



## Description: 5W 3KVAC Isolation Wide Input AC/DC Converters

The rated output power of S05AR series is 5W with wide input voltage range, for both AC input and DC input application. High reliability, precision, large power density, ultra-small size, no external heat sink required, stable output voltage and etc, with over current protection, EMI filter circuit, the rectifier filter circuit, 3000V isolation voltage, short circuit, overload, internal thermal protection. Widely used in telecommunications, industrial control, instrument, data acquisition, signal control and other electronic systems.

## FEATURES

|                                 |                                  |                                  |
|---------------------------------|----------------------------------|----------------------------------|
| Universal input voltage range   | Both for AC and DC input voltage | Wide input : 2:1& 4:1            |
| Fixed switching frequency       | Over-heat protection             | Output over-current protection   |
| Output short circuit protection | RoHS compliant                   | Operating temperature: -40℃to70℃ |

## SELECTION GUIDE

| Part Number     | Input         |         | Output           |             | Efficiency<br>(typ.)<br>% | Recommended external capacitance |           |           |
|-----------------|---------------|---------|------------------|-------------|---------------------------|----------------------------------|-----------|-----------|
|                 | voltage (VAC) |         | voltage<br>(VDC) | Current (A) |                           | C1                               | C2        | C53       |
|                 | rated         | range   |                  |             |                           |                                  |           |           |
| S05AR220S05     | 220(2:1)      | 165-265 | 5                | 1.00        | 75                        | 0.1uF/50V                        | 330uF/16V | /         |
| S05AR220S09     | 220(2:1)      | 165-265 | 9                | 0.56        | 75                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S12     | 220(2:1)      | 165-265 | 12               | 0.42        | 79                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S15     | 220(2:1)      | 165-265 | 15               | 0.35        | 80                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S24     | 220(2:1)      | 165-265 | 24               | 0.22        | 82                        | 0.1uF/50V                        | 100uF/35V | /         |
| S05AR220D05     | 220(2:1)      | 165-265 | ±5               | ±0.50       | 75                        | 0.1uF/50V                        | 220uF/16V | /         |
| S05AR220D12     | 220(2:1)      | 165-265 | ±12              | ±0.21       | 79                        | 0.1uF/50V                        | 100uF/25V | /         |
| S05AR220D15     | 220(2:1)      | 165-265 | ±15              | ±0.17       | 79                        | 0.1uF/50V                        | 100uF/25V | /         |
| S05AR220D05P05  | 220(2:1)      | 165-265 | +5/+5            | 0.8/0.2     | 73                        | 0.1uF/50V                        | 330uF/16V | 220uF/16V |
| S05AR220D05P12  | 220(2:1)      | 165-265 | +5/+12           | 0.6/0.2     | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220D05P15  | 220(2:1)      | 165-265 | +5/+15           | 0.6/0.15    | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220D05P24  | 220(2:1)      | 165-265 | +5/+24           | 0.6/0.1     | 75                        | 0.1uF/50V                        | 330uF/16V | 47uF/35V  |
| S05AR220T05D05  | 220(2:1)      | 165-265 | +5/±5            | 0.8/±0.1    | 72                        | 0.1uF/50V                        | 330uF/16V | 220uF/16V |
| S05AR220T05D12  | 220(2:1)      | 165-265 | +5/±12           | 0.6/±0.1    | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220T05D15  | 220(2:1)      | 165-265 | +5/±15           | 0.6/±0.08   | 74                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220T05D24  | 220(2:1)      | 165-265 | +5/±24           | 0.6/±0.05   | 75                        | 0.1uF/50V                        | 330uF/16V | 47uF/35V  |
| S05AR220S05W    | 220(4:1)      | 85-265  | 5                | 1.00        | 75                        | 0.1uF/50V                        | 330uF/16V | /         |
| S05AR220S09W    | 220(4:1)      | 85-265  | 9                | 0.56        | 75                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S12W    | 220(4:1)      | 85-265  | 12               | 0.42        | 79                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S15W    | 220(4:1)      | 85-265  | 15               | 0.35        | 80                        | 0.1uF/50V                        | 220uF/25V | /         |
| S05AR220S24W    | 220(4:1)      | 85-265  | 24               | 0.22        | 82                        | 0.1uF/50V                        | 100uF/35V | /         |
| S05AR220D05W    | 220(4:1)      | 85-265  | ±5               | ±0.50       | 75                        | 0.1uF/50V                        | 220uF/16V | /         |
| S05AR220D12W    | 220(4:1)      | 85-265  | ±12              | ±0.21       | 79                        | 0.1uF/50V                        | 100uF/25V | /         |
| S05AR220D15W    | 220(4:1)      | 85-265  | ±15              | ±0.17       | 79                        | 0.1uF/50V                        | 100uF/25V | /         |
| S05AR220D05P05W | 220(4:1)      | 85-265  | +5/+5            | 0.8/0.2     | 73                        | 0.1uF/50V                        | 330uF/16V | 220uF/16V |
| S05AR220D05P12W | 220(4:1)      | 85-265  | +5/+12           | 0.6/0.2     | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220D05P15W | 220(4:1)      | 85-265  | +5/+15           | 0.6/0.15    | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220D05P24W | 220(4:1)      | 85-265  | +5/+24           | 0.6/0.1     | 75                        | 0.1uF/50V                        | 330uF/16V | 47uF/35V  |
| S05AR220T05D05W | 220(4:1)      | 85-265  | +5/±5            | 0.8/±0.1    | 72                        | 0.1uF/50V                        | 330uF/16V | 220uF/16V |
| S05AR220T05D12W | 220(4:1)      | 85-265  | +5/±12           | 0.6/±0.1    | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220T05D15W | 220(4:1)      | 85-265  | +5/±15           | 0.6/±0.08   | 74                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |
| S05AR220T05D24W | 220(4:1)      | 85-265  | +5/±24           | 0.6/±0.05   | 75                        | 0.1uF/50V                        | 330uF/16V | 47uF/35V  |
| S05AR220D12P05W | 220(4:1)      | 85-265  | +12/+5           | 0.24/0.12   | 73                        | 0.1uF/50V                        | 330uF/16V | 100uF/25V |

All specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

## GENERAL CHARACTERISTICS

| Parameter               | conditions                                       | Min.                  | Typ. | Max. | units |
|-------------------------|--------------------------------------------------|-----------------------|------|------|-------|
| Isolated voltage        | Input / output within 1min., Leakage current 2mA |                       | 3000 |      | VAC   |
| Seismic                 | 10-55Hz                                          | 5                     | 5    |      | G     |
| over-current protection | All input range                                  | Hiccup, self-recovery |      |      |       |
| Cooling                 | Free air convection                              |                       |      |      |       |
| Case material           | Flame-retardant plastic                          |                       |      |      |       |

## INPUT CHARACTERISTICS

| Parameter         | conditions               | Min. | Typ. | Max. | units |
|-------------------|--------------------------|------|------|------|-------|
| Operating voltage | 220VAC Input (165V-265V) | 165  | 220  | 265  | VAC   |
| Operating voltage | 220VAC Input (85V-265V)  | 85   | 220  | 265  | VAC   |
| Start rising time | Non-capacitive load      | 20   |      |      | ms    |

## OUTPUT CHARACTERISTICS

| Parameter                  | conditions                                                                                                                 | Min. | Typ.      | Max.      | units |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------|------|-----------|-----------|-------|
| Voltage accuracy           | $I_o=0.1 \dots 1.0 \times I_{onom}$                                                                                        |      |           | $\pm 3$   | %     |
|                            | $V_i=V_i \text{ rated}$ (for main circuit when it is dual output)                                                          |      |           | $\pm 5$   | %     |
| Line regulation            | $V_{imin} \leq V_i \leq V_{imax}$ (for main circuit when it is dual output)                                                |      | $\pm 0.5$ | $\pm 1.5$ | %     |
| Load regulation            | $I_o=0.1 \dots 1.0 \times I_{onom}$                                                                                        |      | $\pm 1$   | $\pm 3$   | %     |
|                            | $V_{imin} \leq V_i \leq V_{imax}$ (for main circuit when it is dual output)                                                |      |           |           |       |
| Auxiliary voltage accuracy | Main Load and auxiliary load differ 25%,the auxiliary circuit of the load with at least 25%,when full load at main circuit |      |           | $\pm 3$   | %     |
| Ripple and noise           | 20MHz bandwidth (Max VP-P is 50mV for 3.3V output)                                                                         |      |           | $\pm 1$   | %     |
| Over-current protection    | $V_{imin} \leq V_i \leq V_{imax}$                                                                                          | 120  |           |           | %     |
| Switch frequency           | $V_{imin} \leq V_i \leq V_{imax}$                                                                                          |      | 100K      |           | Hz    |

## TEMPERATURE CHARACTERISTICS

| Parameter               | conditions       | Min. | Typ.       | Max. | units |
|-------------------------|------------------|------|------------|------|-------|
| Operating temperature   | Industrial level | -40  |            | +70  | °C    |
| Max. shell temperature  | Industrial level |      |            | +95  | °C    |
| Storage temperature     | Industrial level | -40  |            | +105 | °C    |
| Relative temperature    | No condensation  | 5    |            | 90   | RH(%) |
| temperature coefficient |                  |      | $\pm 0.02$ |      | %/°C  |

Notes; the shell temperature can not exceed the max. shell temperature at any operation environment

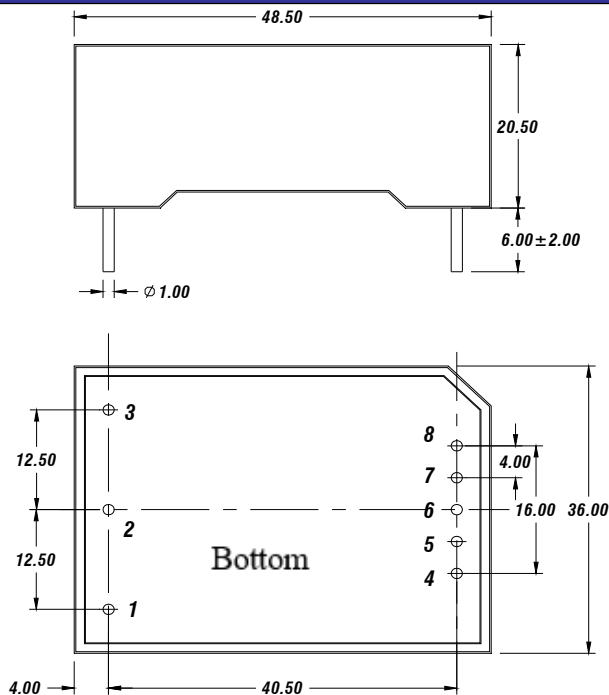
## EMC CHARACTERISTICS

|     |                                              |                                                                                                              |
|-----|----------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| EMI | Conduction interference                      | CISPR32/EN55032 CLASS B                                                                                      |
| EMI | Radiation interference                       | CISPR32/EN55032 CLASS B                                                                                      |
| EMS | Electrostatic Discharge JN                   | IEC/EN 61000-4-2 Contact $\pm 6KV$ /Air $\pm 8KV$ Perf. Criteria B                                           |
| EMS | Radiation immunity                           | IEC/EN 61000-4-3 10V/m perf. Criteria A                                                                      |
| EMS | Burst immunity (EFT)                         | IEC/EN 61000-4-4 $\pm 2KV$ perf. Criteria B                                                                  |
| EMS | Burst immunity (EFT)                         | IEC/EN 61000-4-4 $\pm 4KV$ (see recommended circuit) perf. Criteria B                                        |
| EMS | Surge immunity                               | IEC/EN 61000-4-5 line to line $\pm 1KV$ /line to ground $\pm 2KV$ perf. Criteria B                           |
| EMS | Surge immunity                               | IEC/EN 61000-4-5 line to line $\pm 2KV$ /line to ground $\pm 4KV$ (see recommended circuit) perf. Criteria B |
| EMS | Conducted interference immunity              | IEC/EN61000-4-6 10 Vr.m.s perf. Criteria A                                                                   |
| EMS | Power frequency magnetic field immunity      | IEC/EN61000-4-8 10A/m perf. Criteria A                                                                       |
| EMS | Voltage sag,drop,and short-term interruption | IEC/EN61000-4-11 0%, 70% perf. Criteria B                                                                    |

## MECHANICAL DIMENSIONS

## PIN DESIGN

**DIP**



unit: mm tolerance of PIN diameter:  $\pm 0.10\text{MM}$

Unmarked tolerances :  $\pm 0.50\text{MM}$

| PIN | single | dual<br>(com) | dual<br>(Not com) | triple |
|-----|--------|---------------|-------------------|--------|
| 1   | FG     | FG            | FG                | FG     |
| 2   | N      | N             | N                 | N      |
| 3   | L      | L             | L                 | L      |
| 4   | -V0    | -V0           | -V01              | -V01   |
| 5   | /      | /             | +V01              | +V01   |
| 6   | /      | COM           | /                 | -V02   |
| 7   | /      | /             | -V02              | COM    |
| 8   | +V0    | +V0           | +V02              | +V02   |

## MODEL SELECTION

Diagram illustrating the breakdown of the part number **S05A R220 D05 W** into its constituent parts and their meanings:

- S**: Brand name
- 05**: Rated output power
- A**: AC-DC
- R**: Package type
- 220**: Rated input voltage
- D**: S: single output D: dual output
- 05**: Main (auxiliary) output voltage
- W**: W: 4:1 Wide voltage input range

The diagram illustrates the components of a power supply model number: **S05AR220T05D12W**. Each character is connected by a line to its corresponding description:

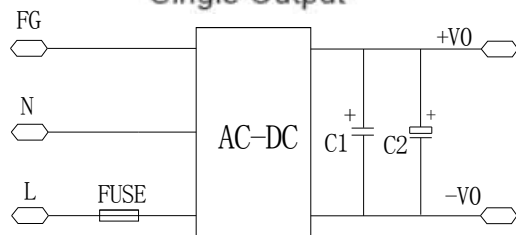
- S**: Brand name
- 05**: Rated output power
- A**: AC-DC
- R**: Package type
- 220**: Rated input voltage
- T**: S:single output D:dual output T:triple output
- 05**: Main output voltage
- D**: auxiliary is is dual output voltage
- 12**: auxiliary output voltage
- W**: W:4:1 Wide voltage input range

The diagram illustrates the meaning of each part of the resistor code S 05 A R 220 D 05 P 12 W. Arrows point from each character to its corresponding description:

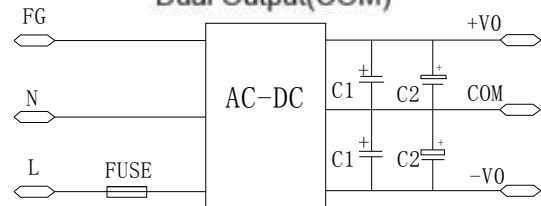
- S**: Brand name
- 05**: Rated output power
- A**: AC-DC
- R**: Package type
- 220**: Rated input voltage
- D**: S:single output D:dual output T:triple output
- 05**: Main output voltage
- P**: auxiliary is is positive output voltage
- 12**: auxiliary output voltage
- W**: W:4:1 Wide voltage input range

## RECOMMEND CIRCUIT

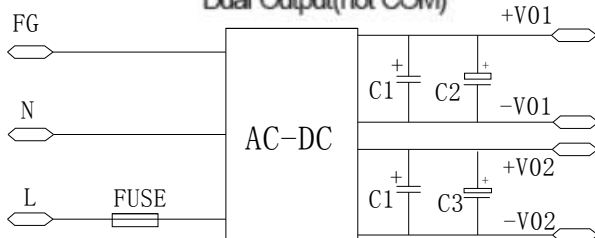
Single Output



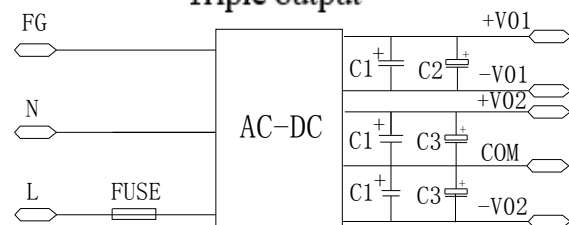
Dual Output(COM)



Dual Output(not COM)



Triple output



- Notes: 1. The value of C1, C2, C3 should refer to the output external capacitance table at page one  
 2. Fuse : 1A/250VAC slow-break type , must be connected

## USING ATTENTIONS

- Module will cause irreversible damage when it in the long-term overload state.
- Module will cause irreversible damage when it out of the state maximum input voltage range