AC/DC Converter FA5-220SXXB9D4(-1) Series



Typical Features

- ♦ Wide input voltage range:90-265VAC/127-380VDC
- ◆ No load power consumption≤0.3W
- Transfer efficiency (typ. 82%)
- Switching Frequency: 65KHz
- Protections: short circuit, over-current, over-voltage
- ◆ Isolation voltage:3000Vac
- ◆ 4000m altitude application
- ◆ Conform to IEC62368/UL62368/EN62368 test standard
- ◆ Ultra small bare board, industrial level design
- ◆ PCB mounting

Application Field

FA5-220SXXB9D4(-1) Series----- a compact size, high efficient, power module offered by Aipu. It features universal input voltage range, DC and AC dual-use, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation. with good EMC performance, meet international EN55032, IEC/EN61000 standard. This series have very important application for power, industrial, instrument, smart home field. The application circuit in the datasheet is strongly recommended for harsh EMC environment.

Typical Product List

Certifi cate	ltem No.	O	utput Specificatio	ns	Max.	Ripple&	Efficiency@
		Power	Voltage	Current	Load @220 Vac	Noise 20MHz (Max)	Full Load , 220Vac (Typical)
		(W)	u F	lo1(m A)	uF	mVp-p	%
-	FA5-220S3V3B9D4(-1)	3	3.3	1000	800	90	67
-	FA5-220S05B9D4(-1)	5	5	1000	200	90	71
-	FA5-220S5V25B9D4(-1)	5	5.25	952	1500	90	72
-	FA5-220S09B9D4(-1)	5	9	556	200	120	77
-	FA5-220S12B9D4(-1)	5	12	416	200	120	79
-	FA5-220S15B9D4(-1)	5	15	333	200	150	79
-	FA5-220S24B9D4(-1)	5	24	208	33	120	82

Note 1: The note -1 after the name is the bent-foot model;

Note 2: The typical value of output efficiency is based on the product being aged at full load for half an hour;

Note 3: The full-load efficiency (%, TYP) in the table fluctuates by ±2%, and the full-load efficiency is the total output power divided by the input power of the module;

Note 4: The ripple and noise test method uses the twisted-pair test method. For specific test methods and matching, please see the following (Ripple & Noise Test Instructions);

Note 5: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

Input Specifications									
Item	Operating Condition	Min	Тур.	Max	Unit				
Input Voltage Range	AC input	90	220	265	VAC				



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Image: body of the sector										
<table-container>IndureImag</table-container>				DC input		127	310	380	VDC	
<table-container> Here Introduct Interpretation Interpretation</table-container>	Input Frequency Range -			47	50	63	Hz			
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$ \ \ \ \ \ \ \ \ \ \ \ \ \ $		5	Surge Current		220VAC		-	-	21	
Image: I		Le	akage Current		-			0.25mA TYP/2	30VAC/50Hz	
Hot-plug $\ \ \ \ \ \ \ \ \ \ \ \ \ $		E Reco	External Fuse		-			1A-3A/250VA	C slow-fusing	
Nominal input voltage range, 15-100% load (%* 15% load could work if output is stable)Min.Typ.Max.UnitVoSingle Output is stable)VoSingle Output is stable)Single O		Hot-plug		-			unavai	ilable		
Output Specifications Min. Typ. Max. Unit Item Operating Condition Min. Typ. Max. Unit Voltage Accuracy Full input voltage range, 15-100% load (0%~15% load could work if output is stable) Vo - ±2.0 ±5.0 % Line Regulation Nominal Load Vo - ±1.0 ±3.0 % Load Regulation Nominal input voltage,20%~100% load Vo - ±1.0 ±5.0 % No Load Power Input 115VAC - - - 0.3 W Gonsumption Input 220VAC 15 - - % Turn-or Delay Time Nominal Input voltage (full load) 1 600 - ms Input 115VAC (full load) - 70 - % ms ms Overshoot Input 220VAC (full load) - 70 - % % Short circuit protection Ecovery time Full input voltage range 5.00 - 45.0	Remot	e Control Terminal		-			unavai	ilable		
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No Load Power ConsumptionInput 115VAC0.3WMinimum LoadSingle Output15%Minimum LoadSingle Output15-%%Turn-or Delay TimeNominal input voltage (full load)-600-msPower-off Holding TimeInput 115VAC (full load)-600-msPower-off Recovery timeInput 220VAC (full load)-70-%Overshoot range25%~50%~25%-5.0-+5.0%Recovery time25%~50%~25%-5.0-+5.0%Short circuit protectionFull input voltage range-50%~75%~50%-%OutputVer-shoot rangeFull input voltage range- 40.03% -%OutputVereficient 40.03% -%%Concrust protectionInput 220VAC- 40.03% -%%Core rating Frequency 40.03% -%%Core rating Frequency 40.03% -%%Core rating Temperature65-KHzCore rating Temperature400-%Core rating Temperature%%Core rating Temperature65-KHzCore rating Temperature<	Loa	d Regulation	Noi	ominal input voltage,20%~100% load Vo		-	±1.0	±5.0	%	
ConsumptionInput 220VAC0.3WMinimum LoadSingle Output15%Turn-or Delay TimeNominal input voltage (full load).600.msPower-off Holding TimeInput 115VAC (full load).30Power-off Robing TimeInput 220VAC (full load)30Overshoot mic rangeInput 220VAC (full load)70Overshoot nok rangeSo%~75%~50%%Overshoot nok rangeSo%~75%~50%%Outrut vort-shoot neFull input voltage range%Outrut protectionFull input 220VAC%%Outrut protectionFull input voltage range%%Over shoot ne%%%Outrut protectionInput 220VAC%%%%%%%%%%%%%%%%%%%%<	No Load Power Consumption			Input 115VAC		-	-			
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Dyna mic rangeOvershoot range $25\%^{\circ}50\%^{\circ}25\%$ $50\%^{\circ}75\%^{\circ}50\%$ -5.0 -5.0 $+5.0$ $\%$ Respo nseRecovery time $50\%^{\circ}75\%^{\circ}50\%$ -5.0 -5.0 -5.0 $+5.0$ ms $Output$ vor-shoot $Full input voltage range$ (-5.0) -5.0 <td< td=""><td>Power-0</td><td>off Holding Time</td><td></td><td>Input 220VAC (full load)</td><td>-</td><td>70</td><td>-</td><td>mS</td></td<>	Power-0	off Holding Time		Input 220VAC (full load)	-	70	-	mS		
Response nseRecovery time $50\%^{7}75\%^{5}0\%$ -5.0 -5.0 $+5.0$ mS Output Over-shoot $Full input voltage range$ 410% 45.0 9.0% Short circl in protection $Full input voltage range$ 410% 9.0% 9.0% Drift Coefficient $ \pm 0.03\%$ $ 9.0\%$ Over Current ProtectionInput 220VAC 210% 210% 9.0% 9.0% General SpecificationsItemOperating ConditionMin.Typ.Max.Unit $0 perating Temperature$ $ -40$ $ +105$ $ -$ Storage Temperature $ -40$ $ +110$ $ -$	Dyna mic	Overshoot range		25%~50%~25%		-5.0	-	+5.0	%	
Output Over-shootFull input voltage range $\leq 10\%V_0$ $\leq 10\%V_0$ Short circuit protection- G_{C} <	Respo nse	Recovery time		50%~75%~50%		-5.0	-	+5.0	mS	
Short circuit protectionFull input voltage range $C \cup Iuous, Self-recovery$ HiccurDrift Coefficient $\pm 0.03\%$ - $\%\%\%$ Over Current ProtectionInput 220VAC $\geq \perp \vee Io Self-recovery$ HiccurGeneral SpecificationsItemOperating ConditionMin.Typ.Max.UnitSwitching Frequency65-KHzOperating Temperature40-+105 $_{\sim}C$	Outp	ut Over-shoot					%			
Drift Coefficient \cdot \cdot \pm 0.03% \cdot $\%$ % COver Current ProtectionInput 220VAC \cdot	Short circuit protection			Full input voltage fange		Сог	Hiccup			
Over Current ProtectionInput 220VAC $\ge 1 + 0 \cdot 5 + 1 + 0 \cdot 5 + 1 + 1 - 1 + 0 \cdot 5 + 1 + 1 - 1 + 1 + 0 \cdot 5 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +$	Drift Coefficient			-		-	±0.03%	-	%/ ℃	
General SpecificationsItemOperating ConditionMin.Typ.Max.UnitSwitching Frequency65-KHzOperating Temperature40-+105 $_{\mathcal{C}}^{\mathcal{C}}$ Storage Temperature40-+110 $_{\mathcal{C}}^{\mathcal{C}}$	Over Current Protection			Input 220VAC		≥110% Io Self-recovery			Hiccup	
ItemOperating ConditionMin.Typ.Max.UnitSwitching Frequency65-KHzOperating Temperature40-+105 $^{\circ}_{C}$ Storage Temperature40-+110 $^{\circ}_{C}$	Genera	al Specifications								
Switching Frequency-65-KHzOperating Temperature40-+105_^CStorage Temperature40-+110_C		Item		Operating Condition		Min.	Тур.	Max.	Unit	
Operating Temperature40-+105Storage Temperature40-+110	Sv	vitching Frequency		-		-	65	-	KHz	
Storage Temperature40 - +110	Ope	erating Temperatur	e	-		-40	-	+105	°C	
	Storage Temperature			-		-40	-	+110		



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Soldering Temperature		Wave-soldering	260±4°C, timing 5-10S				
		Manual-soldering		360±8℃, timing 4-7S			
Relative Humidity		-	10	-	90	%RH	
Isolation Voltage		Test 1min, leakage current≤5mA	3000	-		VAC	
Insulation Resistor		@DC500V	100	-		MΩ	
Safety Standard		-	EN62368, IEC62368				
Vibration		-	10-55Hz,10G,30Min,along X,Y,Z				
Safety Class		-	CLASS II				
Class of Case			UL94 V-0				
MTBF		-	МІL-HDBK-217F@25℃>300,000Н				

EMC Characteristics

Total Item		Sub Item	Test Standard	Class			
	EN 41	CE	CISPR32/EN55032	CLASS B (Recommend Circuit 2)			
	EIVII	RE	CISPR32/EN55032	CLASS B (Recommend Circuit 2)			
		RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (Recommend Circuit 1)			
EMC		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B(Recommend Circuit 1)			
EIMC		ESD	IEC/EN61000-4-2	Contact ±6KV / Air ±8KV Perf.Criteria B			
	EMS	Surge	IEC/EN61000-4-5	±1KV Perf.Criteria B			
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B			
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B			

Dimension



AC/DC Converter FA5-220SXXB9D4(-1) Series



Dimension -1 THIRD ANGLE PROJECTION Max42.00[1.653] Max22.00[0.866] - 2.00[0.078] 4 1 3 5 7 12 14 5 7 Ø1.20[0.047] - 0.80 [0.031] Note: Grid 2.54x2.54mm Unit:mm[inch] General tolerance:±1.00mm[±0.039inch] Layout is for reference, please refer to actual item Max13.00[0.511] 0.50 [0.020] 4.50 [0.177]--5.08 [0.200] 33.02 [1.300] Packing Code LxWxH В 42 x 20 x 13mm 1.654 × 0.788 × 0.531inch **Pin Definition** 7 Pin 1 3 5 12 14

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

AC(N)

AC(L)

+Cap

-Cap

Test Method:

Single(S)

(1) 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

(2) Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



-Vo

+Vo

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Product Characteristic Curve



Note

1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 90~100VAC/240~265VAC/127~140VDC/ 340~380VDC.

2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

Typical Application Circuit and EMC Recommended Circuit



AC/DC Converter FA5-220SXXB9D4(-1) Series



Model	C1 (required)	C2 (required)	L1	C3 (required)	C4	L2	NTC	CY0	FUSE (required)	TVS
FA5-220S3V3B9D4	_	680uF/10V		680uF/10V	0.1uF/5 0V	4.7mH	5D-9	102M/ 400V	3.15A/ 250V	SMBJ7.0A
FA5-220S05B9D4		680uF/10V		680uF/10V						SMBJ7.0A
FA5-220S5V25B9D4		470uF/16V		330uF/10V						SMBJ9.0A
FA5-220S09B9D4	10uF/ 400V	470uF/16V	2.0uH	220uF/16V						SMBJ12A
FA5-220S12B9D4	-	330uF/16V		100uF/16V						SMBJ20A
FA5-220S15B9D4		330uF/16V		100uF/16V						SMBJ20A
FA5-220S24B9D4		100uF/35V		47uF/35V						SMBJ30A

Note:

1.C1: When AC input, C1 is the input filter electrolytic capacitor (must be external), the recommended value is 10uF/400V.

When DC input, C1 is a large filter capacitor in the EMC filter (must be external), the recommended value is 10uF/400V.

2. R1: is a current limiting resistor, the recommended value is 12 ohms, 5W.

3. MOV1 is a varistor, the recommended model is 10D561K.

2.EMC solution-recommended circuit(under high EMC request)



AC/DC Converter FA5-220SXXB9D4(-1) Series



FUSE	Recommended 3.15A, 250Vac (required)	NTC	5D-9	R1,R2	Resistance 2.2K, above 1/8W
MOV	10D561K	CY1,CY2	1nF/400VAC		
СХ	0.22uF/275Vac	LDM	330uH		
LCM	40mH min	L2,L3	Color ring 1mH,1W		

Note:

1. The product should be used within the specification range, or it will cause permanent damage to it;

2. The input terminal should connect to fuse;

3. If the product is operated under the minimum load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;

4. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;

5. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75% with nominal input voltage and rated output load(pure resistance load);

6. All index testing methods in this datasheet are based on our Company's corporate standards;

7. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model

products will exceed the above-mentioned requirements, please directly contact our technician for specific information;

8. We can provide product customization service,

9. Specifications are subject to change without prior notice.

Guangzhou Aipu Electron Technology Co., Ltd

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