



# ORIENT

## Photo coupler

### Product Data Sheet

Part Number: OR-263X

Customer: \_\_\_\_\_

Date: \_\_\_\_\_

**SHENZHEN ORIENT COMPONENTS CO., LTD**

Block A 3rd Floor No.4 Building, Tian'an Cyber Park, Huangge Rd, LongGang Dist, Shenzhen, GD

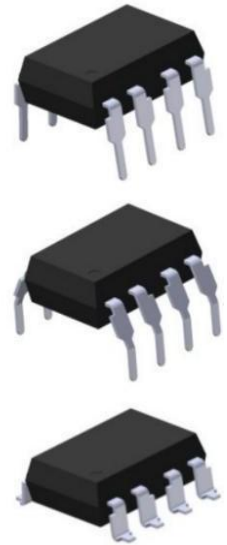
TEL: 0755-29681816

FAX: 0755-29681200

[www.orient-opto.com](http://www.orient-opto.com)

### 1. Features

- (1)High speed: 10Mbit/s
- (2)10kV/μs min. common mode transient immunity (OR-2631) 5kV/μs min. common mode transient immunity (OR-2630)
- (3)Logic gate output
- (4)Guaranteed performance from -40 to 100°C
- (5)High isolation voltage between input and output (Viso=5000 Vrms )
- (6)Safety approval
  - UL approved (No.E323844)
  - VDE approved (No.40029733)
  - CQC approved (No.CQC19001231254 )
- (7)In compliance with RoHS, REACH standards
- (8)MSL Class I



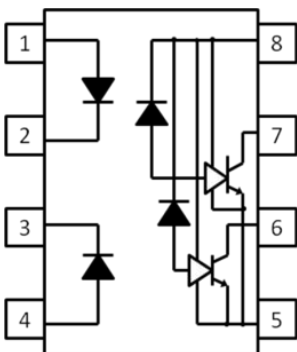
### 2. Instructions

The OR-2630 and OR-2631 are consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output. It is packaged in a 8-pin DIP package and available in wide-lead spacing and SMD options.

### 3. Application Range

- (1) Ground loop elimination
- (2) LSTTL to TTL, LSTTL or 5 volt CMOS
- (3) Line receiver, data transmission
- (4) Data multiplexing
- (5) Switching power supplies
- (6) Pulse transformer replacement
- (7) Computer peripheral interface
- (8) High speed logic ground isolation

### 4. Functional Diagram



Pin Configuration:  
 1.Anode      5.Gnd  
 2.Cathode    6.Vout2  
 3.Cathode    7.Vout1  
 4.Anode      8.Vcc

| Truth Table (Positive Logic) |        |
|------------------------------|--------|
| Input                        | Output |
| H                            | L      |
| L                            | H      |

0.1 capacitor F bypass capacitance needs to be connected between A Pin8 and Pin5

**5. Absolute Maximum Ratings (Ta=25°C)\*1**

| Parameter             |                               | Symbol           | Rated Value | Unit             |
|-----------------------|-------------------------------|------------------|-------------|------------------|
| Input                 | Average Forward Input Current | I <sub>F</sub>   | 20          | mA               |
|                       | Reverse Input Voltage         | V <sub>R</sub>   | 5           | V                |
|                       | Power Dissipation             | P <sub>I</sub>   | 40          | mW               |
| Output                | Output Collector Current      | I <sub>O</sub>   | 50          | mA               |
|                       | Output Collector Voltage      | V <sub>O</sub>   | 7           | V                |
|                       | Supply voltage                | V <sub>CC</sub>  | 7           | V                |
|                       | Output Power Dissipation      | P <sub>O</sub>   | 85          | mW               |
| Insulation Voltage    |                               | V <sub>iso</sub> | 5000        | V <sub>rms</sub> |
| Working Temperature   |                               | T <sub>opr</sub> | -40 ~ +100  | °C               |
| Storage Temperature   |                               | T <sub>stg</sub> | -55 ~ +125  |                  |
| Soldering Temperature |                               | T <sub>sol</sub> | 260         |                  |

Notes:

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2, 3 & 4 are shorted together, and pins 5, 6, 7 & 8 are shorted together.

\*2. soldering time is 10 seconds.

## 6. Opto-electronic Characteristics

Over recommended temperature ( $T_A = -40^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ ) unless otherwise specified. All Typical at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^{\circ}\text{C}$ . All enable test conditions apply to single channel products only.

| Parameter  |  | Symbol                    | Min | Typ  | Max | Unit                   | Condition   |
|--|--|---------------------------|-----|------|-----|------------------------|---|
| Input  | Forward Voltage                            | $V_F$                     | —   | 1.4  | 1.8 | V                      | $I_F = 10\text{mA}, T_A = 25^{\circ}\text{C}$                   |
|  | Temperature Coefficient Of Forward Voltage | $\Delta V_F / \Delta T_A$ | —   | -1.8 | —   | mV/ $^{\circ}\text{C}$ | $I_F = 10\text{mA}$   |
|  | Reverse Voltage                            | $BV_R$                    | 5   | —    | —   | V                      | $I_R = 10\mu\text{A}$   |
|  | Input Capacitance                          | $C_{IN}$                  | —   | 34   | —   | pF                     | $f = 1\text{MHz}, V_F = 0\text{V}$                              |
| Output   | High Level Supply Current                  | $I_{CCH}$                 | —   | 12.5 | 18  | mA                     | $V_{CC} = 5.5\text{V}, I_F = 0\text{mA}$                        |
|  | Low Level Supply Current                   | $I_{CCL}$                 | —   | 14.5 | 21  | mA                     | $V_{CC} = 5.5\text{V}, I_F = 10\text{mA}$                       |
| Transfer Characteristics<br>( $T_A = -40$ to $+85^{\circ}\text{C}$ unless specified otherwise) | High Level Output Current                  | $I_{OH}$                  | —   | 5    | 100 | $\mu\text{A}$          | $V_{CC} = 5.5\text{V}, V_O = 5.5\text{V}, I_F = 250\mu\text{A}$ |
|  | Low Level Output Voltage                   | $V_{OL}$                  | —   | 0.35 | 0.6 | V                      | $V_{CC} = 5.5\text{V}, I_F = 5\text{mA}, I_{CL} = 13\text{mA}$  |
|  | Input Threshold Current                    | $I_{FT}$                  | —   | 2.5  | 5   | mA                     | $V_{CC} = 5.5\text{V}, V_O = 0.6\text{V}, I_{OL} = 13\text{mA}$ |

### 7. Switching Characteristics

(Over recommended temperature (TA = -40°C to +100°C) unless otherwise specified. All Typicals at VCC = 5 V, TA = 25°C. All enable test conditions apply to single channel products only.

| Parameter                                    |         | Symbol                             | Min | Typ | Max | Unit  | Condition  |
|--|---------|------------------------------------|-----|-----|-----|-------|--|
| Propagation delay time to output High level  |         | T <sub>PLH</sub>                   | —   | 35  | 100 | ns    | C <sub>L</sub> =15pF,<br>R <sub>L</sub> =350Ω,<br>T <sub>A</sub> =25°C                               |
| Propagation delay time to output Low level   |         | T <sub>PHL</sub>                   | —   | 40  | 100 | ns    | C <sub>L</sub> =15pF,<br>R <sub>L</sub> =350Ω,<br>T <sub>A</sub> =25°C                               |
| Pulse width distortion                       |         | T <sub>PHL</sub> -T <sub>PLH</sub> | —   | 8   | 35  | ns    | C <sub>L</sub> = 15pF,<br>R <sub>L</sub> =350Ω   |
| Output rise time                             |         | t <sub>r</sub>                     | —   | 40  | —   | ns    | C <sub>L</sub> = 15pF,<br>R <sub>L</sub> =350Ω   |
| Output fall time                             |         | t <sub>f</sub>                     | —   | 10  | —   | ns    | C <sub>L</sub> = 15pF,<br>R <sub>L</sub> =350Ω   |
| Common Mode Transient Immunity at Logic High | OR-2630 | CM <sub>H</sub>                    | 5   | —   | —   | KV/μS | I <sub>F</sub> =0mA,<br>V <sub>OH</sub> =2.0V,<br>R <sub>L</sub> =350 Ω<br>V <sub>CM</sub> =1KVp-p   |
|  | OR-2631 |                                    | 10  | 20  | —   | KV/μS |  |
| Common Mode Transient Immunity at Logic Low  | OR-2630 | CM <sub>L</sub>                    | 5   | —   | —   | KV/μS | I <sub>F</sub> =7.5mA,<br>V <sub>OL</sub> =0.8V,<br>R <sub>L</sub> =350 Ω<br>V <sub>CM</sub> =1KVp-p |
|  | OR-2631 |                                    | 10  | 20  | —   | KV/μS |  |



## 8. Order Information

Part Number

# OR-263XU-Y-Z

### Note

263X = Part Number, 2630 or 2631.

U = Lead form option (S, M or none)

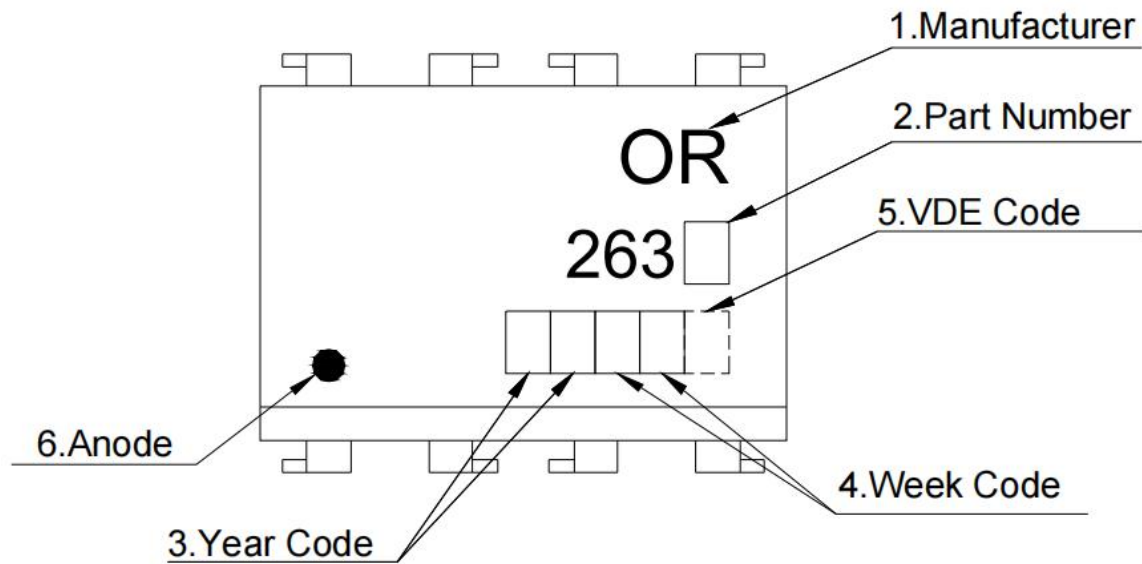
Y = Tape and reel option ( TA,TA1 or none).

Z = 'V' code for VDE safety (This options is not necessary).

\* VDE Code can be selected.

| Option | Description  | Packing quantity    |
|--------|--|---------------------|
| None   | Standard SMD Option  | 45 units per tube   |
| M      | Wide lead bend (0.4 inch spacing)                              | 45 units per tube   |
| TA     | Surface mount lead form (low profile) + TP tape & reel option  | 1000 units per reel |
| TA1    | Surface mount lead form (low profile) + TP1 tape & reel option | 1000 units per reel |

## 9. Naming Rule

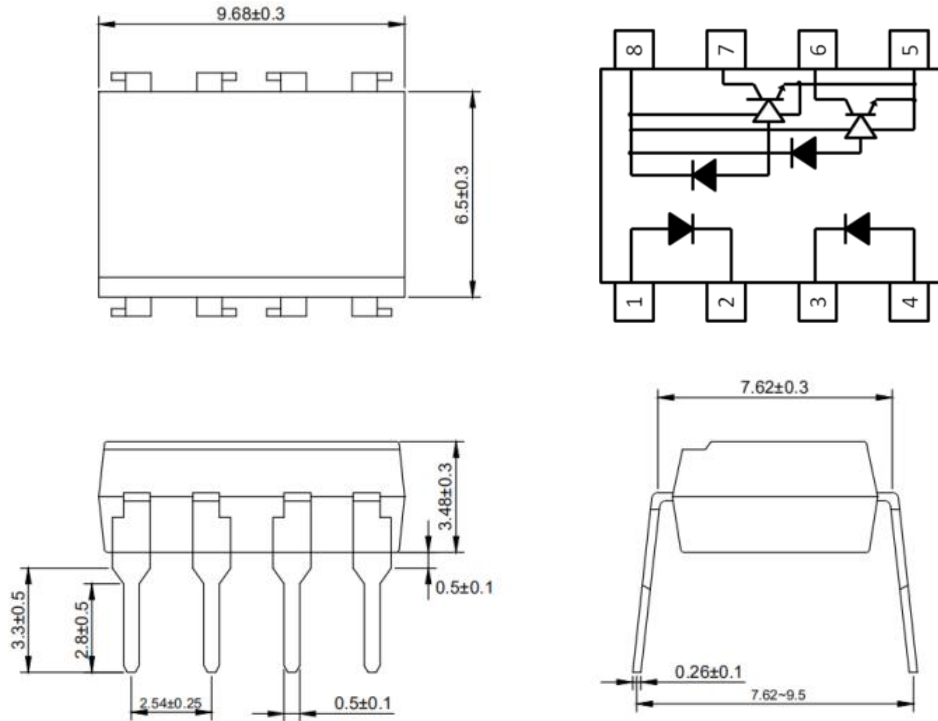


1. Manufacturer : ORIENT.
2. Part Number : 2630 or 2631.
3. Year Code   : '21' means '2021' and so on.
4. Week Code   : 01 means the first week, 02 means the second week and so on.
5. VDE Code     . (Optional)
6. Anode.

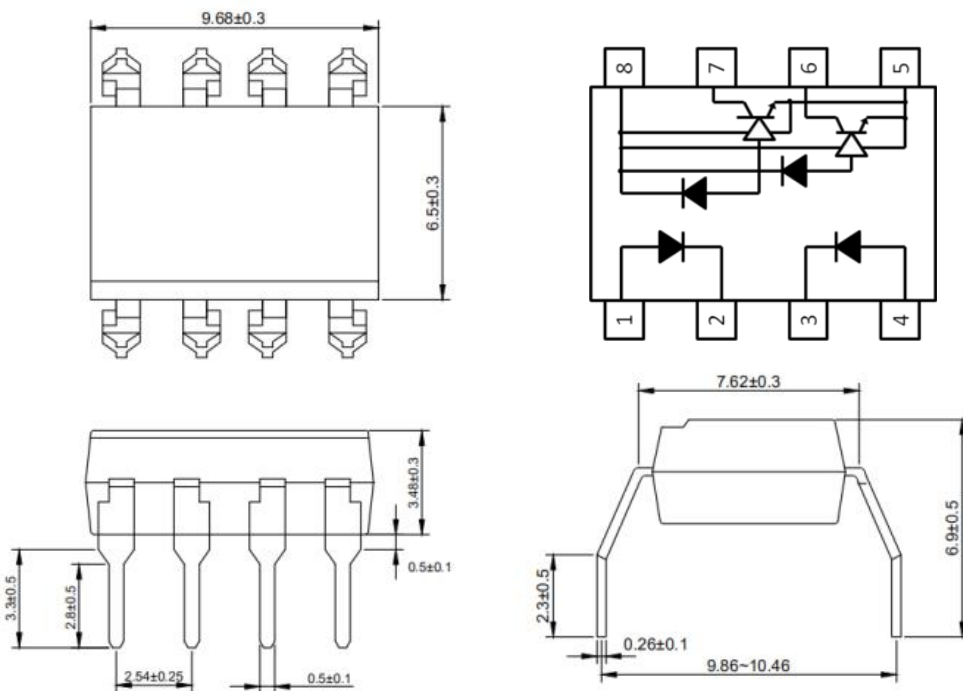
\* VDE Mark can be selected.

10. Outer Dimension

(1) OR-263X

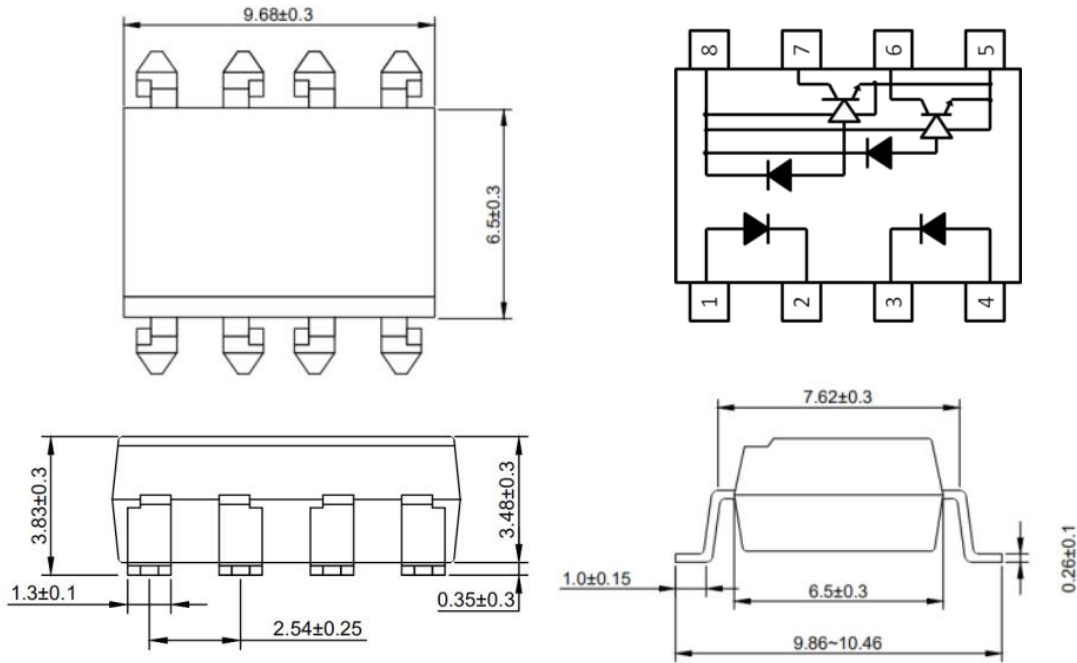


(2) OR-263XM

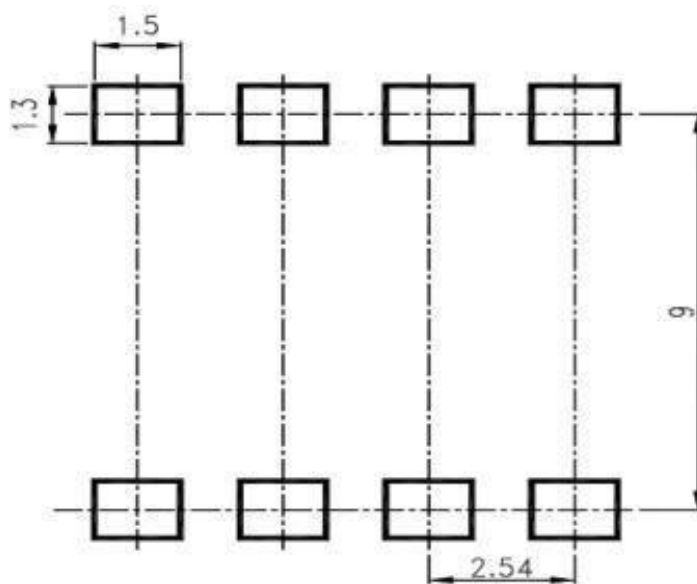




### (3) OR-263XS



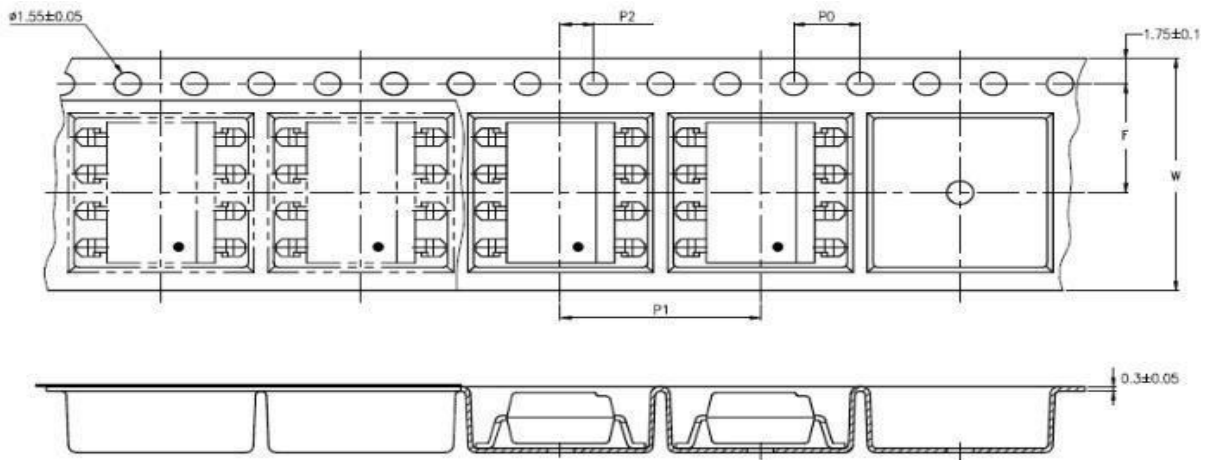
### 11. Recommended Foot Print Patterns (Mount Pad)



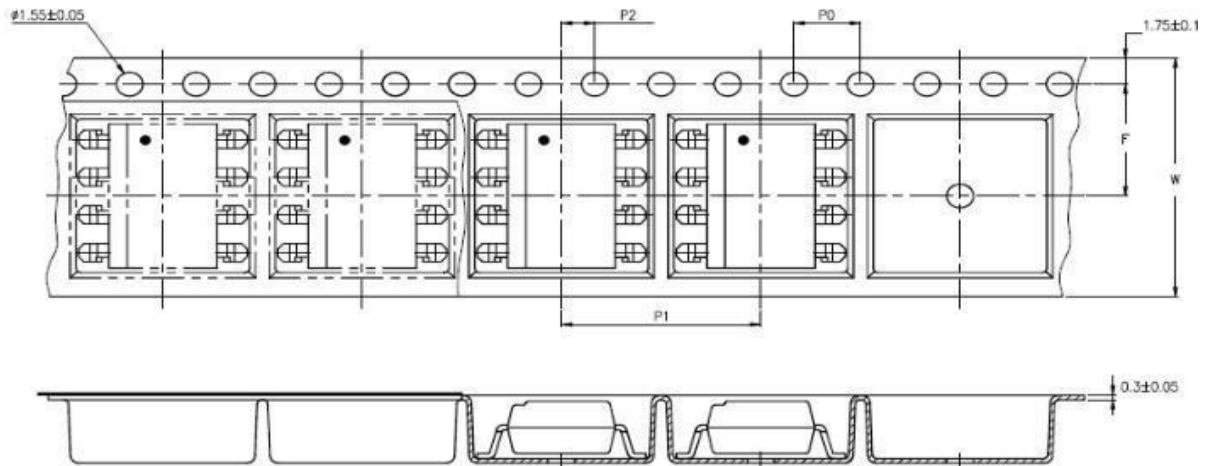
Unit: mm

## 12. Taping Dimensions

### (1) OR-263XS-TA



### (2) OR-263XS-TA1



| type      | symbol | Size: mm (inches) |
|-----------|--------|-------------------|
| bandwidth | W      | 16±0.3 (0.63)     |
| pitch     | P0     | 4±0.1 (0.15)      |
| pitch     | F      | 7.5±0.1 (0.295)   |
|           | P2     | 2±0.1 (0.079)     |
| interval  | P1     | 12±0.1 (0.472)    |

| Encapsulation type | TA/TA1 |
|--------------------|--------|
| Amount (pcs)       | 1000   |

### 13. Package Dimension

#### (1) package dimension

DIP Type

| Packing Information         |               |
|-----------------------------|---------------|
| Packing type                | Tube          |
| Qty per Tube                | 45pcs         |
| Small box (Inner) Dimension | 525*128*60mm  |
| Large box (Outer) Dimension | 545*290*335mm |
| The Amount per Inner Box    | 2,250pcs      |
| The Amount per Outer Box    | 22,500pcs     |


SOP Type

| Packing Information         |                |
|-----------------------------|----------------|
| Packing type                | Reel type      |
| Tape Width                  | 16mm           |
| Qty per Reel                | 1,000pcs       |
| Small box (inner) Dimension | 345*345*58.5mm |
| Large box (Outer) Dimension | 620x360x360mm  |
| Max qty per small box       | 2,000pcs       |
| Max qty per large box       | 20,000pcs      |

#### (2)Packing Label Sample






Material Code :120PCXXXXXX  
  
P/N:OR-XXXXXX  
  
Lot No. :XXXXXX-XXXXX-TX-X  
  
D/C:XXXX  
  
Qty:XXXX PCS  


内箱码

外箱码

“XXXXXXXXXXXXXXXX” (一体机序列码)  
**Made in China**

**Note:**

1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

## 14. Reliability Test

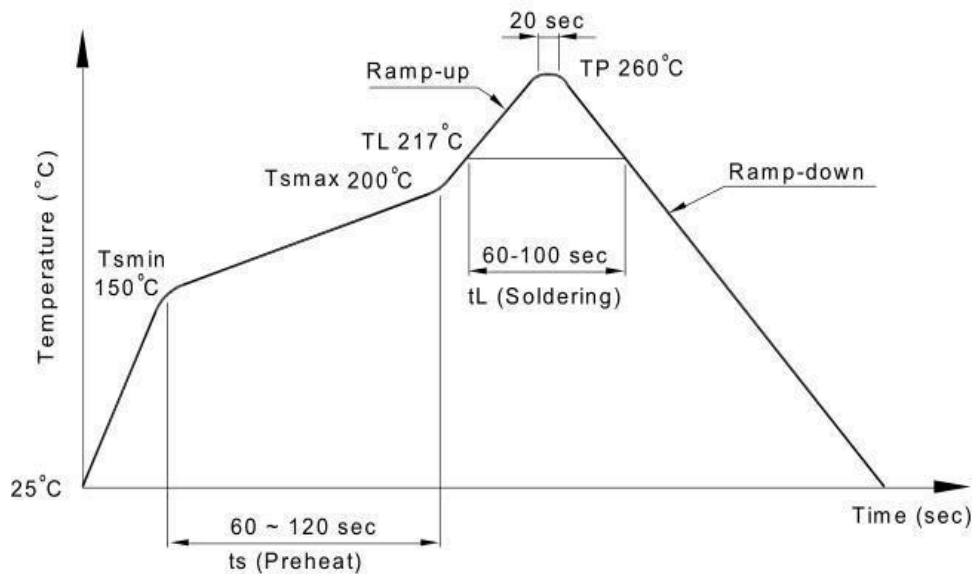
| NO. | ITEMS               | Reliability Testing |   |              |                           |             |
|-----|---------------------|---------------------|---|--------------|---------------------------|-------------|
|     |                     | QTY.<br>(Pcs)       | Condition                               | Process      | Device                    | Standard    |
| 1   | RSH<br>耐焊接热         | 22                  | 260±5°C                                 | 5s/3 次       | 锡炉                        | JESD22-A106 |
| 2   | HTSL<br>高温存储        | 77                  | 125°C                                   | 168 hrs      | 高温烤箱<br>测试仪               | JESD22-A103 |
|     |                     |                     |   | 500 hrs      |                           |             |
|     |                     |                     |   | 1000 hrs     |                           |             |
| 3   | LTSL<br>低温存储        | 77                  | -40°C                                   | 168 hrs      | 低温箱<br>测试仪                | JESD22-A119 |
|     |                     |                     |   | 500 hrs      |                           |             |
|     |                     |                     |   | 1000 hrs     |                           |             |
| 4   | TC<br>温度循环          | 77                  | H:125°C 15min<br>↓5min<br>L:-55°C 15min | 300<br>cycle | 冷热冲击<br>机                 | JESD22-A104 |
| 5   | TS<br>温度冲击          | 77                  | H:100°C 5min<br>↓15s<br>L:-40°C 5min    | 300<br>cycle | 冷热冲击<br>机                 | JESD22-A106 |
| 6   | HTOL<br>高温操作        | 77                  | 100°C<br>IF=10mA<br>Vcc=5V              | 168 hrs      | 高温烤箱<br>测试仪、<br>老化电路<br>板 | JESD22-A108 |
|     |                     |                     |   | 500 hrs      |                           |             |
|     |                     |                     |   | 1000 hrs     |                           |             |
| 7   | ESD-<br>HBM<br>人体模式 | 22                  | ≥8KV 1Cycle                             | 1次           | ESD静电<br>测试仪              | JESD22-A114 |
| 8   | SD<br>可焊性           | 22                  | Pb-free<br>245±5°C                      | 5s/1次        | 锡炉                        | JESD22-B102 |
| 9   | HTHB<br>温湿寿命<br>试验  | 77                  | 85°C,85%RH<br>IF=10mA,Vcc=5V            | 168 hrs      | 恒温恒湿<br>机, 测试<br>仪        | JESD22-A101 |
|     |                     |                     |   | 500 hrs      |                           |             |
|     |                     |                     |   | 1000 hrs     |                           |             |
| 10  | Autoclave<br>压力锅    | 77                  | Ta=121<br>°C,100%RH,2atm                | 96hrs        | 压力锅                       | JESD22-A102 |

### 15. Temperature Profile Of Soldering

(1) IR Reflow soldering (JEDEC-STD-020C compliant)

Note: one solder backflow is recommended under the conditions described below in the temperature and time profile. Do not weld more than three times.

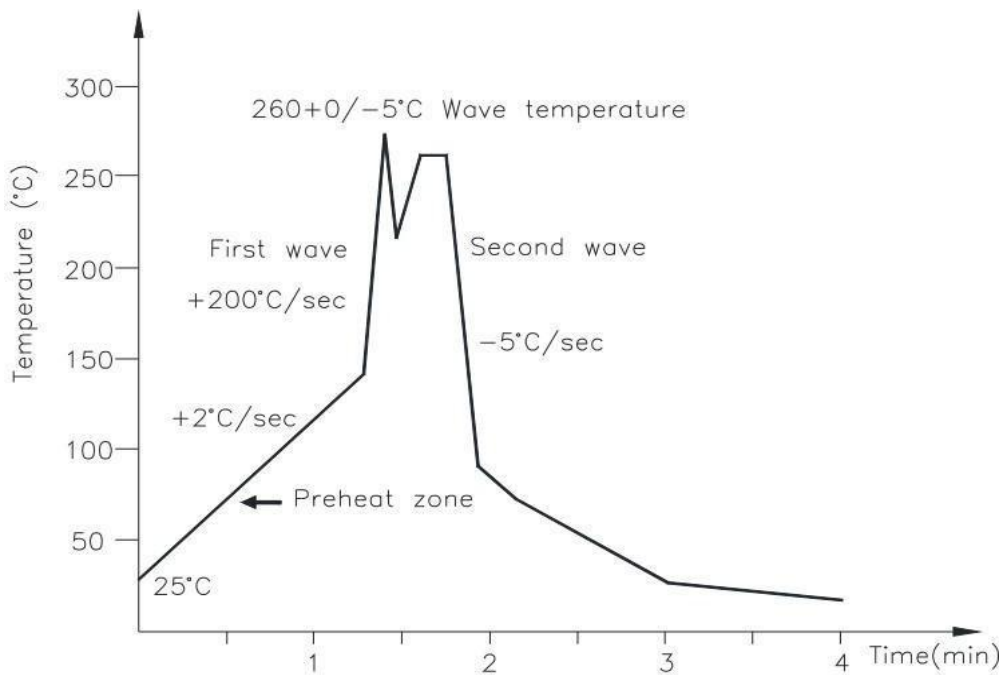
| Profile item                         | Conditions     |
|--------------------------------------|----------------|
| Preheat                              |                |
| - Temperature Min (T Smin )          | 150°C          |
| - Temperature Max (T Smax )          | 200°C          |
| - Time (min to max) (ts)             | 90±30 sec      |
| Soldering zone                       |                |
| - Temperature (TL )                  | 217°C          |
| - Time (t L )                        | 60 sec         |
| Peak Temperature                     | 260°C          |
| Peak Temperature time                | 20 sec         |
| Ramp-up rate                         | 3°C / sec max. |
| Ramp-down rate from peak temperature | 3~6°C / sec    |
| Reflow times                         | ≤3             |



(2) Wave soldering (JEDEC22A111 compliant)

One-time welding is recommended under the temperature condition.

|                     |             |
|---------------------|-------------|
| Temperature         | 260+0/-5°C  |
| Time                | 10 sec      |
| Preheat temperature | 5 to 140°C  |
| Preheat time        | 30 to 80sec |



(3) Hand soldering by soldering iron

Single lead welding is allowed in each process and one-time welding is recommended.

|             |            |
|-------------|------------|
| Temperature | 380+0/-5°C |
| Time        | 3 sec max  |

## 16. Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

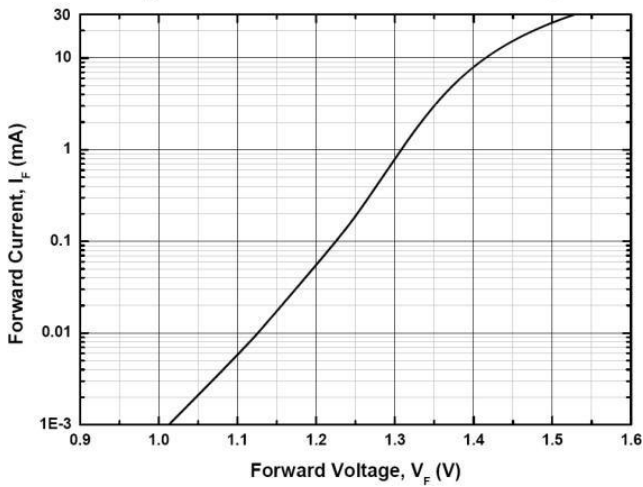


Figure 2. Low Level Output Voltage vs Ambient Temperature

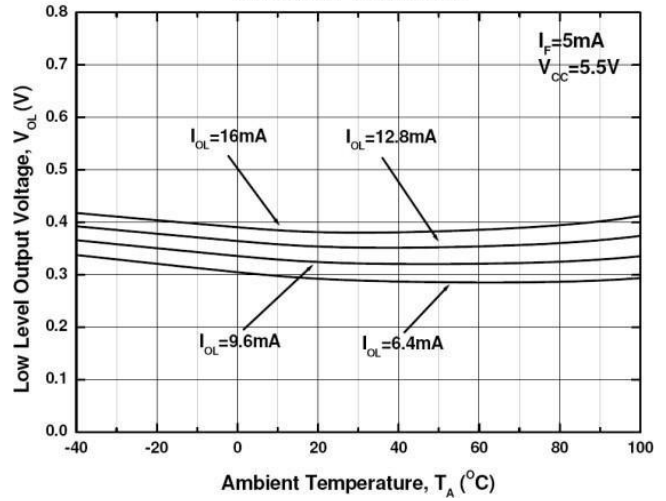


Figure 3. Low Level Output Current vs Ambient Temperature

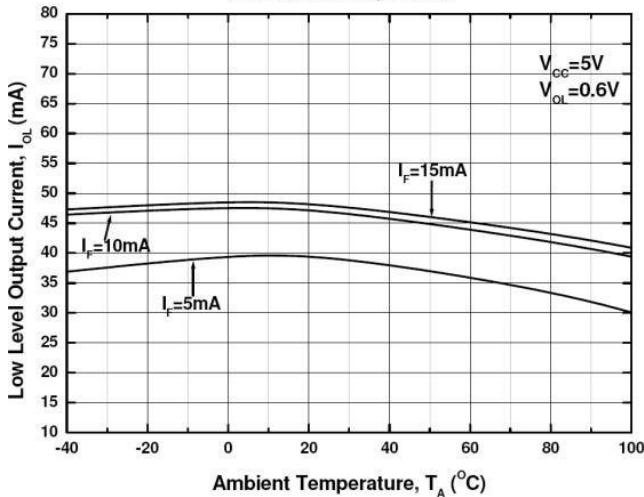


Figure 4. Input Threshold Current vs Ambient Temperature

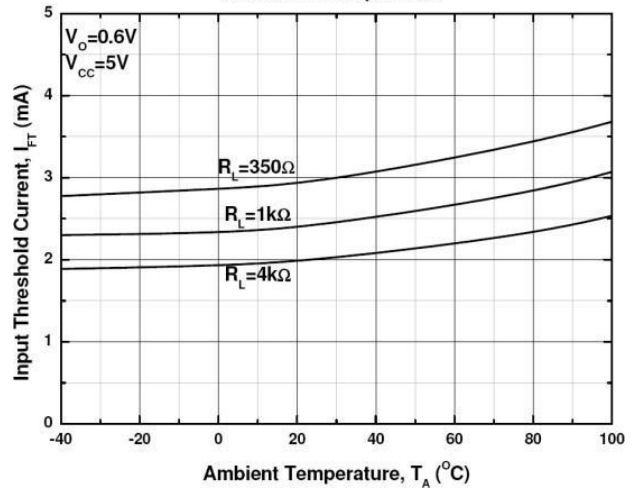


Figure 5. Input Current vs Output Voltage

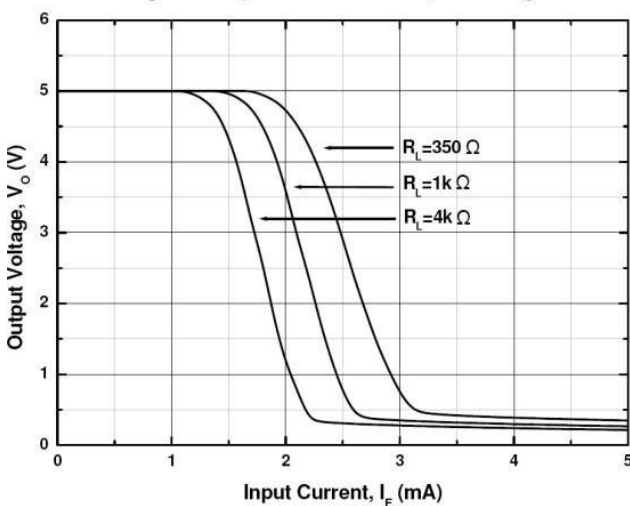


Figure 6. High Level Output Current vs Ambient Temperature

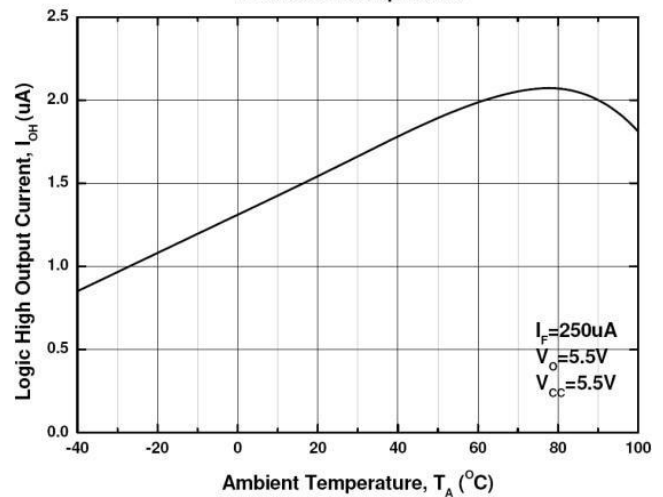




Figure 7. Propagation Delay vs. Forward Current

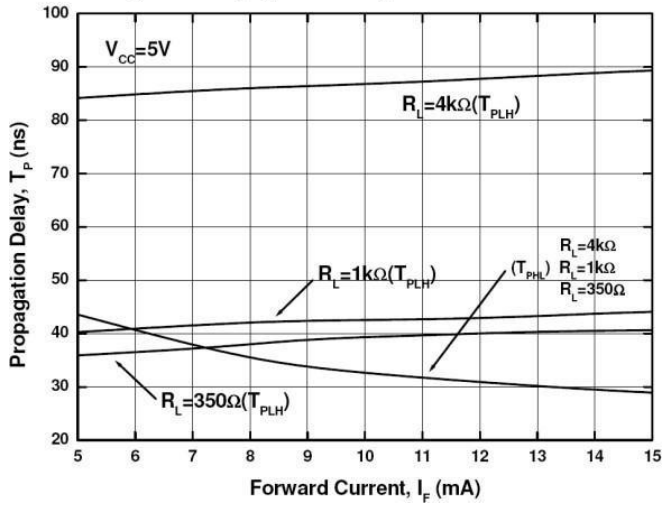


Figure 8. Propagation Delay vs. Temperature

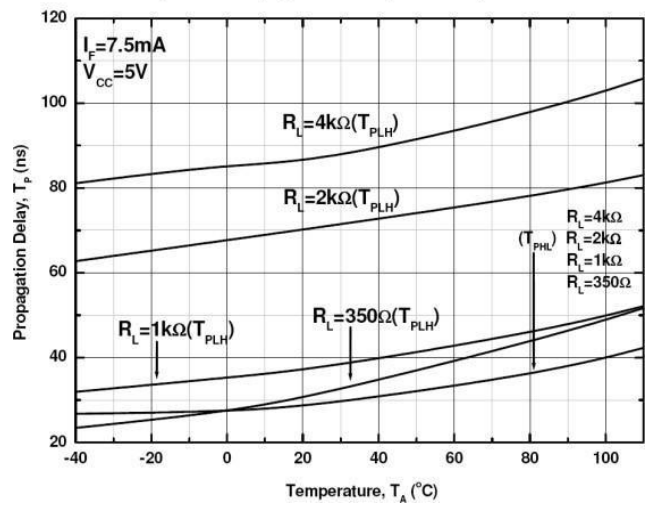


Figure 9. Pulse Width Distortion vs. Temperature

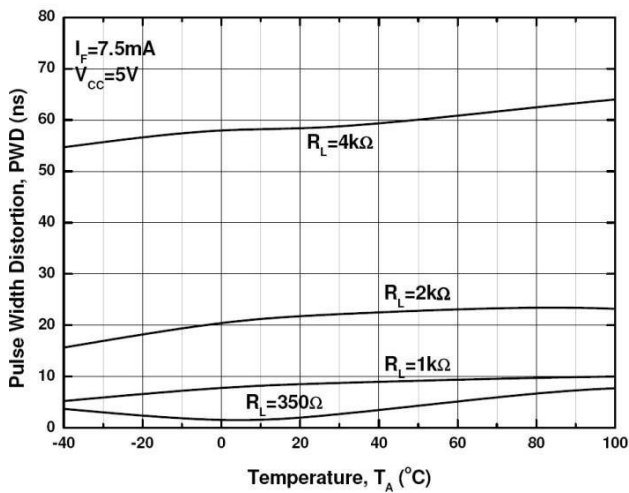


Figure 10. Rise and Fall Time vs. Temperature

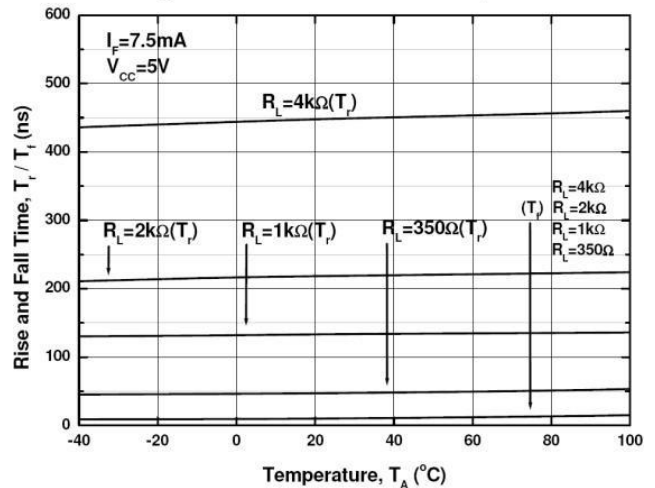


Fig. 11 Test circuit and waveforms for  $t_{PHL}$ ,  $t_{PLH}$ ,  $t_r$ , and  $t_f$

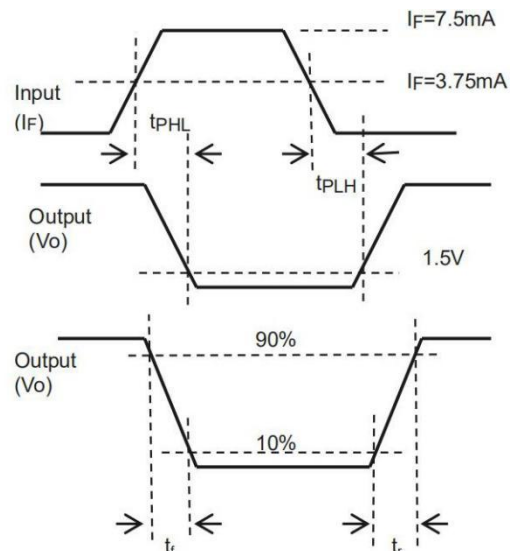
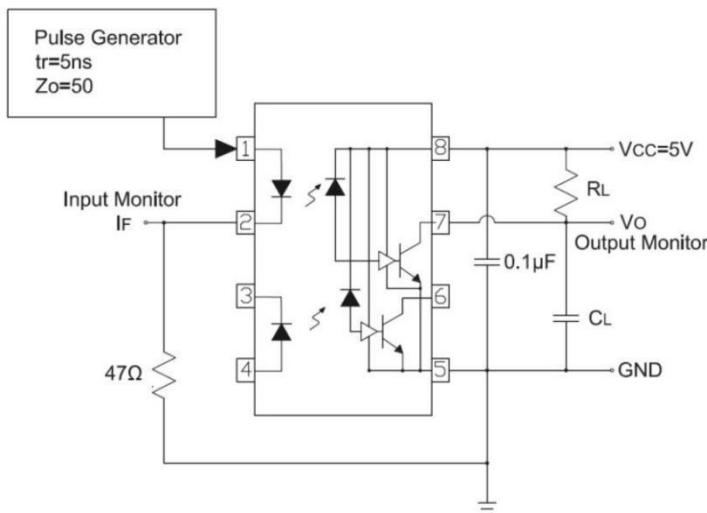
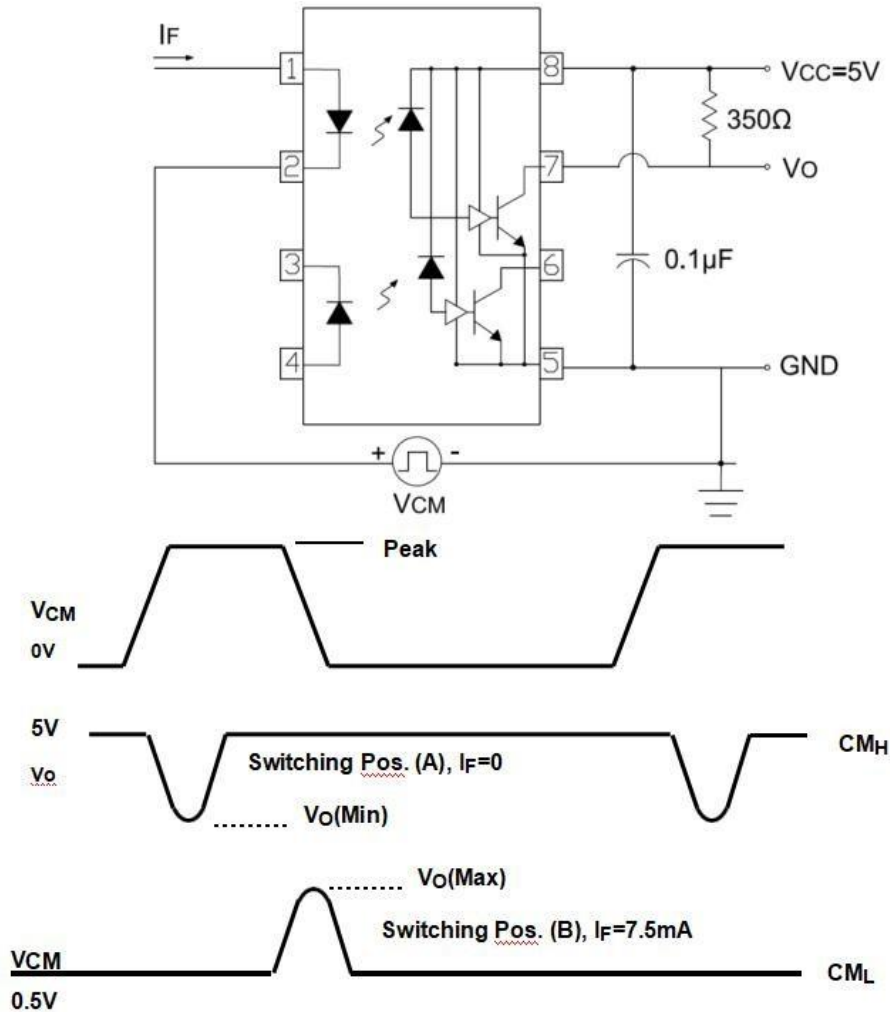




Fig. 12 Test circuit Common mode Transient Immunity



**Note**

- \*3 The VCC supply must be bypassed by a 0.1μF capacitor or larger. This can be either a ceramic or solid tantalum capacitor with good high frequency characteristic and should be connected as close as possible to the package VCC and GND pins
- \*4. tPLH– Propagation delay is measured from the 3.75mA level on the HIGH to LOW transition of the input current pulse to the 1.5 V level on the LOW to HIGH transition of the output voltage pulse.
- \*5. tPHL– Propagation delay is measured from the 3.75mA level on the LOW to HIGH transition of the input current pulse to the 1.5 V level on the HIGH to LOW transition of the output voltage pulse.
- \*6. tr– Rise time is measured from the 90% to the 10% levels on the LOW to HIGH transition of the output pulse.
- \*7. tf– Fall time is measured from the 10% to the 90% levels on the HIGH to LOW transition of the output pulse.
- \*8 CMH– The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the HIGH state (i.e., VOUT > 2.0V).
- \*9 CML– The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the LOW output state (i.e., VOUT < 0.8).