## Typical Features

- ◆ Wide input voltage range 85-305VAC/120-380VDC
- ◆ No-load power consumption ≤0.35W(Typ.)
- ◆ Efficiency up to 77% (Typ.)
- ◆ Operating temperature from -40℃ to +75℃
- ◆ Switching frequency 65KHz
- ◆ Short Circuit & Over Current Protections
- ◆ Isolation Voltage: 3600VAC
- ◆ Max. Operating Altitude: 2000m
- ◆ Compliant with IEC/EN/UL62368 Standards
- ◆ CE/RoHS Certified
- ◆ Fully enclosed plastic case, UL94V-0 rated


CE RoHS
EN62368-1

## Application Field

**FA3-220SXXA2N3 Series** Compact, high-efficiency, CE-certified AC-DC modules from Aipu. Features universal input (AC/DC dual-use), low ripple/noise, low temperature rise, low power consumption, and high efficiency. Offers high reliability, safety isolation, and excellent EMC performance meeting EN55032/IEC/EN61000 standards. Ideal for power, industrial, instrumentation, and smart home sectors. For harsh EMC environments, refer to recommended application circuits.

## Typical Product List

| Certificate | Part No. | Input Voltage Range | | Output Specifications | | | Max. Capacitive Load @220VAC | Ripple & Noise 20MHz (Max) | Efficiency @full load 220VAC (Typ.) |
|---|---|---|---|---|---|---|---|---|---|
| | | Nominal | Range | Power | Voltage | Current | | | |
| | | (VAC) | (VAC) | P(W) | Vo(VDC) | Io(mA) | (uF) | mVp-p | % |
| CE/RoHS | FA3-220S3V3A2N3 | 220 | 85-265 | 2 | 3.3 | 600 | 500 | 100 | 66 |
| | FA3-220S3V8A2N3 | | | 2.3 | 3.8 | 600 | 500 | 100 | 68 |
| | FA3-220S05A2N3 | | | 3 | 5 | 600 | 500 | 100 | 71 |
| | FA3-220S12A2N3 | | | | 12 | 250 | 300 | 120 | 75 |
| | FA3-220S15A2N3 | | | | 15 | 200 | .200 | 140 | 75 |
| | FA3-220S24A2N3 | | | | 24 | 125 | 47 | 140 | 77 |

Note 1: "*" indicates models under development.

Note 2: Typical efficiency measured after 30 min. at full load (burn-in).

Note 3: Full load efficiency (%, Typ.) may fluctuate by ±2%. Efficiency = $P_{out}$ / $P_{in.}$

Note 4: This list is partial. Contact sales for unlisted models.

## Input Specifications

| Item | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Voltage Range | AC Input | 85 | 220 | 265 | VAC |
| | DC Input | 120 | 310 | 380 | VDC |
| Input Frequency Range | - | 47 | 50 | 63 | Hz |
| Standby Power Consumption | Input 115VAC | - | 0.15 | 0.35 | W |
| | Input 220VAC | | | | |
| Input Current | Input 115VAC | - | - | 0.07 | A |
| | Input 220VAC | - | - | 0.05 | |
| Inrush Current | Input 115VAC | - | - | 10 | A |
| | Input 220VAC | - | - | 20 | |
| Leakage Current | - | 0.5mA TYP/230VAC/50Hz | | | |
| Hot Plug | - | Not Supported | | | |
| Recommended External Fuse | - | 1A/300VAC, Slow-blow type | | | |
| Remote Control (Ctrl) | - | N/A | | | |

## Output Specifications

| Item | | Test Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage Accuracy | | Full input voltage range, any load | Vo | - | ±3.0 | ±5.0 | % |
| Line Regulation | | Rated Load | Vo | - | - | ±1.0 | % |
| Load Regulation | | Nominal input voltage, 20%~100% load | Vo | - | - | ±4.0 | % |
| Ripple & Noise | | 5%-100% load, 20MHz bandwidth | Vo | - | - | 140 | mVp-p |
| | | Note 1: Ripple and noise are measured using the parallel cable method. Please refer to the "Ripple & Noise Test Instruction" section for specific test setups and configurations. | | | | | |
| Dynamic Response | Overshoot | 25%~50%~25% | | -5.0 | - | +5.0 | % |
| | Recovery Time | 50%~75%~50% | | - | - | 5.0 | ms |
| Minimum Load | | Single output | | 10 | - | - | % |
| Temperature Coefficient | | - | | - | - | ±0.03 | %/℃ |
| Start-up Delay Time | | Input 115VAC (full load) | | - | - | 1500 | ms |
| | | Input 220VAC (full load) | | - | - | | |
| Hold-up Time | | Input 115VAC (full load) | | 10 | - | - | |
| | | Input 220VAC (full load) | | | - | - | |
| Start-up Overshoot | | Full input voltage range | | ≤10 | | | %Vo |
| Short Circuit Protection(SCP) | | | | Continuous, Auto-recovery | | | Hiccup |
| Over Current Protection(OCP) | | Input 220VAC | | 120%Io | - | 280%Io | mA |

## General Specifications

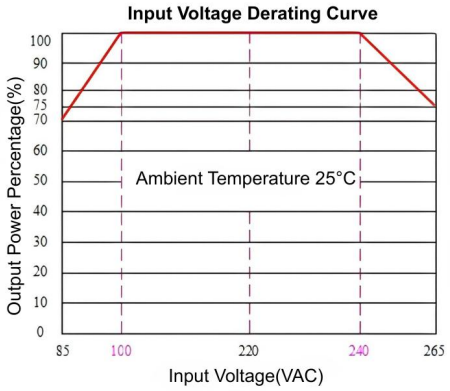
| Item | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Switching Frequency | - | - | 65 | - | KHz |
| Operating Temperature | Refer to the Temperature Derating Curve | -40 | - | +75 | ℃ |
| Storage Temperature | - | -40 | - | +105 | |

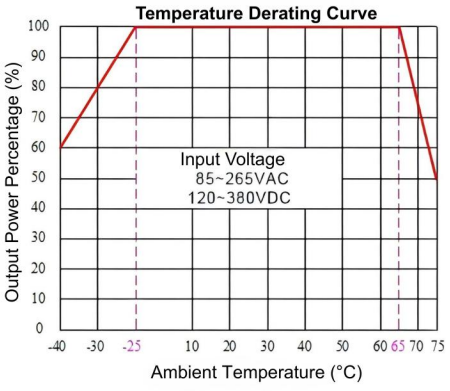
| | | | | | | |
|---|---|---|---|---|---|---|
| Soldering Temperature | Wave-soldering | | 260±4℃, 5-10s | | | |
| | Manual-soldering | | 360±8℃, 4-7s | | | |
| Relative Humidity | - | | 10 | - | 90 | %RH |
| Isolation Voltage | I/P-O/P | Test 1min, leakage current <5mA | 3600 | - | - | VAC |
| Insulation Resistance | I/P-O/P | @DC500V | 100 | - | - | MΩ |
| MTBF | MIL-HDBK-217F@25℃ | | 300 | - | - | kh |
| Safety Standard | - | | IEC/EN62368 | | | |
| Vibration | 10-55Hz, 10G, 30min each axis (X, Y, Z) | | | | | |
| Safety Class | - | | CLASS Ⅱ | | | |
| Flammability Rating | - | | UL94V-0 | | | |
| Weights & Dimensions | Part No. | Weight (Typ.) | Dimensions L x W x H | | | |
| | A2 | 16g | 37.7X18.7X13.6mm | 1.484X0.736X0.535inch | | |

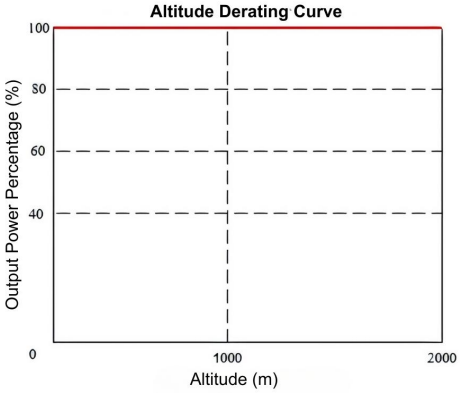
## EMC Performance

| Test Items | | | Test Standards | Performance Level / Criteria |
|---|---|---|---|---|
| EMC | EMI | CE | CISPR32/EN55032 | CLASS B (Ref. Fig. 1) |
| | | RE | CISPR32/EN55032 | CLASS B(Ref. Fig. 1) |
| | 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 |
| | | Surge Immunity | IEC/EN61000-4-5 | line to line ±2KV / line to ground ±4KV<br>Perf.Criteria B (Ref. Fig. 1) |
| | | EFT | IEC/EN61000-4-4 | ±2KV Perf.Criteria B |
| | | Voltage Dips & Interruptions | IEC/EN61000-4-11 | 0%~70%,Perf. Criteria B |

## Product Characteristics Graphs




Note 1: For input voltage ranges of 85-130VAC / 240-305VAC / 120-170VDC / 340-430VDC, temperature derating must be applied based on the input voltage derating curve. (The maximum operating temperature for CE certification is 50°C).

Note 2: Cooling: Natural convection. For enclosed environments, please contact us.

## Typical Application Circuit & EMC Recommended Components

### 1. Typical Application Circuit

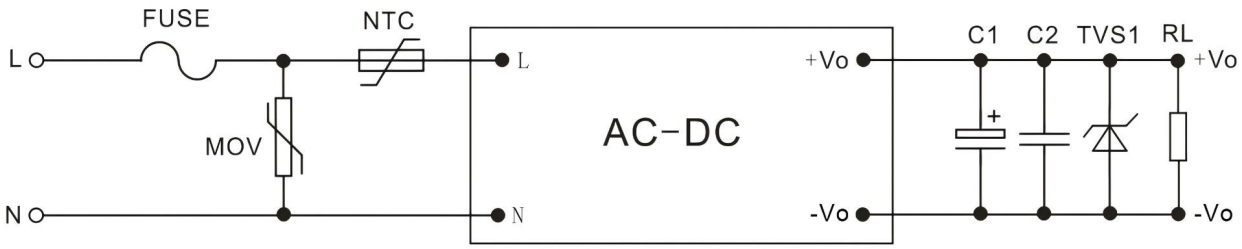



Figure 1

| 型号 | C1 | C2 | FUSE(Required) | MOV | NTC | TVS |
|---|---|---|---|---|---|---|
| FA3-220S3V3A2N3 | 330uF/10V | 1uF/50V | 1A/300VAC, Slow-blow | 10D471K /3500A | 10D-7 | SMBJ7.0A |
| FA3-220S3V8A2N3 | | | | | | |
| FA3-220S05A2N3 | | | | | | |
| FA3-220S12A2N3 | 220uF/16V | | | | | SMBJ20A |
| FA3-220S15A2N3 | 100uF/25V | | | | | |
| FA3-220S24A2N3 | 47uF/35V | | | | | SMBJ30A |

**Notes:**

1. **C1**: Electrolytic capacitor. High-frequency, low-resistance type is recommended. Refer to manufacturer specifications for capacity and ripple current.
2. **C2**: Ceramic capacitor, used to filter high-frequency noise.
3. **TVS**: Recommended to protect downstream circuits in case of module anomaly.

### 2. EMC Recommended Components(for higher EMC requirements)

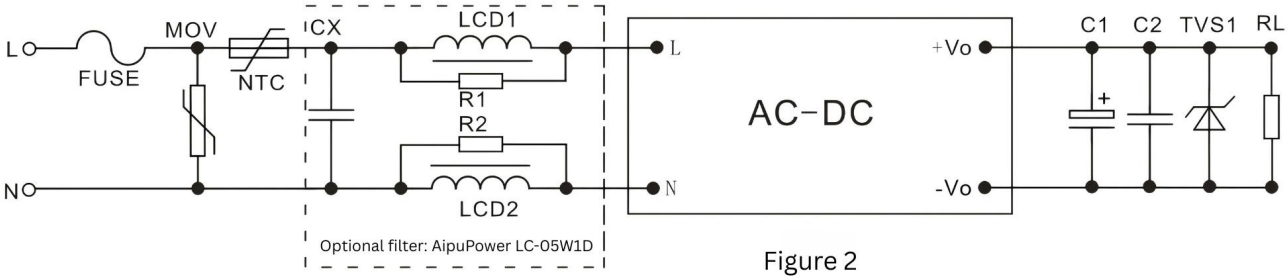
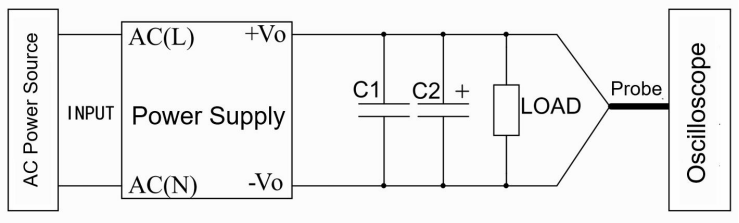



Figure 2

| Components | Recommended values | Components | Recommended values |
|---|---|---|---|
| MOV | 10D471K/3500A | NTC | 10D-7 |
| CX | X2/104K/275VAC | LCD1,LCD2 | 1mH/1W Color ring inductor |
| FUSE | 1A/300VAC, Slow-blow, Required | R1、R2 | 2KΩ,1/8W以上 |

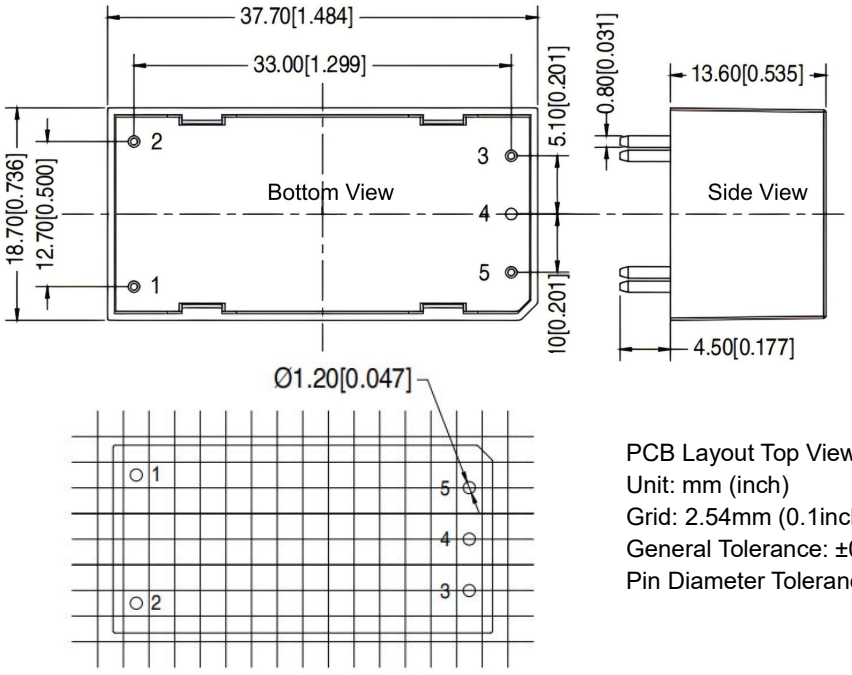
Note: Some component parameters should be used in conjunction with the recommended values of the typical application circuit.

## Ripple & Noise Test Instruction (Parallel Cable Method, 20MHz Bandwidth)




1. Ripple & Noise is measured using the parallel-cable method. The oscilloscope bandwidth is set to 20MHz with "Sample" mode. The probe cap and ground lead are removed, while a 0.1uF ceramic capacitor (C1) and a 10uF high-frequency low-impedance electrolytic capacitor (C2) are connected in parallel at the probe tip.
2. Schematic of Output Ripple & Noise Test: Connect the input terminals of the power module to the DC source, and the output terminals to the electronic load via a test jig. Use separate sampling wires to measure directly at the output terminals. Power cables with appropriate gauges and insulation must be selected based on the output current.

## Mechanical Dimensions




PCB Layout Top View
Unit: mm (inch)
Grid: 2.54mm (0.1inch)
General Tolerance: ±0.5 (±0.019)
Pin Diameter Tolerance: ±0.10 (±0.004)

**Pin Definition**

| Pin No. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Function | AC(N) | AC(L) | +Vo | NP | -Vo |
| | AC Input (Neutral) | AC Input (Line) | Positive Output | No Pin | Negative Output |

**Application Notice**

**Notes:**

1. The product must be used within the specified range; otherwise, permanent damage may occur.
2. Product performance cannot be guaranteed if the load is below the minimum required load.
3. Product performance cannot be guaranteed if the product operates outside the specified load range.
4. Unless otherwise specified, all data are measured at Ta=25℃, humidity<75%R, nominal input voltage, and rated output load (pure resistive load).
5. All test methods are based on our corporate standards.
6. The above specifications apply only to the standard models listed in this datasheet. Some specifications for non-standard models may vary. Please contact our technical staff for details.
7. Customized products are available.

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