Typical Features

- Wide input voltage range 90-264VAC/122-370VDC
- No-load power consumption ≤0.5W@220VAC
- Efficiency up to 86%(Typ.)
- Switching frequency 65KHz
- Output short circuit & over current protections
- Isolation voltage 4000Vac
- PCB DIP mounting

Application Field

FA60-220SXXG2N4 *Series*----- *Compact size & high efficiency AC-DC modular power supplies with global adapt input voltage range (both AC and 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. The additional circuit diagram for EMC is recommended for the application with higher EMC requirement.*

Typical Product List

Certificate	Part No.	Output Specification			Max. Capacitive Load, 220VAC	Ripple & Noise @ 20MHz (mVp-p)		Efficiency @Full Load, 220VAC
		Power	Voltage	Current				
		(W)	Vo（V）	Io（mA）	(uF)	Typ.	Max	(%) Typ.
-	FA60-220S05G2N4	50	5	10000	80000	-	150	82
	FA60-220S12G2N4	60	12	5000	14000	-	150	86
	FA60-220S24G2N4	60	24	2500	4000	-	150	86
	FA60-220S36G2N4	60	36	1670	1500	-	150	86
	FA60-220S37G2N4	60	37	1622	1500	-	150	86

Note 1: Please contact Aipu sales for other output voltages requirement in 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 twisted pair method, please refer to the following Ripple & Noise test instruction.

Input Specifications

Item	Operating 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	-	
	Input 220Vac	-	50	-	

No-load 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			
Remote control	-	N/A			

Output Specifications

Item		Operating Condition	Min.	Typ.	Max.	Unit
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	%
Minimum load		Single Output	0	-	-	%
Turn-on Delay Time		Nominal input voltage (Full load)	-	800	-	mS
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 Overshooting		Full input voltage range	≤10%Vo			%
Short Circuit Protection			Continuous, Self-recovery			Hiccup
Drift Coefficient		-	-	±0.03%	-	%/℃
Over Current Protection		Input 220VAC	≥110% Io, Self-recovery			Hiccup

General Specifications

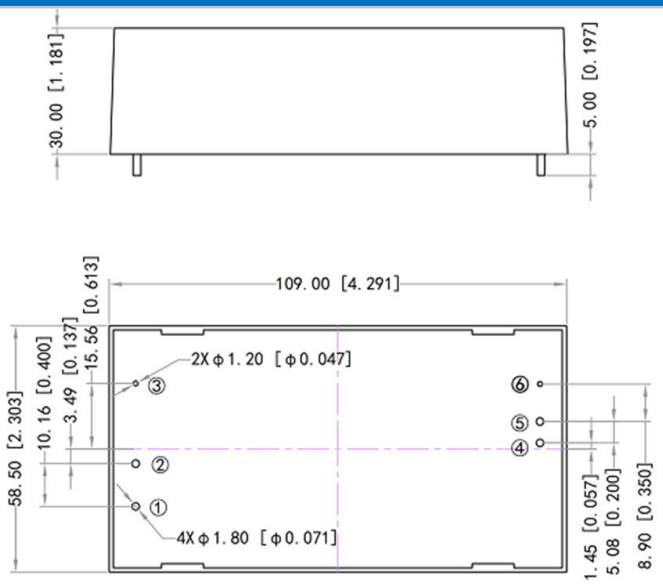
Item		Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency		-	-	65	-	KHz
Operating Temperature		Refer to the Temperature Derating Graph	-40	-	+70	℃
Storage Temperature		-	-40	-	+85	
Soldering Temperature		Wave-soldering	260±4℃, time 5-10S			
		Manual-soldering	360±8℃, time 4-7S			
Relative Humidity		-	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
Safety Standard		-	EN62368, IEC62368			
Vibration		-	10-55Hz,10G, 30 Min, along X,Y,Z			

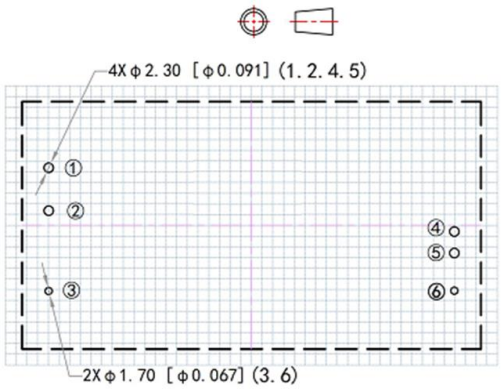
Safety Class	-	CLASS II
Case Flame Class	-	UL94-V0
MTBF	MIL-HDBK-217F@25℃	＞300,000H
Unit Weight	Part No.	Weight (TYP.)
	FA60-220SXXG2N4	360g

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

Mechanical Dimensions





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]

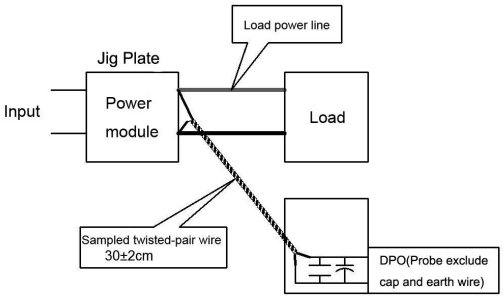
Pin No.	Function
1	AC(N)
2	AC(L)
3	FG
4	+Vout
5	-Vout
6	Trim

Package Code	Dimensions L x W x H	
G2	109.00X58.50X30.00 mm	4.291X2.303X1.181 inch

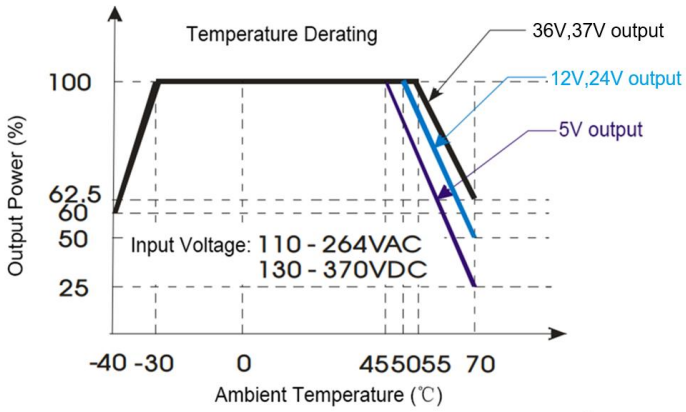
Ripple & Noise Test Instruction (Twisted Pair Method 20MHZ bandwidth)

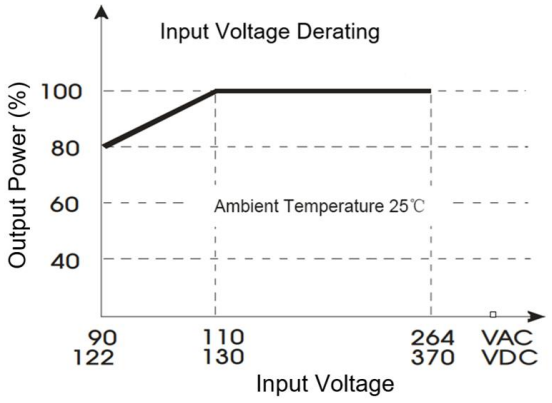
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

2) The test diagram is shown on the right. 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 twisted pair (length 30cm ± 2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be start after input power on.



Product Characteristics Graphs

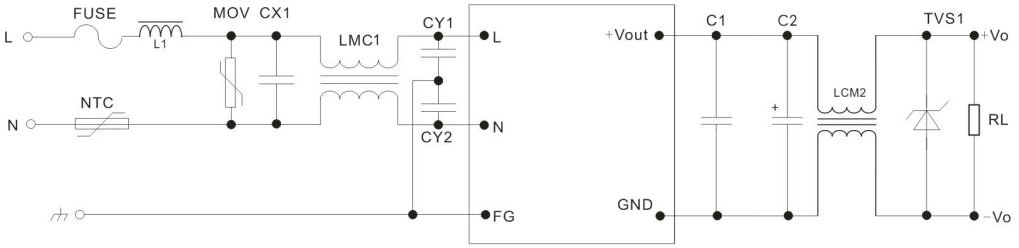




Note 1: The output power should be derated based on the input voltage derating graph at 90~110VAC/122~130VDC.

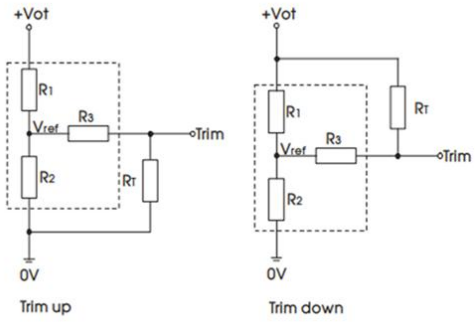
Note 2: This product should operate at a natural air condition, please contact us if it need be used at a closed space.

Recommended EMC Circuit for Application



Component No.	FA60-220S05G2N4	FA60-220S12G2N4	FA60-220S24G2N4	FA60-220S36G2N4	FA60-220S37G2N4
FUSE (Necessary)	3.15A/250V (Time-delay fuse)				
MOV	14D561K/4500A				
NTC	10D-11				
CX1	X2, 334K/305VAC				
L1	1.2mH/1.5A				
LMC1	10mH/1.5A				
CY1, CY2	Y1/1nF/400VAC				
C1	1uF/ 50V				
C2	820uF/6.3V	680uF/16V	470uF/35V	470uF/50V	
TVS1	SMBJ7.0A	SMBJ20.0A	SMBJ30.0A	SMBJ50.0A	

Trim and Calculation of Trim Resistance



Trim resistance calculating formula

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2$$

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）
5	3.3	3.3	1	2.5	Output voltage adjustment ≤ ±10%
12	3.83	1	1	2.5	
24	8.66	1	1	2.5	
36	47	3.49	1	2.5	
37	47	3.38	1	2.5	

Application Notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.

2. A fuse should be connected at input.

3. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.

5. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators in this datasheet had been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

8. Aipupower can provide customization service.

9. The product specifications may be modified without prior notice. Please refer to the published data sheet at Aipupower website.

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