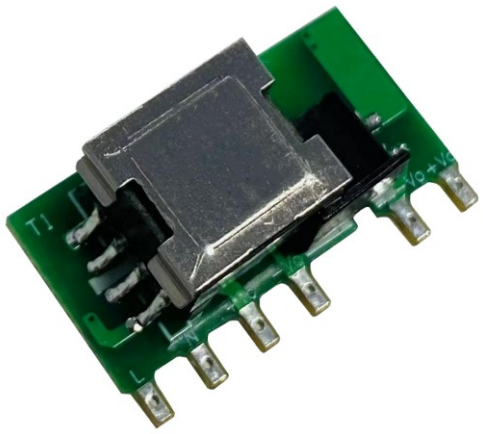
Typical Features

- ◆ Wide input voltage range 85-305VAC/70-430VDC
- ◆ No load power consumption ≤ 0.15W
- ◆ Efficiency up to 76%(TYP.)
- ◆ Operating temperature from -40℃ to +105℃
- ◆ Switching Frequency 65KHz
- ◆ Short circuit protection & over current protection
- ◆ Isolation voltage 3100Vac
- ◆ Altitude during operating 4000m Max
- ◆ Compliant with IEC62368/UL62368/EN62368
- ◆ Mini size open-frame, industrial level design
- ◆ PCB SIP mounting
- ◆ Creepage distance and clearance distance 4.5mm



Application Field

DA3-220SXXG9D4 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 for EMC is recommended in this data sheet for the application with higher EMC requirement.*

Typical Product List

Certificate	Part No.	Output Specifications					Capacitive Load @220Vac	Ripple& Noise 20MHz	Efficiency@ Full Load, 220Vac
		Power	Voltage1	Current1	Voltage 2	Current 2	u F (Max)	mVp-p (Max)	%(Typ)
		(W)	Vo1(V)	Io1(m A)	Vo2(V)	Io2(m A)			
-	DA3-220S3V3G9D4	2	3.3	600	-	-	500	100	69
-	DA3-220S05G9D4	3	5	600	-	-	500	100	73
-	DA3-220S09G9D4	3	9	333	-	-	500	100	75
-	DA3-220S12G9D4	3	12	250	-	-	500	100	75
-	DA3-220S15G9D4	3	15	200	-	-	400	120	75
-	DA3-220S24G9D4	3	24	125	-	-	100	150	76

Note 1 - The ripple and noise are tested by the twisted pair method, please refer to the following test instructions.

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.

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	115VAC	-	-	0.10	A
	220VAC	-	-	0.07	
Surge Current	115VAC	-	-	22	
	220VAC	-	-	24	
No load power consumption	115VAC	-	0.10	0.15	W
	220VAC				
Leakage Current	-	0.25mA TYP/ 230VAC/ 50Hz			
Recommended External Fuse	-	1A-3A/300VAC Time-delay fuse			
Hot Plug	-	NA			
Remote Control	-	NA			

Output Specifications

Item		Operating Condition		Min	Typ.	Max	Unit
Voltage Accuracy		Full input voltage range, 10-100% load	Vo1	-	±2.0	±6.0	%
Line Regulation		Rated load	Vo1	-	±1.0	±2.0	%
Load Regulation		Rated input voltage, 20%~100% load	Vo1	-	±1.0	±3.0	%
Minimum Load		Single Output		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% 50%~75%~50%		-5.0	-	+5.0	%
	Recovery time			-5.0	-	+5.0	mS
Output Overshoot		Full input voltage range		≤10%Vo			%
Short circuit Protection		Full input voltage range		Continuous, self-recovery			Hiccup
Drift Coefficient		-		-	±0.03%	-	%/℃
Over Current Protection		Input 220VAC		≥110% Io, self-recovery			Hiccup
Ripple & Noise		Full input voltage range		-	50	150	mV

General Specifications

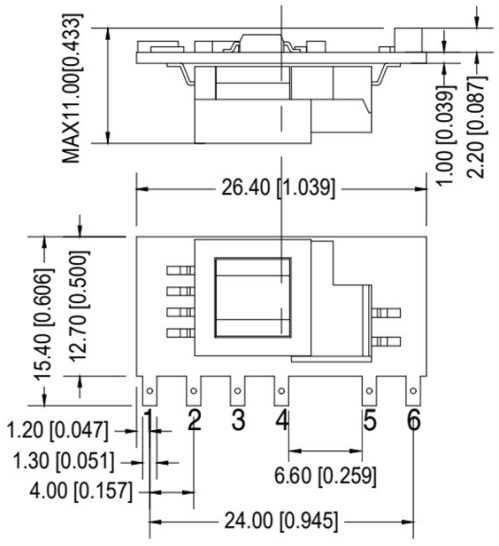
Item	Operating Condition	Min	Typ.	Max	Unit
Switching Frequency	-	-	65	-	KHz
Operating Temperature	Please refer to the Temperature Derating Curve	-40	-	+105	℃
Storage Temperature	-	-40	-	+110	
Soldering Temperature	Wave soldering	260±4℃, time 5-10S			

		Manual soldering	360±8℃, time 4-7S			
Relative Humidity		-	10	-	90	%RH
Isolation Voltage	I/P-O/P	Dielectric test 1min, leakage current≤5mA	3100	-	-	VAC
Insulation Resistance	I/P-O/P	@ DC500V	100	-	-	MΩ
Safety Standard		-	EN62368, IEC62368			
Vibration		-	10-55Hz,10G, 30 Min, along X, Y, Z			
Safety Class		-	CLASS II			
MTBF		MIL-HDBK-217F @25℃	＞1000,000H			
Product Weight		-	4g（TYP）			

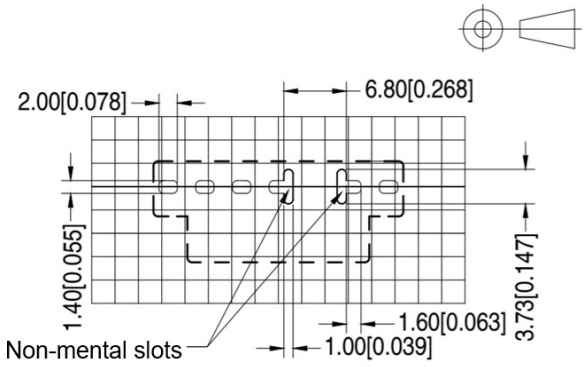
EMC Performance

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

Mechanical Dimensions



Unit: mm[inch]
General tolerance ±1.00[±0.039]
The components layout is only for reference, any deviation from the actual unit should be accepted.



PCB layout vertical view (Grid 2.54x2.54mm)

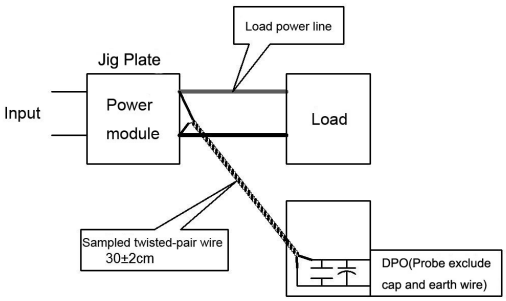
Pin No.	Function
1	L(input)
2	N(input)
3	Vcap+
4	Vcap-
5	Vout-
6	Vout+

Packing Code	L x W x H	
-	26.4 x 15.4 x 11.0 mm	1.039 × 0.606 × 0.433 inch

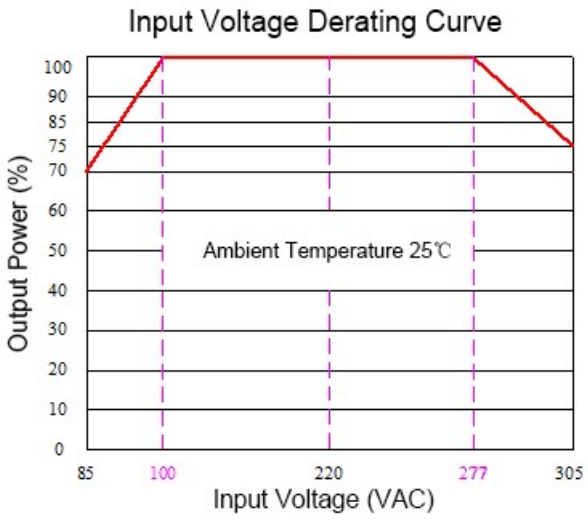
Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)

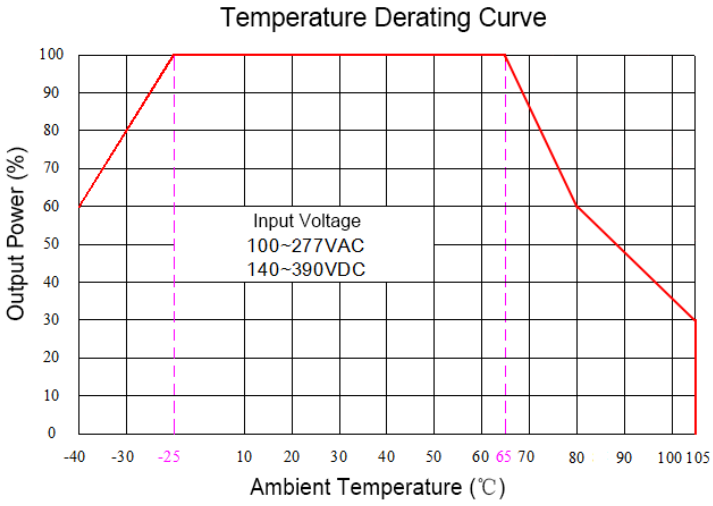
1) Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample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

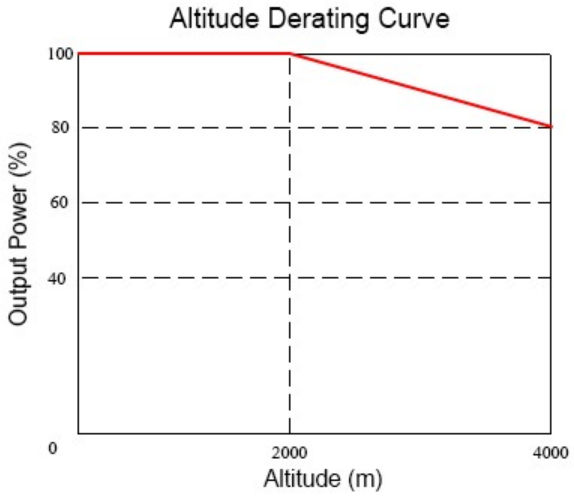
2) The output ripple noise test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Product Performance Curves





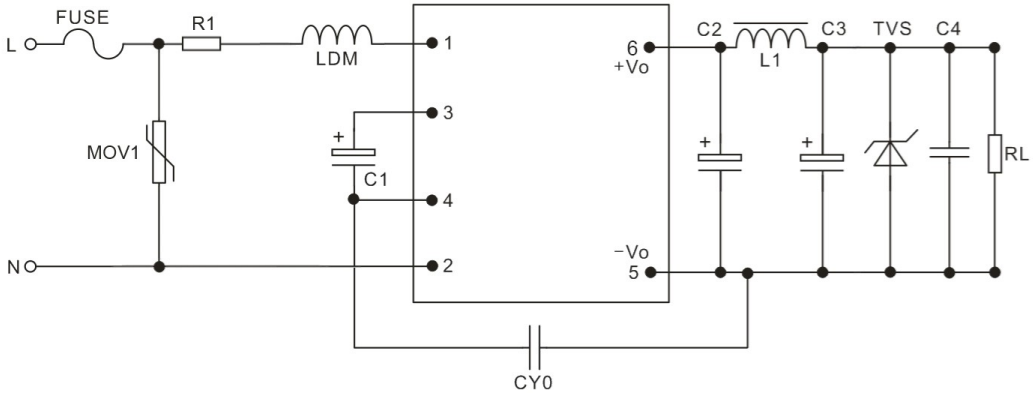


Note 1 - The output power should be derated based on the input voltage derating curve at 85~100VAC/277~305VAC/70~140VDC/ 390~430VDC.

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

Recommended Circuits for Application

1.Typical Application Circuit



Circuit 1

Part No.	C2 (* Solid-state capacitor)	L1 (*)	C3 (*Solid-state capacitor)	C4	LDM	R1 (*)	CY0	FUSE (*)	TVS
DA3-220S3V3G9D4	220uF/10V	2.0uH	220uF/10V	0.1uF /50V	4.7mH /0.2A	12Ω/5W (Wire-wound resistor)	Y1 /102M /400V	1A/300V, Time-delay fuse	SMBJ7.0A
DA3-220S05G9D4	220uF/10V		220uF/10V						SMBJ7.0A
DA3-220S09G9D4	220uF/16V		68uF/16V						SMBJ12A
DA3-220S12G9D4	220uF/16V		68uF/16V						SMBJ20A
DA3-220S15G9D4	220uF/35V		68uF/35V						SMBJ20A
DA3-220S24G9D4	68uF/35V		47uF/35V						SMBJ30A

C1（*）	Operating Condition
10uF/450V	Input 85-305VAC，-25℃~85℃ Input 165-305VAC，-40℃~85℃
22uF/450V	Input 85-305VAC，-40℃~85℃

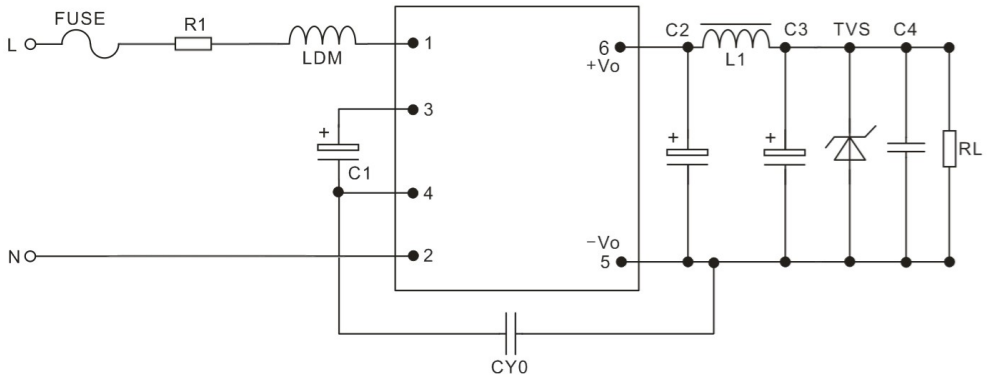
Note 1 - * marked component is necessary for the application, not optional.

Note 2 - C1 will work as the input filter at AC input, and the EMC filter at DC input, an electrolytic capacitor is recommended with ripple current >200mA@100KHz.

Note 3 - MOV1 is a Metal Oxide Varistor, 14D561K/4500A is recommended.

2. Recommended circuit for high EMC requirement

Basic application

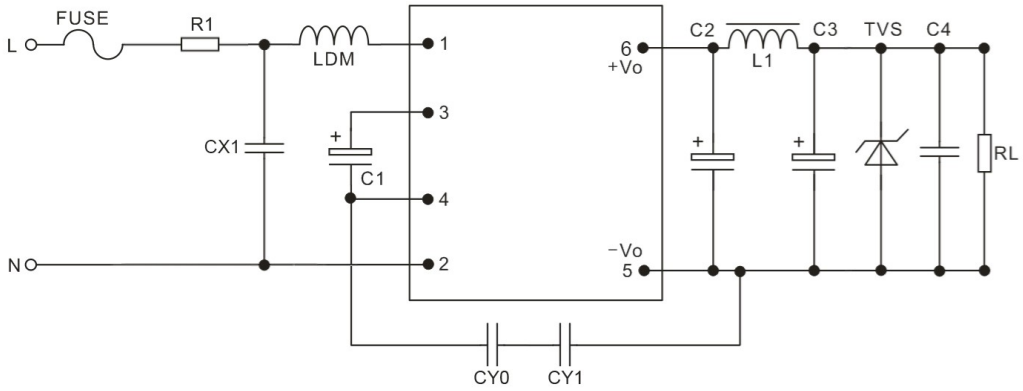


Circuit 2-1

Application Environment	Ambient Temperature	EMS Level	EMI Class
Basic Applications	-40℃ ~ +85℃	3	Class A

Component	Recommend Value
FUSE(Necessary)	1A/300V, Time-delay fuse
R1 (Wire-wound resistor, necessary)	12Ω/5W
LDM	1.2mH/4Ω Max/0.2A Min
Note – Wire-wound resistor is recommended for R1 as the input plug-in resistor, SMD resistor or a carbon film resistor is not available for the application.	

Recommended circuit for indoor household normal environment

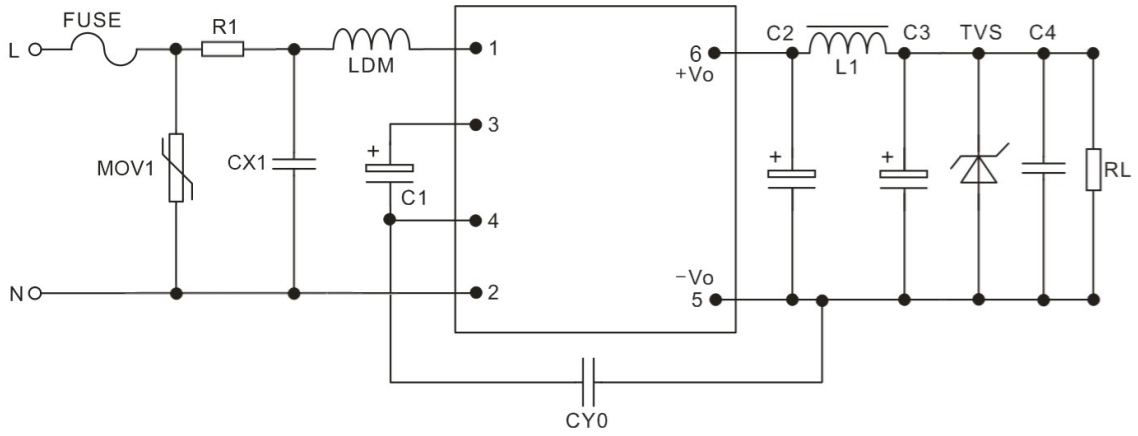


Circuit 2-2

Application Environment	Ambient Temperature	EMS Level	EMI Class
Indoor household Normal	-25℃ ~ +55℃	3	Class B

Component	Recommended Value
FUSE (Necessary)	1A/300V, Time-delay fuse
R1 (Wire-wound resistor, necessary)	12Ω/5W
CX1	X2/104K/310VAC
LDM	1.2mH/4Ω Max/0.2A Min
Note 1 – 2x Y capacitors (CY0 & CY1, 2.2nF/250VAC recommended) are needed for household application which is compliant with IEC60335. Note 2 - A <3.8MΩ bleeder resistor is recommended to connect in parallel with X capacitor to meet certificate requirement, the resistor value can be defined according to the actual test situation. Note 3 - Wire-wound resistor is recommended for R1 as the input plug-in resistor, SMD resistor or a carbon film resistor is not available for the application.	

Recommended circuit for indoor industrial environment

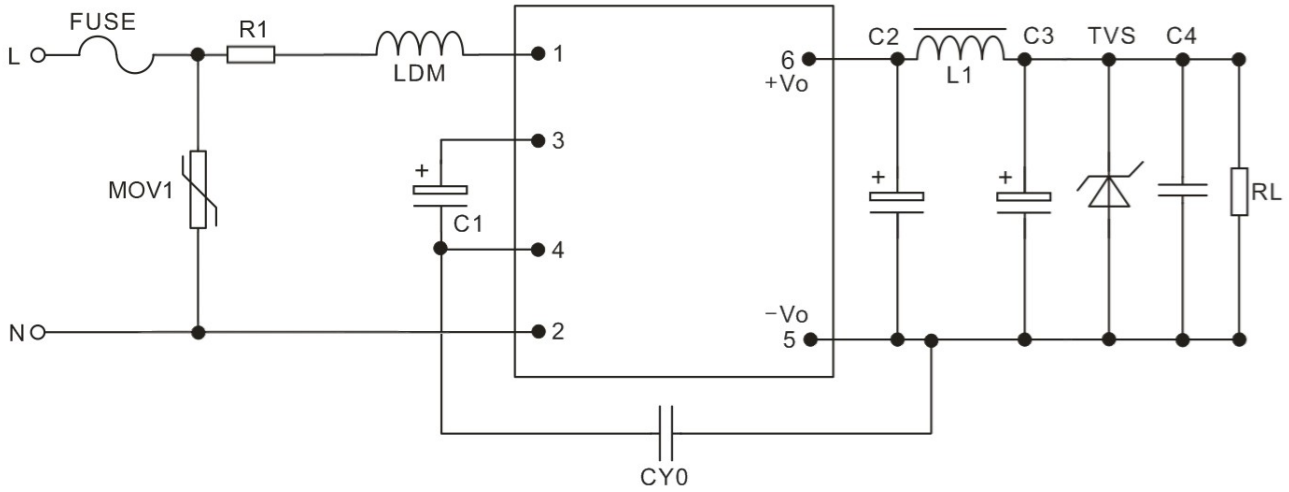


Circuit 2-3

Application Environment	Ambient Temperature	EMS Level	EMI Class
Indoor Industry	-25℃ ~ +55℃	4	Class B

Component	Recommended Value
FUSE (Necessary)	2A/300V, Time-delay fuse
MOV1	14D561K/4500A
R1 (Wire-wound resistor, necessary)	12Ω/5W
CX1	X2/104K/310VAC
LDM	1.2mH/4Ω Max/0.2A Min
Note 1 - A <3.8MΩ bleeder resistor is recommended to connect in parallel with X capacitor to meet certificate requirement, the resistor value can be defined according to the actual test situation. Note 2 - Wire-wound resistor is recommended for R1 as the input plug-in resistor, SMD resistor or a carbon film resistor is not available for the application.	

Recommended circuit for outdoor normal environment



Circuit 2-4

Application Environment	Ambient Temperature	EMS Level	EMI Class
Outdoor normal	-40℃ ~ +85℃	4	Class A

Component	Recommended Value
FUSE (Necessary)	2A/300V, Time-delay fuse
MOV1	14D561K/4500A
R1 (Wire-wound resistor, necessary)	12Ω/5W
LDM	1.2mH/4Ω Max/0.2A Min
Note - Wire-wound resistor is recommended for R1 as the input plug-in resistor, SMD resistor or a carbon film resistor is not available for the application.	

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/ It is not recommended to connect the power supply outputs in parallel to achieve a bigger power output.

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, rated input voltage and rated 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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