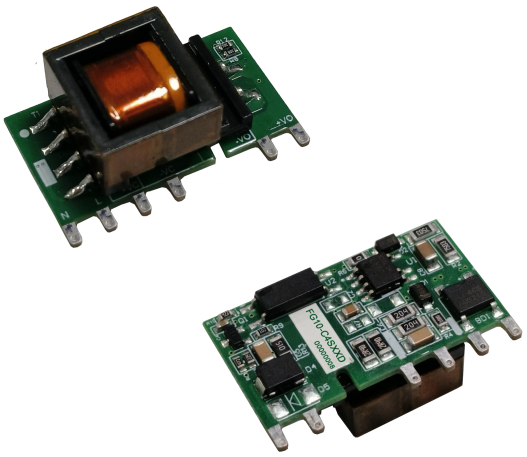
Typical Features

- Wide input voltage range 85-305VAC/120-430VDC
- No load power consumption ≤0.2W@220VAC
- Efficiency up to 83%(TYP.)
- Operating temperature from -40 to +85℃
- Switching Frequency 65KHz
- Short circuit & over current protections
- Isolation voltage 3600VAC
- Altitude during operating 5000m Max
- Compliant with IEC/EN62368/UL62368
- With CE, CB & UL certificates
- Mini size open-frame, industrial grade design
- PCB SIP mounting



EN62368-1 IEC62368-1 UL62368-1

Application Field

FG10-C4SXXD Series ----- Mini size open-frame AC-DC power supplies with global adapted input voltage range (both AC and 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 high 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.)
		Nom.	Range	Power	Voltage	Current			
		(VAC)	(VAC)	P(W)	Vo (VDC)	Io(mA)	(uF)	mVp-p	%
CE, CB & UL	FG10-C4S03D	220	85-305	6.6	3.3	2000	5000	100	73
	FG10-C4S05D			10	5	2000	5000	100	77
	FG10-C4S09D			10	9	1111	4000	100	78
	FG10-C4S12D			10	12	833	1000	120	80
	FG10-C4S15D			10	15	667	1000	120	81
	FG10-C4S24D			10	24	416	300	150	83

Note 1: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 2: 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 3: The Ripple and Noise is tested by the Parallel-line method (please refer to the following test instruction).

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

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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	-	47	50	63	Hz
Input current	115VAC input	-	-	0.30	A
	220VAC input	-	-	0.18	
Surge current	115VAC input	-	-	15	
	220VAC input	-	-	30	
No-load power consumption	115VAC input	-	-	0.20	W
	220VAC input	-	-		
Leakage current	-	0.5mA TYP/ 230VAC/ 50Hz			
Recommended external fuse	-	2A/300VAC Time-delay fuse			
Hot plug	-	Unavailable			
ON/OFF Control	-	Unavailable			

Output Specifications

Item		Test Condition	Min	Typ.	Max	Unit
Voltage accuracy		Full input voltage range, any load	-	±2.0	±3.0	%
Line regulation		Rated load	-	±0.5	±1.0	%
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)	-		-	
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	≥120% Io, self-recovery			Hiccup
Ripple & Noise		10%-100% load, 20MHz bandwidth	-	50	150	mV
Note: The Ripple and 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	

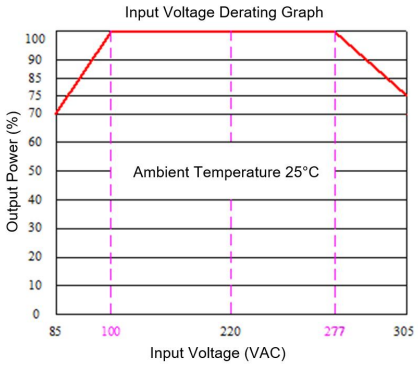
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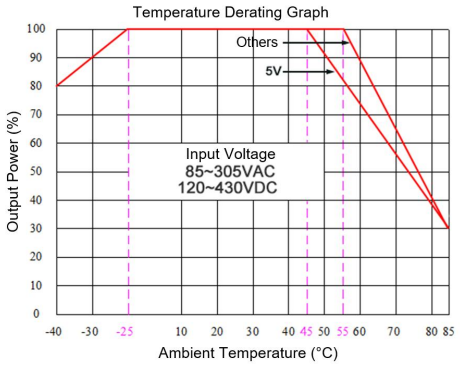
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity			10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current ≤5mA	3600	-	-	VAC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K hours
Safety standard			IEC/EN62368/UL62368			
Vibration			10-55Hz,10G,30 Min, along X, Y, Z			
Safety standard			CLASS Ⅱ			
Weight & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H			
	FG10-C4SXXD	10g	32.0 x 20.0x 14.0 mm	1.260 × 0.787 × 0.551 inch		

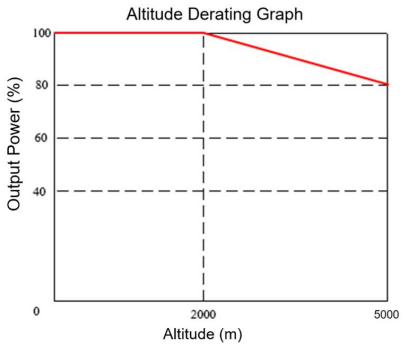
EMC Performance

Items			Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2/1)
		RE	CISPR32/EN55032	CLASS B (with the Recommended Circuit 2/1)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B (with the Recommended Circuit 2/1)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the Recommended Circuit 2/1)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf. Criteria B (with the Recommended Circuit 2/1)
		Surge	IEC/EN61000-4-5	Line to line ±2KV, line to ground ±4KV Perf. Criteria B (with the Recommended Circuit 2/1)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B (with the Recommended Circuit 2/1)
		Voltage dips & Interruptions	IEC/EN61000-4-11	0%~70% Perf. Criteria B (with the Recommended Circuit 2/1)

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.

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Recommended Circuits for Application

1. Typical application circuit diagram

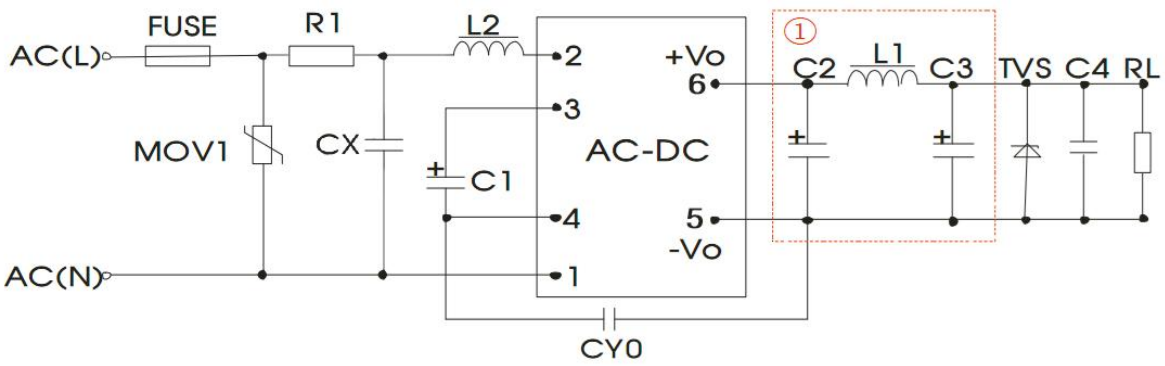


Figure - Circuit 1 (① is a Pi type filtering circuit)

Part No.	C1 (*)	C2(*) Solid-state capacitor	L1 (*)	C3(*) Solid-state capacitor	C4	L2	CX	CY0	FUSE (*)	TVS
FG10-C4S03D	22uF /450V	820uF/16V	2.0uH /3A	150uF/35V	0.1uF /50V	2.2mH /0.5A	X2 /104K /310VAC	Y1/ 102M 400V AC	2.0A/ 300VAC Time delay fuse	SMBJ7.0A
FG10-C4S05D		820uF/16V		150uF/35V						SMBJ7.0A
FG10-C4S09D		470uF/16V		220uF/16V						SMBJ20A
FG10-C4S12D		220uF/16V		220uF/16V						SMBJ20A
FG10-C4S15D		220uF/16V		220uF/16V						SMBJ30A
FG10-C4S24D		100uF/35V		68uF/35V						SMBJ30A

Note:

1) The * marked components are necessary for the application, not optional.
2) 6.8Ω/3W wire-wound resistor is recommended for R1, Carbon film or other resistors are not available.
3) 14D561K/4500A is recommended for MOV1.

2. Recommended EMC circuit diagrams (for higher EMC requirement)

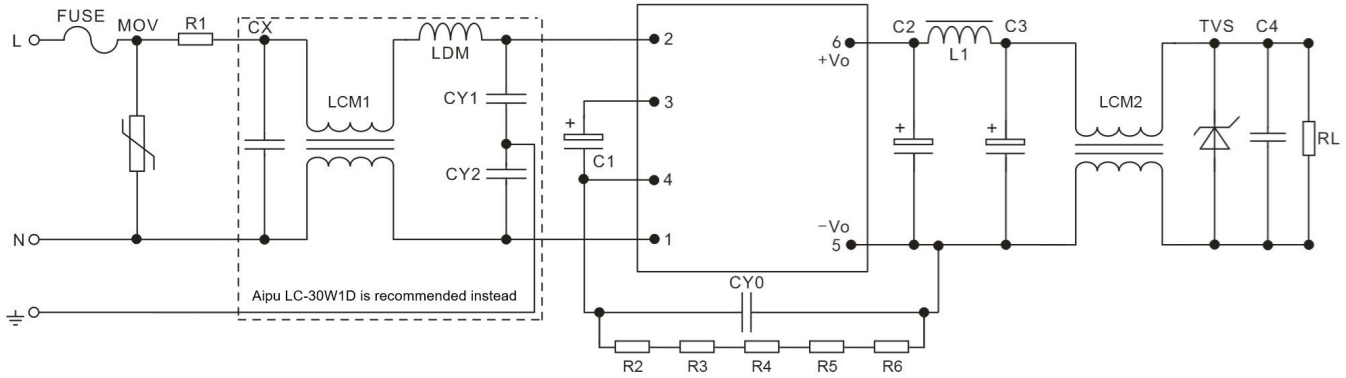


Figure - Circuit 2/1

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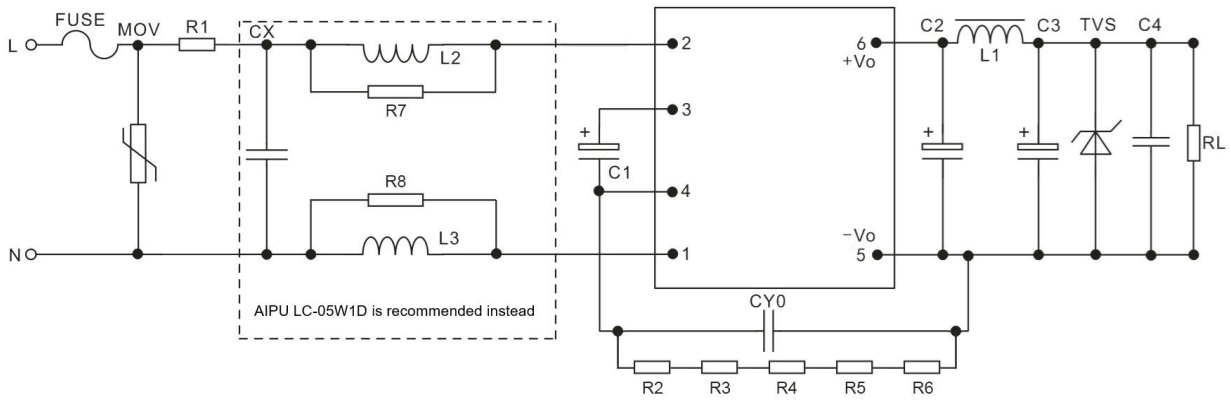
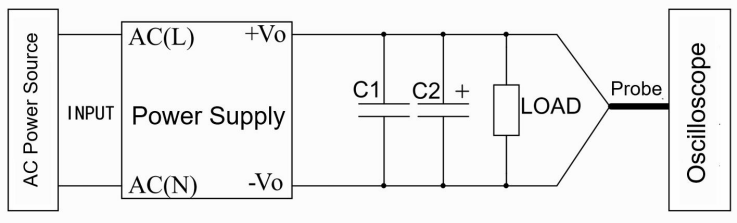


Figure - Circuit 2/2

FUSE	2.0A/300VAC Time-delay fuse (Necessary)	R1	Wire-wound resistor 6.8 Ω/3W	R7, R8	2.2KΩ/ >1/8W
MOV	14D561K/4500A	CY1, CY2	Y1/102M/400VAC	LCM2	100uH/3A
CX	X2/104K/310VAC	LDM	330uH/0.5A	-	-
LCM1	40mH/0.5A	L2, L3	Color-ring choke 1mH/1W	-	-
Note: For ESD protection, discharge needles are recommended together with R2, R3, R4, R5, R6 bleeder resistors (1206/50MΩ/0.25W) connected in parallel with CY0.					

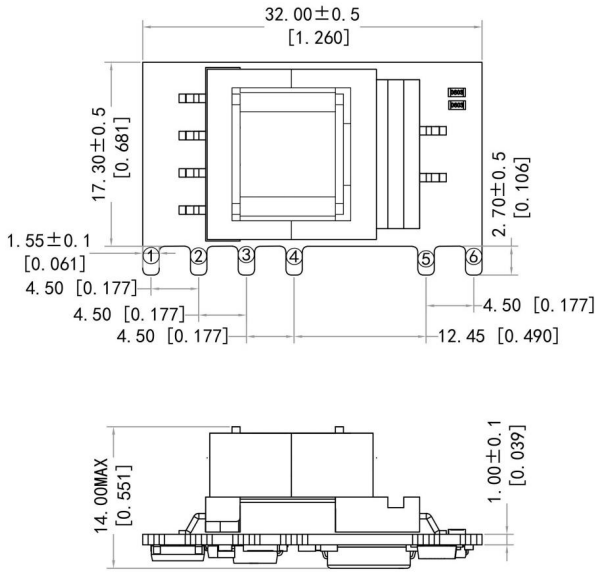
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)

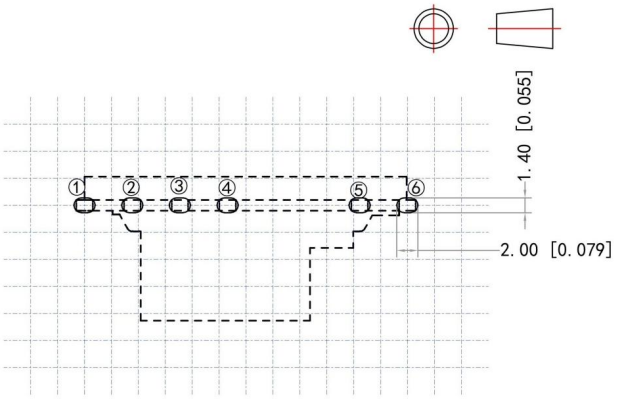


1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high-frequency low-resistance electrolytic capacitor C2(10uF) are connected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





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

Unit: mm[inch]
General tolerance: ±0.5[±0.020]
Terminal section tolerance: ±0.10[±0.004]

Terminals Function Description

Terminal No.	1	2	3	4	5	6
Function	AC(N)	AC(L)	+Vcap	-Vcap	-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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