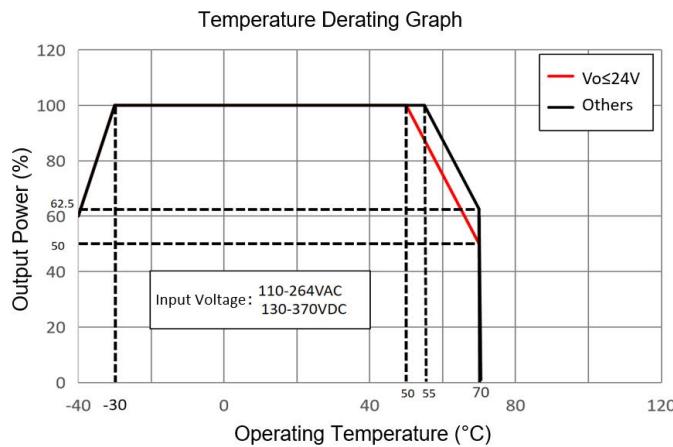
Note 1: The output power should be derated based on the input voltage derating graph at 90~110VAC/122~130VDC.

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

Ripple & Noise Test Instruction (Parallel-line Method 20MHZ bandwidth)
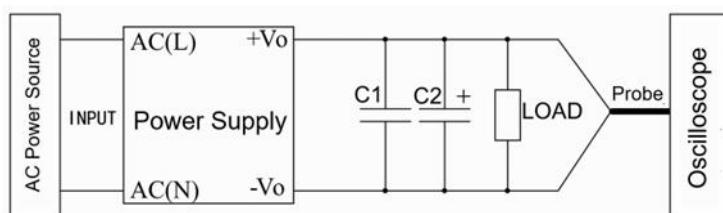
1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high frequency low impedance electrolytic capacitor C2(10uF) are connected in 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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Recommended EMC Circuit for Application
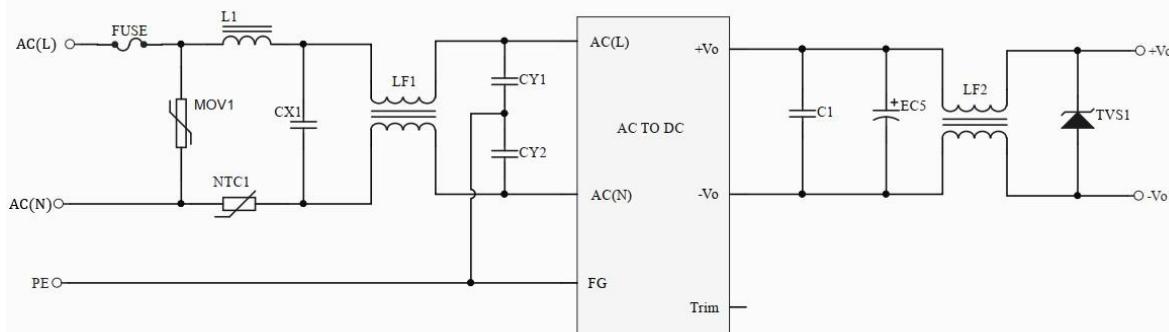
Component No.	FA60-220S12G2N4	FA60-220S24G2N4	FA60-220S36G2N4	FA60-220S37G2N4
FUSE (Required)	3.15A/250VAC (Time-delay fuse)			
MOV1	14D561K/4500A			
NTC1	5D-13/5Ω			
CX1	X2/334K/275VAC			
L1	1.2mH/1.5A			
LF1	10mH/1.5A			
CY1, CY2	Y1/1nF/400VAC			
C1	1uF/ 50V			
LF2	150uH/5A			
EC5	680uF/16V	470uF/35V	470uF/50V	470uF/50V
TVS1	SMBJ20.0A	SMBJ30.0A	SMBJ50.0A	SMBJ50.0A

Output Voltage Trim & Calculation of Trim Resistance
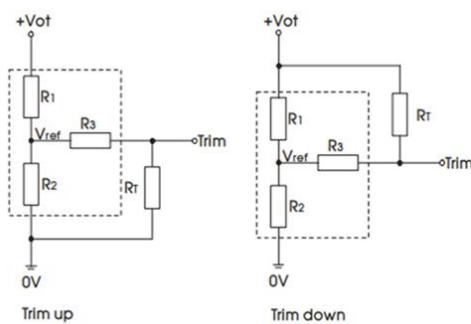
Trim resistance calculating formula

up: $R_T = \dfrac{\alpha R_2}{R_2 - \alpha} - R_3$ $\alpha = \dfrac{Vref}{Vot - Vref} \cdot R_1$

down: $R_T = \dfrac{\alpha R_1}{R_1 - \alpha} - R_3$ $\alpha = \dfrac{Vot - Vref}{Vref} \cdot R_2$

RT is the Trim resistor, α is a custom parameter,
Vot is the required voltage of Trim up or Trim down.

Note: Trim up & down circuits, the components in the dotted area are inside of the converter.

Vout（V）	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref（V）	Vot（V）
12	3.83	1	1	2.5	
24	8.66	1	1	2.5	Output voltage
36	47	3.49	1	2.5	adjustment ≤ ±10%
37	47	3.38	1	2.5	

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Mechanical Dimensions

Front view

Bottom view

PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]
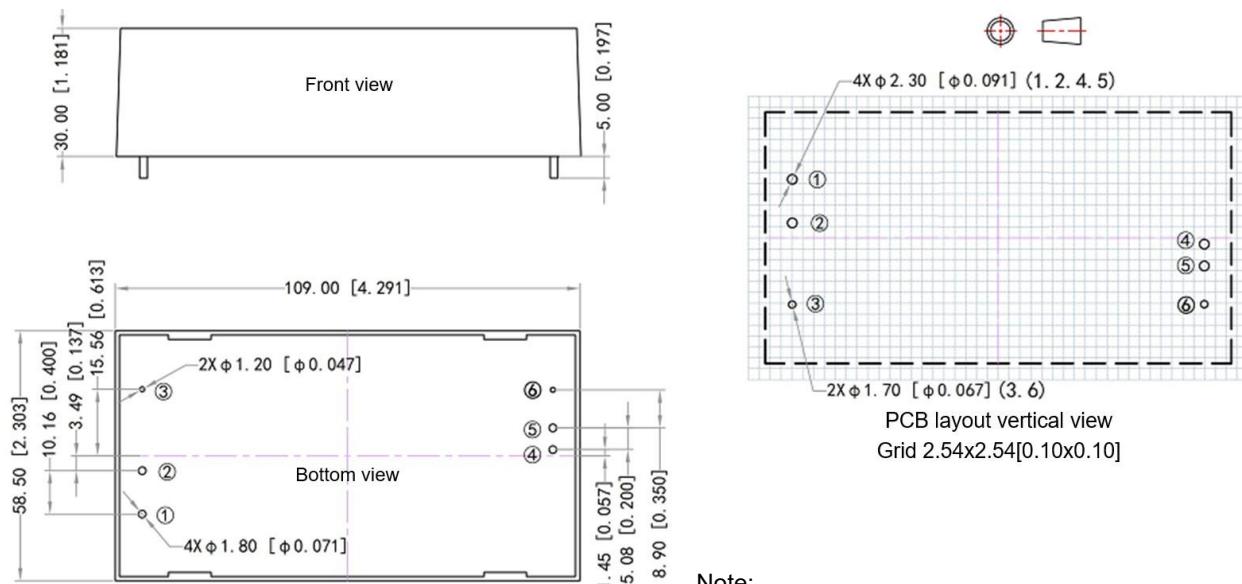
Note:
Pin 1,2,4,5 diameter Ø1.8mm; Pin 3,6 diameter Ø1.2mm
Unit: mm[inch]
Pin diameter tolerance ±0.10[±0.004]
General tolerance ±0.50[±0.020]

Pin-out Function Description

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

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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