# WAYON

## WORA09P22LH/B Single Phase AC Output
### 700V 0.9A Solid-state Relay

## Description

WORA09P22LH/B is a 700V, 0.9A solid-state relay that adopts photoelectric isolation and has an isolation voltage up to 4000V.The maximum load current is 0.9A, repetitive peak OFF-state voltage can reach 700V. Mainly used in household appliances (air conditioners, refrigerators, washing machines, microwave ovens, personal bathroom products, etc) and industrial control.

## Features

- Non zero-cross
- Photoelectric isolation
- Maximum load current is 0.9A
- Repetitive peak OFF-state voltage 700V
- Maximum isolation voltage is up to 4000V
- UL508 & EN60747
- Package form: DIP7 & SMD7
- HF & Pb free & RoHS
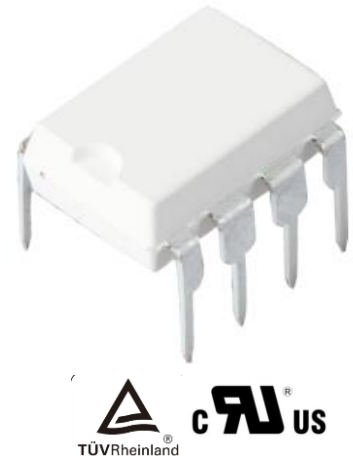
## Functional Diagram
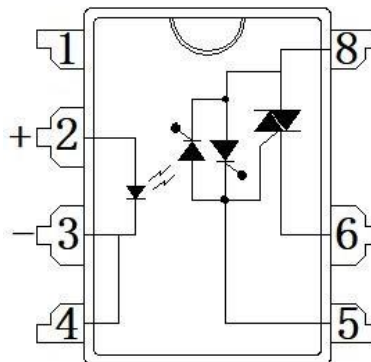


## Function Description

As shown in the figure above, the indirect diode of PIN2 and PIN3 & PIN4; Indirect photosensitive devices of PIN5 and PIN8; Indirect output thyristors of PIN6 and PIN8. When the input diode is powered on, the photosensitive device is triggered to make the output thyristor switched on.

## Pin Arrangement Diagram



---
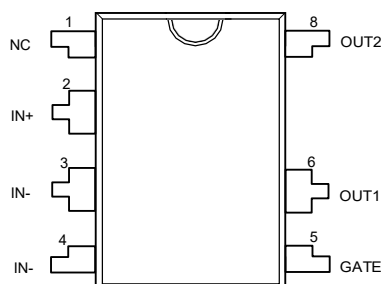
## Pin Configuration

| Pin Number | Symbol | Function |
|---|---|---|
| 1 | NC | Floating |
| 2 | IN+ | Input diode P terminal |
| 3 | IN- | Input diode N terminal |
| 4 | IN- | Input diode N terminal |
| 5 | GATE | Output bidirectional thyristor gate |
| 6 | OUT1 | Output bidirectional thyristor 1 ends |
| 7 | --- | --- |
| 8 | OUT2 | Output bidirectional thyristor 2 ends |

## Absolute Maximum Ratings Temp=25℃

| Parameter | | Symbol | Condition | MIN | TYP | MAX | Unit |
|---|---|---|---|---|---|---|---|
| Input | Reverse voltage | $V_R$ | | | | 6 | V |
| | Forward current | $I_F$ | | | | 50 | mA |
| Output | Repetitive peak OFF-state voltage | $V_{DRM}/V_{RRM}$ | | | | 700 | V |
| | Rated current (RMS) | $I_{T(RMS)}$ | $I_F$=10mA | | | 0.9 | A |
| | Peak one cycle surge current | $I_{SURGE}$ | 50Hz, 1 cycle | | 9 | | A |
| Isolation Voltage* | | $V_{ISO}$ | $I_{ISO} \leqslant 0.3mA$ | 4000 | | | Vrms |
| Operating temperature | | $T_{OPT}$ | | -30 | | 85 | ℃ |
| Storage temperature | | $T_{STG}$ | | -40 | | 125 | ℃ |

**"*":** RH=40 to 60%, T=20~30℃,AC for 1 minute.

## Electro-optical Characteristics

| Parameter | | Symbol | Condition | MIN | TYP | MAX | Unit |
|---|---|---|---|---|---|---|---|
| Input | Forward voltage | $V_F$ | $I_F$=10mA | | 1.2 | 1.3 | V |
| | Reverse current | $I_R$ | $V_R$=5V | | | 10 | µA |
| Output | Repetitive peak OFF-state current | $I_{DRM}$ | $V_{DRM}$=700V | | | 10 | µA |
| | Repetitive peak OFF-state current | $I_{RRM}$ | $V_{RRM}$=700V | | | 10 | uA |
| | ON-state voltage* | $V_T$ | $I_{IN}$=10mA $I_L$=0.9A $V_D$=6V | | 1 | 1.2 | V |
| | Holding current | $I_H$ | | | | 25 | mA |
| | Peak one cycle surge | $I_{SURGE}$ | 50Hz,1 cycle | | 9 | | A |
| | Critical rate of rise of OFF-state voltage | dv/dt | $V_{DRM}$=600Vx1/$\sqrt{2}$ | 200 | | | V/µs |
| Transfer | Minimum trigger current * | $I_{FT}$ | V=±5V | | 3 | 8 | mA |
| | Recommended working current | $I_{IN}$ | | 10 | | 18 | mA |

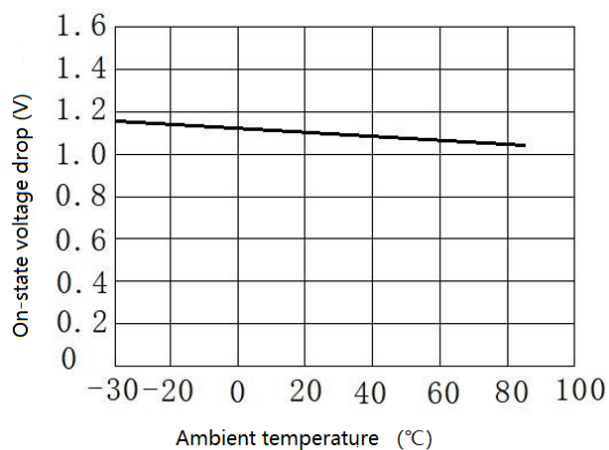| characteristics | Turn-on time | $t_{ON}$ | $I_{IN}$=10mA, $V_D$=6V $R_L$=100Ω | | 0.01 | 1 | mS |
|---|---|---|---|---|---|---|---|
| | Turn-off time | $t_{OFF}$ | | | | 1+1/2 cycle | |

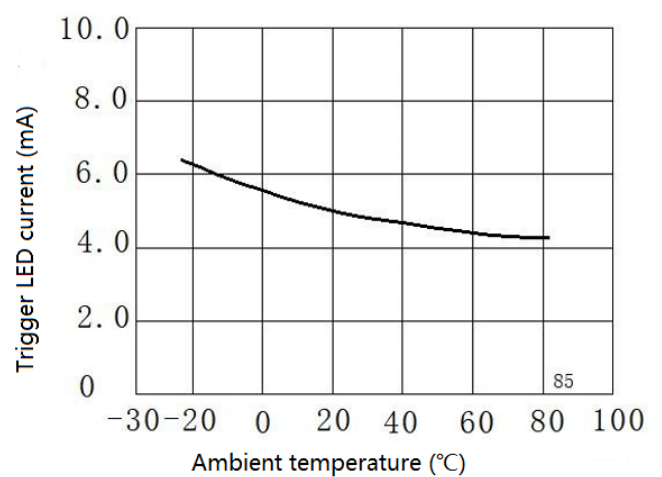" *" is the key parameter.

## Typical Curves

● **Load current （RMS）VS Ambient Temperature**
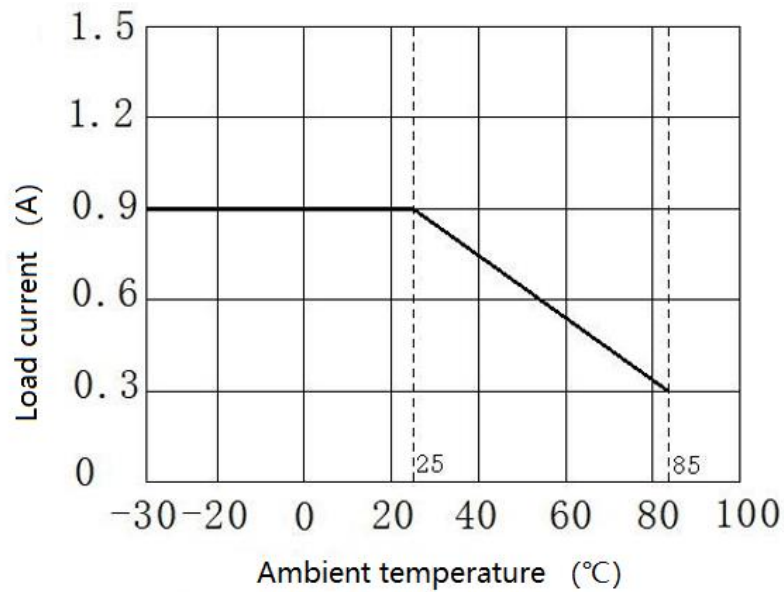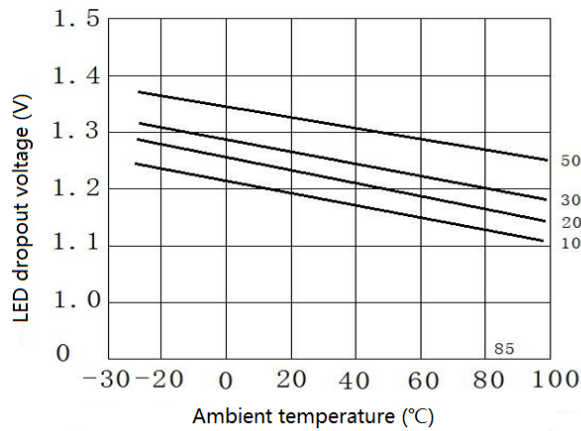


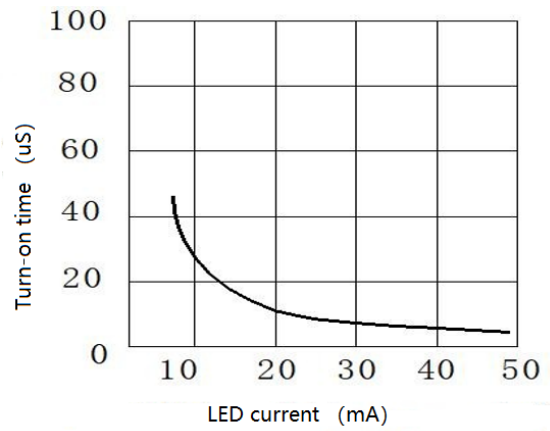● **On-state voltage drop vs Ambient Temperature**

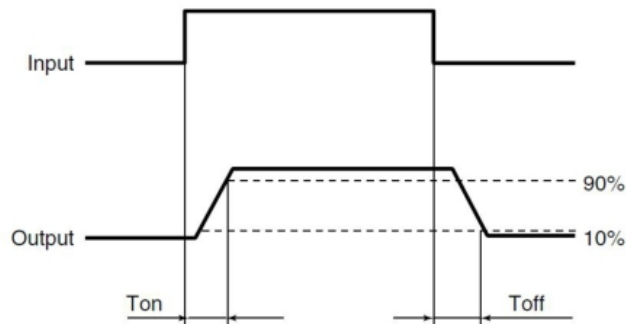● **Trigger LED current vs Ambient Temperature**

- **LED dropout voltage vs Ambient Temperature**



- **Turn-on time vs LED current**



- **Turn-on and turn-off time**



## Typical Application and Description

- **Application circuit**



R1: 330 Ω  5V
R1: 800~1000 Ω  12V
R1: 1.5~2.0K Ω  24V
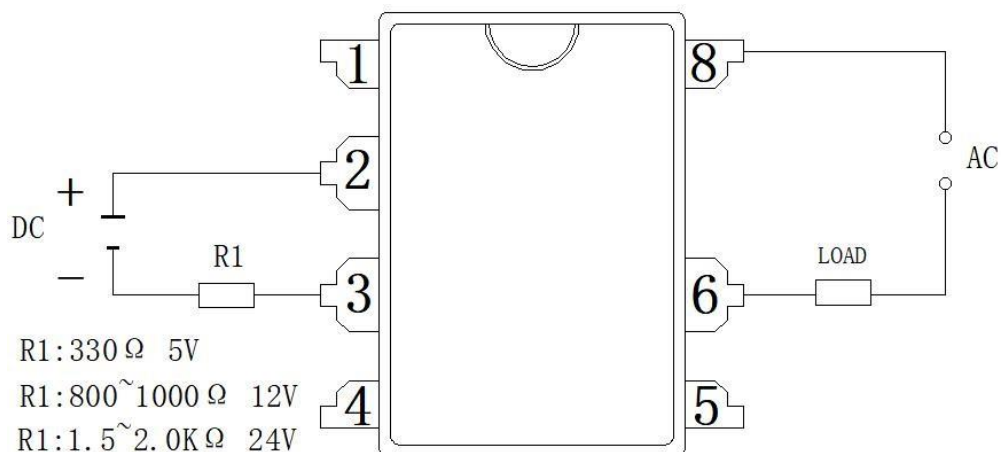
- **Application description**

  **Matters needing attention:**

  A. When the operating temperature exceeds 25 ° C, the derating curve should be referred to the attached figure;

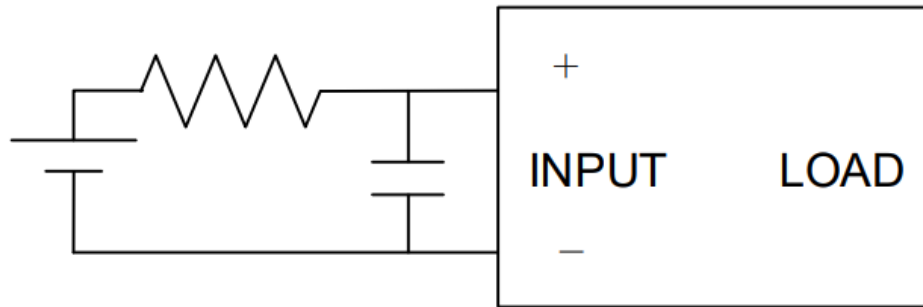B. Relay wiring, be sure to ensure that the input polarity is correct, so as not to damage the relay;

C. Because the SSR operation time is very short, the input noise may cause SSR misoperation, so when the input environmental noise is large, the input should be connected to the R/C loop to absorb noise;



D. Recommended to use the circuit, the output peak voltage may cause SSR misoperation, so please add R/C circuit or varistor to absorb the peak voltage at the output end, see the following figure:
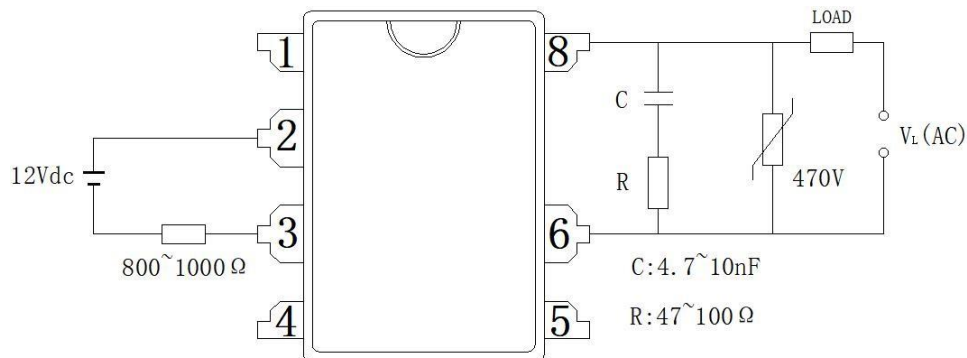


- **ESD protection measures**

   A. When using soldering iron, ground the front end of the soldering iron, it is recommended to use a low-voltage soldering iron;

   B. The equipment used in assembly should also be correctly grounded.

- **Soldering**

   Flow soldering should be completed at 260℃ and within 10s.

   Flow soldering should be completed at 350℃ and within 5s.

**Order Code**

W OR A 09 P 22 LH
① ② ③ ④ ⑤ ⑥ ⑦

① Company Code(W：WAYON)

② Product Series(OR)

③ A:AC OUT

④ Load current:0.9A

⑤ Z: Zero-cross     P: Non zero-cross

⑥ Load voltage 22: 220V; Load voltage 38: 380V

⑦ Package (LH:DIP7; LB:SMD7)

## Model & Package

| Model | Package | Marking | Packing method | QTY(PCS) |
|---|---|---|---|---|
| WORA09P22LH | DIP7 | 09P22 | Tube | TBD |
| WORA09P22LB | SMD7 | 09P22 | Tape and reel | TBD |

## Outline Dimensions  Unit：mm

● **Package DIP7**
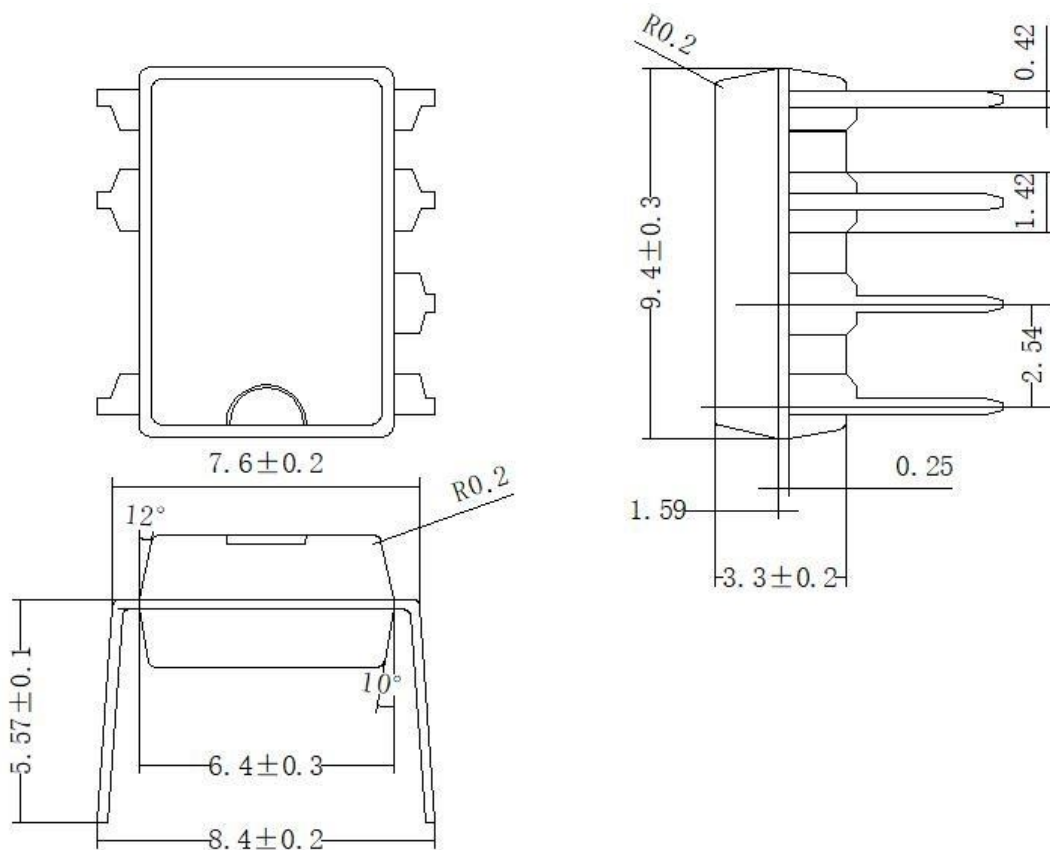


Note：No tolerance is marked as ±0.05mm.

- **Package SMD7**

Note:  No tolerance is  marked as  ±0.05mm.

Name of hazardous  substance

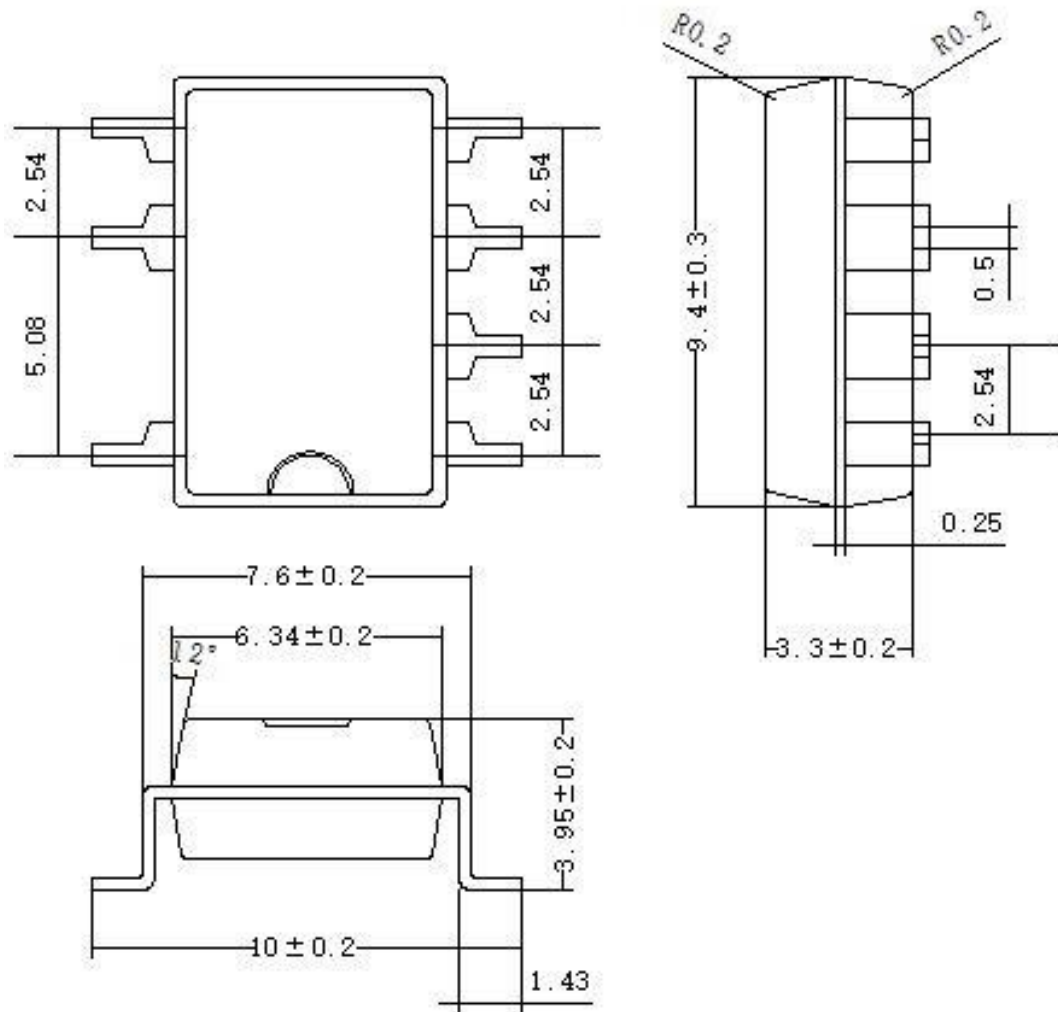| Part name | Name of hazardous substance | | | | | |
|---|---|---|---|---|---|---|
| | Pb | Hg | Cd | Cr$^{+6}$ | PBB | PBDE |
| Lead frame | ○ | ○ | ○ | ○ | ○ | ○ |
| Epoxy Resin Molding Compound | ○ | ○ | ○ | ○ | ○ | ○ |
| Chip | ○ | ○ | ○ | ○ | ○ | ○ |
| Wire | ○ | ○ | ○ | ○ | ○ | ○ |
| Adhesive | ○ | ○ | ○ | ○ | ○ | ○ |
| Instructions | ○：   Indicates that the content of the toxic and harmful substances is below the limit requirements of GBT26572 -2011 standard. <br> ×：   Indicates that the content of the toxic and harmful substances exceeds the limit requirements of the GBT26572 -2011 standard. | | | | | |

## CONTACT INFORMATION

No.1001, Shiwan (7) Road, Pudong District, Shanghai, P.R.China.201207
Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com
WAYON website: **http://www.way-on.com**
For additional information, please contact your local Sales Representative.

WAYON ® is registered trademark of WAYON Corporation.

## Product Specification Statement

1.  The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2.  The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3.  WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

4.  Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

5.  The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

6.  Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.