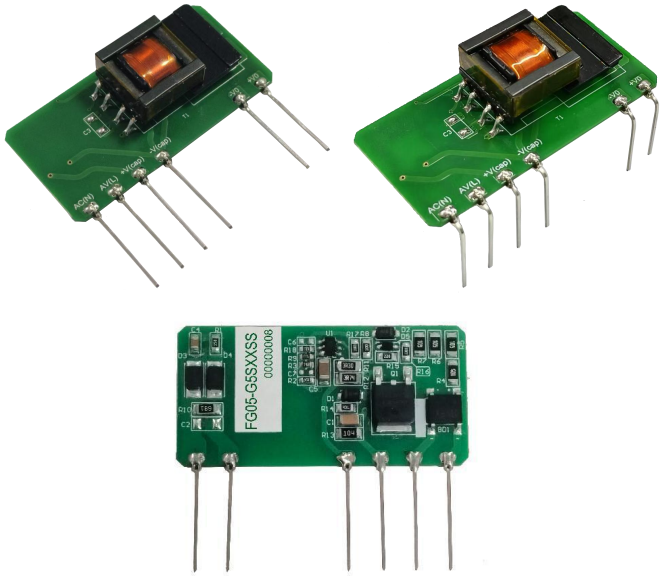
Typical Features

- Wide input voltage range 85-528VAC/120-745VDC
- No load power consumption ≤0.8W (@380VAC)
- Efficiency up to 80% Typ. (@230VAC)
- Operating temperature from -40℃ to +85℃
- Switching frequency 65KHz (Typ.)
- Output short circuit & over current protections
- Isolation voltage 4300VAC
- Altitude during operating 4000m Max
- Compliant with IEC/EN62368/UL62368
- PCB SIP mounting



Application Field

FG05-G5SXXSS Series ---- Mini size, high efficiency open-frame power supplies with wide input voltage range (both AC & DC available), low ripple, low temperature rise, low standby power consumption, high efficiency, high reliability, safety isolated and compliance with IEC/EN62368/UL62368. This series of products can be widely used in the fields of Industry, Office devices, Electric power and Household devices, etc. Additional circuit for EMC is recommended for the application with high EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Specifications			Max Capacitive Load @230VAC	Ripple & Noise 20MHz (Max)	Efficiency @full Load 230VAC (Typ.)
		Nominal	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P(W)	Vo (VDC)	Io (mA)	(uF)	mVp-p	%
-	FG05-G5S03SS(-1)	230	85-528	3.3	3.3	1000	3000	100	69
-	FG05-G5S05SS(-1)			5	5	1000	3000	100	72
-	FG05-G5S09SS(-1)				9	556	800	100	76
-	FG05-G5S12SS(-1)				12	416	800	100	77
-	FG05-G5S15SS(-1)				15	333	800	100	77
-	FG05-G5S24SS(-1)				24	208	300	150	80

Note 1: The Ripple & Noise should be tested with the external circuit.

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 minimum efficiency should be -2% of the typical value.

Note 4: Please contact Aipu sales for other output voltages requirement of this series but not listed in this table.

Note 5: The suffix -1 indicates the part with pins 90° bent.

Input Specifications

Item	Test Condition	Min	Typ.	Max	Unit
Input voltage range	AC input	85	230	528	VAC
	DC input	120	325	745	VDC

Input frequency range	-	47	50	63	Hz
Input current	Input 115VAC	-	-	0.30	A
	Input 230VAC	-	-	0.20	
Surge current	Input 115VAC	-	-	15	
	Input 230VAC	-	-	20	
Standby power consumption	Input 230VAC	-	-	0.65	W
	Input 380VAC	-	-	0.80	
Leakage current	-	0.25mA TYP/ 230VAC/ 50Hz			
Recommended external fuse	-	2.0A/600VAC, Time-delay fuse (required)			
Hot-plug	-	NA			
ON/OFF Control	-	NA			

Output Specifications

Item		Test Condition		Min.	Typ.	Max.	Unit
Voltage accuracy		Full input voltage range, 10-100% load (it can operate stably at 0-10% load)	Vo≤5V	-	±2.0	±8.0	%
			Others	-	±2.0	±5.0	
Line regulation		Rated Load		-	-	±1.5	%
Load regulation		Nominal input voltage, 10%~100% load		-	-	±6.0	%
Ripple & Noise		5%-100% load, 20MHz bandwidth	Vo=24V	-	-	150	mVp-p
			Others	-	-	100	
Minimum load		Single Output		10	-	-	%
Temperature drift coefficient		-		-	-	±0.03	%/℃
Turn-on delay time		Input 115VAC (full load)		-	-	6000	mS
		Input 230VAC (full load)		-	-	3000	
Power-off hold up time		Input 115VAC (full load)		-	10	-	mS
		Input 230VAC (full load)		-	100	-	
Dynamic response	Overshoot range	25%~50%~25% 50%~75%~50%		-5.0	-	+5.0	%
	Recovery time			-	-	5.0	mS
Output start-up overshoot		Full input voltage range		≤10			%Vo
Short circuit protection				Continuous, self-recovery			Hiccup
Over current protection		Input 230VAC		110%Io	-	220%Io	mA

Note: The Ripple & Noise is tested by the Parallel-line method (refer to the following test instruction).

General Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Switching frequency	-	60	65	70	KHz
Operating temperature	Refer to the Temperature Derating Graph	-40	-	+85	℃
Storage temperature	-	-40	-	+105	
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	4300	-	-	VAC
Insulation resistance	I/P-O/P	@DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F 25℃		300	-	-	K Hours
Vibration	-		10-55Hz,10G, 30Min, along X, Y, Z			

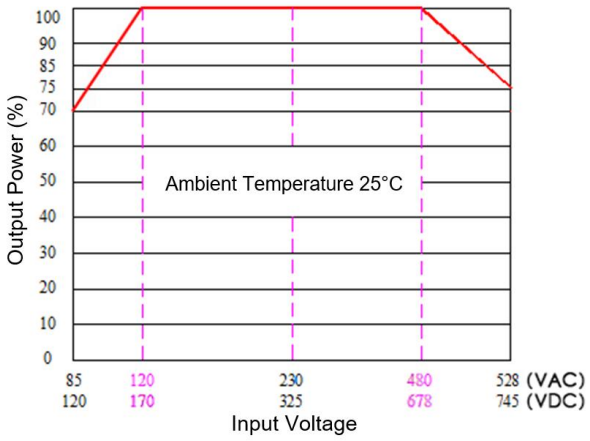
Weight & Dimensions	Part No.	Weight (Typ)	Dimensions L x W x H	
	FG05-G5SXXSS(-1)	7g	44.50X22.00X13.00 mm	1.752X0.866X0.512 inch

EMC Performance

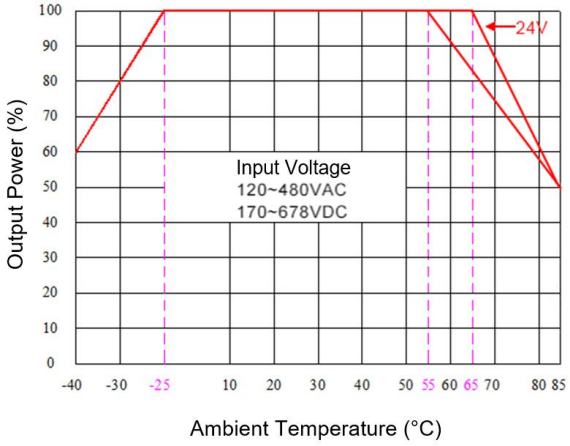
Items			Test standards	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommend Circuit 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommend Circuit 2)
	EMS	ESD	IEC/EN 61000-4-2	Contact ±6KV, Air ±8KV perf. Criteria B (with the Recommend Circuit 2)
		RS	IEC/EN 61000-4-3	10V/m perf. Criteria B (with the Recommend Circuit 2)
		EFT	IEC/EN 61000-4-4	±2KV perf. Criteria B (with the Recommend Circuit 1)
				±4KV perf. Criteria B (with the Recommend Circuit 2)
		Surge	IEC/EN 61000-4-5	Line to line ±2KV, line to ground ±4KV perf. Criteria B (with the Recommend Circuit 2)
		CS	IEC/EN61000-4-6	10 Vr.m.s perf. Criteria B (with the Recommend Circuit 2)

Product Characteristics Graphs

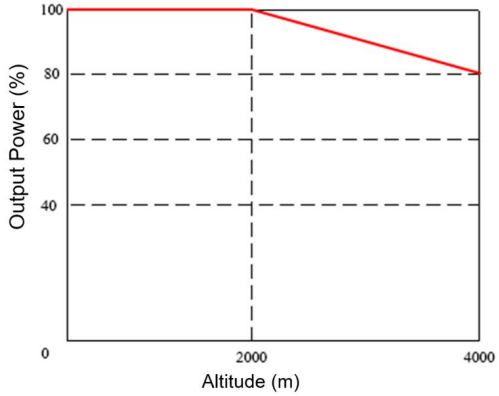
Input Voltage Derating Graph



Temperature Derating Graph



Altitude Derating Graph



Note 1: The output power should be derated based on the input voltage derating Graph at 85~120VAC/120V~170VDC & 480~528VAC/678~745VDC.

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

Recommended Circuits for Application

1. Typical application circuit diagram

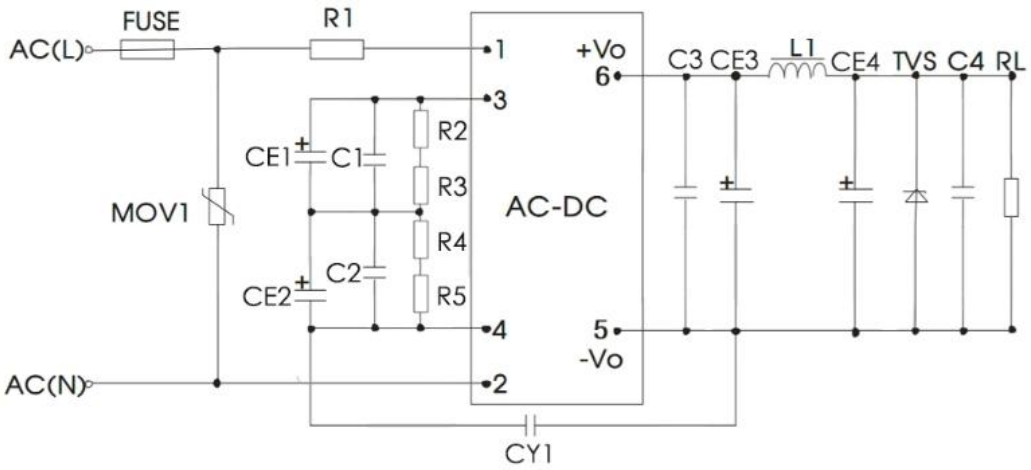


Figure - Circuit 1

Recommended parameters

Component No.	FG05-G5S03(-1)	FG05-G5S05(-1)	FG05-G5S09(-1)	FG05-G5S12(-1)	FG05-G5S15(-1)	FG05-G5S24(-1)
CE3 (*Solid-state capacitor)	470uF/16V	470uF/16V	470uF/16V	220uF/16V	220uF/25V	100uF/35V
L1(*)	2.2uH/2A					
CE4(*Electrolytic capacitor)	470uF/16V	470uF/16V	470uF/16V	220uF/16V	220uF/25V	47uF/35V
C1, C2	0.1uF/630V					
CY1 (*)	Y1/102M/400VAC					
C3, C4	0.1uF/50V					
TVS	SMBJ7.0A	SMBJ7.0A	SMBJ20A	SMBJ20A	SMBJ20A	SMBJ30A
CE1, CE2 (*)	33uF/450V					
R2, R3, R4, R5 (*)	1206/1MΩ					

Note:

1. The * marked components are required for the application, not optional.
2. FUSE is required, 2A/600VAC time-delay fuse is recommended.
3. 14D911K/4500A Varistor is recommended for MOV1 which is required.
4. 12Ω/3W wire-wound resistor is recommended for R1 which is required.
5. CE1 & CE2 work as the filtering capacitors at AC input and EMC filtering at DC input. The electrolytic capacitors are recommended with Ripple current >200mA@100KHz and ESR≤100Ω at low temperature.
6. R2, R3, R4 & R5 are voltage equalizing resistors for CE1 & CE2.
7. C3 & C4 are SMD ceramic capacitors to suppress the high-frequency noise.
8. CE3 & CE4 are output filtering capacitors which work with L1 to set up a Pi filtering circuit. High frequency low impedance electrolytic capacitors (ESR≤1.1Ω@-40°C) or solid-state capacitors are recommended. The rated capacitance and Ripple current refer to the manufacture's specification, withstand voltage should be derated at least 80%.

2. Recommended EMC circuit diagram (for high EMC requirement)

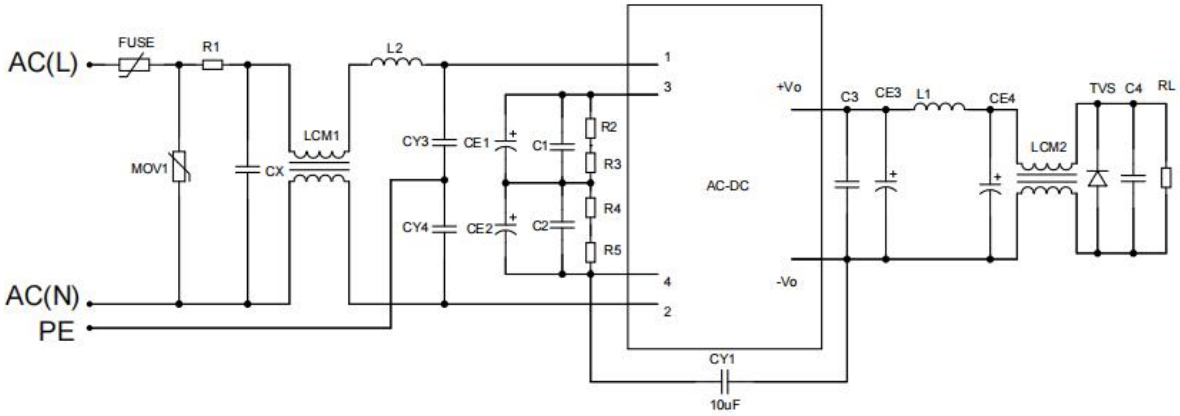
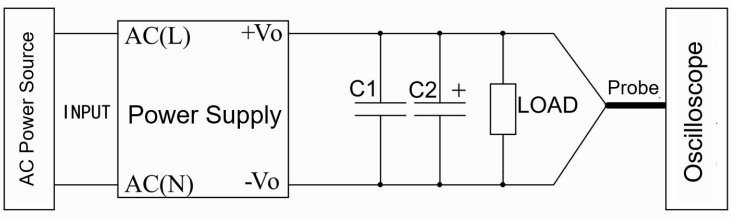


Figure - Circuit 2

Recommended parameters

Component No.	Recommended Value
MOV1	14D911K/4500A
R1(Wire-wound resistor, required)	12Ω/3W
L2	330uH/0.5A
CX	X2/104K/530VAC
FUSE (Required)	2A/600V, time-delay fuse
CY3, CY4	Y1/102M/400VAC
LCM1	TD1212-8MH,8mH
LCM2	T10x6x5C,100uH
Note 1: R1 is the input plug-in resistor, SMD resistor or carbon-film resistor are not available. Note 2: Refer to the typical circuit components recommendation for which are not mentioned in this table.	

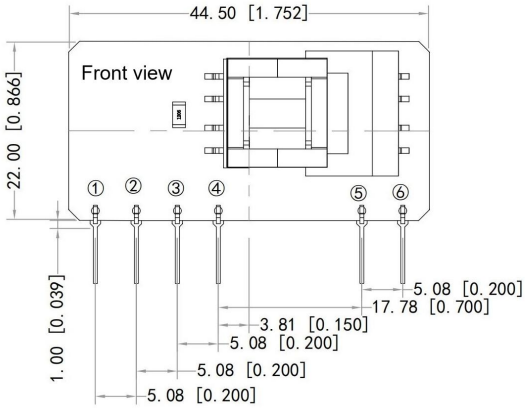
Ripple & Noise Test Instructions (Parallel-line method, 20MHz Bandwidth)

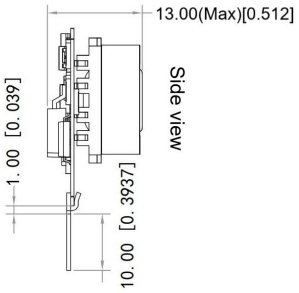


1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high frequency low impedance electrolytic capacitor C2(10uF) are connected in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

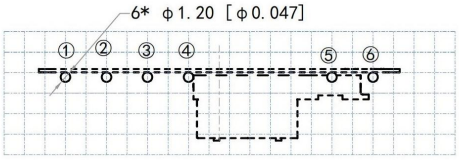
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The test can start at the converter output terminals after input power on.

FG05-G5SXXSS Mechanical Dimensions





Note: Pin Size SQ 0.5X0.5mm



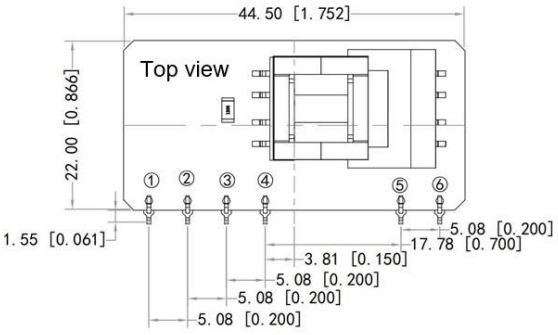
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

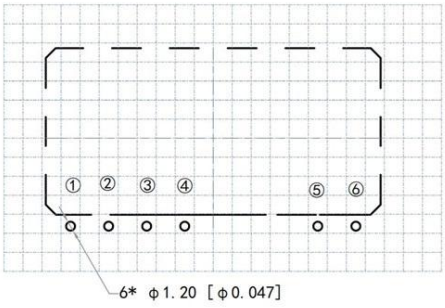
Unit: mm[inch]
Pin section tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

Pin-out Function Description

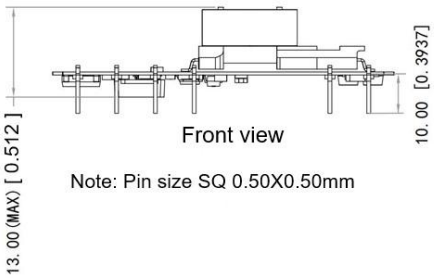
Pin No.	1	2	3	4	5	6
Function	AC(L)	AC(N)	+V(cap)	-V(cap)	-Vo	+Vo

FG05-G5SXXSS-1 Mechanical Dimensions





PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]



Note: Pin size SQ 0.50X0.50mm

Unit: mm[inch]
Pin section 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(L)	AC(N)	+V(cap)	-V(cap)	-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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