Typical Features

- Wide input voltage range 85-305VAC/90-430VDC
- No load power consumption ≤0.25W@220VAC
- Efficiency up to 82%(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
- Mini size open-frame, industrial grade design
- PCB SIP mounting

Application Field

The FG10-C4SXXN series is a line of CE-certified, compact, and high-efficiency power modules from AIPULNION. This series features a universal input voltage range (AC/DC dual-use), low ripple, low temperature rise, low power consumption, and high efficiency. It offers high reliability, safety isolation, and excellent EMC performance.

Complying with international EN55032 and IEC/EN61000 standards, these products are widely used in power systems, industrial control, instrumentation, and smart home applications. For harsh electromagnetic environments, please refer to our recommended application circuits.

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	%
-	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: Typical efficiency values are measured after the product has been aged at full load for 30 minutes.

Note 2: The full load efficiency (%, TYP) tolerance is ±2%. Efficiency is calculated as total output power divided by input power.

Note 3: Due to space limitations, this is only a partial product list. For models not listed, please contact our sales department.

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	-	0.15	0.25	W
	220VAC input	-			
Surge current	115VAC input	-	-	0.25	A
	220VAC input	-	-	0.18	
No-load power consumption	115VAC input	-	-	15	
	220VAC input	-	-	20	
Leakage current	-	0.25mA TYP/ 230VAC/ 50Hz			
Fuse built-in	-	1A/300VAC Slow blow fuse			
Hot plug	-	Not Supported			

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	-	-	-	%
Temperature drift coefficient		-	-	-	±0.2	%/℃
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% 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	-	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

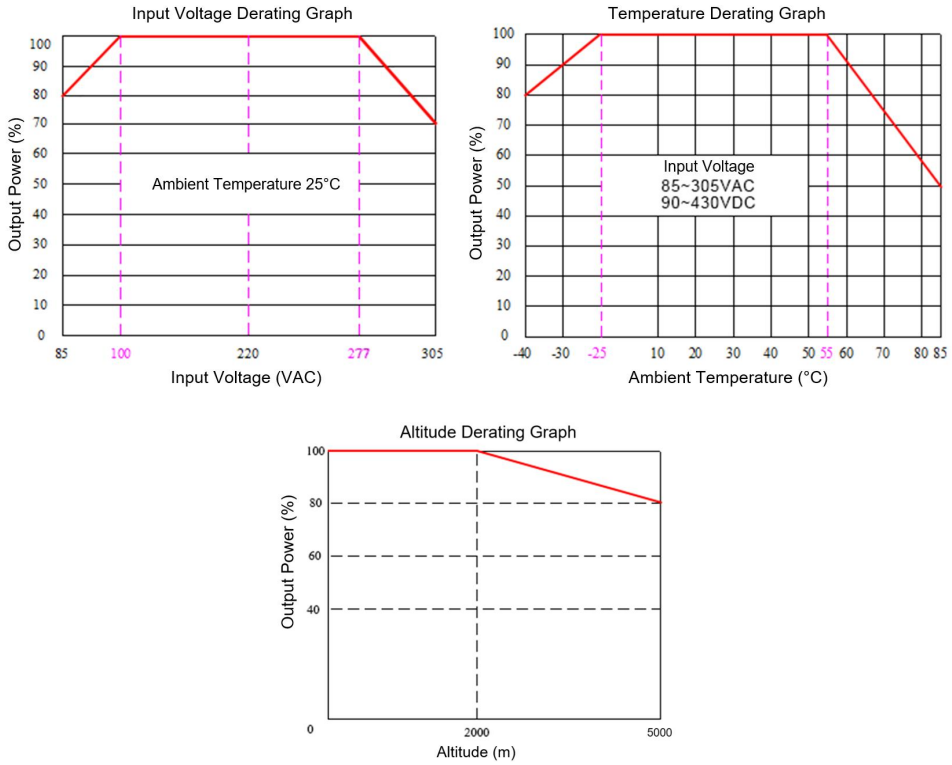
Item	Test Condition		Min	Typ.	Max	Unit
Switching frequency			-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-40	-	+85	℃
Storage temperature			-40	-	+105	
Soldering temperature	Wave soldering		260±4℃, time 5-10S			
	Manual soldering		360±8℃, time 4-7S			
Relative humidity			10	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <5mA	3600	-	-	VAC
			5000	-	-	VDC
Insulation resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		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

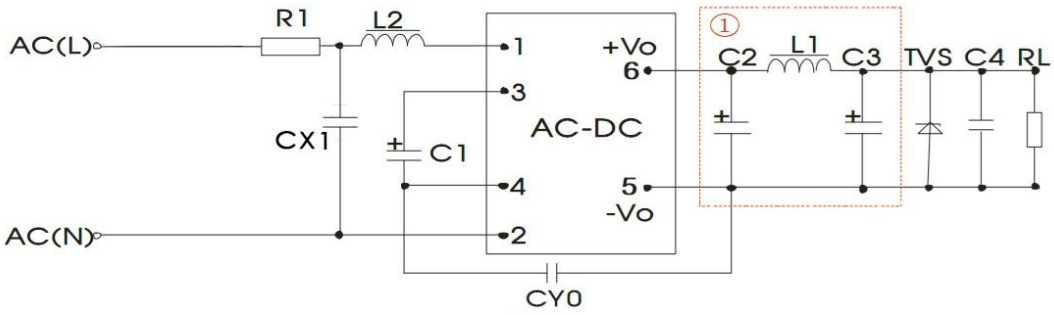


Figure - Circuit 1 (① is a Pi type filtering circuit)

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	22μF 450V	820μF/10V	2.0uH/3A	330μF/10V	Y1 102M 400VAC	3W 6.8Ω	X2 104K 310VAC	820uH 0.35A	0.1μF 50V	SMBJ7.0A
FG10-C4S05N										SMBJ7.0A
FG10-C4S09N		470μF/16V		100μF/16V						SMBJ20A
FG10-C4S12N										SMBJ20A
FG10-C4S15N		470μF/25V		100μF/25V						SMBJ20A

FG10-C4S24N		220μF/35V		100μF/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)

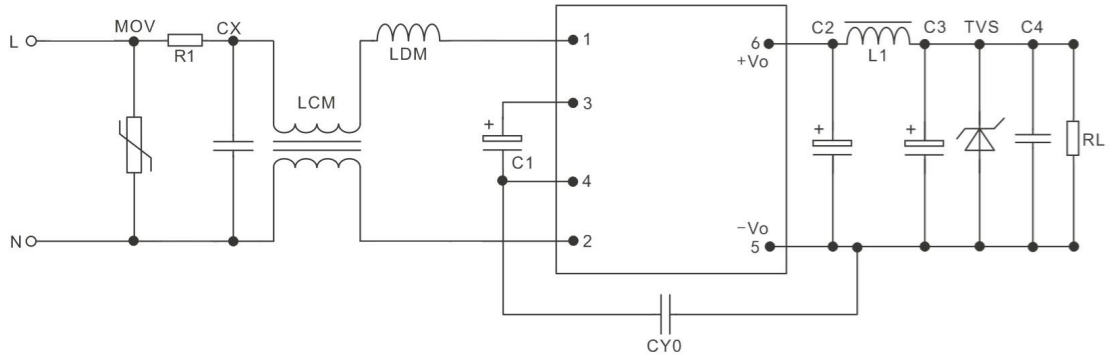
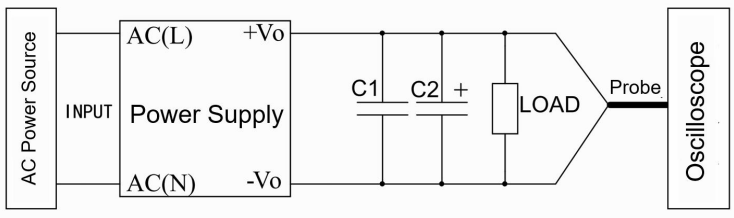


Figure - Circuit 2

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

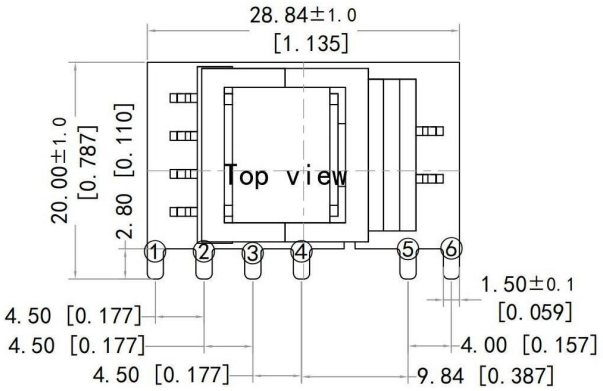
Note: All the other components not mentioned in above table should be referred to the typical application recommendation.

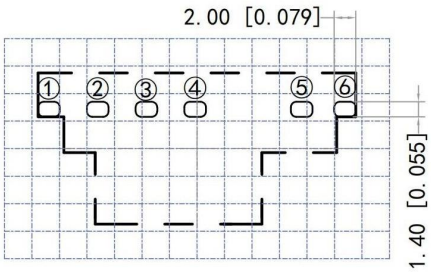
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)



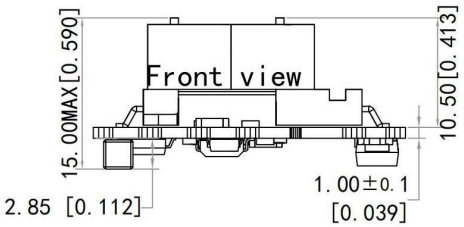
1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1μF) and one high frequency low impedance electrolytic capacitor C2(10μF) are connected in 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]
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℃, 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 above are the performance specifications for the standard models listed in this manual. Some specifications for non-standard models may deviate from these requirements. For specific details, please contact our technical support team.

7. Aipupower can provide customization service.

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