

Typical Features

- ◆ Wide input voltage range 85-305VAC/120-430VDC
- ◆ No load power consumption $\leq 0.25\text{W}(@220\text{VAC})$
- ◆ Efficiency 74% (Typ.)
- ◆ Switching Frequency 65KHz
- ◆ Short circuit & over-current protections
- ◆ Isolation voltage 4000Vac
- ◆ Compliant with IEC/EN62368/UL62368
- ◆ PCB DIP mounting



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 in this data sheet for the application with high EMC requirement.

Typical Product List

| Certificate | Part No. | Output Specification | | | | | Max. Capacitive Load | Ripple & Noise 20MHz (Max) | Efficiency @full load 220Vac (TYP) |
|-------------|----------------|----------------------|-----------|-----------|-----------|-----------|----------------------|----------------------------|------------------------------------|
| | | Power | Voltage 1 | Current 1 | Voltage 2 | Current 2 | | | |
| | | (W) | Vo1(V) | Io1(mA) | Vo2(V) | Io2(mA) | | | |
| / | FA5-220D05C2N4 | 5 | +5 | 500 | -5 | 500 | 2000/1000 | 100/100 | 74 |
| | 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 $\pm 2\%$ 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 | 120 | 310 | 430 | VDC |
| Input Frequency Range | - | 47 | 50 | 63 | Hz |
| No Load Power Consumption | Input 115VAC | - | - | 0.25 | W |
| | Input 220VAC | - | - | | |
| Input Current | 115VAC | - | - | 0.12 | A |
| | 220VAC | - | - | 0.08 | |

| | | | | | |
|---------------------------|--------|-----------------------------|---|----|--|
| Surge Current | 115VAC | - | - | 10 | |
| | 220VAC | - | - | 20 | |
| Leakage Current | - | 0.5mA TYP/230VAC/50Hz | | | |
| External Fuse Recommended | - | 1-2A/250VAC time-delay fuse | | | |
| Hot-plug | - | unavailable | | | |
| Remote 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 | | Single Output | 10 | - | - | % | |
| Turn-on Delay Time | | Nominal input voltage (full load) | - | 2000 | - | mS | |
| Power-off Hold-up Time | | Input 115VAC (full load) | - | 50 | - | mS | |
| | | Input 220VAC (full load) | - | 100 | - | | |
| Dynamic Response | Overshoot range | 25%~50%~25% | -5.0 | - | +5.0 | % | |
| | Recovery Time | 50%~75%~50% | - | 5.0 | - | mS | |
| Output Overshoot | | Full input voltage range | ≤10%Vo | | | % | |
| Short Circuit Protection | | | Continuous, Self-recovery | | | Hiccup | |
| Temperature Coefficient | | - | - | ±0.03% | - | %/°C | |
| Over Current Protection | | Input 220VAC | ≥130% Io, self-recovery | | | Hiccup | |
| Ripple & Noise | | Full input voltage range | - | 50 | 150 | mV | |

Note: The ripple and noise are tested by the twisted pair test method (Refer to the following Test Instructions).

General Specifications

| Item | | Operating Condition | Min | Typ. | Max | Unit |
|-----------------------|--|---|-----------------------|------|-----|------|
| Switching Frequency | | - | - | 65 | - | KHz |
| Operating Temperature | | Refer to the temperature derating curve | -40 | - | +85 | °C |
| Storage Temperature | | - | -40 | - | +90 | |
| Soldering Temperature | | Wave-soldering | 260±4°C, timing 5-10S | | | |
| | | Manual-soldering | 360±8°C, timing 4-7S | | | |
| Relative Humidity | | - | 10 | - | 90 | %RH |

| | | | | | | |
|-----------------------|---------|---------------------------------|------------------------------------|---|---|-----|
| Isolation Voltage | I/P-O/P | 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 V-0 | | | |
| MTBF | | - | MIL-HDBK-217F@25°C > 300,000H | | | |

EMC Performances

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

Mechanical Dimensions

Unit: mm(inch)
Pin diameter tolerance ±0.10(±0.004)
General tolerance ±0.25(±0.010)

| | | |
|----------------|--------------------------|----------------------------|
| Packaging Code | Dimensions L x W x H | |
| C2 | 48.50 x 36.00 x 20.50 mm | 1.909 × 1.417 × 0.807 inch |

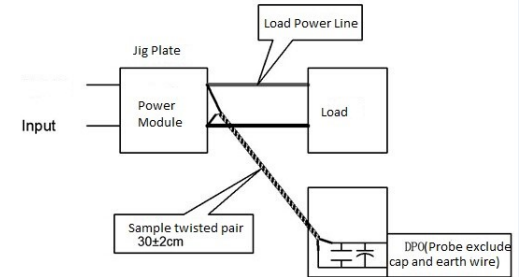
Pin Function Description

| | | | | | | |
|-------------|-----------|-------------|-------------|-------------|--------|-------------|
| Pin No. | 1 | 2 | 3 | 4 | 6 | 8 |
| Function | FG | AC (N) | AC (L) | +Vout | COM | -Vout |
| Description | Input GND | AC(N) input | AC(L) input | +Vo1 output | 0V COM | -Vo2 output |

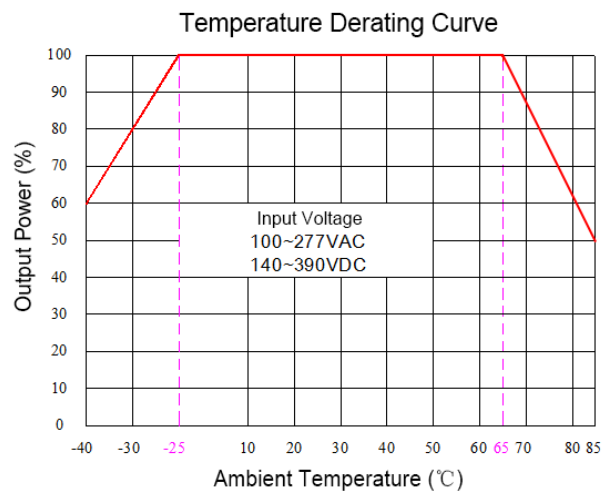
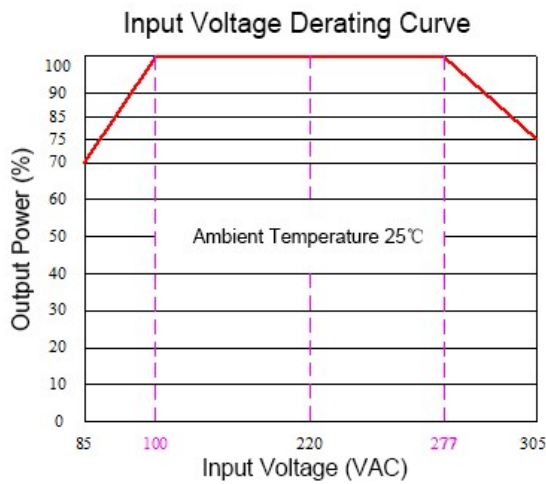
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)

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 started after input power on.



Product Performance Curves

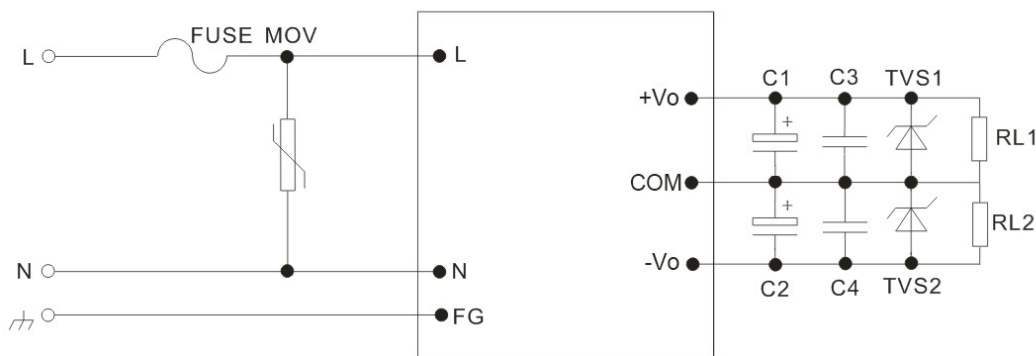


Note 1 - The output power should be derated based on the input voltage derating curve at 85~100VAC/277~305VAC/120~140VDC/ 390~430VDC.

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

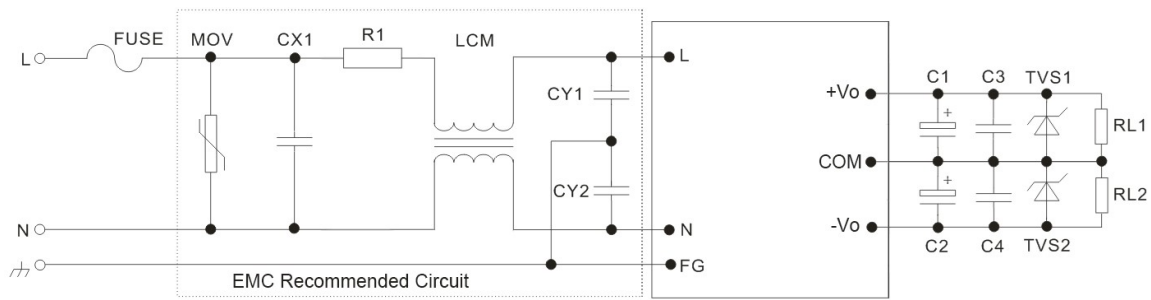
Recommended Circuits for Application

1. Typical application circuit



Circuit 1

2. EMC recommended circuit



Circuit 2

| | | | |
|------|----------------------|--------------------|-------------------------------|
| FUSE | 1A/250Vac(necessary) | CY1, CY2 | 1nF/400VAC |
| MOV | 14D561K | C1, C2, TVS1, TVS2 | See Note 1 |
| CX1 | 0.22uF/275Vac | C3 C4 | 0.1uF/50V |
| LCM | 15mH-30mH/0.5A | R1 | 6.8Ω/2W, wire-wound resistors |

Note:

- 1) High-frequency low-impedance electrolytic capacitors which capacitances less than the Max capacitive load are recommended for C1 & C2, the withstand voltage should be more than 1.5x of the output voltage.
- 2) 0.1uF ceramic SMD chip capacitors are recommended for C3 & C4, the 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°C, 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.
9. The product specifications may be modified without prior notice. Please refer to the published data sheet at Aipupower website.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: <https://www.aipupower.com>