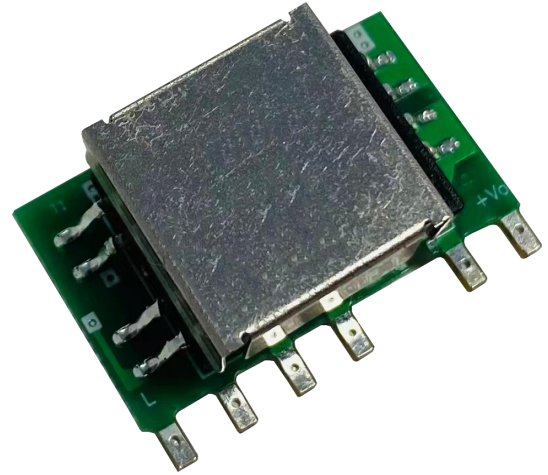


Typical Features

- ◆ Wide input voltage range: 85-305VAC/70-430VDC
- ◆ No load power consumption $\leq 0.3W$
- ◆ Transfer Efficiency up to 78%(TYP.)
- ◆ Switching Frequency: 65KHz
- ◆ Protections: short circuit, over current
- ◆ Isolation voltage: 3600Vac
- ◆ Meet IEC62368/UL62368/EN62368 test standard
- ◆ Conform to CE Certificate
- ◆ Ultra small size bare board, industrial level design
- ◆ PCB mounting



Application Field

A05-C4SXXD Series----- a compact size, high efficient 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, the application circuit in the datasheet is strongly 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(mA) | | | |
| - | A05-C4S03D | 3.3 | 3.3 | 1000 | 2000 | 100 | 68 |
| | A05-C4S05D | 5 | 5 | 1000 | 2000 | 100 | 74 |
| | A05-C4S09D | 5 | 9 | 556 | 1000 | 120 | 76 |
| | A05-C4S12D | 5 | 12 | 416 | 68 | 120 | 78 |
| | A05-C4S12V1D | 5 | 12.1 | 416 | 68 | 120 | 78 |
| | A05-C4S15D | 5 | 15 | 333 | 68 | 120 | 78 |
| | A05-C4S24D | 5 | 24 | 208 | 47 | 120 | 80 |

Note 1: "*" represents a model under development;

Note 2: The typical value of output efficiency is based on the product being aged at full load for half an hour;

Note 3: The full load efficiency (% , TYP) in the table fluctuates by $\pm 2\%$, and the full load efficiency is the total output power divided by the input power of the module;

Note 4: The ripple and noise test method uses the twisted pair test method. For specific test methods and matching, please see the following (Ripple & Noise Test Instructions);

Note 5: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

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 | - | - | 0.15 | A |
| | 220VAC | - | - | 0.10 | |
| Surge Current | 115VAC | - | - | 11 | |
| | 220VAC | - | - | 21 | |
| Leakage Current | - | 0.25mA TYP/230VAC/50Hz | | | |
| Recommended External Input Fuse | - | 1A-3A/250VAC slow fusing | | | |
| Hot Plug | - | unavailable | | | |
| Remote Control Terminal | - | unavailable | | | |

Output Specifications

| Item | Operating Condition | Min | Typ. | Max | Unit | |
|--------------------------|--|---------------------------|------|------|--------|----|
| Voltage Accuracy | Full input voltage range, 10-100% load(0%-10% load with stable output, could work) | 3.3V | - | ±2.0 | ±8.0 | % |
| | | Others | - | ±2.0 | ±6.0 | % |
| Line Regulation | Nominal load | Vo | - | ±1.0 | ±2.0 | % |
| Load Regulation | Nominal input voltage, 20%~100% load | Vo | - | ±1.0 | ±5.0 | % |
| No Load Consumption | Input 115VAC | - | - | 0.3 | W | |
| | Input 220VAC | - | - | | | |
| Minimum Load | Single Output | 10 | - | - | % | |
| Start up Delay Time | Nominal input voltage (full load) | - | 600 | - | mS | |
| Power-off Holding Time | Input 115VAC (full load) | - | 50 | - | mS | |
| | Input 220VAC (full load) | - | 80 | - | | |
| Dynamic Response | Overshoot range | 25%~50%~25% | -5.0 | - | +5.0 | % |
| | Recovery time | 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 | ≥110% Io self-recovery | | | Hiccup |

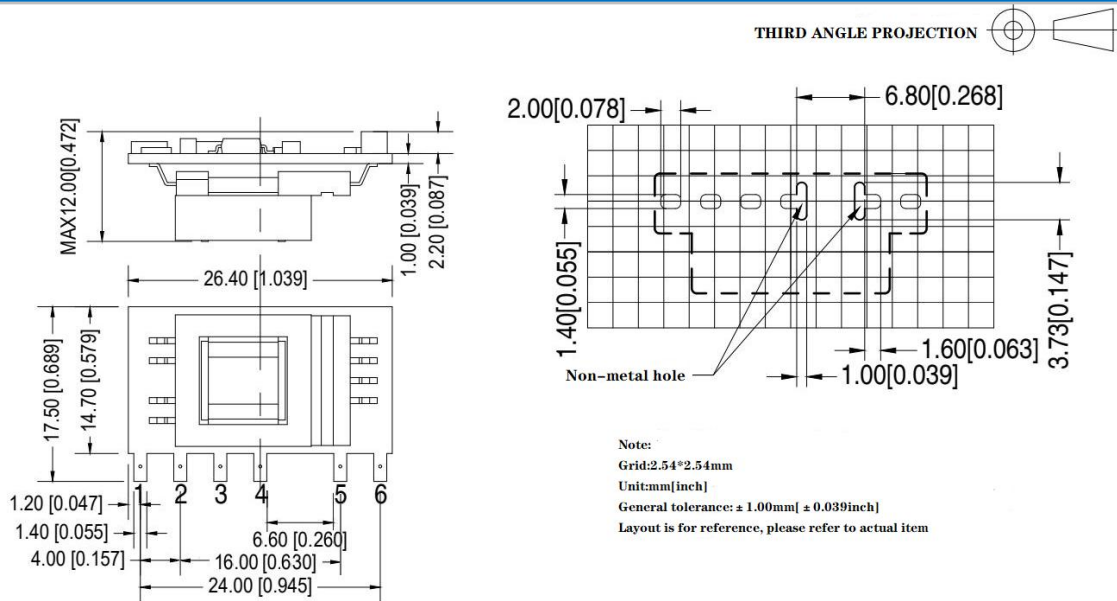
General Specifications

| Item | Operating Condition | Min | Typ. | Max | Unit |
|-----------------------|---------------------|--------------------------------|------|------|------|
| Switching Frequency | - | - | 65 | - | KHz |
| Operating Temperature | - | -40 | - | +105 | °C |
| Storage Temperature | - | -40 | - | +110 | |
| Soldering Temperature | Wave soldering | 260±4°C, time 5-10S | | | |
| | Manual soldering | 360±8°C, time 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 |
| Safety Standard | - | EN62368, IEC62368 | | | |
| Vibration | - | 10-55Hz,10G,30Min,alongX,Y,Z | | | |
| Safety Standard | - | CLASS II | | | |
| MTBF | - | MIL-HDBK-217F@ 25°C > 300,000H | | | |

EMC Characteristics

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

Dimension



Packing Code

L x W x H

26.4 x 17.5x 12.0 mm

1.039 × 0.689× 0.472 inch

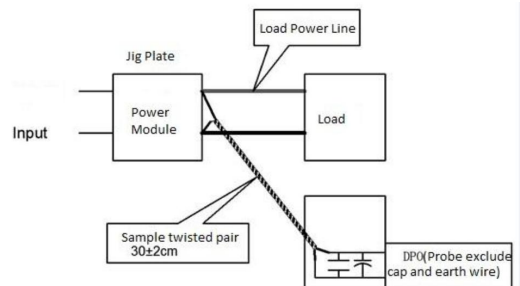
Pin Specification

| Pin | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------|-------|-------|-----|-----|-----|-----|
| Single(S) | AC(L) | AC(N) | +Vc | -Vc | -Vo | +Vo |

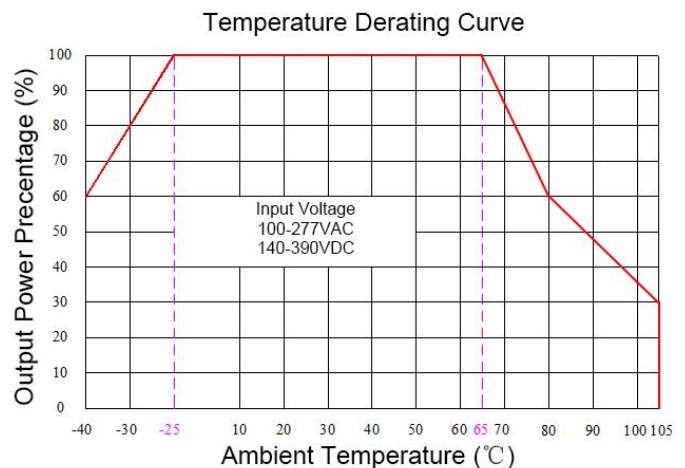
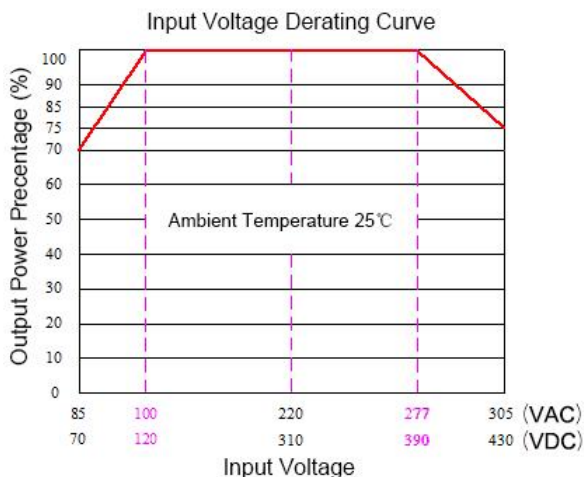
Ripple & Noise Test: (Twisted Pair Method 20MHZ bandwidth)

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

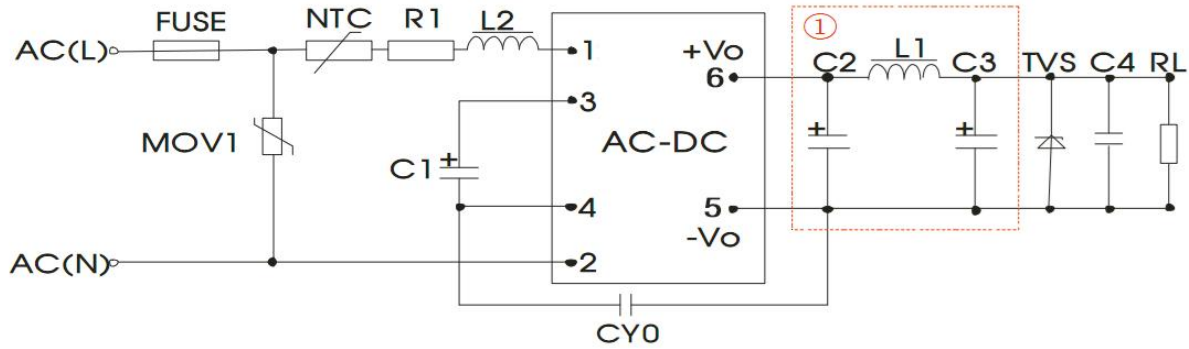


Note 1: Input Voltage should be derated based on Input voltage derating curve when it is 85~100VAC/277~305VAC/70~120VDC/390~430VDC.

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



Recommended Circuit 1

Note: ① is π Type filter

| Products Number | C1 (Necessary) | C2 (Necessary to connect the external electrolytic capacitor) | L1 (Necessary) | C3 (Necessary to connect the external electrolytic capacitor) | C4 | L2 | NTC | CY0 | FUSE (Necessary) | TVS Tube |
|-----------------|---------------------|--|-------------------|--|-----------------|-------|------|-----------|---------------------|----------|
| A05-C4S3V3D | 22 μ F /450V | 470 μ F/10V | 2.0 μ H | 100 μ F/10V | 0.1 μ F/50V | 4.7mH | 5D-9 | 102M/400V | 1A/300V | SMBJ7.0A |
| A05-C4S05D | | 470 μ F/10V | | 100 μ F/10V | | | | | | SMBJ7.0A |
| A05-C4S09D | | 220 μ F/16V | | 220 μ F/16V | | | | | | SMBJ12A |
| A05-C4S12D | | 220 μ F/16V | | 68 μ F/16V | | | | | | SMBJ20A |
| A05-C4S12V1D | | 220 μ F/16V | | 68 μ F/16V | | | | | | SMBJ20A |
| A05-C4S15D | | 220 μ F/35V | | 68 μ F/35V | | | | | | SMBJ20A |
| A05-C4S24D | | 100 μ F/35V | | 47 μ F/35V | | | | | | SMBJ30A |

2. EMC recommended circuit (Used Under high EMC requirement)

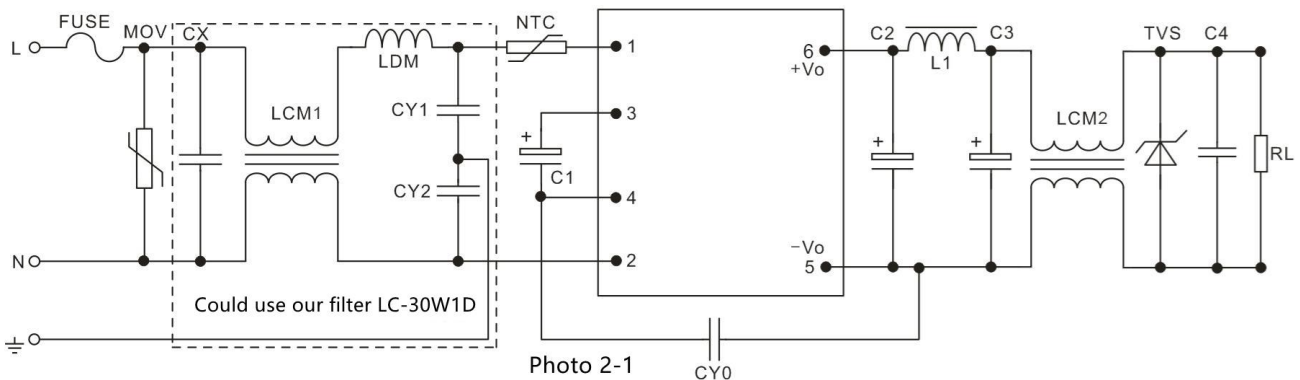
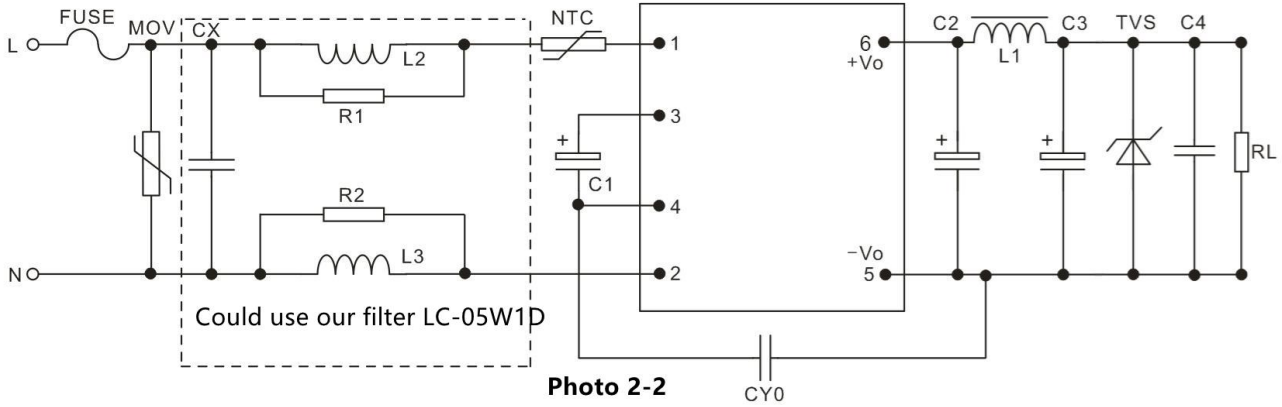


Photo 2-1

Recommended Circuit 2-1



Recommended Circuit 2-2

| Component | Recommend 1A, 300V (Necessary) | NTC | 5D-9 |
|-----------|--------------------------------|----------|-------------------------------|
| MOV | 10D561K | CY1, CY2 | 1nF/400VAC |
| CX | Recommended 0.22uF/310Vac | LDM | 330uH, 0.3A |
| LCM1 | 40mH min | L2,L3 | Color ring inductor 1mH, 0.3A |
| LCM2 | 40mH min | R1, R2 | Resistor 2.2K, above 1/8W |

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 **Ta=25°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 latest manual.

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