

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption $\leq 0.25W@220VAC$
- ◆ Efficiency up to 82%(Typ.)
- ◆ Operating temperature from $-40^{\circ}C$ to $+85^{\circ}C$
- ◆ Switching Frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 3600VAC
- ◆ Altitude during operating 5000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ UL, CE, CB, and CQC compliant
- ◆ Mini size open-frame, industrial grade design
- ◆ PCB SIP mounting



Applications

The FG10-C4SXXN series is a line of compact, high-efficiency power modules certified to UL, CE, CB, and CQC standards. Featuring a universal input voltage range (AC/DC dual-use), this series offers low ripple, minimal temperature rise, low power consumption, and high isolation. With excellent EMC performance meeting EN55032 and IEC/EN61000 standards, these highly reliable modules are widely used in electric power, industrial control, instrumentation, and smart home applications. For operation in harsh electromagnetic environments, please refer to the recommended application circuits provided..

Selection Guide

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)			
UL/CE/CB/CQC	FG10-C4S03N	220	85-305	6.6	3.3	2000	5000	100	72
	FG10-C4S05N			10	5	2000	5000	100	80
-	FG10-C4S5V5N			10	5.5	1810	5000	100	80
UL/CE/CB/CQC	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 $\pm 2\%$. 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
No-load Power Consumption	115VAC input		-	0.15	0.25	W
	220VAC input		-			
Input Current	115VAC input		-	-	0.25	A
	220VAC input		-	-	0.18	
Surge Current	115VAC input		-	-	15	
	220VAC input		-	-	20	
Leakage Current	-		0.25mA TYP/ 230VAC/ 50Hz			
Fuse built-in	-		2A/300VAC Slow blow fuse			
Hot Plug	-		N/A			

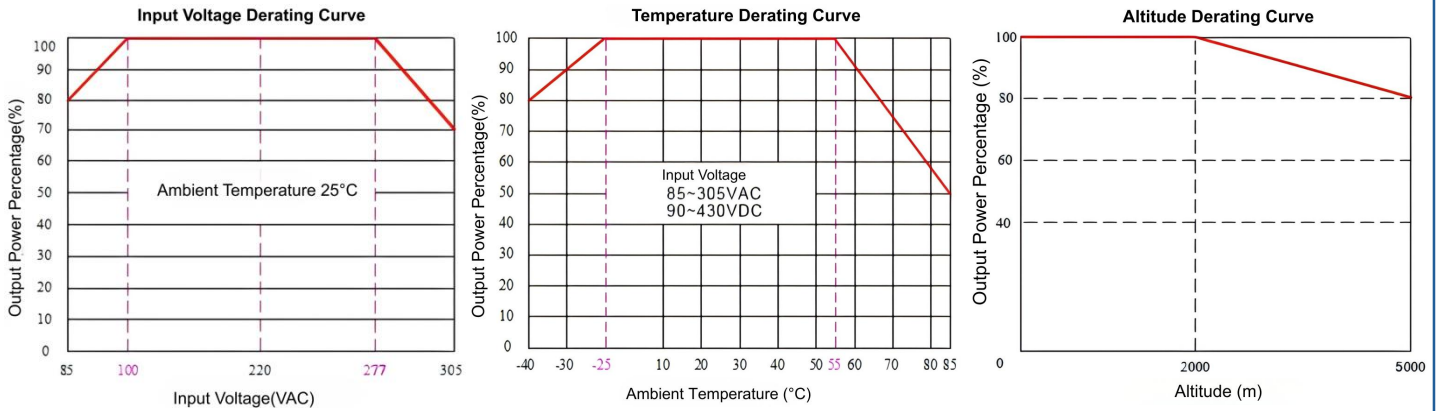
Output Specifications							
Item	Test Condition		Min	Typ.	Max	Unit	
Output voltage accuracy	Input voltage range, 10%-100% load. (Product is stable and operational at 0%-10% load.)	Vo	-	±2.0	±5.0	%	
Line regulation	Rated load	Vo	-	±0.5	±1.5	%	
Load regulation	Nominal input voltage, 10%~100% load	Vo	-	±1.5	±3.0	%	
Minimum load	Single Output		-	-	-	%	
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(SCP)			Continuous, self-recovery			Hiccup	
Over Current Protection(OCP)	Input 220VAC		110%Io	-	200%Io	Hiccup	
Ripple & Noise	10%-100% load, 20MHz bandwidth	Vo	-	80	120	mVp-p	

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 Specifications				
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)
				±1KV Perf. Criteria B (with the Recommended Circuit 1)
		Surge	IEC/EN61000-4-5	±2KV Perf. Criteria B (with the Recommended Circuit 2)
				±4KV 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 Characteristic Curves



Note 1: For input voltages within 85-100VAC / 277-305VAC / 90-140VDC / 390-430VDC, additional temperature derating must be applied based on the Input Voltage Derating Curve.

Note 2: This product is designed for natural air convection cooling. For applications in enclosed environments, please consult our technical support.

Typical Application & Recommended EMC Circuit

1. Typical application circuit diagram

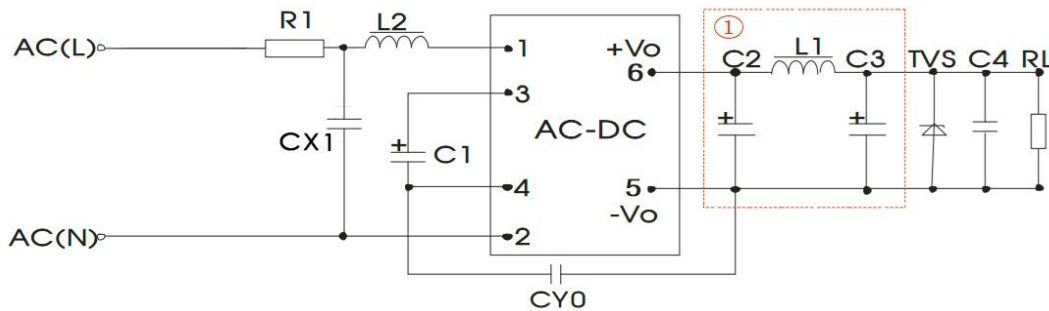


Figure - Circuit 1 ① is a Pi type filtering circuit

Part No.	C1 (*)	C2 (Req. Solid Cap)	L1 (*)	C3(Req. Solid Cap)	CY0 (*)	MOV1	R1 (Req. Wire-wound)	CX1	L2	C4	TVS
FG10-C4S03N	22μF 450V	820μF/10V 470μF/16V 470μF/25V 220μF/35V	2.0μH /3A	330μF/10V 100μF/16V 100μF/25V 100μF/35V	Y1 102M/ 400VAC	14D561K/4 500A	3W/ 6.8Ω	X2 104K/ 310VA C	820μH/ 0.35A	0.1μF/ 50V	SMBJ7.0A
FG10-C4S05N											SMBJ20A
FG10-C4S5V5N											SMBJ20A
FG10-C4S09N											SMBJ20A
FG10-C4S12N											SMBJ20A
FG10-C4S15N											SMBJ20A
FG10-C4S24N											SMBJ30A

* Mandatory component / connection

- Notes:
- C1: An external electrolytic capacitor is required. For AC input, it acts as a filter; for DC input, it functions as an EMC filter. A capacitor with Ripple Current >300mA@100KHz is recommended.
 - C2 & C3: Output filtering capacitors. Please refer to the manufacturer's datasheet for capacitance and ripple current limits. Voltage rating should be

derated to at least 80%. C4 is a ceramic capacitor used to suppress high-frequency noise.

3. R1: Input plug-in resistor. A wire-wound resistor must be used; do not use SMD or carbon film resistors.

4. TVS: Recommended to protect downstream circuitry during abnormal operation. The suggested voltage rating is approximately 1.2 times the output voltage.

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

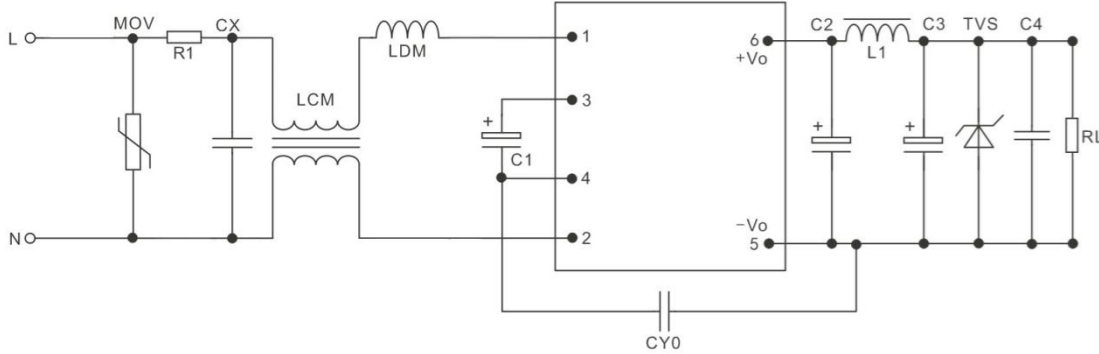
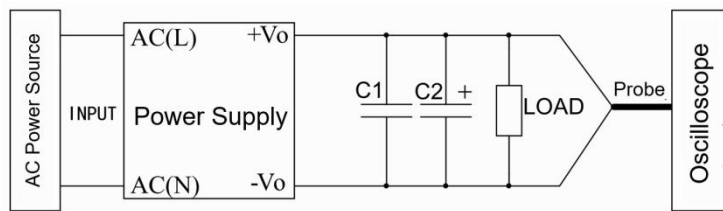


Figure - Circuit 2

MOV	14D561K/4500A	CY0	Y1/102M/400VAC
CX	X2/334K/310VAC	LDM	820μH/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.

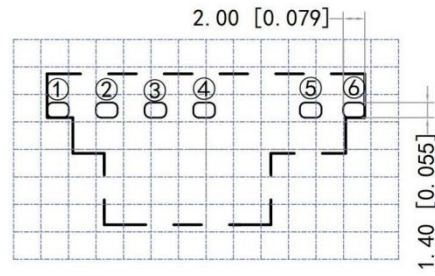
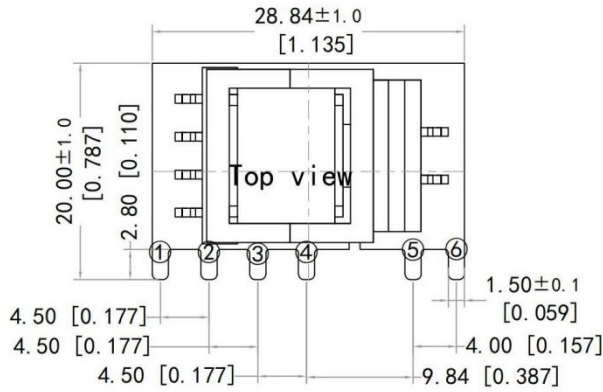
Ripple & Noise Test Instruction (Parallel Cable Method, 20MHz Bandwidth)



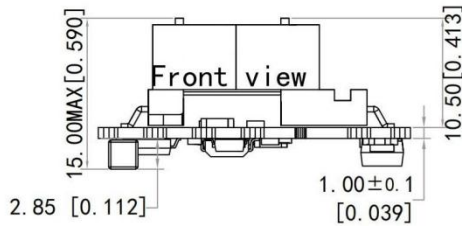
1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1μF) and one high frequency low impedance electrolytic capacitor C2(10μF) are connected in 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: $\pm 0.5[\pm 0.020]$
 Terminal section tolerance: $\pm 0.10[\pm 0.004]$

Pin Definition

Pin No.	1	2	3	4	5	6
Single(S)	AC(L)	AC(N)	+Vc	-Vc	-Vo	+Vo
Function	AC Line Input	AC Neutral Input	External Cap. Positive	External Cap. Negative	Negative Output	Positive Output

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. All specifications are typical at Ta=25°C, Humidity < 75% RH, nominal Vin, and rated resistive load, unless otherwise specified.
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. Custom solutions and specific power module designs are available upon request.

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