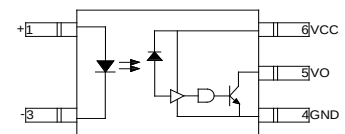
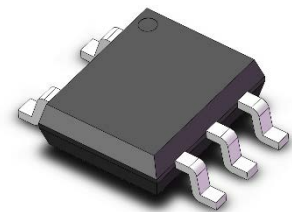


### DESCRIPTION:

The products are 10MBd high-speed opto-couplers in the SOP5 package. The device consists of a high efficient AlGaAs Light Emitting Diode and a high speed optical detector. This design provides excellent AC and DC isolation between the input and output sides of the optocoupler. The output of the optical detector features an open collector Schottky clamped transistor. The enable function allows the optical detector to be strobed. A guaranteed common mode transient immunity is up to 10kV/ $\mu$ s at 3.3V. The optocoupler operational parameters are guaranteed over the temperature range from  $-40^{\circ}\text{C}$  ~  $+110^{\circ}\text{C}$ . The products are widely used in isolation in line receivers, digital isolation for A/D,D/A conversion, ground loop elimination, feedback element in switching mode power supplier, pulse transformer replacement, power transistor isolation in motor drives, interface between microprocessor system, computer and their peripheral.



### MAIN FEATURES

- High isolation 3750 VRMS
- High speed – 10MBd typical
- Operating temperature range  $-40^{\circ}\text{C}$  to  $110^{\circ}\text{C}$
- REACH & RoHS compliance
- HBM: H3A; MM: M4; CDM: C3
- CQC approved
- VDE approved
- UL approved

### Truth Table

| INPUT | OUTPUT |
|-------|--------|
| H     | L      |
| L     | H      |

**ABSOLUTE MAXIMUM RATINGS** (Temperature=25°C)

| Parameter               |                          | Symbol    | Value             | Unit |
|-------------------------|--------------------------|-----------|-------------------|------|
| Input                   | Forward Current          | $I_F$     | 50                | mA   |
|                         | Peak Forward Current     | $I_{FP}$  | 1 <sup>①</sup>    | A    |
|                         | Reverse Voltage          | $V_R$     | 6                 | V    |
|                         | Input Power Dissipation  | $P_D$     | 100               | mW   |
| Output                  | Supply Voltage           | $V_{CC}$  | 7                 | V    |
|                         | Output Voltage           | $V_O$     | 7                 | V    |
|                         | Output Current           | $I_O$     | 50                | mA   |
|                         | Output Power Dissipation | $P_O$     | 85                | mW   |
| Total Power Dissipation |                          | $P_{tot}$ | 200               | mW   |
| Isolation Voltage       |                          | $V_{iso}$ | 3750 <sup>②</sup> | Vrms |
| Operating Temperature   |                          | $T_{opr}$ | -40~110           | °C   |
| Junction Temperature    |                          | $T_j$     | 125               | °C   |
| Storage Temperature     |                          | $T_{stg}$ | -55~125           | °C   |
| Soldering Temperature   |                          | $T_{sol}$ | 260               | °C   |

**NOTE1** : 100μs pulse, 100Hz frequency**NOTE2** : AC for 1minute, R.H.=40~60%**ELECTRICAL CHARACTERISTICS** (Temperature=25°C)

| Parameter |                           | Symbol    | Condition                                         | Min. | Typ. | Max. | Unit |
|-----------|---------------------------|-----------|---------------------------------------------------|------|------|------|------|
| Input     | Forward Voltage           | $V_F$     | $I_F=10mA$                                        | -    | 1.35 | 1.6  | V    |
|           | Reverse Current           | $I_R$     | $V_R=6V$                                          | -    | -    | 1    | μA   |
|           | Input Capacitance         | $C_{in}$  | $V=0, f=1MHz$                                     | -    | 34   | -    | pF   |
| Output    | High Level Output Current | $I_{OH}$  | $I_F=250\mu A$ ,<br>$V_{CC}=3.3V$ ,<br>$V_O=3.3V$ | -    | 5    | 100  | μA   |
|           | High Level Supply Current | $I_{CCH}$ | $V_{CC}=3.3V$ ,<br>$I_F=0mA$                      | -    | -    | 10   | μA   |
|           | Low Level Supply Current  | $I_{CCL}$ | $V_{CC}=3.3V$ ,<br>$I_F=10mA$                     | -    | -    | 13   | mA   |
|           | Logic Low Output Voltage  | $V_{OL}$  | $I_F=5mA$ ,<br>$I_O=13mA$ ,<br>$V_{CC}=3.3V$      | -    | 0.3  | 0.6  | V    |

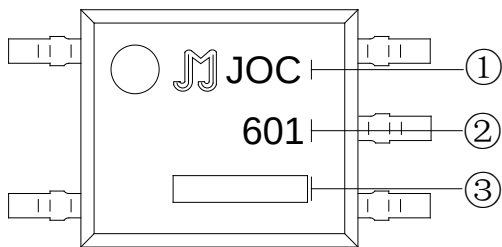
|                           |                                              |                     |                                                                                          |    |           |    |                   |
|---------------------------|----------------------------------------------|---------------------|------------------------------------------------------------------------------------------|----|-----------|----|-------------------|
|                           | Isolation Resistance                         | $R_{ISO}$           | DC500V<br>40~60%R.H.                                                                     | -  | $10^{12}$ | -  | $\Omega$          |
|                           | Floating Capacitance                         | $C_{IO}$            | $V=0, f=1\text{MHz}$                                                                     | -  | 1         | -  | pF                |
| Switching Characteristics | Trigger LED Current                          | $I_{FT}$            | $V_{CC}=5\text{V},$<br>$V_O=V_{OL}$                                                      | -  | -         | 5  | mA                |
|                           | Propagation Delay Time to Logic Low          | $t_{PHL}$           | $C_L=15\text{pF},$<br>$R_L=350\Omega,$<br>$I_F=7.5\text{mA}$                             | -  | -         | 60 | ns                |
|                           | Propagation Delay Time to Logic High         | $t_{PLH}$           |                                                                                          | -  | -         | 60 | ns                |
|                           | Pulse width distortion                       | $ t_{PHL}-t_{PLH} $ |                                                                                          | -  | -         | 35 | ns                |
|                           | Common Mode Transient Immunity at Logic High | $CM_H$              | $V_{CC}=3.3\text{V},$<br>$I_F=0\text{mA},$<br>$V_{CM}=1000\text{V},$<br>$R_L=350\Omega$  | 10 | 15        | -  | kV/ $\mu\text{s}$ |
|                           | Common Mode Transient Immunity at Logic Low  | $CM_L$              | $V_{CC}=3.3\text{V},$<br>$I_F=10\text{mA},$<br>$V_{CM}=1000\text{V},$<br>$R_L=350\Omega$ | 10 | 15        | -  | kV/ $\mu\text{s}$ |
|                           | Rise Time                                    | $t_r$               | $C_L=15\text{pF},$<br>$R_L=350\Omega,$<br>$I_F=7.5\text{mA}$                             | -  | 30        | -  | ns                |
|                           | Fall Time                                    | $t_f$               |                                                                                          | -  | 30        | -  | ns                |

### Recommended Operating Conditions

| Characteristics          | Symbol   | Min. | Typ. | Max. | Unit               |
|--------------------------|----------|------|------|------|--------------------|
| Operating Temperature    | $T_a$    | -40  | -    | 85   | $^{\circ}\text{C}$ |
| Supply Voltage           | $V_{CC}$ | 2.7  | -    | 3.6  | V                  |
|                          |          | 4.5  | -    | 5.5  |                    |
| Low Level Input Current  | $I_{FL}$ | 0    | -    | 250  | $\mu\text{A}$      |
| High Level Input Current | $I_{FH}$ | 7    | -    | 15   | mA                 |

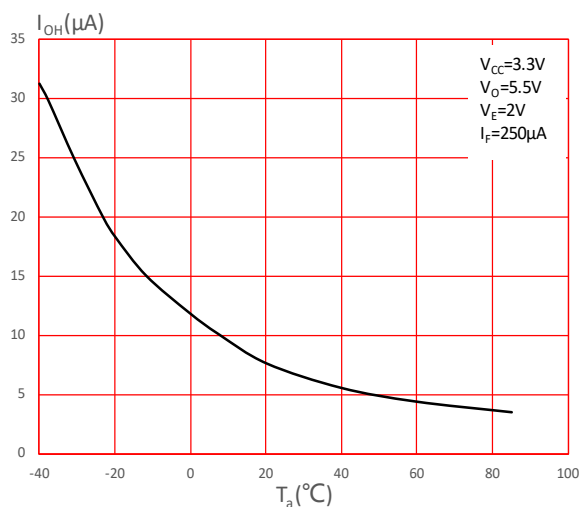
|                                         |       |     |   |    |           |
|-----------------------------------------|-------|-----|---|----|-----------|
| Output Pull-up Resistor                 | $R_L$ | 330 | - | 4k | $\Omega$  |
| Fan Out (at $R_L=1k\Omega$ per channel) | N     | -   | - | 5  | TTL Loads |

## ORDERING AND MARKING INFORMATION

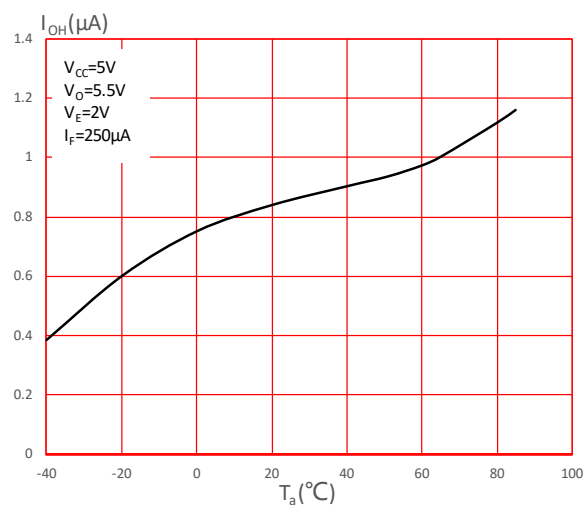
| MARKING INFORMATION                                                                |                 |                                                                                             |                                  |
|------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------|----------------------------------|
|  |                 | <p>① : Company Abbr.<br/>② : Part Number &amp; Rank<br/>③ : Production Information Code</p> |                                  |
| Packing Quantity                                                                   |                 |                                                                                             |                                  |
| Option                                                                             | Quantity        | Quantity – Inner box                                                                        | Quantity –Outer box              |
| SOP5                                                                               | 3000 Units/Reel | 2 Reels/Inner box                                                                           | 5 Inner box/Outer box =30k Units |

## Characteristics Curves

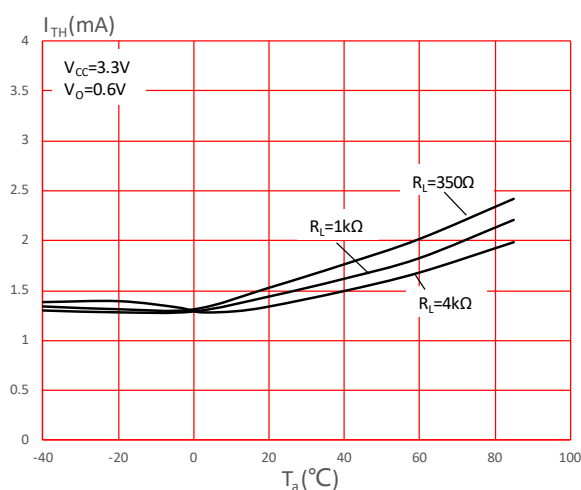
**FIG.1:** High Level Output Current vs. Ambient Temperature



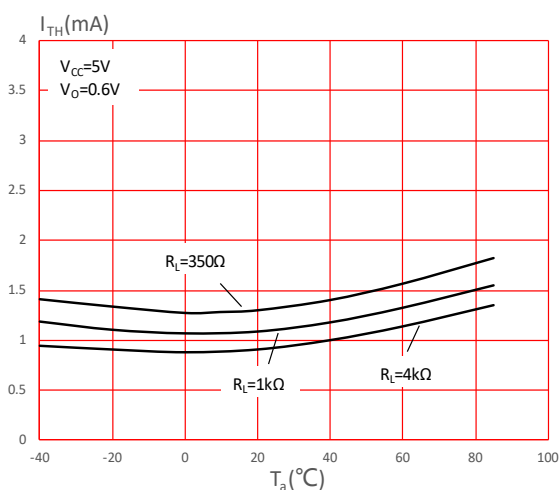
**FIG.2:** High Level Output Current vs. Ambient Temperature



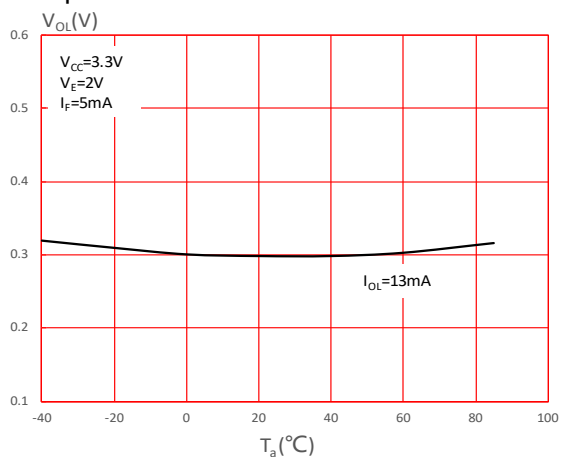
**FIG.3:** Input Threshold Current vs. Ambient Temperature



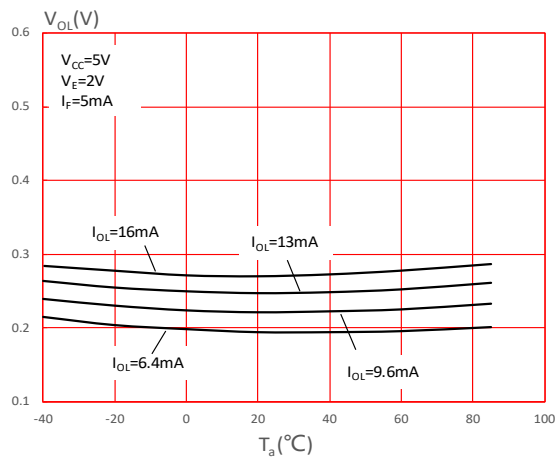
**FIG.4:** Input Threshold Current vs. Ambient Temperature

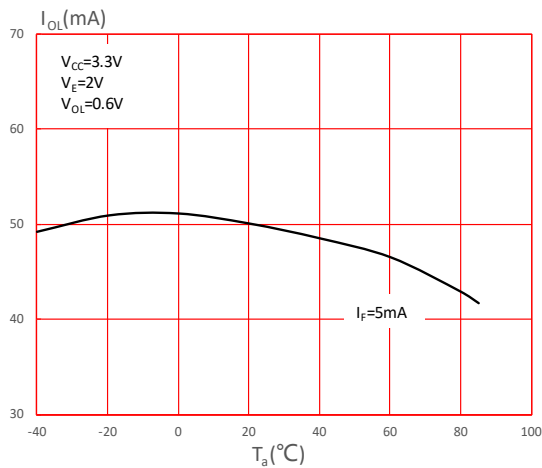
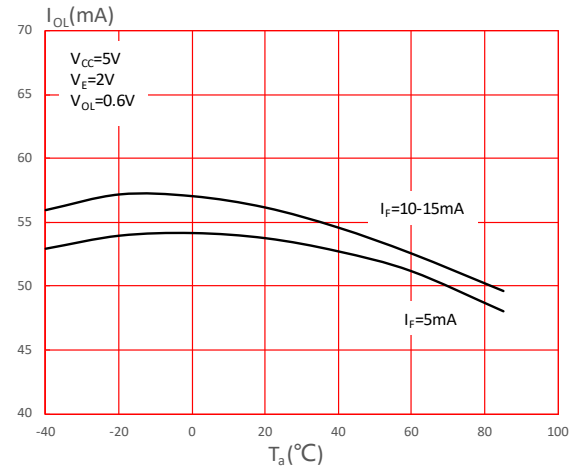
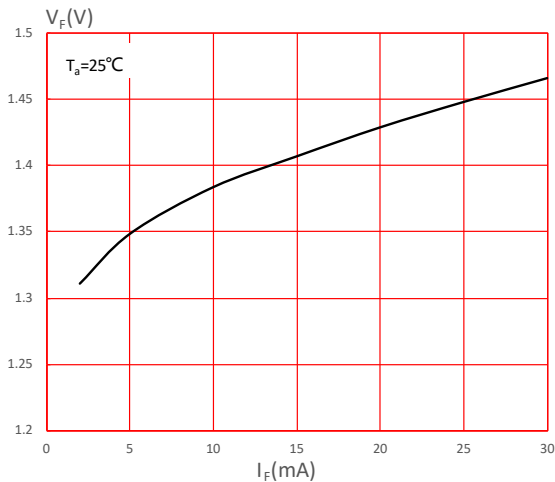
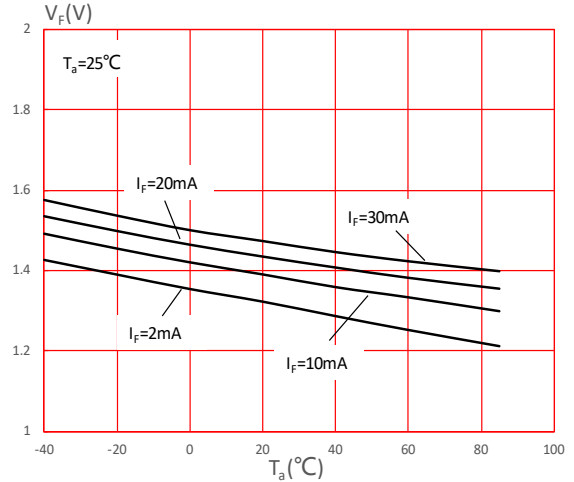
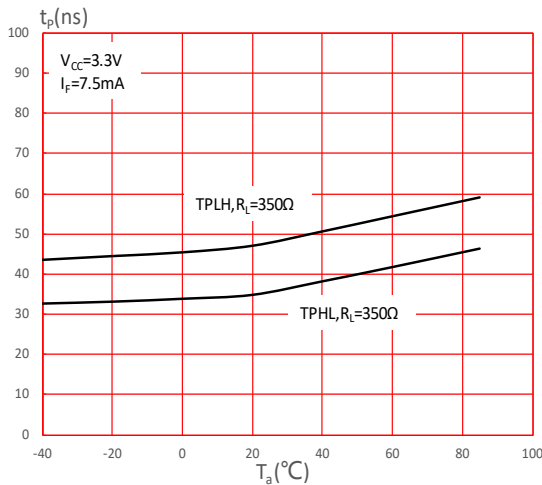
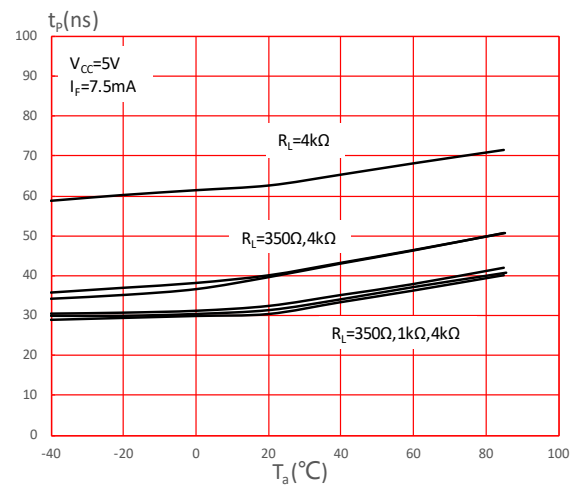


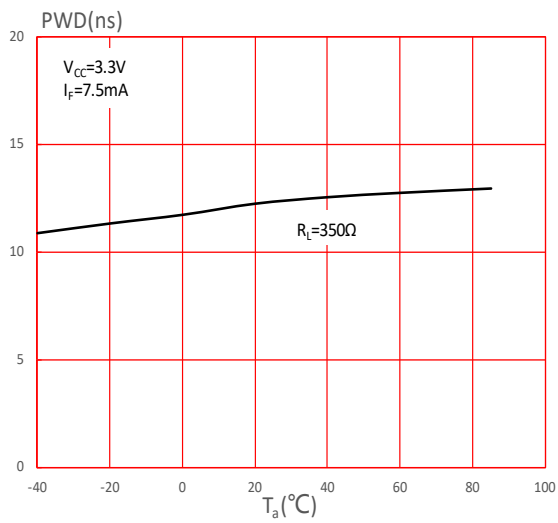
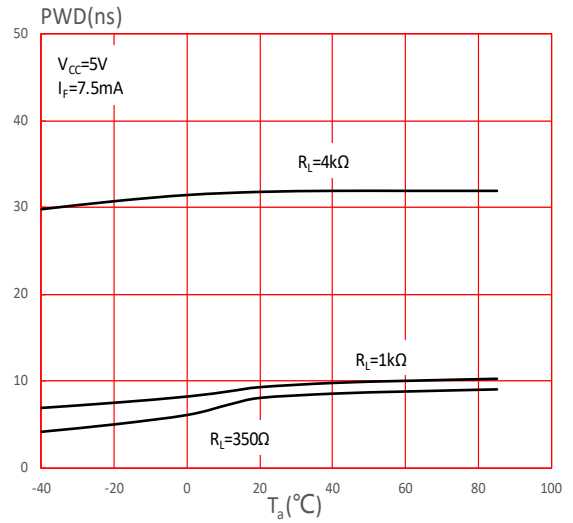
**FIG.5:** Low Level Output Voltage vs. Ambient Temperature



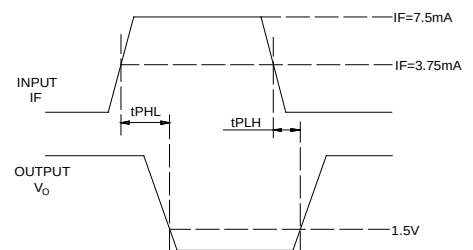
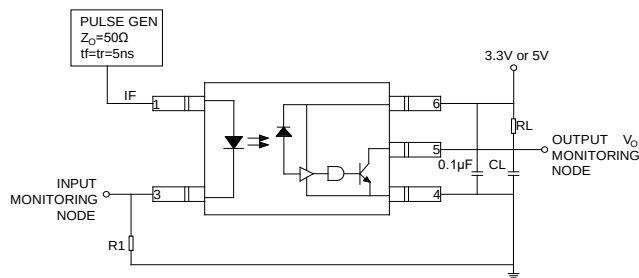
**FIG.6:** Low Level Output Voltage vs. Ambient Temperature



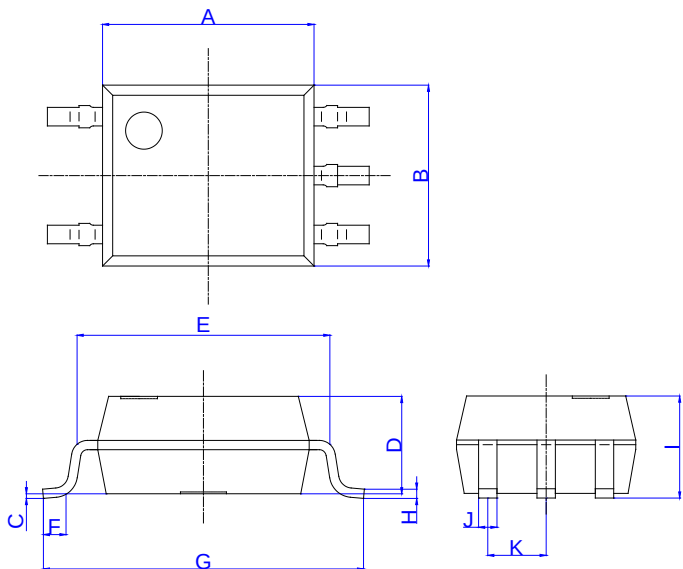
**FIG.7:** Low Level Output Current vs. Ambient Temperature**FIG.8:** Low Level Output Current vs. Ambient Temperature**FIG.9:** Input Forward Voltage vs. Input Forward Current**FIG.10:** Forward Voltage vs. Ambient Temperature**FIG.11:** Propagation Delay vs. Ambient Temperature**FIG.12:** Propagation Delay vs. Ambient Temperature

**FIG.13:** Pulse Width Distortion vs. Ambient Temperature

**FIG.14:** Pulse Width Distortion vs. Ambient Temperature


## TEST CIRCUITS

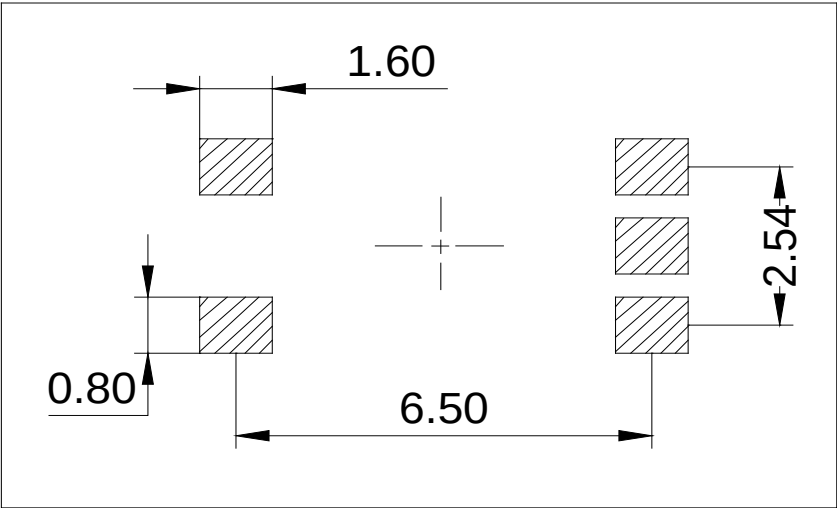
**Fig.15:** Test Circuit and Waveform of  $t_{PHL}$ ,  $t_{PLH}$ 


Package Dimension (Unit: mm)



| Ref. | Dimensions  |      |      |        |      |       |
|------|-------------|------|------|--------|------|-------|
|      | Millimeters |      |      | Inches |      |       |
|      | Min.        | Typ. | Max. | Min.   | Typ. | Max.  |
| A    | 4.40        |      | 4.80 | 0.173  |      | 0.189 |
| B    | 3.60        |      | 4.20 | 0.142  |      | 0.165 |
| C    | 0.00        |      | 0.20 | 0.000  |      | 0.008 |
| D    | 1.90        |      | 2.30 | 0.075  |      | 0.091 |
| E    | 5.00        |      | 5.60 | 0.197  |      | 0.220 |
| F    | 0.34        |      | 0.94 | 0.013  |      | 0.037 |
| G    | 6.70        |      | 7.30 | 0.264  |      | 0.287 |
| H    | 0.10        |      | 0.30 | 0.004  |      | 0.012 |
| I    | 2.00        |      | 2.40 | 0.079  |      | 0.094 |
| J    | 0.25        |      | 0.55 | 0.010  |      | 0.022 |
| K    | 1.02        |      | 1.52 | 0.040  |      | 0.060 |

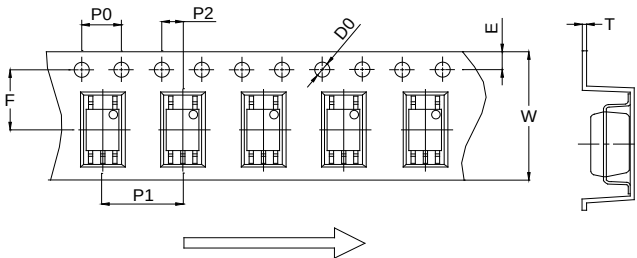
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)





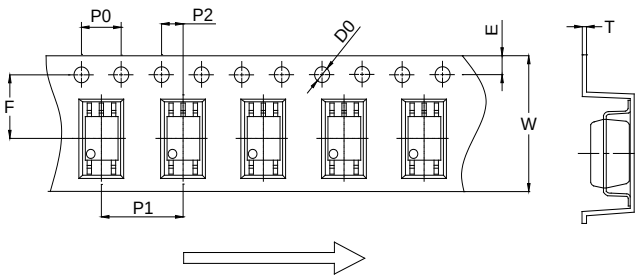
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



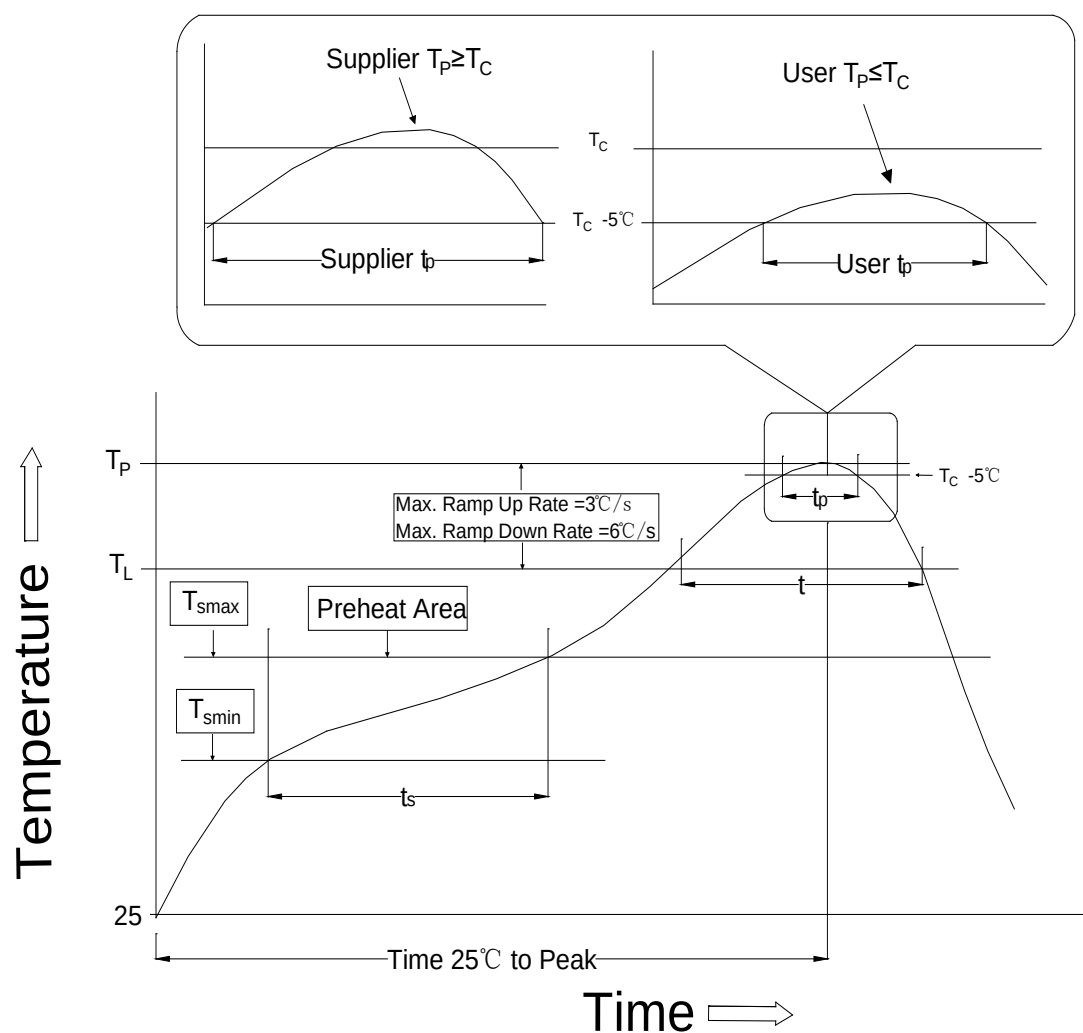
| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| D0   |             | 1.50  | 1.60  |        | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 4.40        | 4.50  | 4.60  | 0.173  | 0.177 | 0.181 |
| T    | 0.25        | 0.30  | 0.35  | 0.010  | 0.012 | 0.014 |
| W    | 11.90       | 12.00 | 12.30 | 0.469  | 0.472 | 0.484 |

Option T2



| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| D0   |             | 1.50  | 1.60  |        | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 4.40        | 4.50  | 4.60  | 0.173  | 0.177 | 0.181 |
| T    | 0.25        | 0.30  | 0.35  | 0.010  | 0.012 | 0.014 |
| W    | 11.90       | 12.00 | 12.30 | 0.469  | 0.472 | 0.484 |

## REFLOW INFORMATION



| Profile Feature                                  | Sn-Pb Assembly Profile | Pb-Free Assembly Profile |
|--------------------------------------------------|------------------------|--------------------------|
| Temperature Min. ( $T_{smin}$ )                  | 100°C                  | 150°C                    |
| Temperature Max. ( $T_{smax}$ )                  | 150°C                  | 200°C                    |
| Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ ) | 60-120 seconds         | 60-120 seconds           |
| Ramp-up Rate ( $t_L$ to $t_P$ )                  | 3°C/second max.        | 3°C/second max.          |
| Liquidus Temperature ( $T_L$ )                   | 183°C                  | 217°C                    |
| Time ( $t_L$ ) Maintained Above ( $T_L$ )        | 60-150 seconds         | 60-150 seconds           |
| Peak Body Package Temperature                    | 235°C+0°C/-5°C         | 260°C+0°C/-5°C           |
| Time ( $t_P$ ) within 5°C of 260°C               | 10 seconds             | 10 seconds               |
| Ramp-down Rate ( $T_P$ to $T_L$ )                | 3-6°C/second           | 3-6°C/second             |
| Time 25°C to Peak Temperature                    | 6 minutes max.         | 8 minutes max.           |

Note:

1. Reflow soldering is recommended at the temperatures and times shown, no more than three times.
2. Avoid direct contact between the epoxy body and any tools or surfaces exceeding its maximum storage temperature.
3. Application of pressure on the epoxy body is prohibited at elevated temperatures. In specific scenarios, any applied force must not exceed 2.5N.
4. Ensure the component has cooled to ambient temperature before proceeding with any subsequent manufacturing steps.
5. The component has a shelf life of one year when stored under standard conditions.
6. Recommend storage Temp.: 0~40°C;  
Recommend storage humidity: <60%;  
MSL level: MSL 1

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