



Typical Features

- ◆ Wide input voltage range: 85-305VAC/120-430VDC
- ◆ No load power consumption≤0.3W (typ.)
- ◆ Transfer Efficiency (Typical 75%)
- ◆ Switching Frequency: 65KHz
- ◆ Protections: short circuit, over current, over temperature
- ◆ Isolation voltage:3000Vac
- ◆ Meet IEC62368/UL62368/EN62368 test standard
- ◆ Pass UL, FCC, CE, RoHS certificate
- ◆ Plastic case, meet UL94 V-0 class
- ◆ PCB mounting



Application Field

FA2-220SXXN2 Series -----a compact size, high efficient, pass UL, FCC, CE, RoHS standard power module offered by Aipu. It features universal input voltage range, AC and DC dual-use, low ripple, low temperature rise, low power consumption, high efficiency, high reliability, safer isolation, good EMC performance. EMC and Safety standard meet international EN55032,IEC/EN61000. These series have important application for power, industry, instrument and smart home field. For harsh EMC environment, our recommended application circuit is highly recommended.

Typical Product List

| Certificate | Part No. | Output Specifications | | | Max. Capacitive Load | Ripple& Noise 20MHz (Max) | Efficiency @ Full Load, 220Vac (Typical) |
|----------------|---------------|-----------------------|---------|---------|----------------------|---------------------------|--|
| | | Power | Voltage | Current | | | |
| | | (W) | Vo(V) | Io(m A) | | | |
| - | FA2-220S3V3N2 | 2 | 3.3 | 600 | 700 | 120 | 68 |
| UL/FCC/CE/RoHS | FA2-220S05N2 | 2 | 5 | 400 | 900 | 120 | 70 |
| - | FA2-220S12N2 | 2 | 12 | 167 | 100 | 150 | 75 |
| - | FA2-220S24N2 | 2 | 24 | 83 | 47 | 150 | 78 |

Note 1: Due to space limitations, above is only a part of our product list, please contact our sales team for more items.
 Note 2: The typical value of output efficiency is based on module is full loaded and burned-in after half an hour.
 Note 3: The fluctuation range of full load efficiency(%,TYP) in table is ±2%, full load efficiency= output power/module's input power.

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 | / | / | 0.06 | A |
| | 220VAC | / | / | 0.04 | |
| Surge Current | 115VAC | / | / | 10 | |
| | 220VAC | / | / | 20 | |
| Leakage Current | - | 0.5mA TYP/230VAC/50Hz | | | |
| Recommended External Input Fuse | - | 1A-2A/250VAC slow fusing | | | |
| Hot Plug | - | Unavailable | | | |
| Remote Control Terminal | - | Unavailable | | | |

Output Specifications

| Item | Operating Condition | | Min | Typ. | Max | Unit |
|--------------------------|---|----|---------------------------|--------|--------|--------|
| Voltage Accuracy | Input voltage 220V, any load | Vo | - | - | ±5.0 | % |
| Line Regulation | Nominal load | Vo | - | - | ±1.0 | % |
| Load Regulation | Nominal input voltage, 20%~100% load | Vo | - | - | ±5.0 | % |
| No Load Consumption | Input 115VAC | | - | 0.1 | 0.3 | W |
| | Input 220VAC | | - | | | |
| Minimum Load | Single Output | | 10 | - | - | % |
| Start up Delay Time | Nominal input voltage (full load) | | - | 200 | - | mS |
| Power-off Holding Time | Input 220VAC (full load) | | - - | 70 | - - | mS |
| Dynamic Response | 25%~50%~25% | | -5.0 | - | +5.0 | % |
| | 50%~75%~50% | | -5.0 | - | +5.0 | mS |
| Output Overshoot | Full input voltage range | | ≤10%Vo | | | % |
| Short circuit Protection | | | Continuous, self-recovery | | | Hiccup |
| Temperature Drift | - | | - | ±0.03% | - | %/°C |
| Over Current Protection | Input 220VAC | | ≥120% Io self-recovery | | | Hiccup |
| Ripple & Noise | Input 220VAC (full load) | | 50 | 80 | 120 | mV |
| | Note: Ripple & Noise is tested by twisted pair method, details please refer to Ripple & Noise test at back. | | | | | |

General Specifications

| Item | Operating Condition | Min | Typ. | Max | Unit |
|-----------------------|---------------------|---------------------|------|-----|------|
| Switching Frequency | - | - | 65 | - | KHz |
| Operating Temperature | - | -40 | - | +75 | °C |
| Storage Temperature | - | -40 | - | +85 | |
| Soldering Temperature | Wave soldering | 260±4°C, time 5-10S | | | |



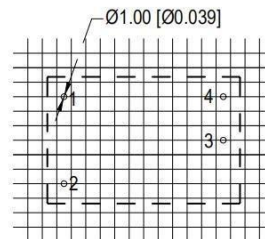
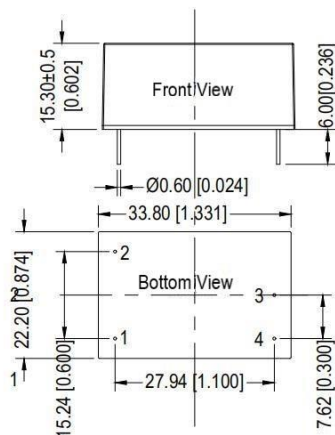
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|------------------------|---|-------------------------------|---|----|-----|
| | Manual soldering | 360±8℃, time 4-7S | | | |
| Relative Humidity | - | 10 | - | 90 | %RH |
| Isolation Voltage | Input-Output Test 1min, leakage current≤5mA | 3000 | - | - | VAC |
| Insulation Resistance | Input-Output@ DC500V | 100 | - | - | MΩ |
| Safety Standard | - | EN62368、IEC62368 | | | |
| Vibration | - | 10-55Hz,10G,30Min,along X,Y,Z | | | |
| Safety Standard | - | CLASS II | | | |
| Class of Case Material | - | UL94 V-0 | | | |
| MTBF | - | MIL-HDBK-217F@25℃ > 300,000H | | | |

EMC Characteristics

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

Dimension

THIRD ANGLE PROJECTION



Note:
Grid 2.54*2.54mm
Unit:mm[inch]
Pin tolerance:±0.10mm[±0.004inch]
General tolerance:±0.50mm[±0.019inch]

| | | |
|--------------|------------------|-----------------------|
| Packing Code | L x W x H | |
| N2 | 33.8X22.2X15.3mm | 1.331X0.874X0.602inch |

Pin Definition

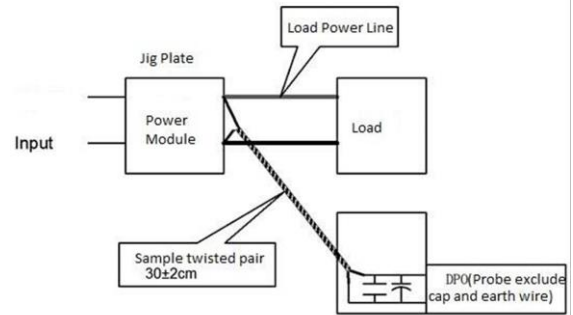
| | | | | |
|-----------|-------|-------|-----|-----|
| Pin | 1 | 2 | 3 | 4 |
| Single(s) | AC(N) | AC(L) | +Vo | -Vo |

Ripple & Noise Test :(Twisted Pair Method 20MHZbandwidth)

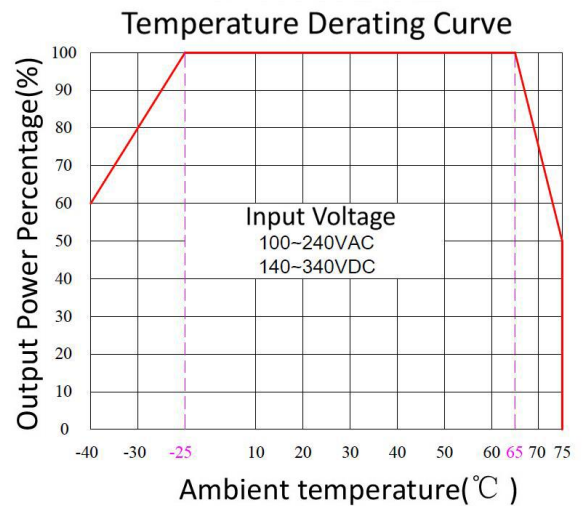
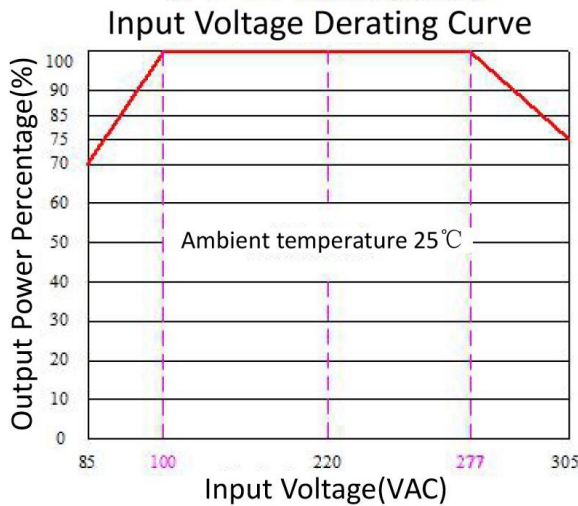
Test Method:

(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.



Product Characteristic Curve



Note 1: Input Voltage should be derated based on Input voltage derating curve when it is 85~100VAC/120~140VDC and 277~305VAC/390~430VDC.

Note 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

1. Typical Application Circuit



Photo 1

| | | | | | | |
|---------------------|-----------|-----------|-----------|-----------|----------|----------|
| Output Voltage | 3V3 5V | 9V | 12V 13V | 15V | 24V | 48V |
| TVS recommend value | SMBJ7.0A | SMBJ12A | SMBJ20A | SMBJ20A | SMBJ30A | SMBJ64A |
| C1 recommend value | 330uF/10V | 220uF/16V | 220uF/16V | 100uF/25V | 47uF/35V | 22uF/63V |

Note:

The output filter capacitor C1 is an electrolytic capacitor, recommended to use high-frequency, low-resistance ones. For capacity and flowing current, please refer to the technical specifications provided by each manufacturer.

C2 is a ceramic capacitor to remove high-frequency noise.

The TVS tube protects the downstream circuit when the module is abnormal and is recommended to be used.

It is recommended to connect an external FUS, model: 1A/250V slow blow.

It is recommended to connect an external RS1 wire-wound resistor, model: 2W, 20Ω.

It is recommended to connect an external MOV varistor, model: 10D561K.

2. ECM Recommended Circuit

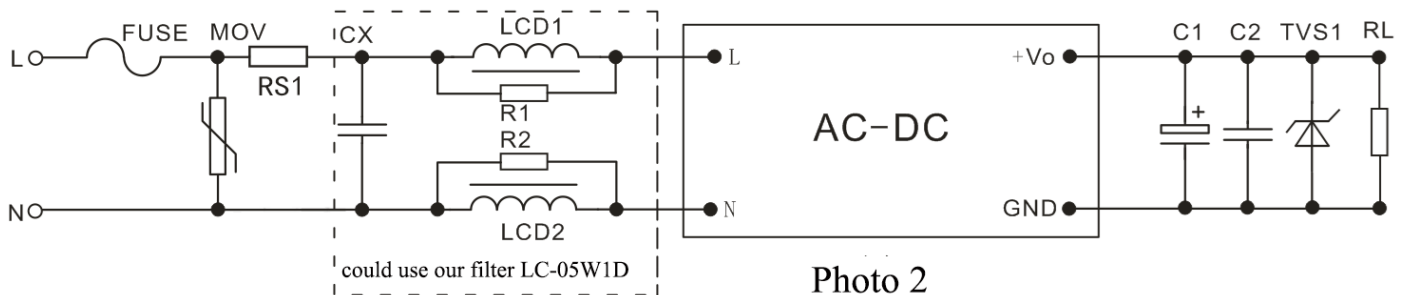


Photo 2

| Components | Recommended Value | Components | Recommended Value |
|------------|--------------------------------|------------|----------------------------|
| MOV | 10D561K | RS1 | 2W,20Ω |
| CX | 0.1uF/275VAC | LMD | 1mH/1W color ring inductor |
| FUSE | 1A/250V,slow fusing, necessary | - | - |
| R1、R2 | 2KΩ, 5%, 1/8W以上 | - | - |



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 worked under the minimum requested load, 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 $T_a=25\text{ }^{\circ}\text{C}$, 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, please follow up with our website for newest manual.