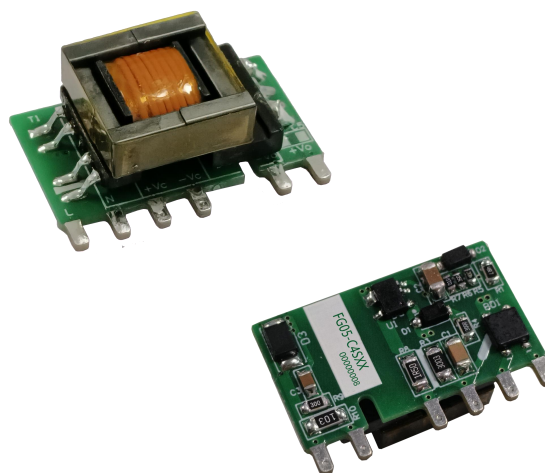


Typical Features

- ◆ Wide input voltage range 85-305VAC/70-430VDC
- ◆ No load power consumption $\leq 0.2W@220VAC$
- ◆ Efficiency up to 83%(TYP.)
- ◆ Operating temperature from $-40^{\circ}C$ to $+85^{\circ}C$
- ◆ Switching frequency 65KHz
- ◆ Short circuit protection & over current protection
- ◆ Isolation voltage 3600VAC
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ Altitude during operation 5000m Max
- ◆ With UL/CB/CE certificates
- ◆ Mini size open-frame, industrial level design
- ◆ PCB SIP mounting



CE

CB

cULus

Application Field

FG05-C4SXX 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. The additional circuit diagram for EMC is recommended for the application with higher EMC requirement.

Typical Product List

Certificate	Part No.	Output Specifications			Capacitive Load @220VAC	Ripple& Noise @20MHz (Max)	Efficiency @Full load 220VAC
		Power	Voltage	Current			
		(W)	Vo(V)	Io(mA)	uF (Max)	mVp-p	%(Typ.)
CE/ CB/UL	FG05-C4S03	3.3	3.3	1000	5000	100	70
	FG05-C4S05	5	5	1000	5000	100	77
	FG05-C4S09	5	9	556	5000	100	79
	FG05-C4S12	5	12	416	3000	100	81
	FG05-C4S15	5	15	333	3000	100	82
	FG05-C4S24	5	24	208	800	100	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 $\pm 2\%$ 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: The Ripple and Noise is tested by the twisted pair method, please refer to the following test instruction.

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

Input Specifications

Item	Operating Condition	Min	Typ.	Max	Unit
Input Voltage Range	AC input	85	220	305	VAC
	DC input	70	310	430	VDC

Input Frequency range	-	47	50	63	Hz
Input Current	Input 115VAC	-	-	0.15	A
	Input 220VAC	-	-	0.10	
Surge Current	Input 115VAC	-	-	17	
	Input 220VAC	-	-	21	
No-load power consumption	Input 115VAC	-	-	0.2	W
	Input 220VAC	-	-		
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
Recommended External Fuse	-	1A-3A/300VAC Time-delay fuse			
Hot Plug	-	Unavailable			
ON/OFF Control	-	Unavailable			

Output Specifications

Item		Operating Condition	Min	Typ.	Max	Unit
Voltage Accuracy		Full input voltage range, 10~100% load (the unit can work stably at <10% load)	-	±2.0	±5.0	%
Line Regulation		Rated load	-	±1.0	±2.0	%
Load Regulation		Nominal input voltage, 20%~100% load	-	±1.0	±5.0	%
Minimum Load		Single Output	10	-	-	%
Turn-on Delay Time		Input 115VAC (full load)	-	300	-	mS
		Input 220VAC (full load)				
Power-off Hold up Time		Input 115VAC (full load)	-	50	-	mS
		Input 220VAC (full load)	-	100	-	
Dynamic Response	Overshoot range	25%~50%~25%	-5.0	-	+5.0	%
	Recovery time	50%~75%~50%	-5.0	-	+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, self-recovery			Hiccup
Temperature Drift		-	-	±0.03%	-	%/°C
Ripple & Noise		Full input voltage range	-	50	100	mV

General Specifications

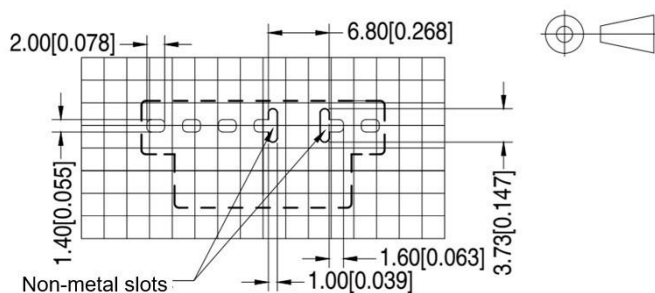
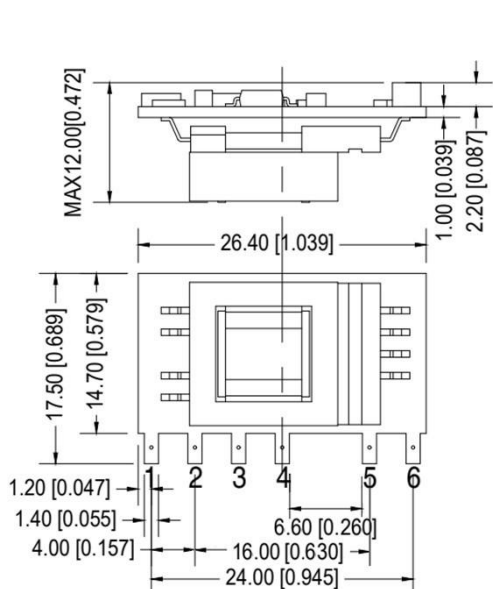
Item	Operating Condition	Min	Typ.	Max	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Refer to the Temperature Derating Graph	-40	-	+85	℃
Storage Temperature	-	-40	-	+110	
Soldering Temperature	Wave soldering	260±4℃, time 5-10S			
	Manual soldering	360±8℃, time 4-7S			
Relative Humidity	-	10	-	90	%RH

Isolation Voltage	I/P-O/P	Dielectric test 1min, leakage current $\leq 5\text{mA}$	3600	-	-	VAC
Insulation Resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
Safety Standard		-	IEC/EN62368, UL62368			
Vibration		-	10-55Hz, 10G, 30 Min, along X,Y,Z			
Safety Class		-	CLASS II			
MTBF		MIL-HDBK-217F @25°C	>300,000H			
Unit Weight		-	5g (Typ.)			

EMC Performances

Total Item	Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032
		RE	CISPR32/EN55032
	EMS	RS	IEC/EN61000-4-3
		CS	IEC/EN61000-4-6
		ESD	IEC/EN61000-4-2
		Surge	IEC/EN61000-4-5
		EFT	IEC/EN61000-4-4
		Voltage dips & interruptions	IEC/EN61000-4-11

Mechanical Dimensions



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

Unit: mm[inch]
General tolerance: $\pm 1.00 [\pm 0.039]$
Terminal section tolerance: $\pm 0.25 [\pm 0.010]$
The components layout is only for reference, any deviation from the actual unit should be accepted.

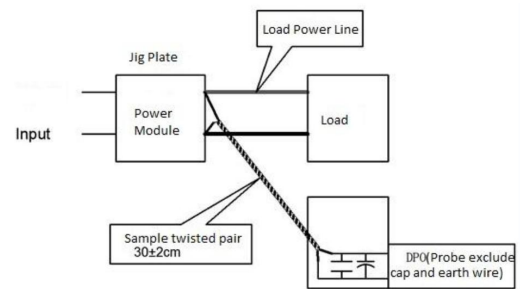
Terminal No.	Function
1	AC(L)
2	AC(N)
3	+Vcap
4	-Vcap
5	-Vo
6	+Vo

Package Code	Dimensions L x W x H	
-	26.40 x 17.50 x 12.00 mm	1.039 x 0.689 x 0.472 inch

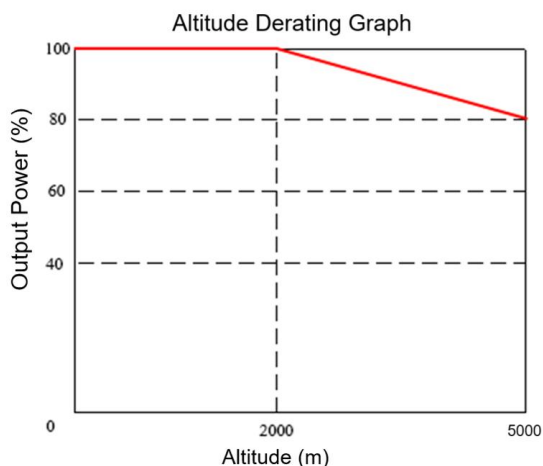
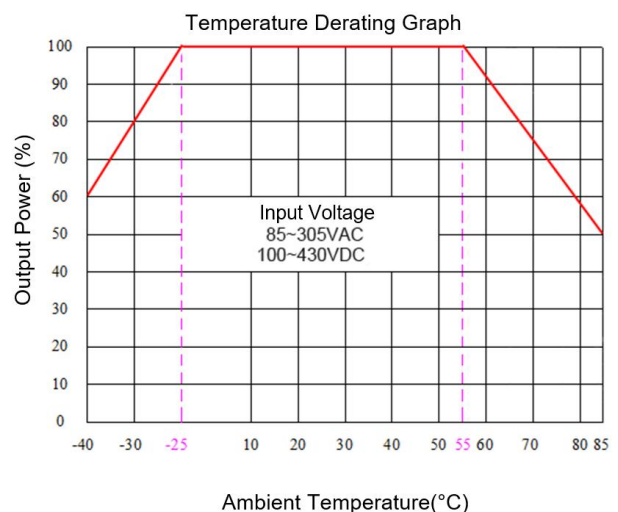
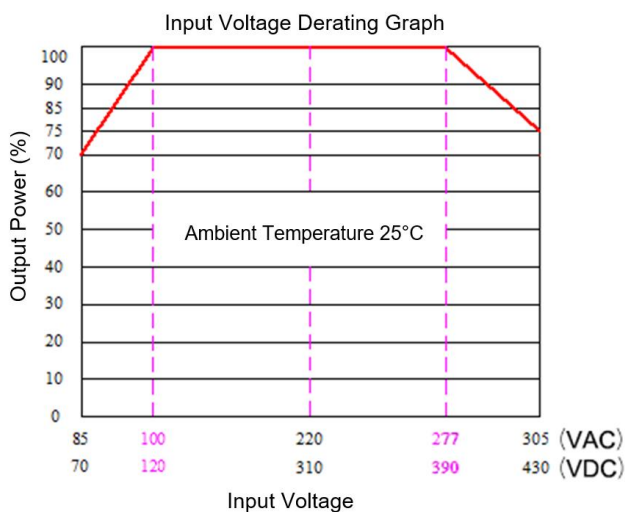
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)

1) The Ripple & noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitors are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

2) The test diagram is shown on the right. 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 twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be start after input power on.



Product Characteristics Graphs



Note 1: The output power should be derated based on the input voltage derating graph at 85~100VAC/277~305VAC/70~120VDC/ 390~430VDC.

Note 2: This product should operate at the natural air condition, please contact us if it could be used at a closed space.

Recommended Circuits Diagrams for Application

1. Typical application circuit diagram

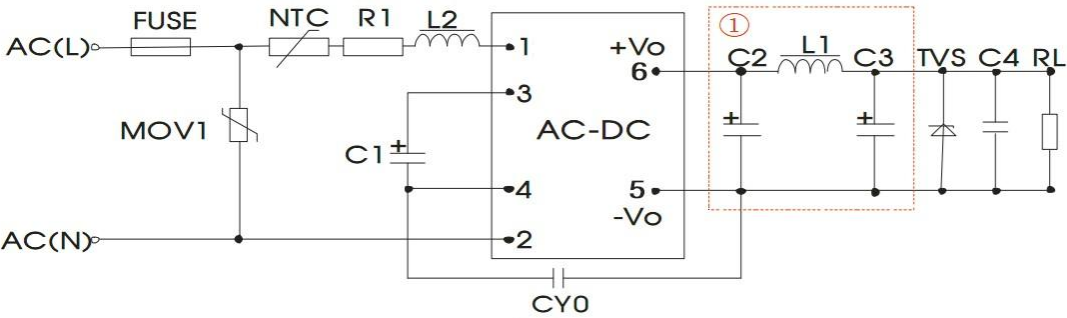


Figure - Circuit 1 (Note ① is a π Type filtering circuit)

Part No.	C1 (*)	C2 (* solid-state capacitor)	L1 (*)	C3 (* solid-state capacitor)	C4	L2	NTC	CY0	FUSE (*)	TVS
FG05-C4S03	22uF /450V	470uF/10V	2.0uH /2A	100uF/10V	0.1uF /50V	4.7mH /0.3A	5D-9	Y1 102M 400VAC	1A/ 300VAC Time Delay fuse	SMBJ7.0A
FG05-C4S05		470uF/10V		100uF/10V						SMBJ7.0A
FG05-C4S09		220uF/16V		220uF/16V						SMBJ12A
FG05-C4S12		220uF/16V		68uF/16V						SMBJ20A
FG05-C4S15		220uF/35V		68uF/35V						SMBJ20A
FG05-C4S24		100uF/35V		47uF/35V						SMBJ30A

Note: The * marked components are necessary for the application, not optional.

2. Recommended circuit diagrams for high EMC requirements

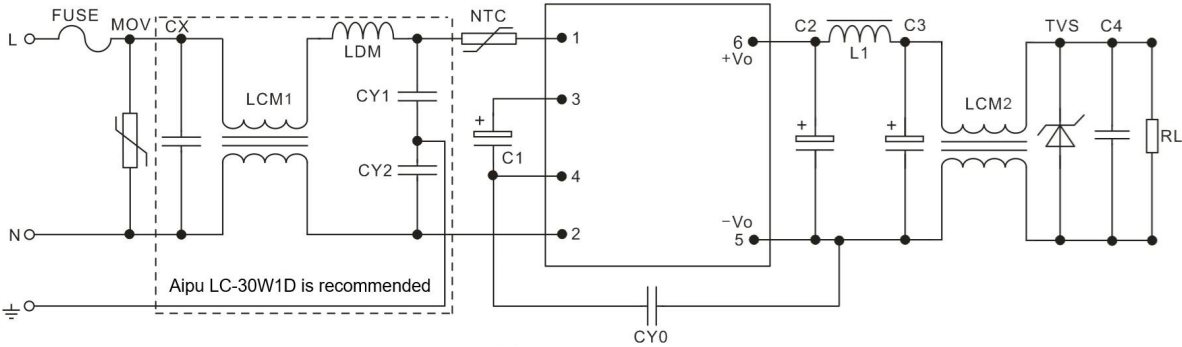


Figure - Circuit 2/1

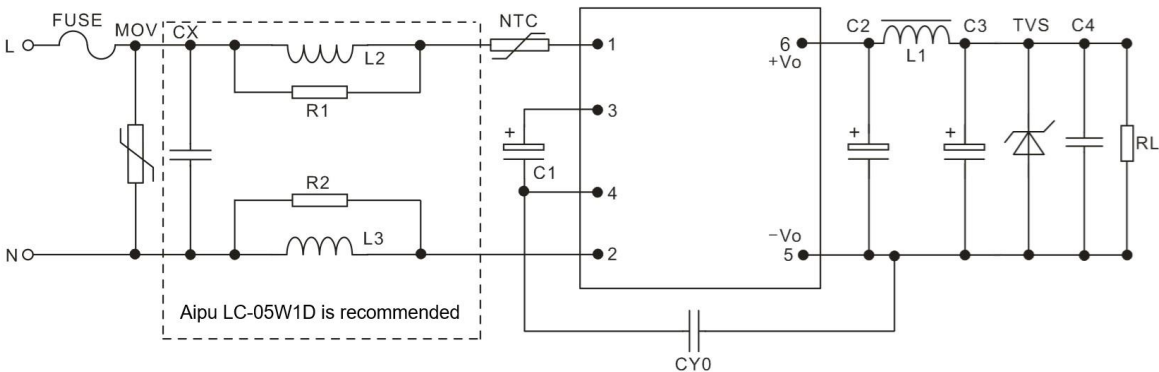


Figure - Circuit 2/2

FUSE	1A/300VAC (Necessary)	NTC	5D-9
MOV	10D561K/3500A	CY1, CY2	Y1/102M/400VAC
CX	X2/224K/310VAC	LDM	330uH/ 0.3A
LCM1	40mH/0.3A	L2, L3	Color-ring choke 1mH/0.3A
LCM2	40uH/2A	R1, R2	2.2KΩ/ >1/8W

Application Notice

1. The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.
2. A fuse should be connected at input.
3. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.
5. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
6. All values or indicators in this datasheet had been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
8. Aipupower can provide customization service.

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