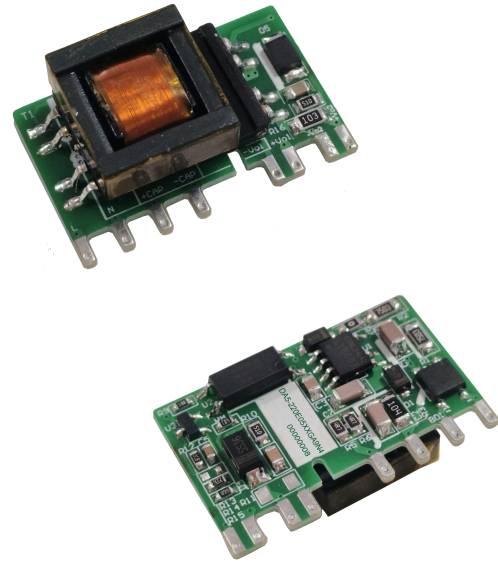


Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption $\leq 0.2W@220VAC$
- ◆ Efficiency 78% (Typ.)
- ◆ Operating temperature from $-40^{\circ}C$ to $+85^{\circ}C$
- ◆ Switching frequency 65KHz
- ◆ Short circuit & over current protections
- ◆ Isolation voltage 3600VAC
- ◆ Altitude during operation 4000m Max
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ Conform to CE
- ◆ Mini size open-frame, industry level design
- ◆ PCB SIP mounting



Application Field

DA5-220EXXXGA9N4 Series ----- Mini size open-frame 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, Industrial, Instrument, Smart home devices, etc. The additional circuit diagram for EMC is recommended for the application with high EMC requirements.

Typical Product List

Certificate	Part No.	Output Specification					Max Capacitive Load @220VAC (uF)	Ripple & Noise 20MHz (Max) mVp-p	Efficiency @Full Load, 220VAC (Typ.) %
		Power (W)	Voltage Vo1(V)	Current Io1(mA)	Voltage Vo2(V)	Current Io2(mA)			
		DA5-220E0512GA9N4	5	5	200	12			
DA5-220E0524GA9N4	5	5	200	24	167	1000/680	100/100	78	

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 are tested by the twisted pair method according to the test instruction in the data sheet.

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

Input Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Input Voltage Range	AC Input	85	220	305	VAC
	DC Input	120	310	430	VDC
Input Frequency Range	-	47	50	63	Hz
Input Current	115VAC	-	-	0.15	A
	220VAC	-	-	0.08	
Surge Current	115VAC	-	-	11	A
	220VAC	-	-	21	
No-load Power Consumption	Input 115VAC	-	-	0.2	W
	Input 220VAC	-	-		
Leakage Current	-	0.25mA TYP/230VAC/50Hz			
External Fuse Recommended	-	1A-3A/300VAC Time-delay fuse			
Hot-plug	-	Unavailable			
Remote 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)	Vo1	-	±2.0	±3.0	%	
		Vo2	-	±2.0	±5.0	%	
Line Regulation	Nominal Load	Vo1	-	±0.5	±1.0	%	
		Vo2	-	±0.5	±2.0	%	
Load Regulation	Nominal input voltage, 20%~100% load	Vo1	-	±0.5	±1.0	%	
		Vo2	-	±0.5	±2.0	%	
Minimum load	Dual outputs isolated	10	-	-	%		
Turn-on Delay Time	Input 115VAC (full load)	-	600	-	mS		
	Input 220VAC (full load)	-		-			
Power-off Hold up Time	Input 115VAC (full load)	-	50	-	mS		
	Input 220VAC (full load)	-	80	-			
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		
Drift Coefficient	-	-	±0.03%	-	%/°C		
Over Current Protection	Input 220VAC	≥120% Io, Self-recovery			Hiccup		
Ripple & Noise	-	-	-	100	mV		

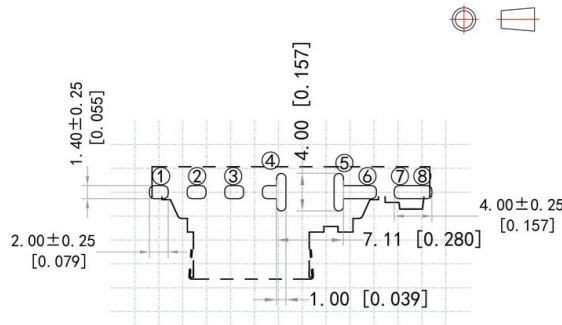
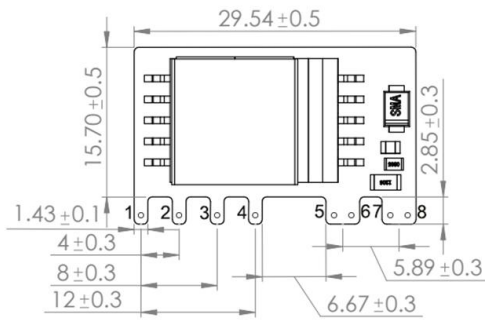
General Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Refer to the temperature derating graph	-40	-	+85	°C
Storage Temperature	-	-40	-	+110	°C
Soldering Temperature	Wave-soldering	260±4°C, timing 5-10S			
	Manual-soldering	360±8°C, timing 4-7S			
Relative Humidity	-	10	-	90	%RH
Isolation Voltage	I/P-O/P, Test 1min, leakage current ≤5mA	3600	-	-	VAC
	Vo1-Vo2, Test 1min, leakage current ≤5mA	500	-	-	VDC
Insulation Resistance	Input-Output@DC500V	100	-	-	MΩ
Safety Standard	-	EN62368, IEC62368			
Vibration	-	10-55Hz, 10G, 30Min, along X, Y, Z			
Safety Class	-	CLASS II			
MTBF	-	MIL-HDBK-217F@25°C > 300,000H			
Unit Weight	-	6g (Typ.)			

EMC Performances

Total Item	Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR22/EN55032 CLASS B (with the recommended circuit 2)
		RE	CISPR22/EN55032 CLASS B (with the recommended circuit 2)
	EMS	RS	IEC/EN61000-4-3 10V/m Perf.Criteria B (with the recommended circuit 1)
		CS	IEC/EN61000-4-6 3Vr.m.s Perf.Criteria B (with the recommended circuit 1)
		ESD	IEC/EN61000-4-2 Contact ±6KV / Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5 ±1KV Perf.Criteria B
		EFT	IEC/EN61000-4-4 ±2KV Perf.Criteria B
		Voltage dips & interruptions	IEC/EN61000-4-11 0%~70% Perf.Criteria B

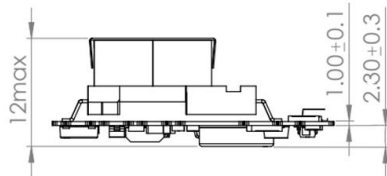
Mechanical Dimensions



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

Unit: mm[inch]
Terminal section tolerance: $\pm 0.25[\pm 0.010]$
General tolerance: $\pm 0.50[\pm 0.020]$
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	+Cap
4	-Cap
5	-Vo1
6	+Vo1
7	-Vo2
8	+Vo2

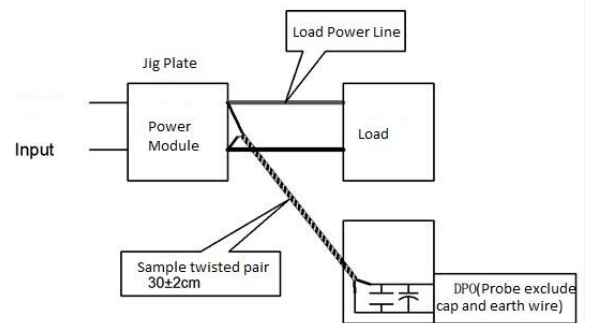


Package Code	Dimensions L x W x H	
-	29.54 x 18.55 x 12.00 mm	1.163 x 0.730 x 0.472 inch

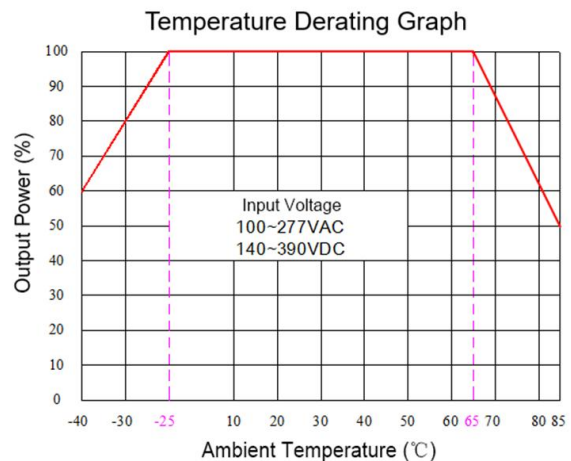
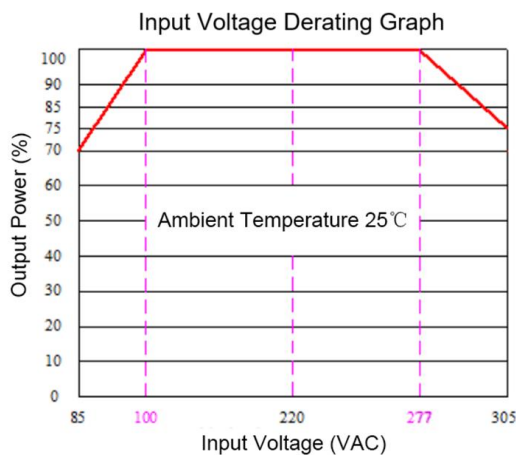
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)

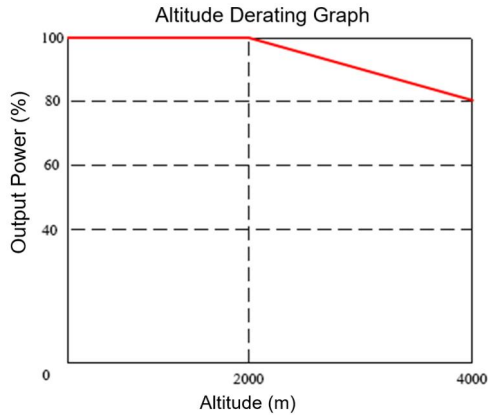
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitors are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at 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/120~140VDC/ 390~430VDC.

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

Recommended Circuits for Application

1, Typical application circuit diagram

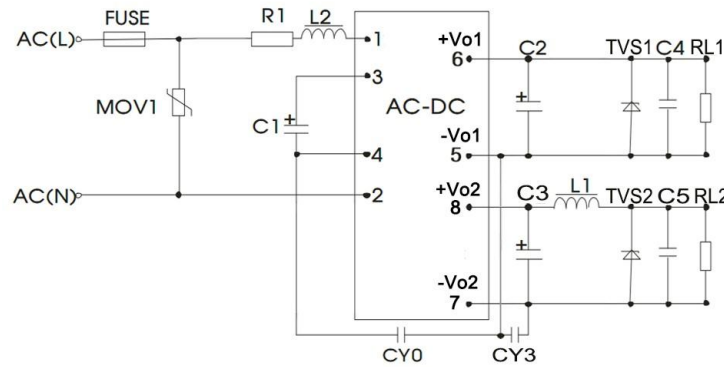


Figure – Circuit 1

Part No.	C1 (*)	R1 (*)	C2 (*)	L1 (*)	C3 (*)	C4/C5	L2	CY0	CY3	FUSE (*)	TVS1	TVS2	
DA5-220E0512 GA9N4	22uF	12Ω	100uF	2uH/	220uF	0.1uF	1mH	Y1	Y1	T1A/	SMBJ7	SMBJ	
DA5-220E0524 GA9N4	/450V	/2W	/16V	0.8A	220uF	/50V	/0.5A	/102M	/102M	300V	.0A	SMBJ	
					/35V			400VAC	250VAC			20A	30A

Note: The * marked components are necessary for the application, not optional. Solid-state capacitors are recommended for C2&C3.

2, Recommended EMC circuits diagrams (for high EMC requirements)

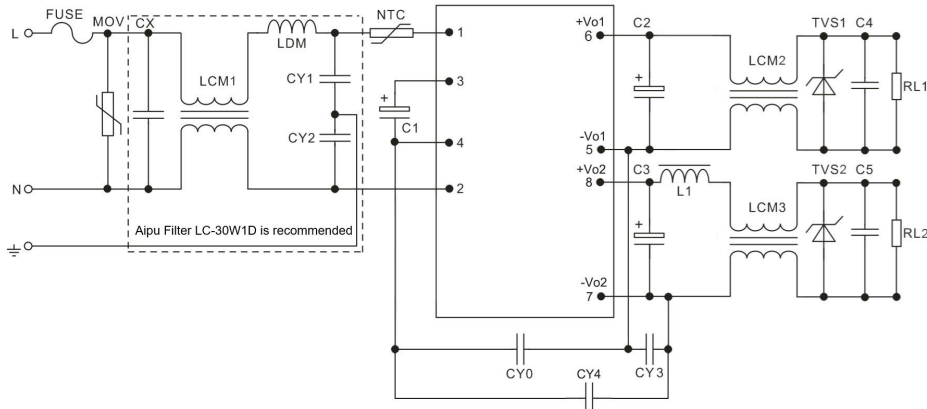


Figure – Circuit 2/1

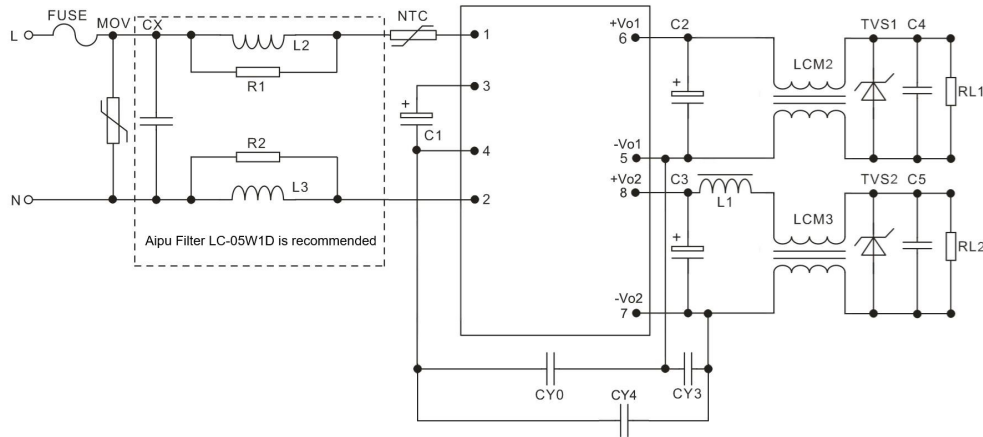


Figure – Circuit 2/2

FUSE	T1A/300V (Necessary)	NTC	5D-9
MOV	14D561K/4500A	CY1, CY2, CY4	Y1/102M/400VAC
CX	X2/102K/310VAC	LDM	330uH/1A
LCM1	40mH/0.3A	L2, L3	Color-ring choke 1mH/1W
LCM2/LCM3	40uH/0.3A	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°C, 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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