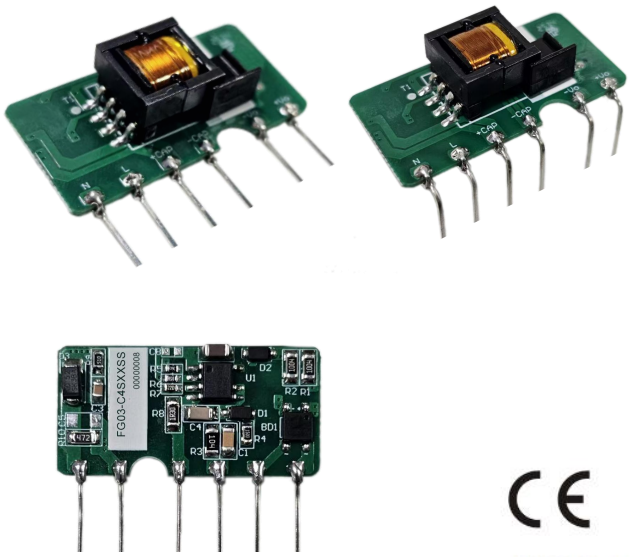
Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption ≤0.30W@220VAC
- ◆ Efficiency up to 79%(Typ.)
- ◆ Operating temperature from -40°C to +85°C
- ◆ Switching frequency 65KHz
- ◆ Output short circuit & over current protections
- ◆ Isolation voltage 4000VAC
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ With CE certificate
- ◆ Altitude during operation 5000m Max
- ◆ Mini size open-frame, industrial level design
- ◆ PCB SIP mounting



EN62368-1

Application Field

FG03-C4SXXSS(-1) Series ---- Mini size & open-frame AC-DC power supplies with global adapted input voltage range both AC & DC available, low ripple, low temperature rise, low standby power consumption, high efficiency, high 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 higher EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Specifications			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	FG03-C4S03SS(-1)	220	85 - 305	2	3.3	600	3000	100	69
	FG03-C4S05SS(-1)			3	5	600	3000	100	71
	FG03-C4S09SS(-1)				9	333	330	100	74
	FG03-C4S12SS(-1)				12	250	330	120	75
	FG03-C4S15SS(-1)				15	200	330	120	77
	FG03-C4S24SS(-1)				24	125	68	120	79

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

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 this table.

Input Specifications

Item	Test Condition	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	-	-	0.15	A
	Input 220VAC	-	-	0.06	
Surge current	Input 115VAC	-	-	11	
	Input 220VAC	-	-	21	
Standby power consumption	Input 115VAC	-	-	0.30	W
	Input 220VAC	-	-		
Leakage current	-	0.5mA TYP/230VAC/50Hz			
Recommended external fuse	-	1-3A/300VAC Time-delay fuse			
Hot plug	-	NA			
ON/OFF Control	-	NA			

Output Specifications

Item		Test Condition	Min	Typ.	Max	Unit
Output voltage accuracy		Full input voltage range, 10-100% load (the unit can work stably at <10% load)	-	±2.0	±6.0	%
Line regulation		Rated load	-	±1.0	±2.0	%
Load regulation		Nominal input voltage, 20%~100% load	-	±1.0	±3.0	%
Minimum load		Single Output	10	-	-	%
Temperature drift coefficient		-	-	-	±0.03	%/℃
Turn-on delay time		Input 115VAC (full load)	-	-	1000	mS
		Input 220VAC (full load)	-	-		
Power-off hold up time		Input 115VAC (full load)	-	50	-	mS
		Input 220VAC (full load)	-	80	-	
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 220VAC	110%Io	-	350%Io	Hiccup
Ripple & Noise		Full input voltage range	-	-	120	mV
Note: The Ripple & Noise is tested by the Parallel-line method (please refer to the following test instruction).						

General Specifications

Item	Test Condition	Min	Typ.	Max	Unit
Switching frequency	-	-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph	-40	-	+85	℃

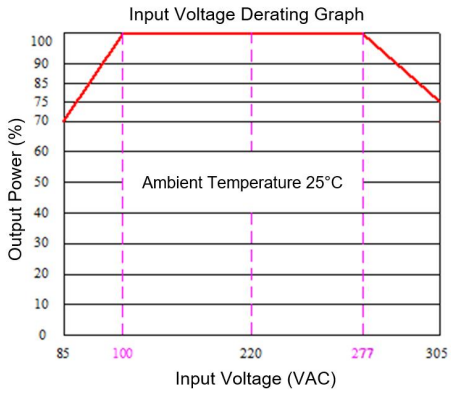
Storage temperature	-		-40	-	+105	℃
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity	-		10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	4000	-	-	VAC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F @25℃		300	-	-	K Hours
Safety standard	-		IEC/EN62368			
Vibration	-		10-55Hz,10G, 30 Min, along X, Y, Z			
Safety class	-		CLASS Ⅱ			

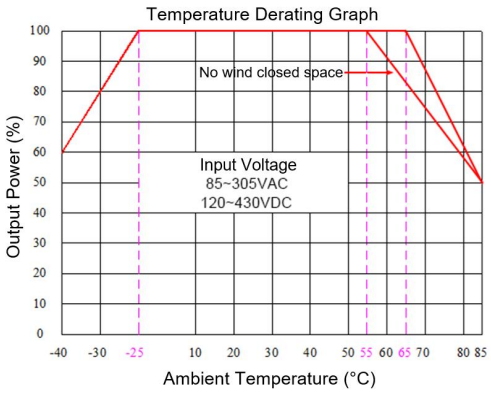
Weight & Dimensions				
Part No.	Weight (Typ.)	Dimensions L x W x H	
FG03-C4SXXSS	4g	35.00 x 18.00 x 11.00 mm	1.378 × 0.709 × 0.433 inch

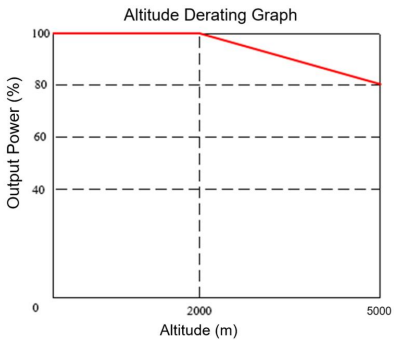
EMC Performances

Items			Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2)
	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 ±6KV / Air ±8KV Perf. Criteria B (with the Recommended Circuit 2)
		Surge	IEC/EN61000-4-5	±2KV Perf. Criteria B (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B (with the Recommended Circuit 2)
		Voltage dips & interruptions	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 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 Application

1.Typical application circuit diagram

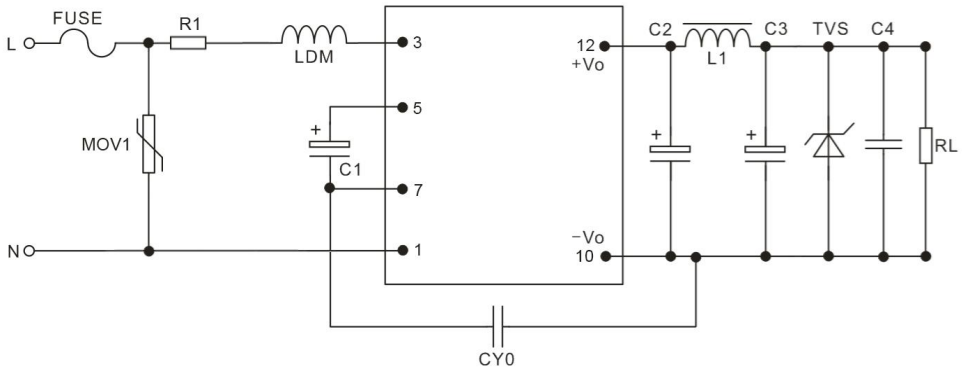


Figure - Circuit 1

Part No.	C2 (*) Solid-state capacitor	L1 (*)	C3 (*) Solid-state capacitor	C4	LDM	R1 (*)	CY0	FUSE (*)	TVS
FG03-C4S03SS(-1)	220uF/10V	2.0uH/ 1A	220uF/10V	0.1uF/ 50V	820uH /0.2A	12Ω/3W Wire-wound resistor	Y1/102M/ 400VAC	1A/300VAC Time-delay fuse	SMBJ7.0A
FG03-C4S05SS(-1)									
FG03-C4S09SS(-1)	220uF/16V		68uF/16V						SMBJ12A
FG03-C4S12SS(-1)	220uF/16V		68uF/16V						SMBJ20A
FG03-C4S15SS(-1)	220uF/35V		68uF/35V						
FG03-C4S24SS(-1)	68uF/35V		47uF/35V						SMBJ30A

C1(*)	Conditions
10uF/450V	Input 85-305VAC, -25℃ ~ +85℃ Input 165-305VAC, -40℃ ~ +85℃
22uF/450V	Input 85-305VAC, -40℃ ~ +85℃

Note:

1) All the * marked components are required for the application, not optional.
2) The Ripple current ＞200mA@100KHz electrolytic capacitor is recommended for C1 which works as the input filter capacitor at AC input and the EMC filter capacitor at DC input.
3) 14D561K/4500A is recommended for MOV1.

2. Recommended circuit diagram for higher EMC requirements

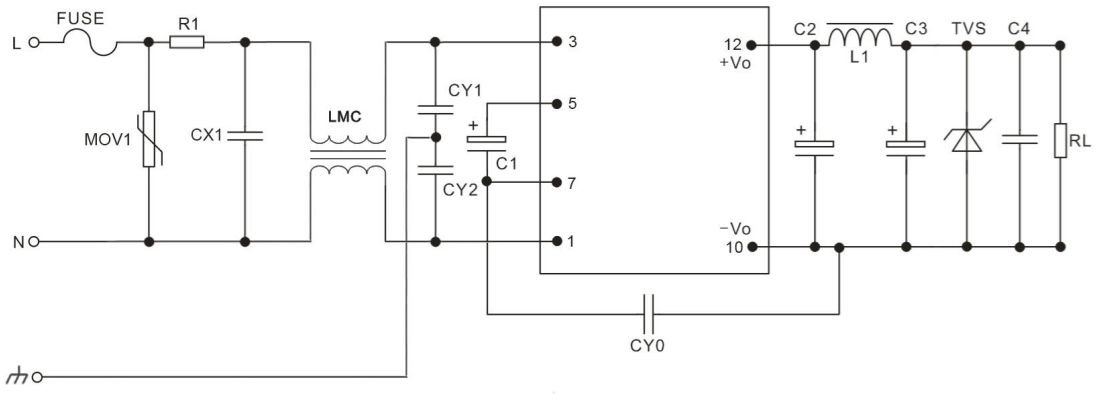
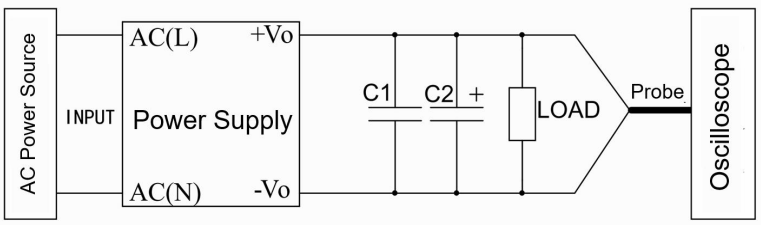


Figure - Circuit 2

FUSE	1A/300VAC Time-delay fuse (Required)	CX1	X2/104K/310VAC
MOV1	14D561K/4500A	LMC	30mH/0.3A
R1	12Ω/3W Wire-wound resistor (Required)	CY1, CY2	Y1/102M/400VAC

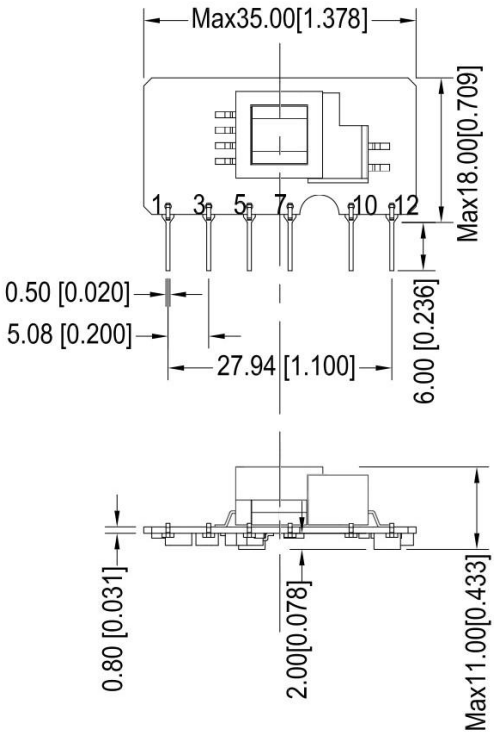
Note: The other components not mentioned in above table should refer to the typical application recommendation.

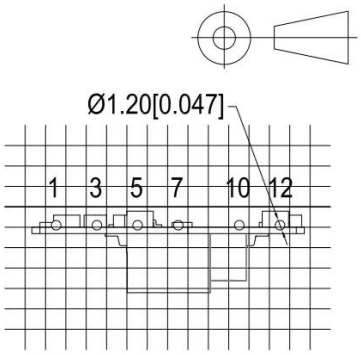
Ripple & Noise Test Instruction (Parallel-line Method, 20MHZ bandwidth)



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 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.

Mechanical Dimensions





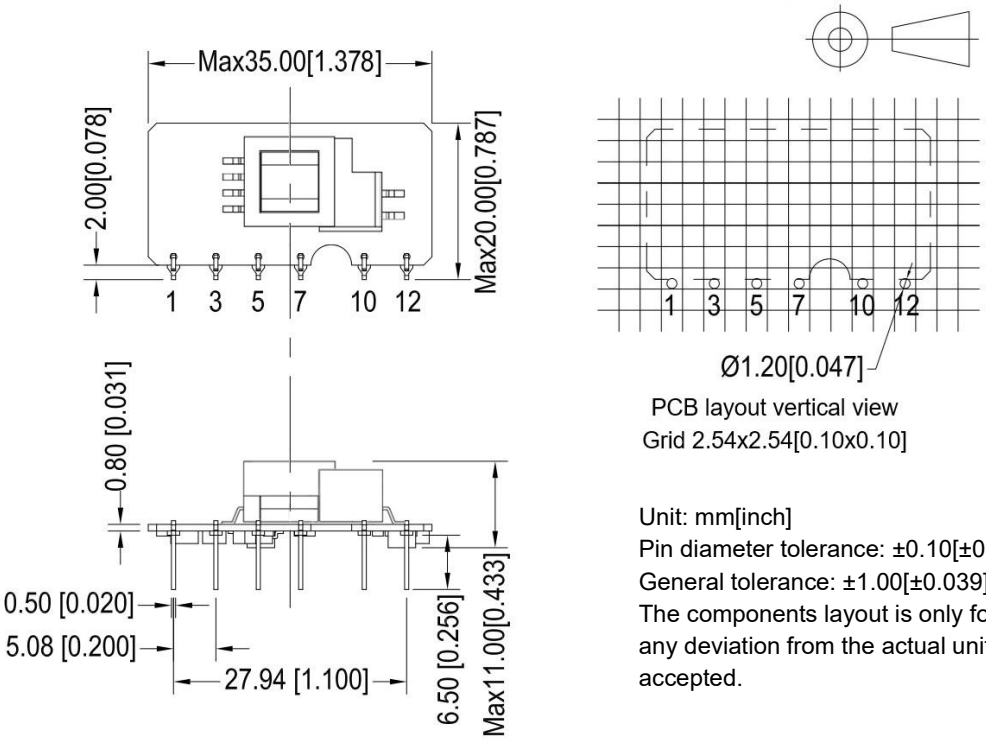
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±1.00[±0.039]
The components layout is only for reference, any deviation from the actual unit should be accepted.

Pin-out Function Description

Pin No.	1	3	5	7	10	12
Function	AC(N)	AC(L)	+Cap	-Cap	-Vo	+Vo

(-1) Mechanical Dimensions



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

Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±1.00[±0.039]
The components layout is only for reference, any deviation from the actual unit should be accepted.

Pin-out Function Description

Pin No.	1	3	5	7	10	12
Function	AC(N)	AC(L)	+Cap	-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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