

### Typical Features

- ◆ Wide input voltage range 85-305VAC/90-430VDC
- ◆ No load power consumption  $\leq 0.25W@220VAC$
- ◆ Efficiency up to 84%(TYP.)
- ◆ Operating temperature from -40 to +85°C
- ◆ Switching Frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 3600VAC
- ◆ Altitude during operating 5000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ Mini size open-frame, industrial grade design
- ◆ PCB SIP mounting



### Application Field

**FG10-C4SXXN 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 (uF)	Ripple & Noise 20MHz (Max) mVp-p	Efficiency @Full Load, 220VAC (Typ.) %
		Nom. (VAC)	Range (VAC)	Power P(W)	Voltage Vo (VDC)	Current Io(mA)			
-	FG10-C4S03N	220	85-305	6.6	3.3	2000	5000	100	72
	FG10-C4S05N			10	5	2000	5000	100	80
	FG10-C4S09N			10	9	1111	1000	100	82
	FG10-C4S12N			10	12	833	1000	100	83
	FG10-C4S15N			10	15	667	1000	100	83
	FG10-C4S24N			10	24	416	800	120	84

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  $\pm 2\%$  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: Please contact Aipu sales for other output voltages requirements 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	90	310	430	VDC
Input frequency	-	47	50	63	Hz
Input current	115VAC input	-	-	0.25	A
	220VAC input	-	-	0.18	
Surge current	115VAC input	-	-	15	
	220VAC input	-	-	20	
No-load power consumption	115VAC input	-	0.15	0.25	W
	220VAC input	-			
Leakage current	-	0.25mA TYP/ 230VAC/ 50Hz			
Fuse built-in	-	1A/300VAC Time-delay fuse			
Hot plug	-	Unavailable			

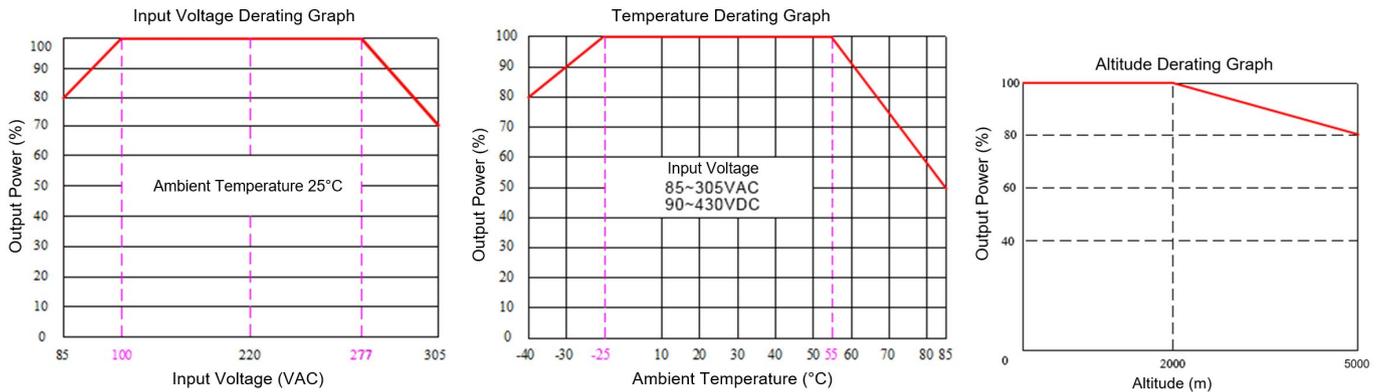
Output Specifications						
Item	Test Condition	Min	Typ.	Max	Unit	
Output voltage accuracy	Full input voltage range, 10-100% load (The unit can work stably at 0-10% load)	-	±2.0	±5.0	%	
Line regulation	Rated load	-	±0.5	±1.5	%	
Load regulation	Nominal input voltage, 10%~100% load	-	±1.5	±3.0	%	
Minimum load	Single Output	10	-	-	%	
Temperature drift coefficient	-	-	-	±0.2	%/°C	
Turn-on delay time	Input 115VAC (full load)	-	-	1000	mS	
	Input 220VAC (full load)	-	-			
Power-off hold up time	Input 115VAC (full load)	-	10	-	mS	
	Input 220VAC (full load)	-	60	-		
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	
Ripple & Noise	10%-100% load, 20MHz bandwidth	-	80	120	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	°C
Storage temperature			-40	-	+105	
Soldering temperature	Wave soldering		260±4°C, time 5-10S			
	Manual soldering		360±8°C, time 4-7S			
Relative humidity			10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	3600	-	-	VAC
			5000	-	-	VDC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25°C		1000	-	-	K hours
Safety standard			IEC/EN62368			
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-C4SXXN	9g	28.84 x 20.00x 15.00 mm		1.135 × 0.787 × 0.590 inch	

EMC Performance				
Items		Test Standard	Performance/Class	
EMC	EMI	CE	CISPR32/EN55032	CLASS A (with the Recommended Circuit 1)
				CLASS B (with the Recommended Circuit 2)
		RE	CISPR32/EN55032	CLASS A (with the Recommended Circuit 1)
				CLASS B (with the Recommended Circuit 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B
		CS	IEC/EN61000-4-6	10Vr.m.s Perf. Criteria B
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf. Criteria B (with the Recommended Circuit 2)
		Surge	IEC/EN61000-4-5	±1KV Perf. Criteria B (with the Recommended Circuit 1)
				±2KV Perf. Criteria B (with the Recommended Circuit 2)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B (with the Recommended Circuit 1)
±4KV 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/90~140VDC & 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

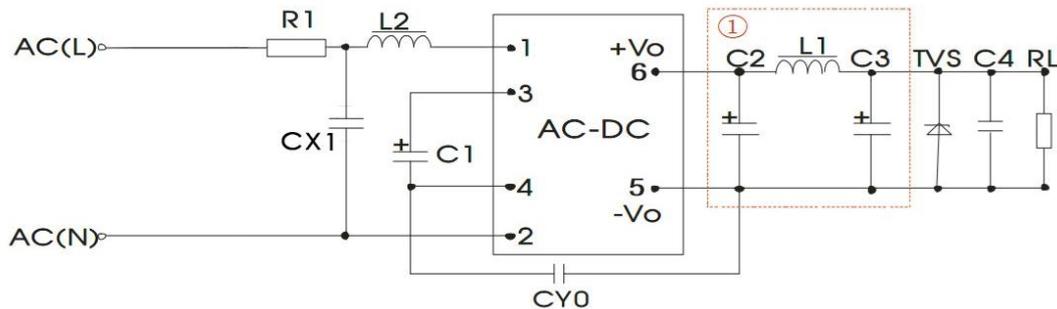
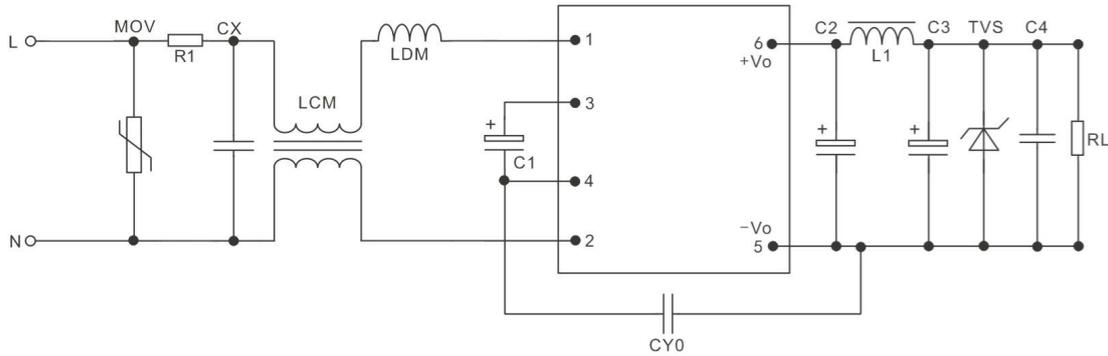


Figure - Circuit 1 (① is a Pi type filtering circuit)

Part No.	C1 (Required)	C2(Required Solid-state capacitor)	L1 (Required)	C3(Required Solid-state capacitor)	CY0 (Required)	R1 (Required)	CX1	L2	C4	TVS
FG10-C4S03N	22uF 450V	820uF/10V	2.0uH/3A	330uF/10V	Y1 102M 400VAC	3W 6.8Ω	X2 104K 310VAC	820uH 0.35A	0.1uF 50V	SMBJ7.0A
FG10-C4S05N				SMBJ7.0A						
FG10-C4S09N		470uF/16V		100uF/16V						SMBJ20A
FG10-C4S12N		470uF/25V		100uF/25V						SMBJ20A
FG10-C4S15N		470uF/25V		100uF/25V						SMBJ20A
FG10-C4S24N		220uF/35V		100uF/35V						SMBJ30A

- Note:
- 1) An electrolytic capacitor with Ripple current >300mA@100KHz is recommended for C1 which works as the input filter at AC input and EMC filter at DC input.
  - 2) C2 & C3 are output filtering capacitors which capacitance and ripple current values should refer to the manufacturer's spec. The withstanding voltage should be derated at least 80%. C4 is a ceramic capacitor to suppress the high frequency noise.
  - 3) A wire-wound resistor is recommended for the plug-in resistor R1, SMD or carbon film resistors are not available.
  - 4) TVS is recommended to protect the output circuit under abnormal condition, its spec should be about 1.2X of output voltage.

**2. Recommended EMC circuit diagram (for higher EMC requirement)**

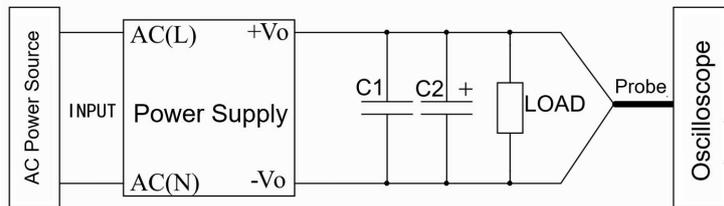


**Figure - Circuit 2**

MOV	14D561K/4500A	CY0	Y1/102M/400VAC
CX	X2/334K/310VAC	LDM	820uH/0.35A
LCM	25mH/0.35A	R1	Wire-wound resistor 6.8Ω/3W

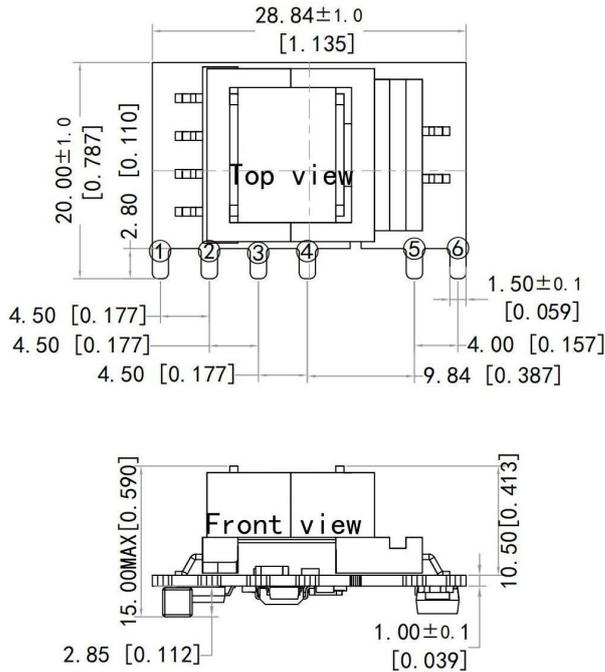
Note: All the other components not mentioned in above table should be referred to the typical application recommendation.

**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**



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(L)	AC(N)	+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°C, 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.

**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](mailto:sales@aipu-elec.com) Website: <https://www.aipupower.com>