## Typical Features

- Wide input voltage range 85-305VAC/100-430VDC
- No-load power consumption ≤0.30W@220VAC
- Efficiency up to 88%(Typ.)
- Operating temperature from -40℃ to +85℃
- Switching frequency 65KHz
- Output short circuit & over current protections
- Isolation voltage 4200VAC
- Altitude during operation 4000m Max
- Compliant with IEC/EN62368/UL62368
- PCB DIP mounting


## Application Field

**FA40-220SXXG2D5 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 and Smart home devices, etc. The additional circuit diagram for EMC is recommended for the application with high EMC requirement.

## Typical Product List

| Certificate | Part No | Input Voltage | | Output Specifications | | | Max Capacitive Load @220VAC | Ripple & Noise 20MHz (Max) | Efficiency @Full Load 220VAC (Typ.) |
|---|---|---|---|---|---|---|---|---|---|
| | | Nom. | Range | Power | Voltage | Current | | | |
| | | (VAC) | (VAC) | P(W) | Vo(V) | Io(A) | uF | mVp-p | % |
| - | FA40-220S05G2D5 | 220 | 85-305 | 40 | 5 | 8000 | 7000 | 100 | 85 |
| - | FA40-220S12G2D5 | | | | 12 | 3333 | 6000 | 120 | 88 |
| - | FA40-220S15G2D5 | | | | 15 | 2667 | 5000 | 120 | 88 |
| - | FA40-220S24G2D5 | | | | 24 | 1667 | 800 | 150 | 88 |

Note 1: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 2: 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.

Note 3: The Ripple and Noise is tested by the twisted pair method, please refer to the following test instruction.

Note 4: Please contact Aipu sales for other output voltages requirements in this series but not in this table.

## Input Specifications

| Item | Operating Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input voltage range | AC Input | 85 | 220 | 305 | VAC |
| | DC Input | 100 | 310 | 430 | VDC |
| Input frequency range | - | 47 | 50 | 63 | Hz |

| | | | | | |
|---|---|---|---|---|---|
| Input current | Input 115VAC | - | - | 0.70 | A |
| | Input 220VAC | - | - | 0.45 | |
| Surge current | Input 115VAC | - | - | 18 | A |
| | Input 220VAC | - | - | 20 | |
| No-load power consumption | Input 115VAC | - | - | 0.3 | W |
| | Input 220VAC | - | - | | |
| Leakage current | - | 0.5mA TYP/230VAC/50Hz | | | |
| External fuse recommended | - | 3.15A/300VAC Time-delay fuse | | | |
| Hot plug | - | N/A | | | |
| ON/OFF Control | - | N/A | | | |

## Output Specifications

| Item | | Operating Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Voltage accuracy | | Full input voltage range, any load | - | ±2.0 | ±3.0 | % |
| Line regulation | | Rated Load | - | - | ±0.5 | % |
| Load regulation | | Nominal input voltage, 20%~100% load | - | - | ±1.0 | % |
| Ripple & Noise | | 5%-100% load, 20MHz bandwidth | - | - | 150 | mVp-p |
| Minimum load | | Single Output | 0 | - | - | % |
| Temperature drift coefficient | | - | - | ±0.03% | - | %/℃ |
| Turn-on delay time | | Input 115Vac (Full load) | - | - | 1500 | mS |
| | | Input 220Vac (Full load) | - | - | | |
| Power-off hold up time | | Input 115Vac (Full load) | 10 | - | - | mS |
| | | Input 220Vac (Full load) | 20 | - | - | |
| Dynamic Response | Overshoot range | 25%~50%~25% | -5.0 | - | +5.0 | % |
| | Recovery time | 50%~75%~50% | - | - | 5.0 | mS |
| Output overshooting | | Full input voltage range | ≤10%Vo | | | % |
| Short circuit protection | | | Continuous, Self-recovery | | | Hiccup |
| Over current protection | | Input 220VAC | ≥120% Io, Self-recovery | | | Hiccup |
| Over voltage protection | | 5VDC Output | ≤7.5VDC | | | Hiccup |
| | | 12VDC Output | ≤18VCD | | | |
| | | 15VDC Output | ≤20VDC | | | |
| | | 24VDC Output | ≤30VDC | | | |

## General Specifications

| Item | Operating Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Switching frequency | - | - | 65 | - | KHz |
| Operating temperature | Refer to the temperature derating graph | -40 | - | +85 | ℃ |
| Storage temperature | - | -40 | - | +105 | |
| Soldering temperature | Wave-soldering | 260±4℃, time 5-10S | | | |
| | Manual-soldering | 360±8℃, time 4-7S | | | |

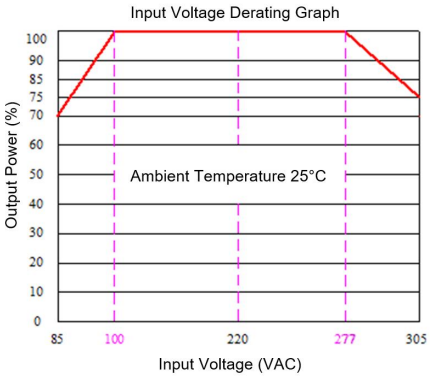
| | | | | | | |
|---|---|---|---|---|---|---|
| Relative humidity | - | | 10 | - | 90 | %RH |
| Isolation voltage | I/P-O/P | Test 1min, leakage current ≤5mA | 4200 | - | - | VAC |
| Insulation resistance | I/P-O/P | @DC500V | 100 | - | - | MΩ |
| MTBF | MIL-HDBK-217F@25℃ | | 300 | - | - | K Hours |
| Safety standard | - | | EN62368, IEC62368 | | | |
| Vibration | - | | 10-55Hz,10G,30 Min, along X, Y, Z | | | |
| Safety class | - | | CLASS II | | | |

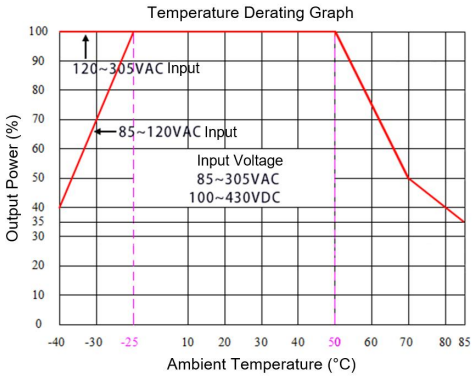
| Weight & Dimensions | Part No. | Weight (Typ.) | Dimensions L x W x H | |
|---|---|---|---|---|
| | FA40-220SXXG2D5 | 125g | 71.0 X 41.0 X 32.0 mm | 2.795 X 1.614 X 1.260 inch |

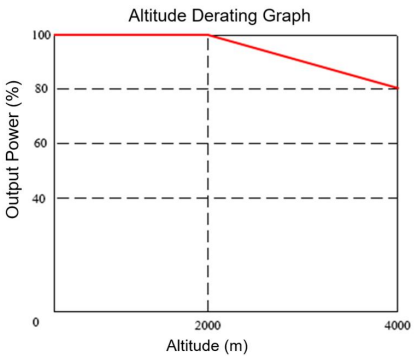
## EMC Performances

| Total Item | | Sub Item | Test Standard | Performance/Class |
|---|---|---|---|---|
| EMC | EMI | CE | CISPR32/EN55032 | CLASS B (with the recommended circuit 2) |
| | | RE | CISPR32/EN55032 | CLASS B (with the recommended circuit 2) |
| | EMS | RS | IEC/EN61000-4-3 | 10V/m Perf.Criteria B (with the recommended circuit 2) |
| | | CS | IEC/EN61000-4-6 | 3Vr.m.s Perf.Criteria B (with the recommended circuit 2) |
| | | ESD | IEC/EN61000-4-2 | Contact ±6KV / Air ±8KV Perf.Criteria B (with the recommended circuit 2) |
| | | Surge | IEC/EN61000-4-5 | ±1KV Perf.Criteria B (with the recommended circuit 2) |
| | | EFT | IEC/EN61000-4-4 | ±2KV Perf.Criteria B (with the recommended circuit 2) |
| | | Voltage dip & interruption | IEC/EN61000-4-11 | 0%~70% Perf.Criteria B |

## Product Characteristics Graphs




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

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

## Recommended Circuits for Application

**1. Typical application circuit diagram**

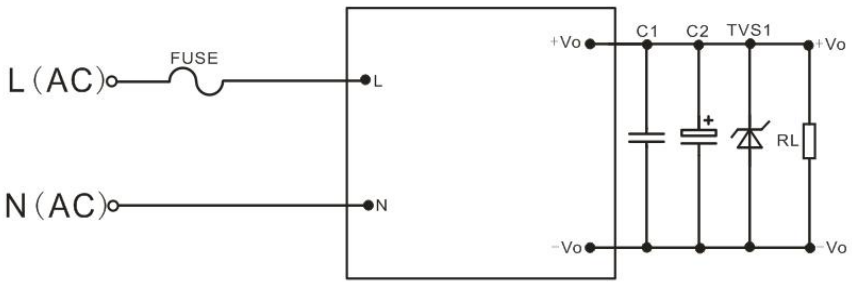



**Figure – Circuit 1**

| Part No. | FUSE (Necessary) | C1 | C2 | TVS1 |
|---|---|---|---|---|
| FA40-220S05G2D5 | 3.15A/300VAC Time-delay fuse | 1uF/50V Ceramic SMD capacitor | 330uF/16V | SMBJ7.0A |
| FA40-220S12G2D5 | | | 330uF/16V | SMBJ20A |
| FA40-220S15G2D5 | | | 220uF/25V | SMBJ20A |
| FA40-220S24G2D5 | | | 100uF/35V | SMBJ30A |

Note:

High-frequency low resistance electrolytic capacitors are recommended for C2 which capacitance and current should be referred to its manufacturer's specification, it's withstand-voltage should be derated at least 80% of rated. 0.1uF/50V/1206 ceramic SMD capacitor is recommended for C1 to suppress the high frequency noise. TVS1 is recommended to protect the output circuit. FUSE is necessary for the application, not optional.

**2. Recommended EMC circuit for high EMC requirements**

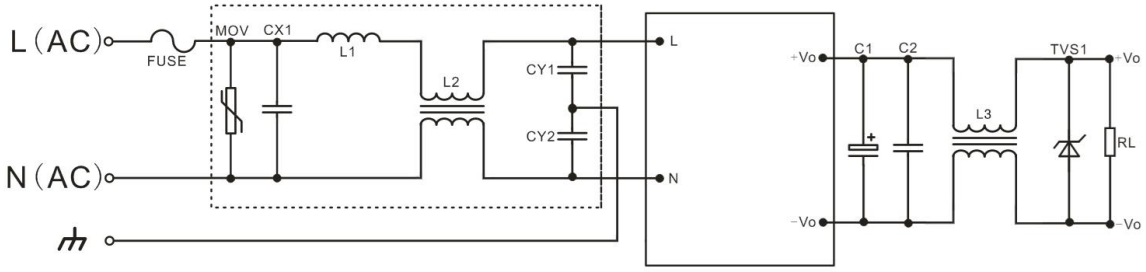
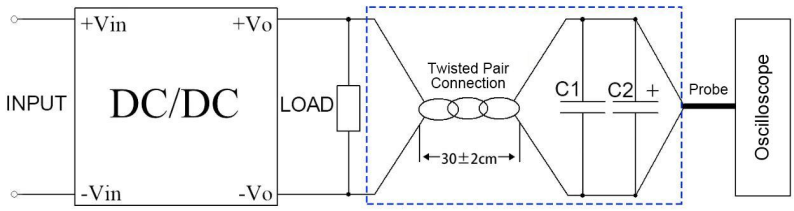



**Figure – Circuit 2**

| Component | Description & recommended values | |
|---|---|---|
| FUSE | Time-delay fuse | 3.15A/300VAC (necessary) |
| MOV | Varistor | 14D561K/4500A |
| CX1 | X capacitor | X2/104K/310VAC |
| L1 | Differential mode choke | 2.0uH/2.5A Drum choke |
| L2 | Common mode choke | 15mH/2.5A |
| L3 | Common mode choke | 145uH/5A |
| CY1, CY2 | Y capacitor | Y1/102M/400VAC |

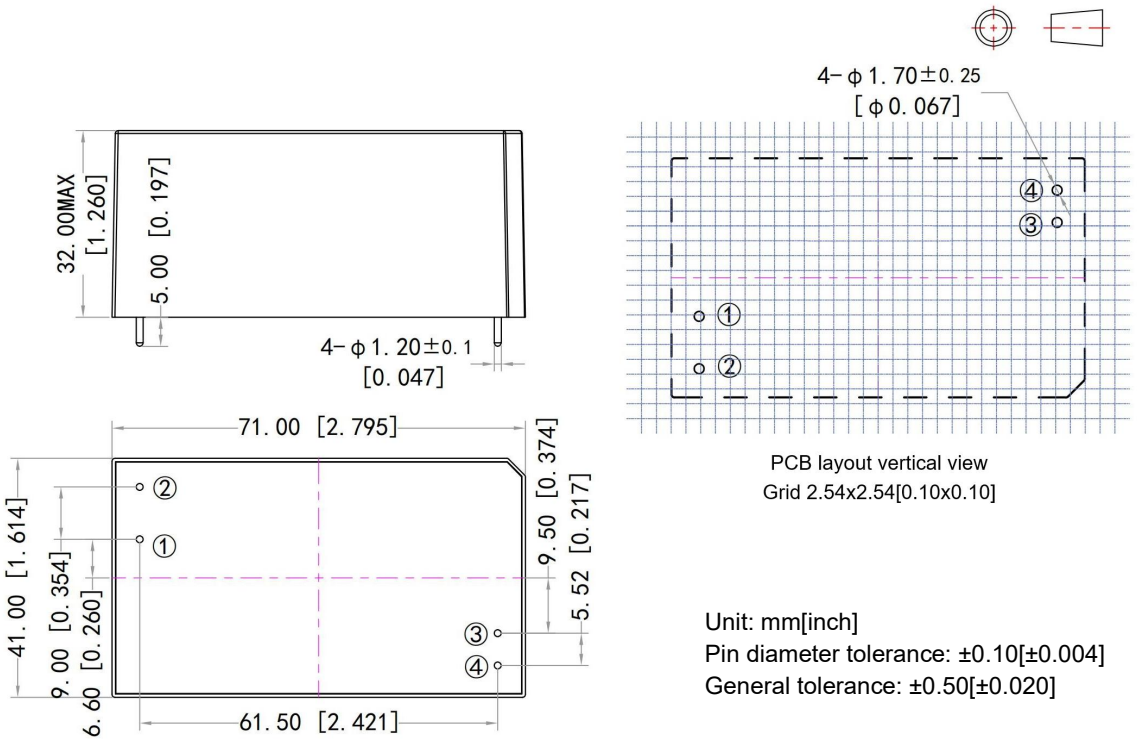
## Ripple & Noise Test Instruction (Twisted Pair Method 20MHZ bandwidth)




1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.

2. The power supply output connects to the load by the cables. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the polarity of the output and the oscilloscope probe should not be reversed. The test can be start after input power on.

## Mechanical Dimensions




PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

**Pin-out Function Description**

| Pin No. | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Function | AC(L) | AC(N) | -Vo | +Vo |

**Application Notice**

1.The products should be used according to the specifications on this datasheet, otherwise it could be permanently damaged.

2. A fuse should be connected at input.

3. The product performance on this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance on this datasheet cannot be guaranteed if it works at over-load condition.

5. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators on this datasheet had been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed on 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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