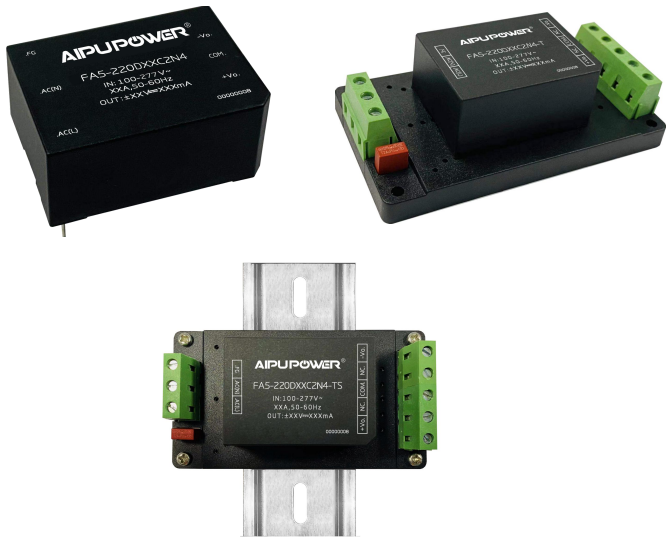
AC/DC Converter
FA5-220DXXC2N4 Series

Typical Features

- Wide input voltage range 85-305VAC/120-430VDC
- No load power consumption ≤0.25W@220VAC
- Efficiency up to 80% (Typ.)
- Operating temperature from -40 to +85°C
- Switching frequency 65KHz
- Short circuit & Over-current protections
- Isolation voltage 4000VAC
- Altitude during operation 4000m Max
- Compliant with IEC/EN62368/UL62368
- PCB DIP mounting
- Enclosed plastic case, flame class UL94-V0



Application Field

FA5-220DXXC2N4 Series *---- Compact size, high efficiency modular 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 for EMC is recommended for the application with high EMC requirement.*

Typical Product List

Certificate	Part No.	Output Specification					Capacitive Load (Max) @220VAC	Ripple & Noise (Max) @20MHz	Efficiency @full load 220VAC
		Power	Voltage 1	Current 1	Voltage 2	Current 2			
		（W）	Vo1(V)	Io1(mA)	Vo2(V)	Io2(mA)	uF	mVp-p	%(Typ.)
-	FA5-220D05C2N4	5	+5	500	-5	500	2000/1000	100/100	72
	FA5-220D12C2N4	5	+12	208	-12	208	1000/600	120/120	76
	FA5-220D15C2N4	5	+15	167	-15	167	800/470	120/120	78
	FA5-220D24C2N4	5	+24	104	-24	104	500/200	150/150	80

Note 1: Please contact Aipu sales for other output voltages requirements in this series but not in this table.

Note 2: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 3: The full load efficiency should be in ±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 4: The suffix -T indicates the chassis package, -TS indicates the package of DIN Rail which width is 35mm.

Input Specifications

Item	Operating Condition	Min	Typ.	Max	Unit
Input Voltage Range	AC input	85	220	305	VAC
	DC input	120	310	430	VDC

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Input Frequency Range	-	47	50	63	Hz
No Load Power Consumption	Input 115VAC	-	-	0.25	W
	Input 220VAC	-	-		
Input Current	Input 115VAC	-	-	0.12	A
	Input 220VAC	-	-	0.08	
Surge Current	Input 115VAC	-	-	10	
	Input 220VAC	-	-	20	
Leakage Current	-	0.5mA TYP/230VAC/50Hz			
External Fuse recommended	-	1-2A/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, any load	Vo1	-	±2.0	±3.0	%
			Vo2	-	±2.0	±5.0	
Line Regulation		Rated load	Vo1	-	-	±0.5	%
			Vo2	-	-	±1.0	
Load Regulation		Nominal input voltage, 20%~100% load	Vo1	-	-	±1.0	%
			Vo2	-	-	±4.0	
Minimum Load		Dual output with common GND		10	-	-	%
Turn-on Delay Time		Input 115VAC (full load)		-	2000	-	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% 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
Temperature Coefficient		-		-	±0.03%	-	%/℃
Over Current Protection		Input 220VAC		≥130% Io, self-recovery			Hiccup
Ripple & Noise		Full input voltage range		-	50	150	mV
		Note: The Ripple & Noise is tested by the twisted pair method, please refer to the following Test Instruction.					

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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	-	+90	
Soldering Temperature		Wave-soldering	260±4℃, timing 5-10S			
		Manual-soldering	360±8℃, timing 4-7S			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	I/P-O/P	Dielectric Test 1min, leakage current ≤5mA	4000	-	-	VAC
	I/P-FG		2500	-	-	VAC
Insulation Resistance	I/P-O/P	@DC500V	100	-		MΩ
Safety Standard		-	EN62368, IEC62368			
Vibration		-	10-55Hz,10G,30Min, along X,Y,Z			
Safety Class		-	CLASS Ⅱ			
Flame Class of Case		-	UL94-V0			
MTBF		-	MIL-HDBK-217F@25℃＞300,000H			
Unit weight		Part No.	Weight (Typ.)			
		FA5-220DXXC2N4	60g			
		FA5-220DXXC2N4-T	105g			
		FA5-220DXXC2N4-TS	145g			

EMC Performances

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommend Circuit Figure 2)
		RE	CISPR32/EN55032	CLASS B (with the Recommend Circuit Figure 2)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (with the Recommend Circuit Figure 2)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (with the Recommend Circuit Figure 2)
		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B (with the Recommend Circuit Figure 2)
		Surge	IEC/EN61000-4-5	Line to line ±2KV / line to ground ±4KV Perf.Criteria B (with the Recommend Circuit Figure 2)
		EFT	IEC/EN61000-4-4	±4KV Perf.Criteria B (with the Recommend Circuit Figure 2)
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

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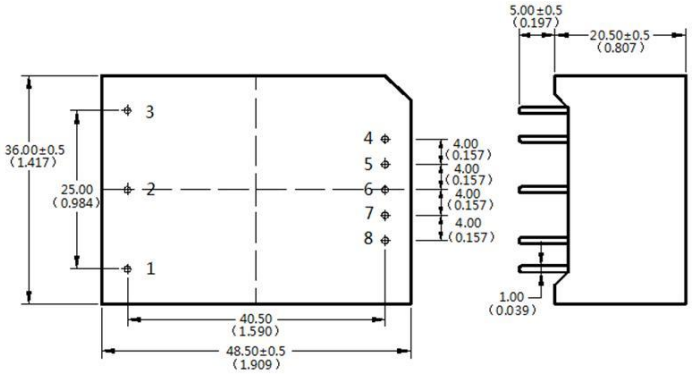
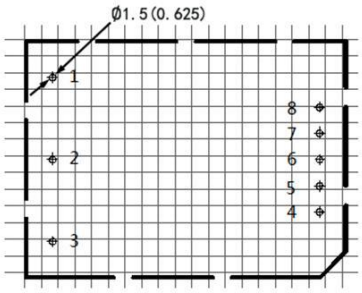
Mechanical Dimensions



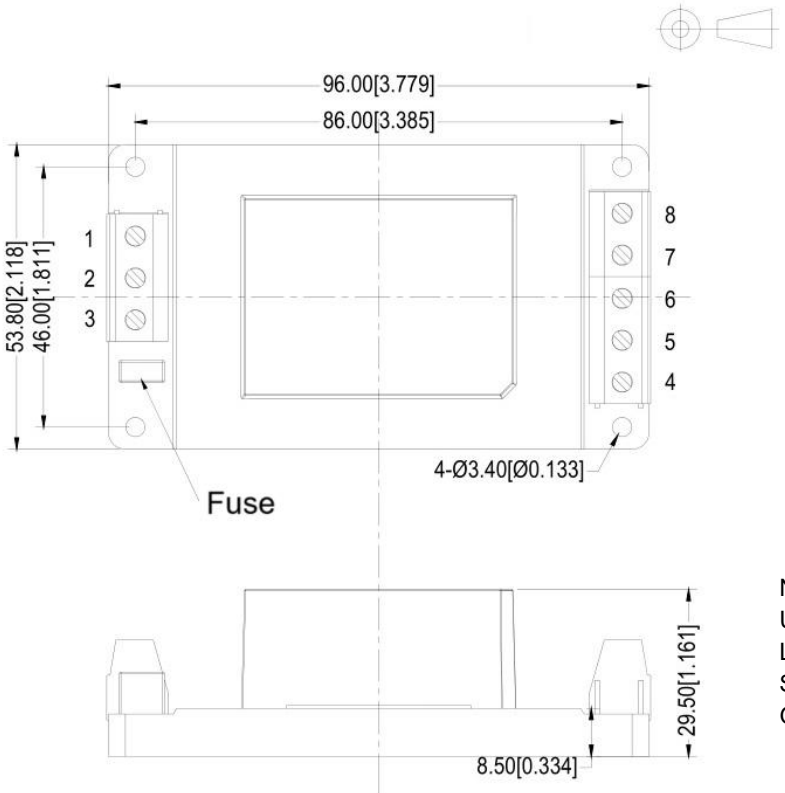


PCB layout vertical view
Grid 2.54x2.54(0.10x0.10)

Pin No.	Function
1	FG
2	AC(N)
3	AC(L)
4	+Vo
5	No Pin
6	COM
7	No Pin
8	-Vo

Note:
Unit: mm(inch)
Pin diameter tolerance ±0.10(±0.004)
General tolerance ±0.50(±0.020)

-T Package Dimensions



Terminal No.	Function
1	FG
2	AC(N)
3	AC(L)
4	+Vo
5	No Connection
6	COM
7	No Connection
8	-Vo

Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4N.m Max
General tolerance: ±1.00[±0.039]

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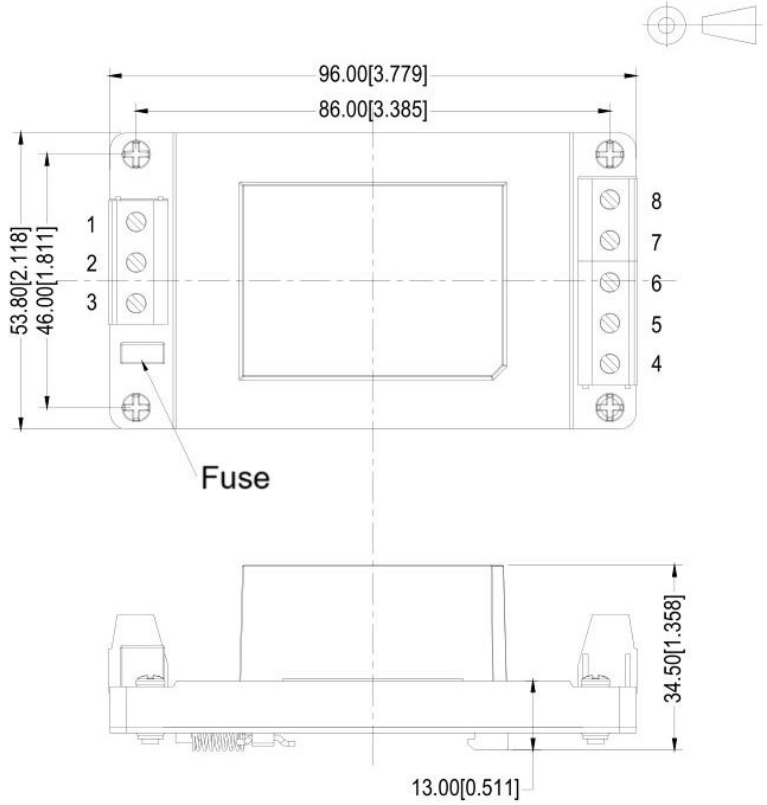
-TS Package Dimensions



Terminal No.	Function
1	FG
2	AC(N)
3	AC(L)
4	+Vo
5	No Connection
6	COM
7	No Connection
8	-Vo

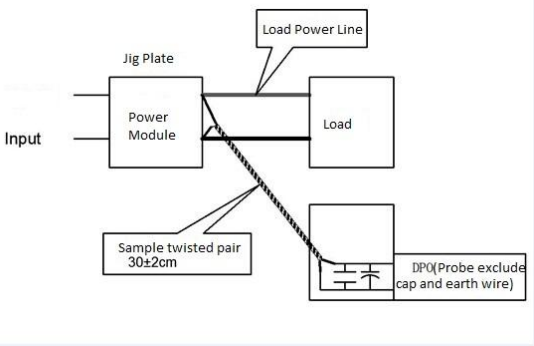
Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4N.m Max
General tolerance: ±1.00[±0.039]

Package Code	Dimensions L x W x H	
-	48.50X36.00X20.50 mm	1.909X1.417X0.807 inch
-T	96.00X53.80X29.50 mm	3.779X2.118X1.161 inch
-TS	96.00X53.80X34.50 mm	3.779X2.118X1.358 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 capacitor 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±2cm) 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.



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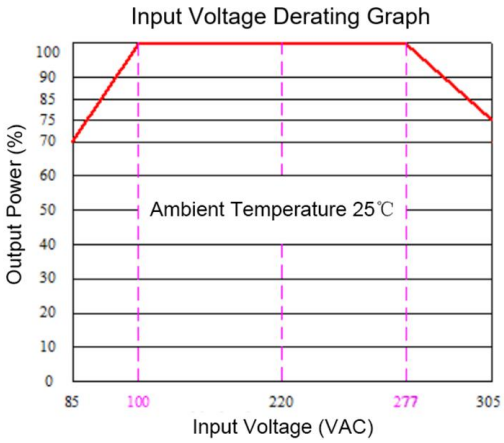
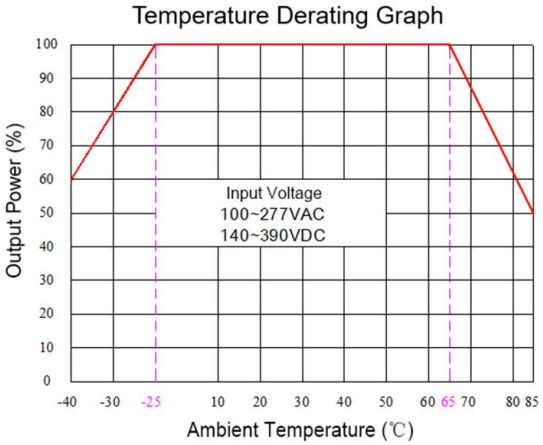
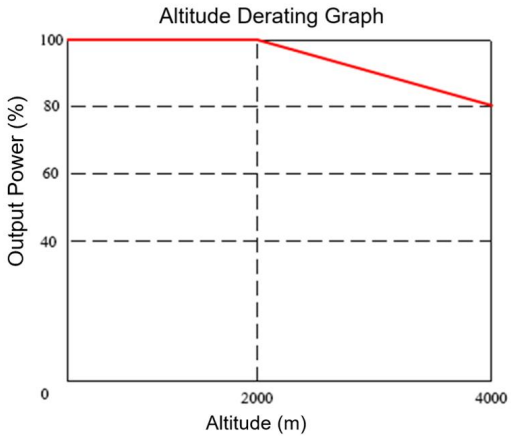
Product Characteristics Graphs







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 natural air condition, please contact us if it need be used at a closed space.

Recommended Circuit Diagrams for Application

1. Typical application circuit diagram

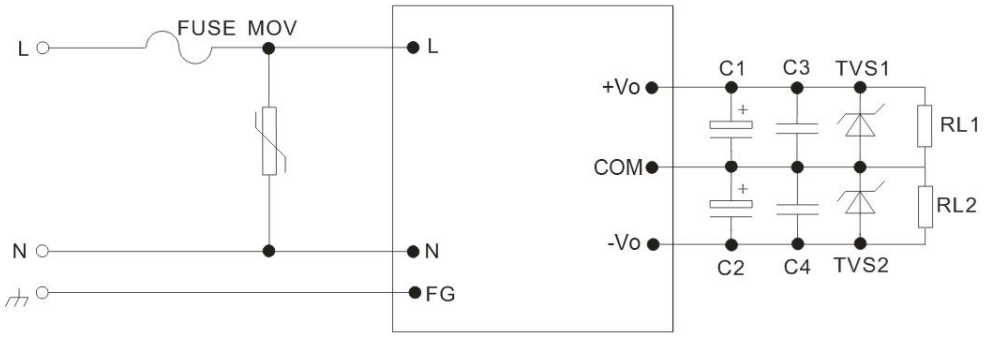


Figure 1

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2. Recommended EMC circuit diagram

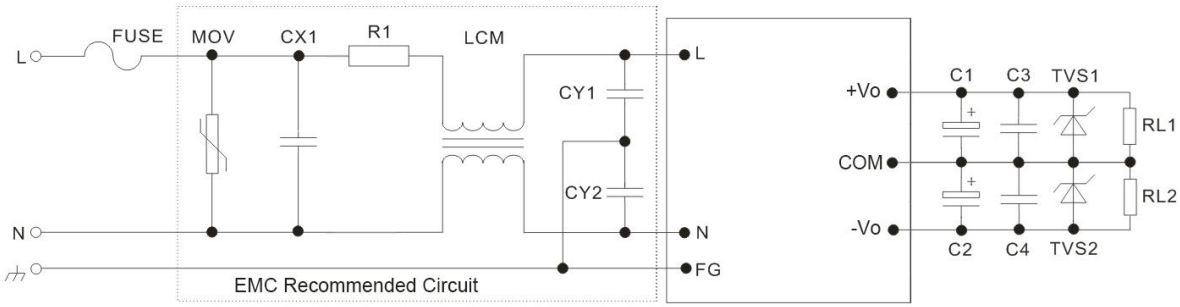

Figure 2

FUSE	1A/300Vac(necessary)	CY1, CY2	Y1/102M/400VAC
MOV	14D561K/4500A	C1, C2, TVS1, TVS2	See Note below
CX1	X2/224K/310VAC	C3 C4	1206/104K/50V
LCM	30mH/0.5A	R1	6.8Ω/2W, wire-wound resistor

Note:

1) High-frequency low-impedance electrolytic capacitors are recommended for C1 & C2 which capacitance should be less than the Max capacitive load and the withstand voltage more than 1.5x of the output voltage.

2) 0.1uF ceramic SMD chip capacitors are recommended for C3 & C4 which withstand voltage should be more than 1.5x of the output voltage.

3) TVS1 & TVS2: SMBJ7.0A for 5V output, SMBJ12.0A for 9V output, SMBJ20A for 12V & 15V outputs, SMBJ30.0A for 24V output and SMBJ64A for 48V output.

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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