## Typical Features

- ◆ Wide input voltage range:85-305VAC/120-430VDC
- ◆ No load power consumption≤0.15W
- ◆ Transfer Efficiency 86%(TYP.)
- ◆ Switching Frequency: 65KHz
- ◆ Protections: short circuit, over current, over voltage
- ◆ Isolation voltage:4000VAC
- ◆ Meet IEC62368/UL62368/EN62368 test standard
- ◆ With CB, CE, RoHS certificate
- ◆ Plastic case, UL94 V-0 class


## Application Field

***DA20-220SXXG2N4*** *Series----- a compact size, high efficient, pass CE 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 (MAX) | Ripple& Noise 20MHz (MAX) | Full load efficiency, 220VAC (Typ.) |
|---|---|---|---|---|---|---|---|
| | | Power | Voltage | Current | u F | mVp-p | % |
| | | (W) | Vo(V) | Io(m A) | | | |
| CB/CE/RoHS | DA20-220S05G2N4 | 20 | +5 | 4000 | 8000 | 80 | 84% |
| - | DA20-220S09G2N4 | 20 | +9 | 2222 | 5000 | 80 | 85% |
| CB/CE/RoHS | DA20-220S12G2N4 | 20 | +12 | 1666 | 5000 | 80 | 86% |
| CB/CE/RoHS | DA20-220S12V5G2N4 | 20 | +12.5 | 1600 | 4000 | 80 | 86% |
| CB/CE/RoHS | DA20-220S15G2N4 | 20 | +15 | 1333 | 4700 | 80 | 86% |
| CB/CE/RoHS | DA20-220S24G2N4 | 20 | +24 | 833 | 2000 | 100 | 88% |

Note 1: The typical value of output efficiency is based on the product being aged at full load for half an hour;

Note 2: The full load efficiency (%, TYP) in the table fluctuates by ±2%. The full load output efficiency is equal to the total output power divided by the input power of the power module;

Note 3: Due to limited space, the above is only a partial list of products. If you need products outside the list, please contact our sales department.

Note 4: -T is a wiring package, -TS is a guide rail package, and the guide rail width is 35mm;

## 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 | 100VAC | - | - | 0.55 | A |
| | 220VAC | - | - | 0.35 | |
| Surge Current | 100VAC | - | - | 10 | |
| | 220VAC | - | - | 20 | |
| No Load Power Consumption | Input 115VAC | - | 0.1 | 0.15 | W |
| | Input 230VAC | - | | | |
| Leakage Current | - | 0.5mA TYP/230VAC/50Hz | | | |
| Recommended External Input Fuse | - | 3.15A-5A/250VAC slow fusing | | | |
| Hot Plug | - | Unavailable | | | |
| Remote Control Terminal | - | No remote control terminal | | | |

## Output Specifications

| Item | | Operating Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Voltage Accuracy | | Full input voltage range, any load | - | ±1.0 | ±2.0 | % |
| Line Regulation | | Nominal load | - | - | ±0.5 | % |
| Load Regulation | | Nominal input voltage, 20%~100% load | - | - | ±2.0 | % |
| Minimum Load | | Single Output | 0 | - | - | % |
| Start up Delay Time | | Input 115VAC(full load) | - | 500 | - | mS |
| | | Input 220VAC(full load) | - | | - | |
| Power-off Holding Time | | Input 115VAC(full load) | - | 14 | - | mS |
| | | Input 220VAC(full load) | - | 70 | - | |
| Dynamic Response | Overshoot range | 25%~50%~25%<br>50%~75%~50% | -5.0 | - | +5.0 | % |
| | Recovery time | | -5.0 | - | +5.0 | mS |
| Output Overshoot | | Full input voltage range | ≤10%Vo | | | % |
| Short circuit Protection | | | Continuous, self-recovery | | | Hiccup |
| Drift Coefficient | | - | - | ±0.03% | - | %/℃ |
| Over Current Protection | | Input 100-265VAC | ≥130% Io self-recovery | | | Hiccup |
| Over Voltage Protection | | Input 5VDC | ≤10 | | | VDC |
| | | Input 12VDC/12.5VDC | ≤18 | | | |
| | | Input 15VDC | ≤20 | | | |
| | | Input 24VDC | ≤30 | | | |
| Ripple & Noise | | - | - | 80 | 100 | mV |

Note: Ripple & noise is tested by Twisted Pair Method, for details please check “Ripple & Noise Test” at back.

## General Specifications

| Item | | Operating Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Switching Frequency | | - | - | 65 | - | KHz |
| Operating Temperature | | - | -40 | - | +105 | ℃ |
| | | Base on temperature derating curve, see Product Characteristic Curve at back. | | | | |
| Storage Temperature | | - | -40 | - | +110 | |
| 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 | 4000 | - | - | 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 | | | |
| MTBF | | - | MIL-HDBK-217F 25℃＞300,000H | | | |

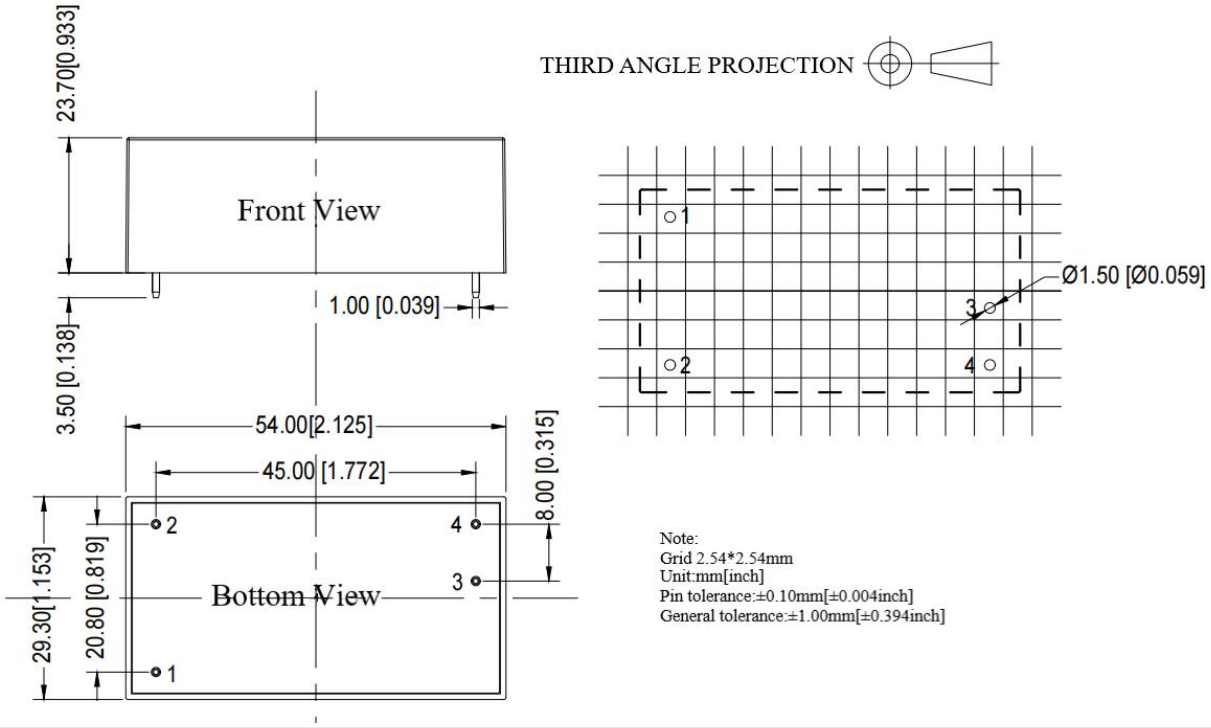
## Physical Specifications

| | | |
|---|---|---|
| Case Material | | Black flame-retardant and heat-resistant plastic (UL94V-0) |
| Dimension | Horizontal package | 54.0X 29.3X23.7mm |
| Weight | | 50g (TYP) |
| Cooling Method | | Free air convection |

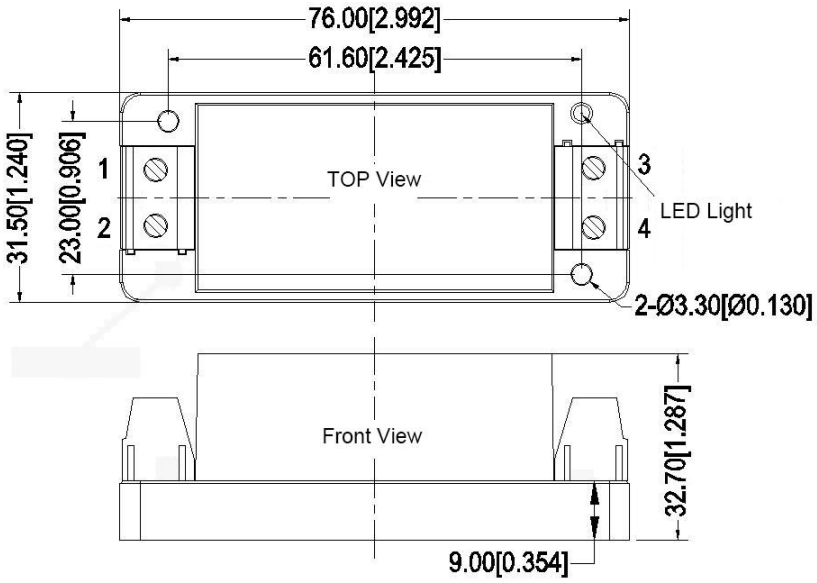
## EMC Characteristics

| Total Items | | Sub Items | 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 (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 (bare board) |
| | | | | ±2KV Perf.Criteria B (Recommended Circuit 2) |
| | | EFT | IEC/EN61000-4-4 | ±2KV Perf.Criteria B (Recommended Circuit 2) |
| | | Voltage dips and interruptions | IEC/EN61000-4-11 | 0%~70% Perf.Criteria B |

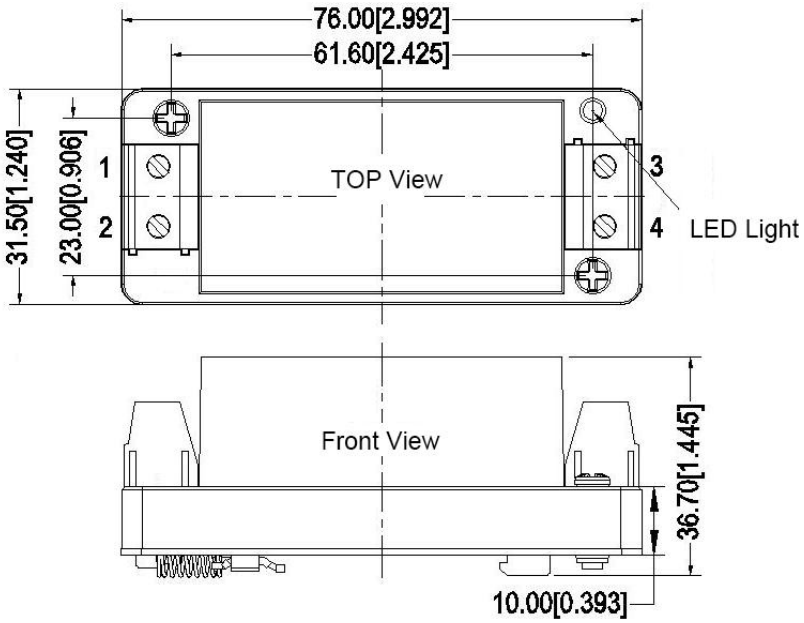
## Packing Dimension




## -T Packing Dimension



## -TS Packing Dimension




| Part No. | L x W x H | |
|---|---|---|
| - | 54.0 X 29.3 X 23.7mm | 2.126 X 1.153 X 0.933inch |
| -T | 76.0 X 31.5 X 32.7mm | 2.992 X 1.240 X 1.287inch |
| -TS | 76.0 X 31.5 X 37.7mm | 2.992 X 31.5 X 1.484inch |

## Pin Definition

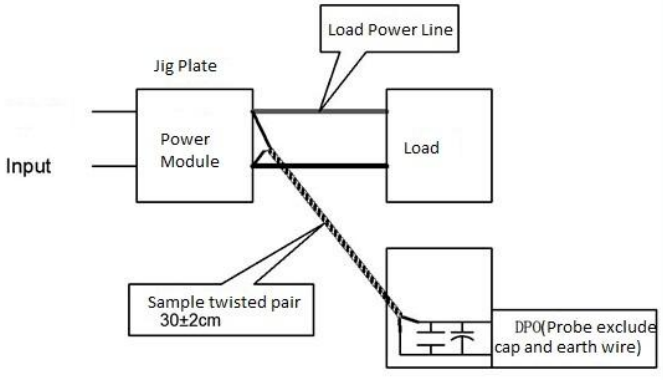
| Pin-out | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Single (S) | AC(L) | AC(N) | +Vo | -Vo |

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

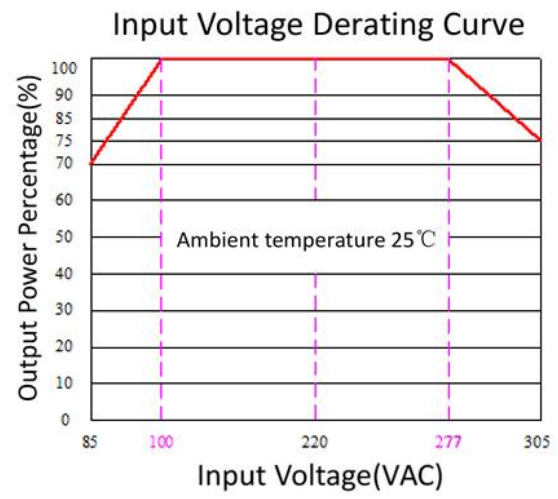
Test Method:

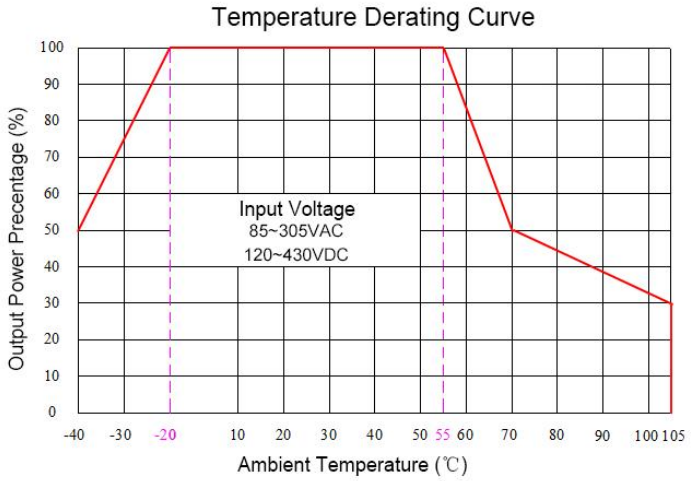
(1) 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

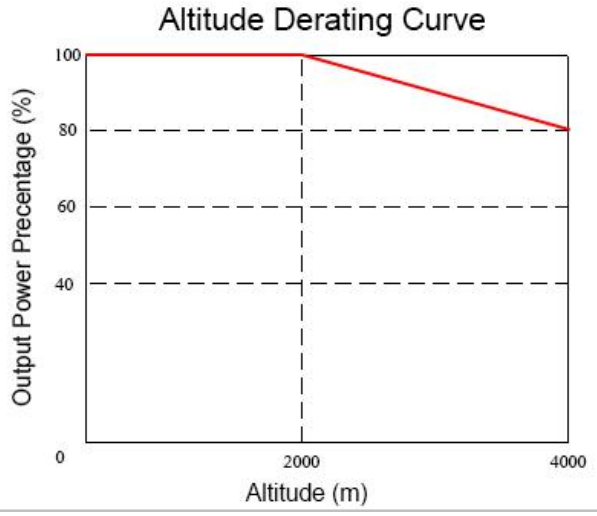
(2) Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



## Product Characteristic Curve



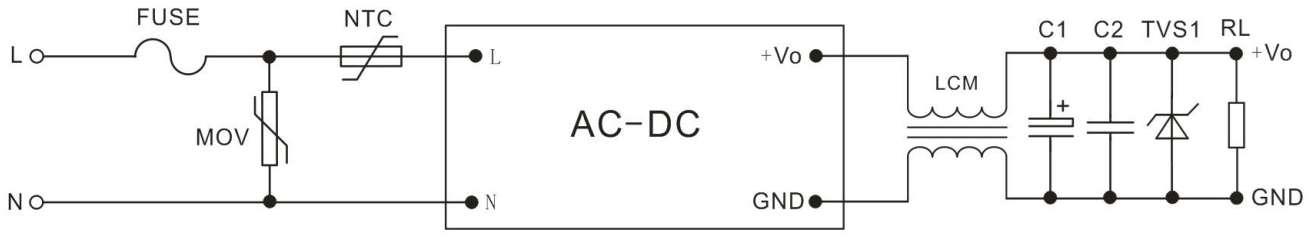




Note 1: Input Voltage should be derated base on Input Voltage Derating Curve when it is 85~100VAC/240~305VAC/120~140VDC/ 340~430VDC.

Note 2: Our product is suitable to use under natural air cooling environment, if use it under closed condition, please contact with us.

## Recommend Design Application

### 1. Typical Application Circuit



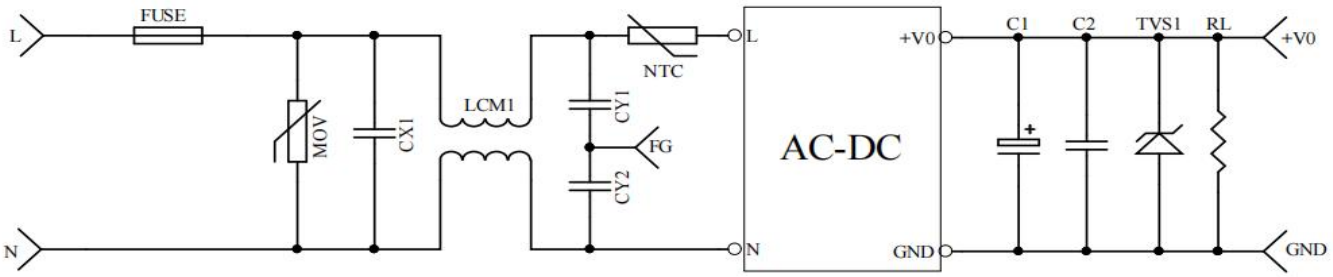

Recommended Circuit 1

| | | | | | |
|---|---|---|---|---|---|
| FUSE | Recommend 2A,300VAC (necessary) | C2 | 0.1uF/50V | TVS1 | 15V: SMBJ20.0A |
| MOV | 14D561K | TVS1 | 5V: SMBJ7.0A | TVS1 | 24V: SMBJ30.0A |
| NTC | 5D-9 | TVS1 | 9V: SMBJ12.0A | TVS1 | 48V: SMBJ64.0A |
| C1 | electrolytic capacitor 220uF | TVS1 | 12V12.5V: SMBJ20.0A | LCM | Common mode inductor 180uH |

**Note:**

1. C1 is an output high-frequency low-resistance filter electrolytic capacitor, which can reduce output ripple. It can be increased according to customer usage conditions. The capacitor withstand voltage is more than 1.2 times the output voltage.
2. TVS1 is a transient voltage absorber. When the module power supply output voltage is abnormal, it protects the subsequent circuit. Select the appropriate original model according to the above table.

## 2. EMC recommended circuit (used under conditions with high EMC requirements)




Recommended Circuit 2

| | | | |
|---|---|---|---|
| FUSE | Recommend 2A, 300VAC<br>（necessary） | CY1，CY2 | 1nF/400VAC |
| MOV | 14D561K | LCM1 | 15-25mH |
| NTC | 5D-9 | - | - |
| CX1 | 0.22uF/310VAC | - | - |

**Note:**

1.The product should be used under the specification range, otherwise it will cause permanent damage to it.

2.Product's input terminal should connect to fuse;

3.If the product operated below the minimum load request, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;

4.If the product worked beyond the load range, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;

5.Unless otherwise specified, data in this datasheet are tested under conditions of **Ta=25 ℃, humidity<75%** when inputting nominal voltage and outputting rated 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 customized product service;

9.The product specification may be changed at any time without prior notice.

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