

Description

The WOC-357X is a photoelectric coupler composed of light-emitting diode and phototransistor. It is packaged in a 4-pin package at SOP .



SOP4

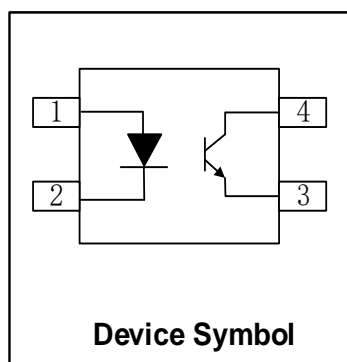
Features

- Current transfer ratio(CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High input-output isolation voltage($V_{iso} = 3,750\text{Vrms}$)
- Operating Temperature: $-55^\circ\text{C} \sim 110^\circ\text{C}$
- RoHS
- MSL1

Applications

- Programmable controllers
- Switching power supply, intelligent meter
- Home appliances: such as air conditioners, fans, water heaters, etc

Schematic & PIN Configuration



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

Product Nomenclature

WOC - 357 X - X X - X X X - XX
 ① ② ③ ④ ⑤ ⑥ ⑦

Designation:

WOC=WAYON Optocoupler

357=Product Series

- ① = Lead form option(NONE)₍₁₎
- ② = CTR Rank(A,B,C,D,NONE)₍₂₎
- ③ = Tape and Reel option(TP,TP1)₍₃₎
- ④ = Lead frame Material(F,NONE)₍₄₎
- ⑤ =VDE order option(fixed code “V”)
- ⑥ = Halogen free option(fixed code “G”)
- ⑦ = Customer code

Notes

1. Lead form option:

| Symbol | Description |
|--------|-------------|
| NONE | SOP4 |

2. CTR Rank:

| Symbol | Description |
|---------|-------------|
| A,B,C,D | CTR Rank |
| NONE | No Rank |

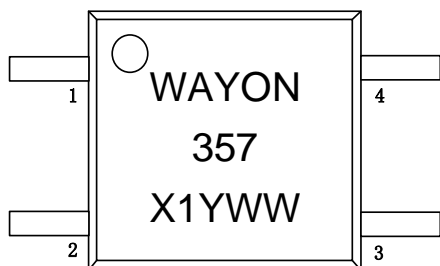
3. Tape and Reel option:

| Symbol | Description |
|--------|--------------------|
| TP&TP1 | Tape and Reel Type |

4. Lead frame Material

| Symbol | Description |
|--------|-------------|
| NONE | Copper |

Marking Information



Designation:

WAYON: denotes Device

357 : denotes Device

X : denotes CTR Rank

1Y : denotes year code

WW: denotes week code

Maximum Rating

| Parameter | | Symbol | Value | Unit |
|-------------------------|---|-----------|------------|----------------------|
| Input | Forward Current | I_F | 50 | mA |
| | Reverse Voltage | V_R | 6 | V |
| | Power Dissipation | P_D | 70 | mW |
| | Derating factor (above $T_a = 90^\circ\text{C}$) | | 2.9 | mW/ $^\circ\text{C}$ |
| Output | Collector-Emitter Voltage | V_{CEO} | 80 | V |
| | Emitter-Collector Voltage | V_{ECO} | 7 | V |
| | Collector Current | I_C | 50 | mA |
| | Collector Power Dissipation | P_C | 150 | mW |
| | Derating factor (above $T_a = 70^\circ\text{C}$) | | 3.7 | mW/ $^\circ\text{C}$ |
| Operating Temperature | | T_{opr} | -55 ~ +110 | $^\circ\text{C}$ |
| Storage Temperature | | T_{stg} | -55 ~ +125 | $^\circ\text{C}$ |
| Total Power Consumption | | P(W) | 200 | mW |
| Isolation Voltage | | V_{iso} | 3750 | Vrms |
| Soldering Temperature | | T_{sol} | 260 | $^\circ\text{C}$ |

Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2).For 10 seconds

Electrical Optical Characteristics (TA=25°C)

| Parameter | | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------------|--------------------------------------|---------------|--|--------------------|--------------------|------|---------------|
| Input | Forward Voltage | V_F | $I_F = 20\text{mA}$ | - | 1.2 | 1.4 | V |
| | Reverse Current | I_R | $V_R = 4\text{V}$ | - | - | 10 | μA |
| | Terminal Capacitance | C_t | $V = 0, f = 1\text{kHz}$ | - | 30 | 250 | pF |
| Output | Collector Dark Current | I_{CEO} | $V_{CE} = 20\text{V}, I_F = 0$ | - | - | 100 | nA |
| | Collector-Emitter Breakdown Voltage | BV_{CEO} | $I_C = 0.1\text{mA}, I_F = 0$ | 80 | - | - | V |
| | Emitter-Collector Breakdown Voltage | BV_{ECO} | $I_E = 10\mu\text{A}, I_F = 0$ | 7 | - | - | V |
| Transfer Characteristics | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F = 20\text{mA}, I_C = 1\text{mA}$ | - | 0.1 | 0.2 | V |
| | Isolation Resistance | R_{ISO} | DC500V, 40~60%RH | 5×10^{10} | 1×10^{11} | - | Ω |
| | Floating capacitance | C_f | $V = 0, f = 1\text{MHz}$ | - | 0.6 | 1.0 | pF |
| | Cut-off Frequency | F_C | $V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$ | - | 80 | - | kHz |
| | Response Time (Rise) | t_r | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ | - | 4 | 18 | μs |
| | Response Time (Fall) | t_f | | - | 3 | 18 | μs |

Rank Table Of Current Transfer Ratio (CTR=IC/IF x 100%)

| Rank Code | Symbol | Min. | Max. | Condition |
|-----------|--------|------|------|--|
| NoNe | CTR | 50 | 600 | $I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$ |
| A | | 80 | 160 | |
| B | | 130 | 260 | |
| C | | 200 | 400 | |
| D | | 300 | 600 | |

Characteristics Curves

Fig.1 Relative Current Transfer Ratio vs. Forward Current

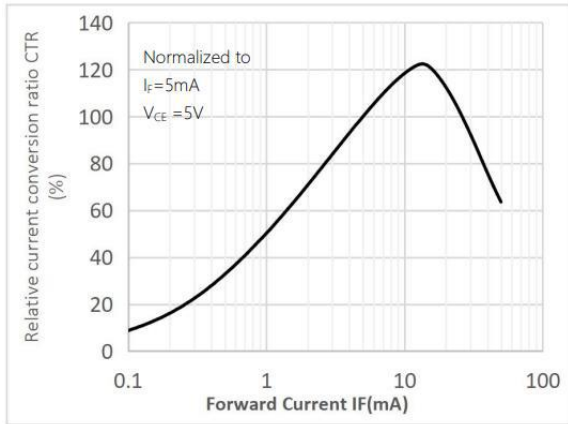


Fig.2 Forward Current vs. Forward Voltage

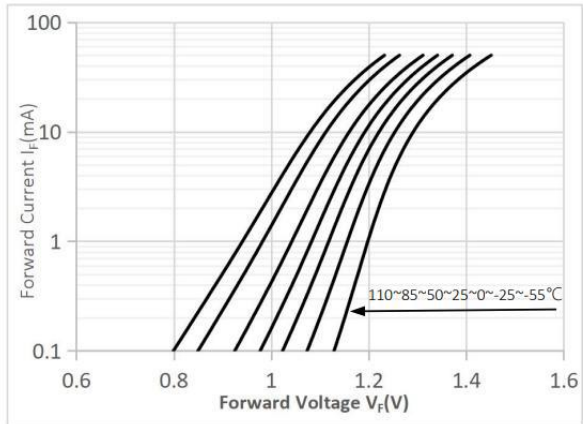


Fig.3 Collector Current vs. Collector-emitter Voltage

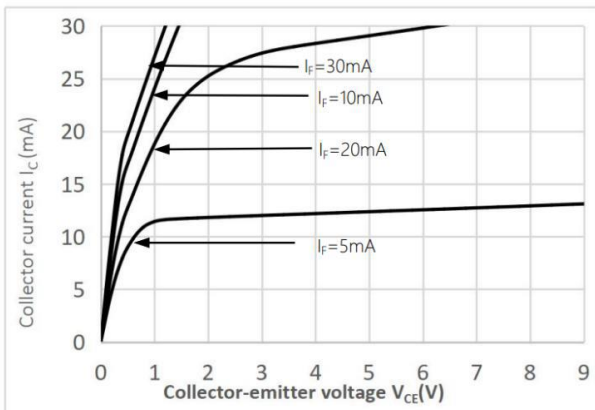


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

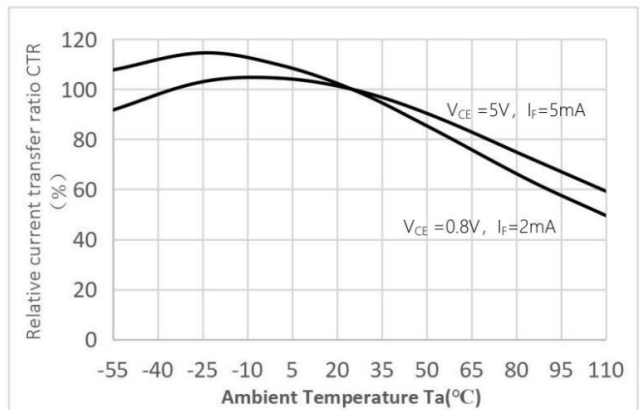


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

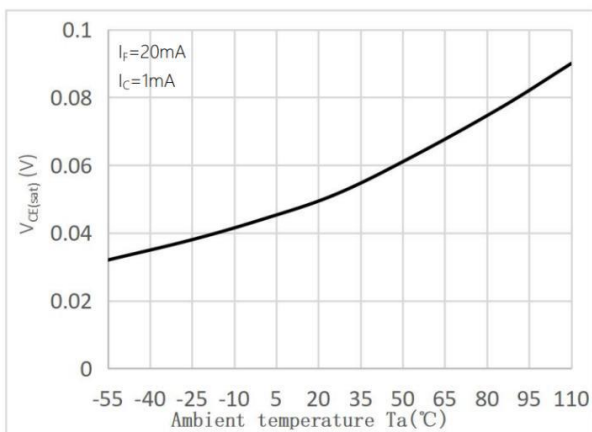


Fig.6 Collector Dark Current vs Ambient Temperature

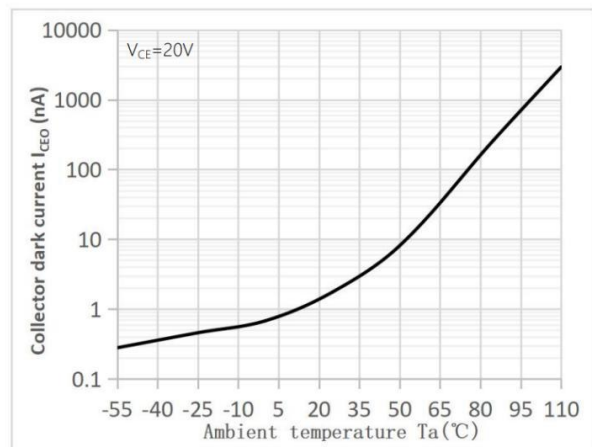


Fig.7 Response Time vs. Load Resistance

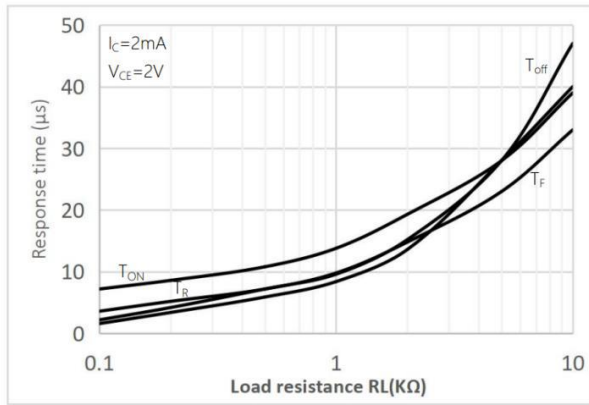


Fig.8 Frequency Response

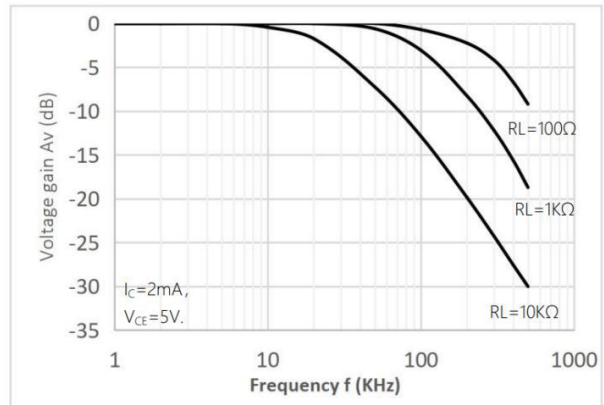


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

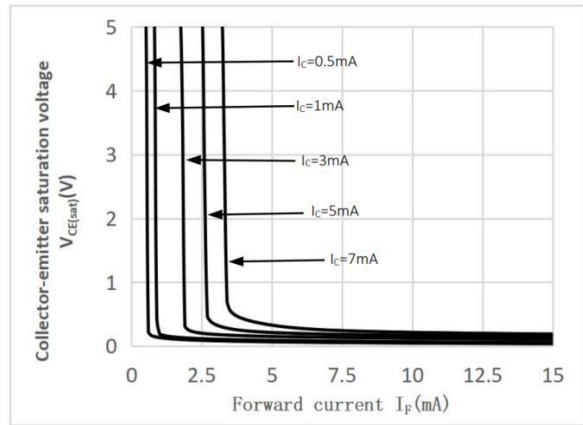
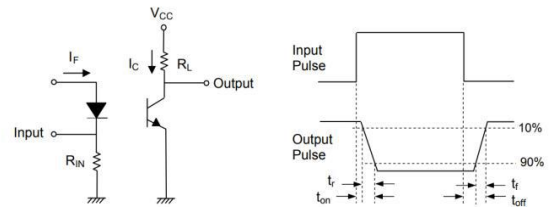
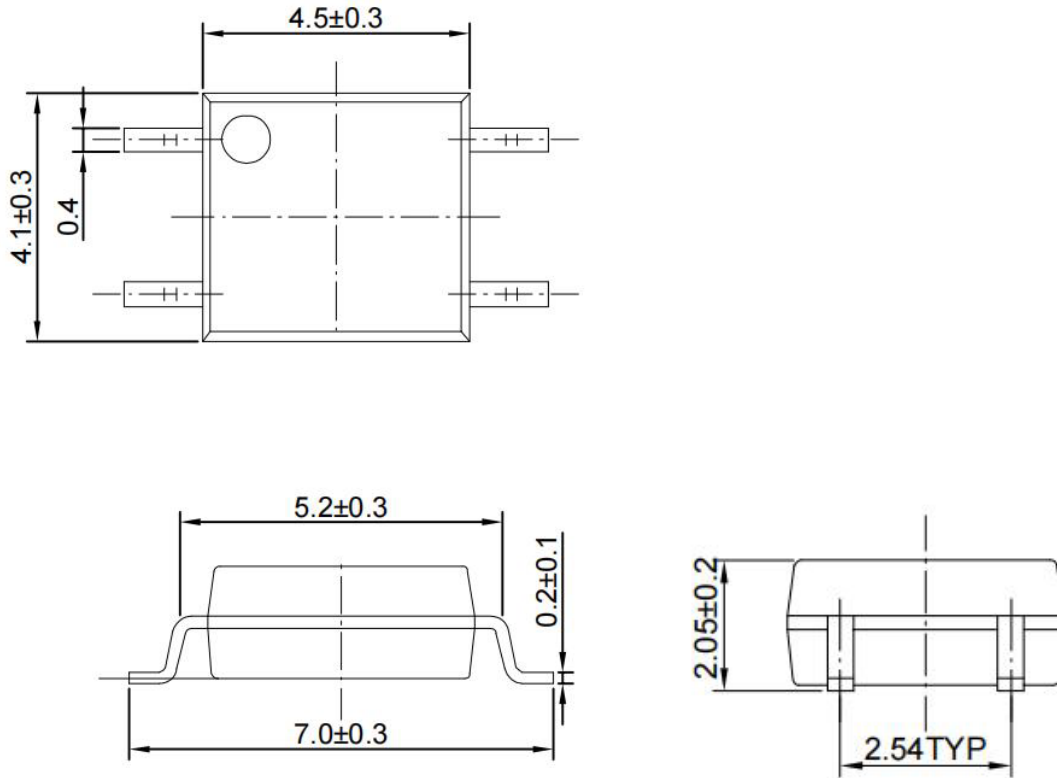


Fig10. Switching Time Test Circuit & Waveform



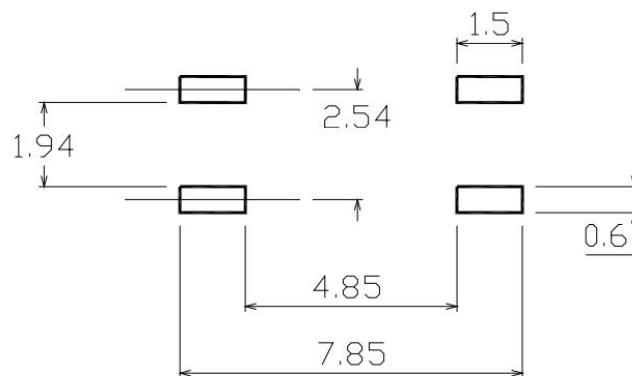
Outline Dimensions



Unit: mm

Tolerance: ± 0.1 mm

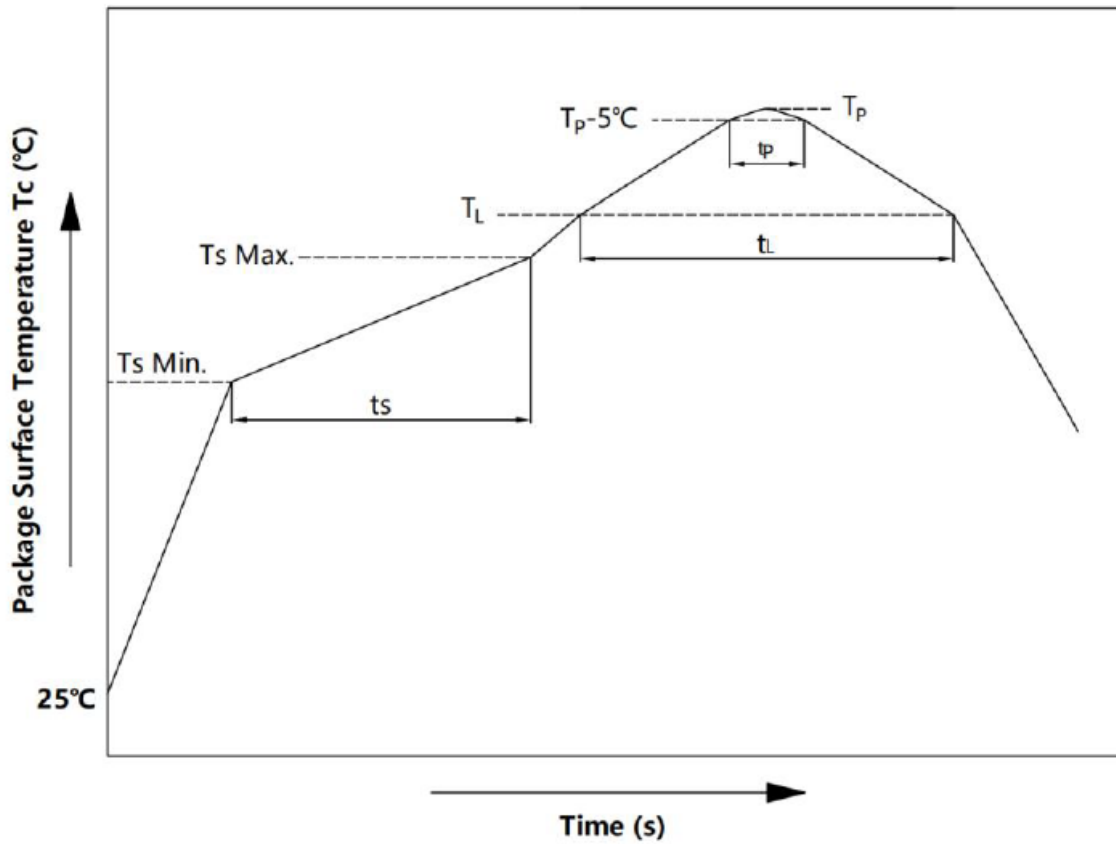
Recommended solder pad Design



Unit: mm

Tolerance: ± 0.1 mm

Temperature Profile Of Soldering IR Reflow soldering



| Item | Symbol | Min. | Max. | Unit |
|--|--------|------|------|-------|
| Preheat Temperature | T_s | 150 | 200 | °C |
| Preheat Time | t_s | 60 | 120 | s |
| Ramp-Up Rate (T_L to T_P) | - | - | 3 | °C /s |
| Liquidus Temperature | T_L | 217 | | °C |
| Time Above T_L | t_L | 60 | 150 | s |
| Peak Temperature | T_P | - | 260 | °C |
| Time During Which T_c Is Between (T_P-5) and T_P | t_p | - | 30 | s |
| Ramp-down Rate(T_P to T_L) | - | 3 | 6 | °C /s |

Note:

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

Wave Soldering

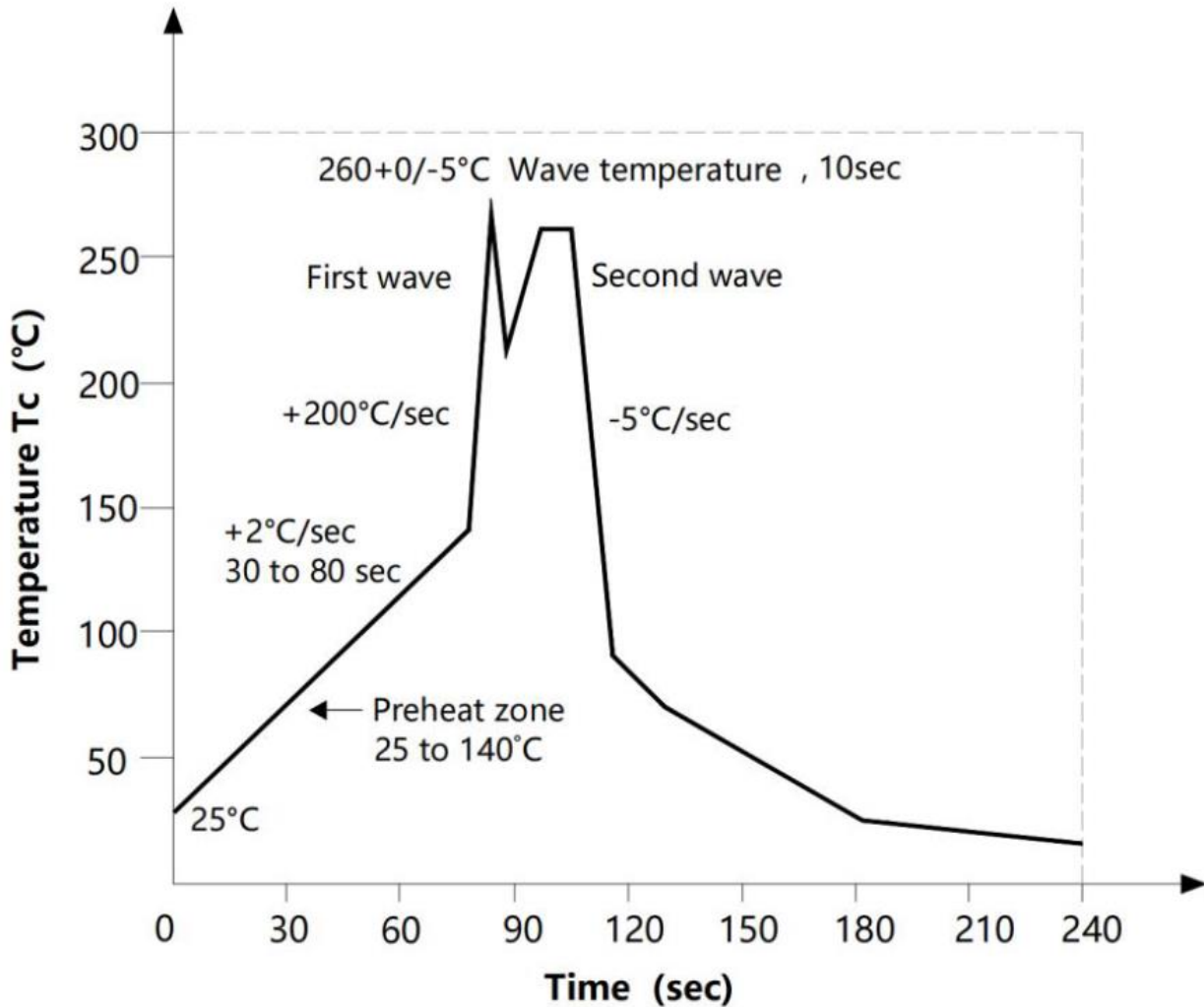
One time soldering is recommended within the condition.

Temperature: $260 \pm 0/-5^\circ\text{C}$.

Time: 10 sec.

Preheat temperature: 25 to 140°C .

Preheat time: 30 to 80 sec.



Soldering with hand soldering iron

Allow single lead soldering in every single process. One time soldering is recommended. Temperature:

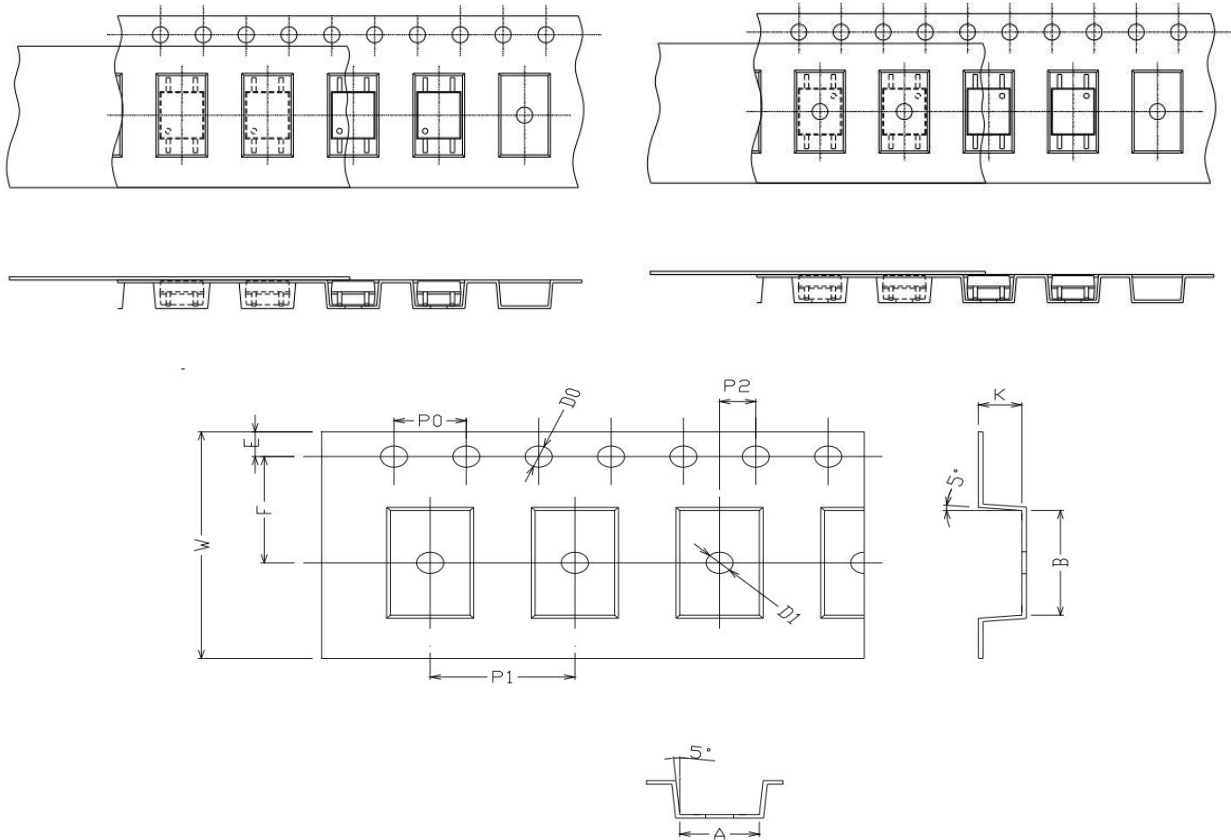
$380 \pm 0/-5^\circ\text{C}$

Time: 3 sec max.

Packing

Option TP:

Option TP1:



| | | | | | | |
|---------------|--------|----------|---------|-------|-------|-------|
| Deminsion/mm | W | E | F | P0 | P1 | P2 |
| Packagetype:S | 16±0.2 | 1.75±0.1 | 7.5±0.1 | 4±0.1 | 8±0.1 | 2±0.1 |

| | | | | | |
|---------------|---------|---------|---------|---------|---------|
| Deminsion/mm | A | B | D0 | D1 | K |
| Packagetype:S | 4.4±0.1 | 7.5±0.1 | 1.5±0.1 | 1.5±0.1 | 2.4±0.1 |

| | | | |
|---------------|---------|--------------|--------------|
| Packagetype:S | Reel | Inner carton | Outer carton |
| QTY/PCS | 3K/reel | 6K(2 reels) | 60K |

CONTACT INFORMATION

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For additional information, please contact your local Sales Representative.

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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.
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