



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-314

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

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

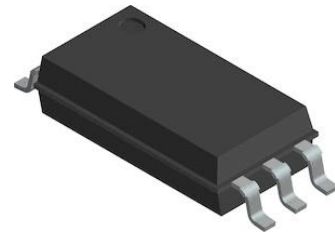
TEL: 0755-29681816

FAX: 0755-29681200

www.orient-opto.com

1. Features

- (1) High speed response.
- (2) Ultra high CMR.
- (3) Bootstrappable supply current.
- (4) 0.6-A maximum peak output current
- (5) 0.4-A minimum peak output current
- (6) 0.7- μ s maximum propagation delay over temperature range
- (7) $I_{CC(max)} = 3$ -mA maximum supply current
- (8) 25 kV/ μ s minimum common mode rejection (CMR) at $V_{CM} = 1500V$
- (9) Wide VCC operating range: 10V to 30V over temperature range
- (10) Available in Stretched SO-6 package
- (11) Industrial temperature range: -40° C to 105° C
- (12) Safety approval
 - UL approved(No.E323844)
 - VDE approved(No.40029733)
 - CQC approved (No.CQC19001231480)
- (13) In compliance with RoHS, REACH standard
- (14) MSL Level 1



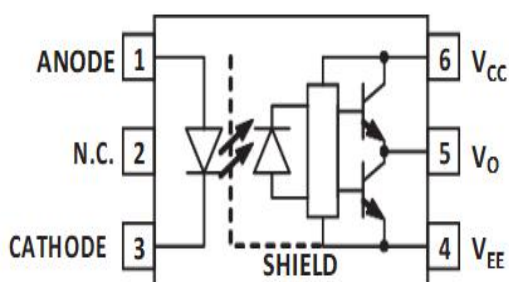
2. Description

The OR-314 consists of a GaAsP LED optically coupled to an integrated circuit with a power output stage. These optocouplers are ideally suited for driving power IGBTs and MOSFETs used in motor control inverter applications. The high operating voltage range of the output stage provides the drive voltages required by gate controlled devices. The voltage and current supplied by this optocoupler makes it ideally suited for directly driving small or medium power IGBTs.

3. Application Range

- (1) Isolated IGBT/Power MOSFET gate drive
- (2) AC and Brushless DC motor drives
- (3) Industrial inverters
- (4) Inverter for home appliances
- (5) Switching power supplies
- (6) Induction cooker

4. Functional Diagram



| Truth Table | |
|-------------|------|
| LED | VO |
| OFF | LOW |
| ON | HIGH |

Note: A 1 μ F bypass capacitor must be connected between pins VCC and VEE.

5. Absolute Maximum Ratings (Ta=25°C)

| Parameter | | Symbol | Rated Value | Unit |
|--------------------------------|------------------------------------|-------------------------|----------------|------------------|
| Input | Average Forward Input Current | I_F | 25 | mA |
| | Reverse Input Voltage | V_R | 5 | V |
| Output | “High” Peak Output Current | $I_{OH(PEAK)}$ | 0.6 | A |
| | “Low” Peak Output Current | $I_{OL(PEAK)}$ | 0.6 | A |
| | Output Collector Power Dissipation | P_O | 250 | mW |
| Total Output Supply Voltage | | $V_{CC} - V_{EE}$ | -0.5~35 | V |
| Output Voltage | | $V_{O(PEAK)}$ | -0.5~ V_{CC} | V |
| Input Current (Rise/Fall Time) | | $t_{r(IN)} / t_{f(IN)}$ | 500 | ns |
| Insulation Voltage | | V_{iso} | 5000 | V _{rms} |
| Working Temperature | | T_{opr} | -40 ~ + 105 | °C |
| Storage Temperature | | T_{stg} | -55 ~ + 125 | |
| *2 Soldering Temperature | | T_{sol} | 260 | |

*1. Room temperature = 25 °C. Exceeding the maximum absolute rating can permanently damage the device. Working long hours at the maximum absolute rating can affect reliability.

*2. soldering time is 10 seconds.

6. Electrical Optical Characteristics at Ta=25°C

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|--|---------------------------|----------------|------------------|------|-------|--|
| High Level Output Current | I_{OH} | 0.2 | — | — | A | $V_O = (V_{CC} - 4V)$ |
| | | 0.4 | 0.5 | — | | $V_O = (V_{CC} - 10V)$ |
| Low Level Output Current | I_{OL} | 0.2 | 0.4 | — | A | $V_O = (V_{EE} + 2.5V)$ |
| | | 0.4 | 0.5 | — | | $V_{CC} - V_O \leq 15V$ |
| High Level Output Voltage | V_{OH} | $(V_{CC} - 4)$ | $(V_{CC} - 1.8)$ | — | V | $I_O = -100 \text{ mA}$ |
| Low Level Output Voltage | V_{OL} | — | 0.4 | 1 | V | $I_O = 100 \text{ mA}$ |
| High Level Supply Current | I_{CCH} | — | 0.7 | 3.0 | mA | $I_F = 10 \text{ mA}$ |
| Low Level Supply Current | I_{CCL} | — | 1.2 | 3.0 | mA | $I_F = 0 \text{ V}$ |
| Threshold Input Current Low to High | I_{FLH} | — | — | 7.0 | mA | $C_g = 25 \text{ nF}, V_O > 5 \text{ V}$ |
| Threshold Input Voltage High to Low | V_{FHL} | 0.8 | — | — | V | |
| Input Forward Voltage | V_F | 1.2 | 1.55 | 1.95 | V | $I_F = 10 \text{ mA}$ |
| Temperature Coefficient of Forward Voltage | $\Delta V_F / \Delta T_A$ | — | -1.7 | — | mV/°C | $I_F = 10 \text{ mA}$ |
| Input Reverse Breakdown Voltage | B_{VR} | 5 | — | — | V | $I_R = 100 \mu\text{A}$ |
| Input Capacitance | C_{IN} | — | 70 | — | pF | $f = 1 \text{ MHz}, V_F = 0V$ |

7. Switching Characteristics

| Parameter | Symbol | Min. | Typ | Max. | Units | Test Conditions |
|--|-----------|------|-----|------|-------------------|--|
| Propagation Delay Time to High Output Level | t_{PLH} | 0.1 | 0.2 | 0.7 | μs | $R_g = 47 \Omega,$ $C_g = 3 \text{ nF},$ $f = 10 \text{ kHz},$ Duty Cycle = 50% $I_F = 8 \text{ mA},$ $V_{CC} = 30 \text{ V}$ |
| Propagation Delay Time to Low Output Level | t_{PHL} | 0.1 | 0.3 | 0.7 | μs | |
| Propagation Delay Difference Between Any Two Parts | P_{DD} | -0.5 | — | 0.5 | μs | |
| Rise Time | t_r | — | 50 | — | ns | |
| Fall Time | t_f | — | 50 | — | ns | |
| Output High Level Common Mode Transient Immunity | $ CM_H $ | 25 | — | — | kV/ μs | $T_A = 25^\circ \text{ C},$ $V_{CM} = 1500 \text{ V}$ |
| Output Low Level Common Mode Transient Immunity | $ CM_L $ | 25 | — | — | | |



8. Order Information

Part Number

OR-314U-Y-Z

Note

314= Part Number .

U = Lead form option ,W or W1 .

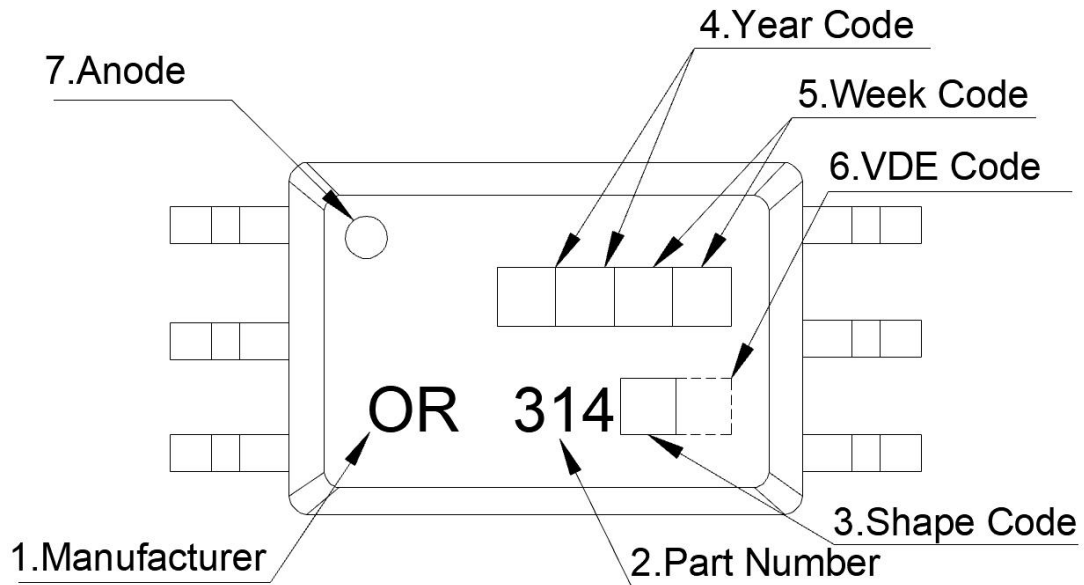
Y = Tape and reel option (TA,TA1 or none) .

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

* VDE Code can be selected.

| Option | Description | Packing quantity |
|--------|--|---------------------|
| S(TA) | Surface mount lead form (low profile) + TA tape & reel option | 1000 units per reel |
| S(TA1) | Surface mount lead form (low profile) + TA1 tape & reel option | 1000 units per reel |

9. Naming Rule

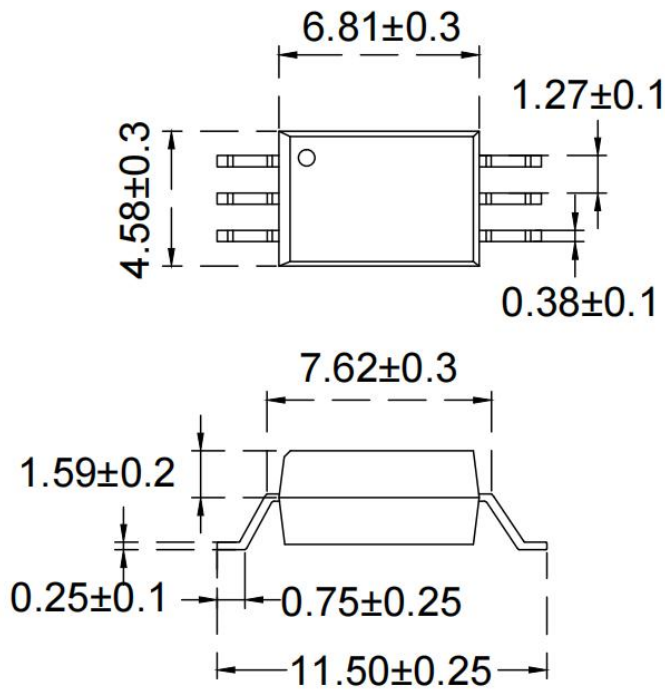


1. Manufacturer : ORIENT.
2. Part Number : 314.
3. Shape Code : Lead form option ,W or W1 .
4. Year Code : '21' means '2021' and so on.
5. Week Code : 01 means the first week, 02 means the second week and so on.
6. VDE Code . (Optional)
7. Anode.

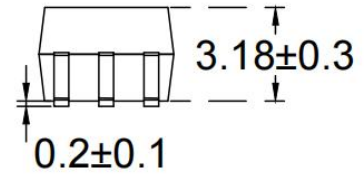
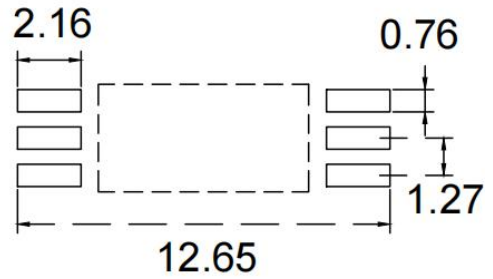
* VDE Mark can be selected.

10. Package Dimension

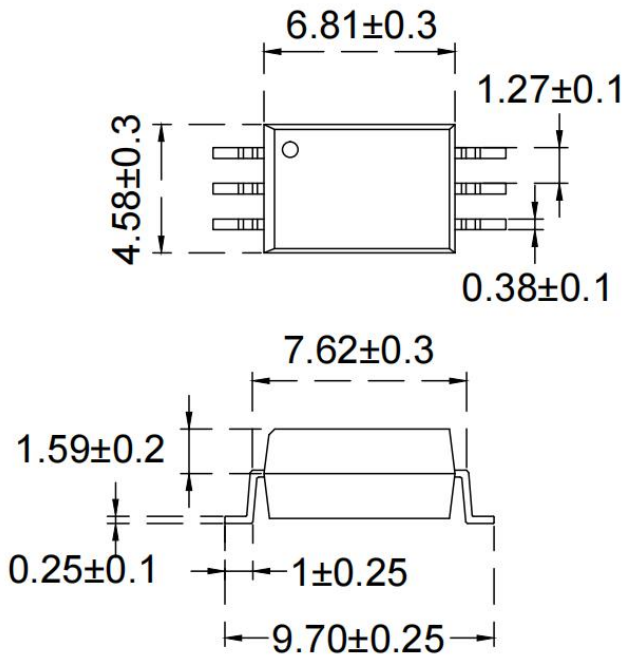
(1).OR-314W



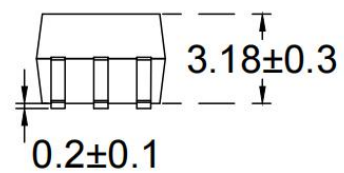
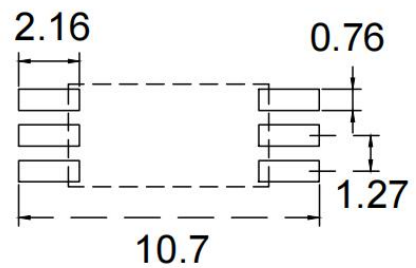
Land Pattern Recommendation



(2).OR-314W1

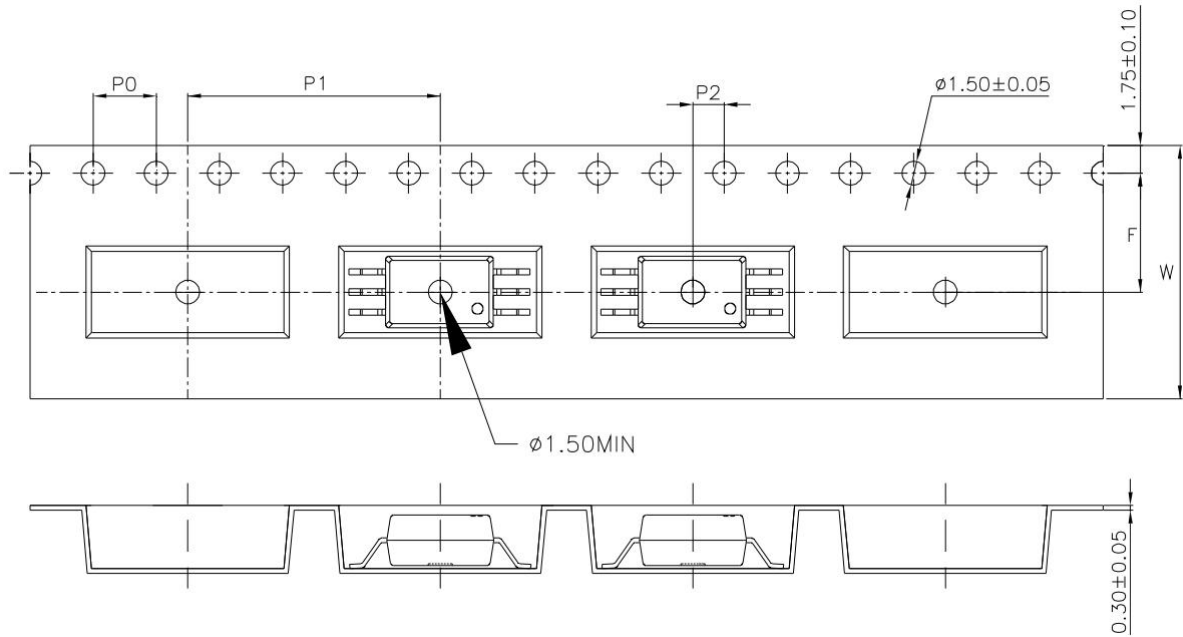


Land Pattern Recommendation

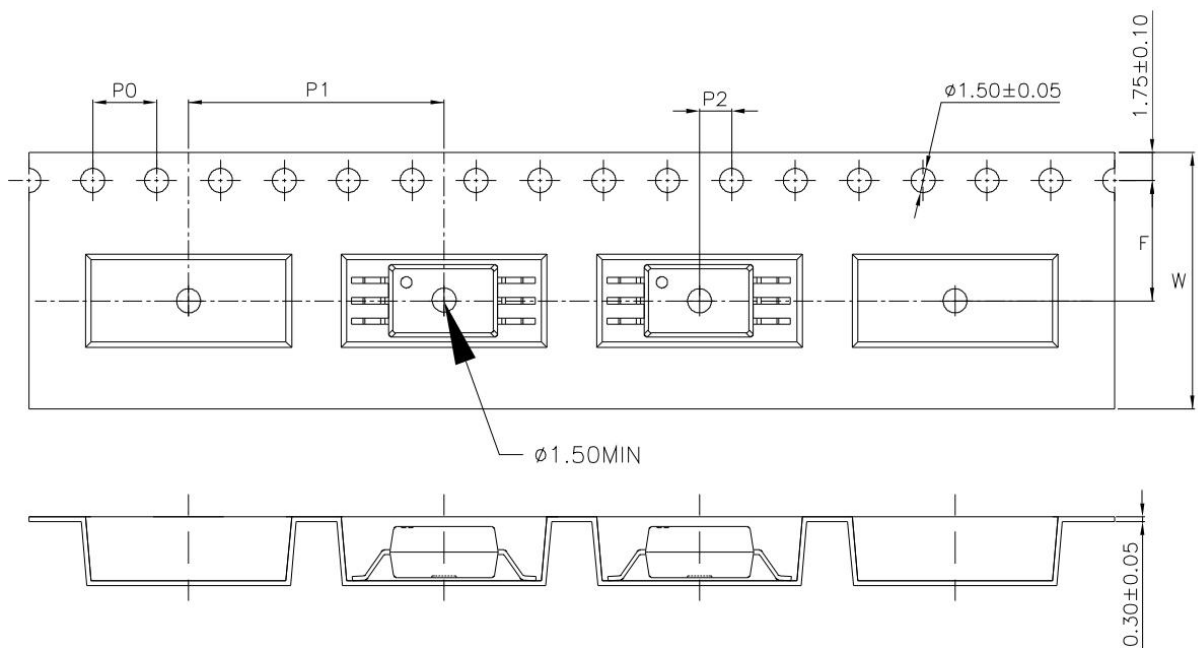


11. Taping Dimensions

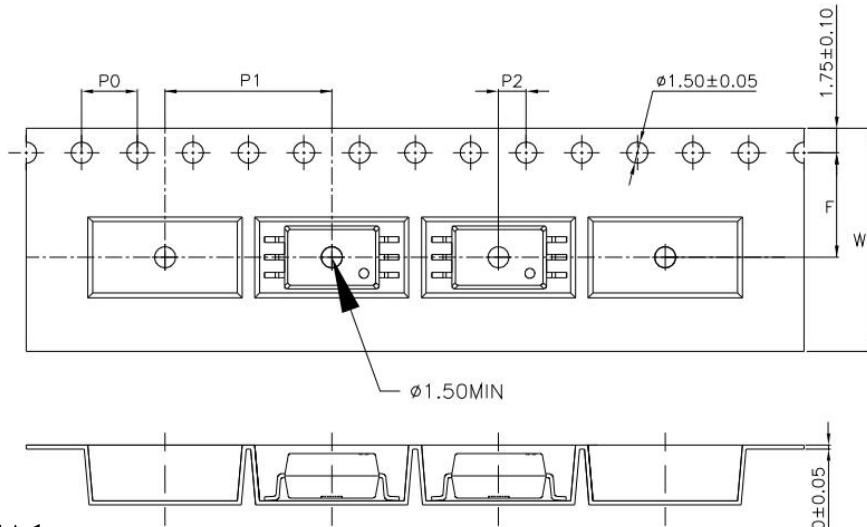
(1)OR-314W-TA



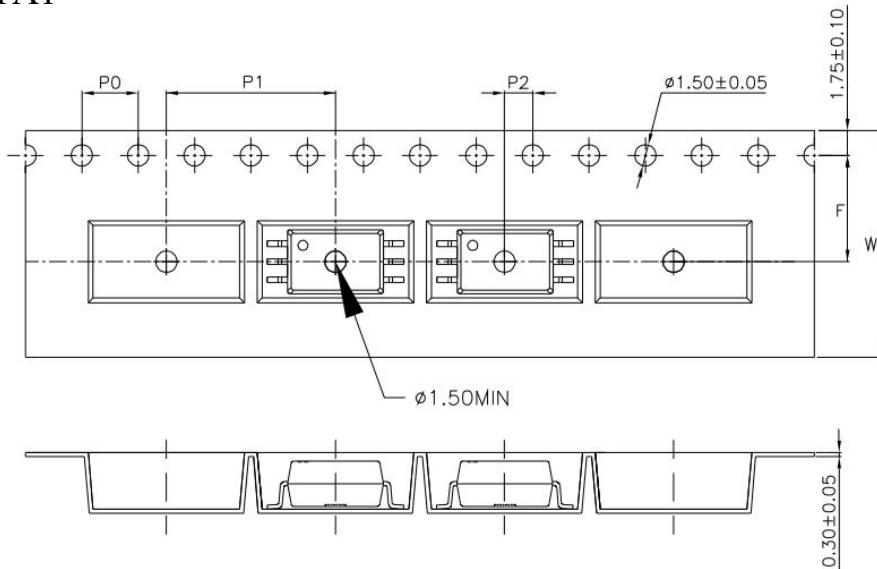
(2)OR-314W-TA1



(1)OR-314W1-TA



(2)OR-314W1-TA1



| Type | symbol | Dimension in mm (inch) For W type | Dimension in mm (inch) For W1 type |
|-----------|--------|--------------------------------------|---------------------------------------|
| bandwidth | W | 16 ± 0.3 (0.63) | 16 ± 0.3 (0.63) |
| pitch | P0 | 4 ± 0.1 (0.16) | 4 ± 0.1 (0.16) |
| pitch | F | 7.5 ± 0.1 (0.3) | 7.5 ± 0.1 (0.3) |
| | P2 | 2 ± 0.1 (0.079) | 2 ± 0.1 (0.079) |
| interval | P1 | 16 ± 0.1 (0.63) | 12 ± 0.1 (0.47) |

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

12. Package Dimension

(1) package dimension

| 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



Note:

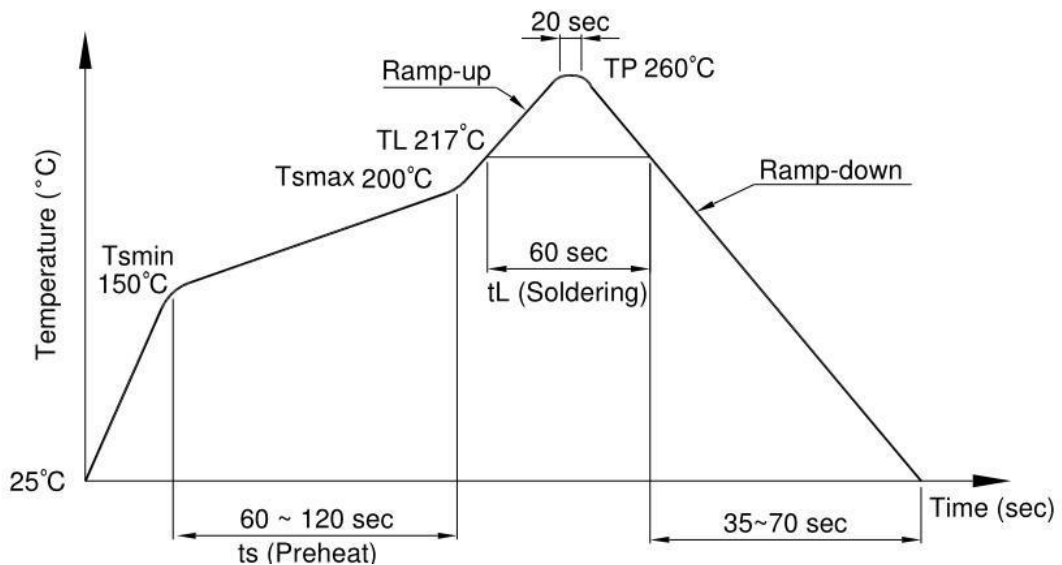
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

13. Temperature Profile Of Soldering

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

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

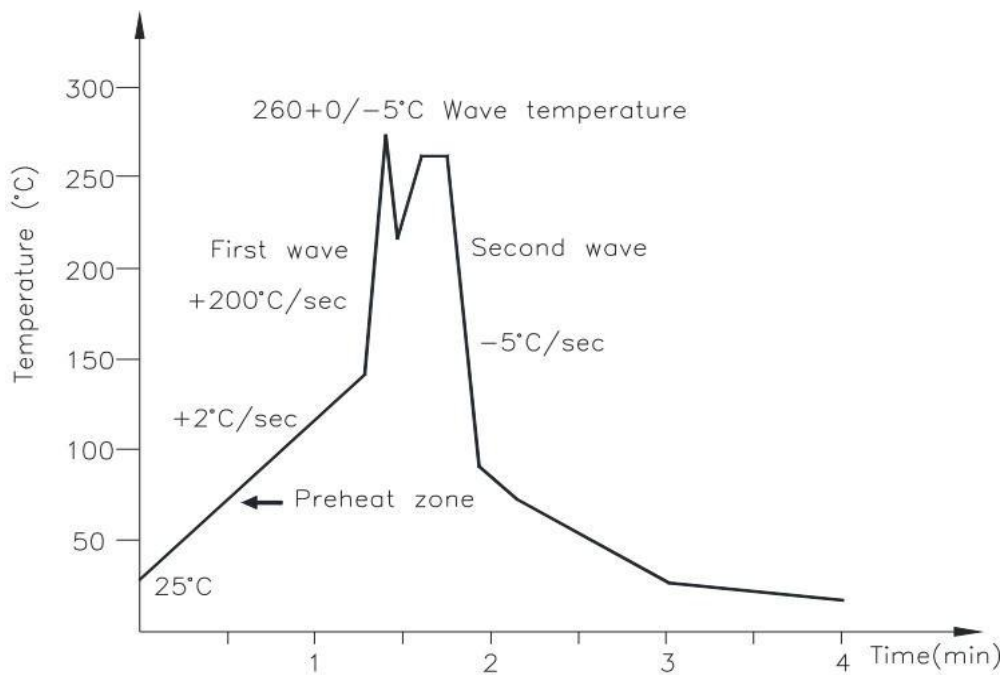
| Profile item | Conditions |
|---|-----------------------------|
| Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts) | 150°C 200°C 90±30 sec |
| Soldering zone - Temperature (TL) - Time (t L) | 217°C 60 sec |
| Peak Temperature | 260°C |
| Peak Temperature time |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



(3) .Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

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



(3).Hand soldering by soldering iron

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

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

14. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

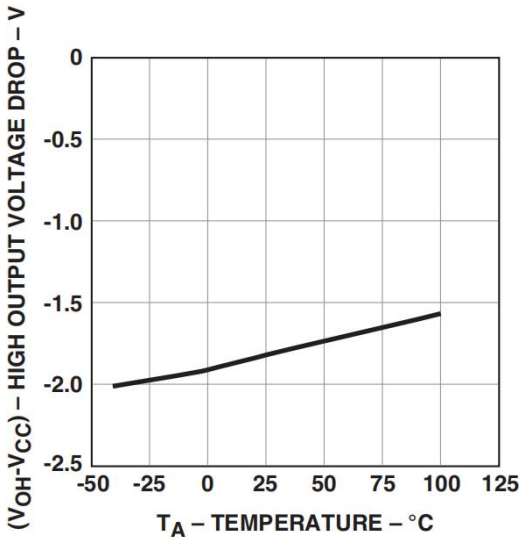


Figure 1. V_{OH} vs. Temperature.

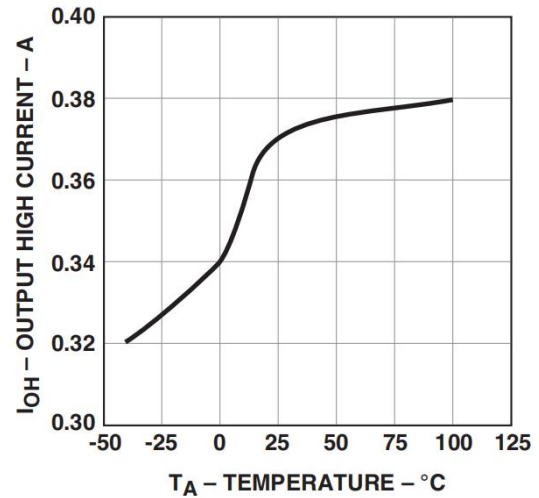


Figure 2. I_{OH} vs. Temperature.

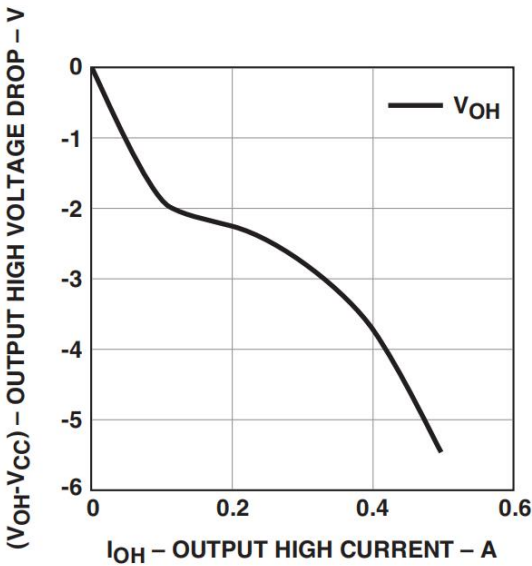


Figure 3. V_{OH} vs. I_{OH} .

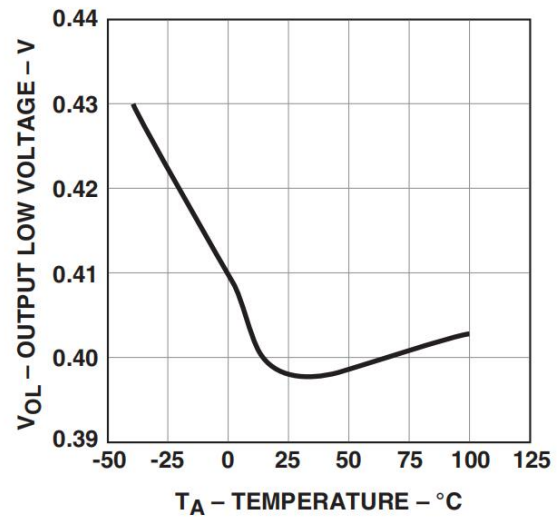


Figure 4. V_{OL} vs. Temperature.

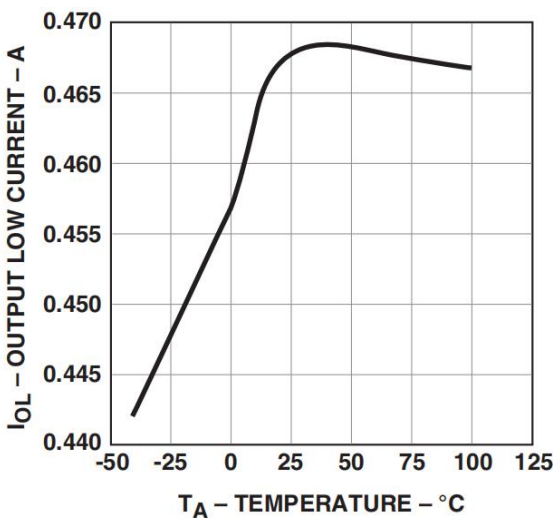


Figure 5. I_{OL} vs. Temperature.

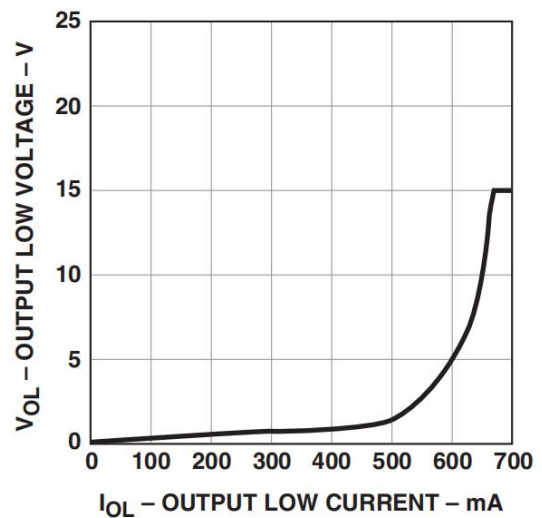


Figure 6. V_{OL} vs. I_{OL} .

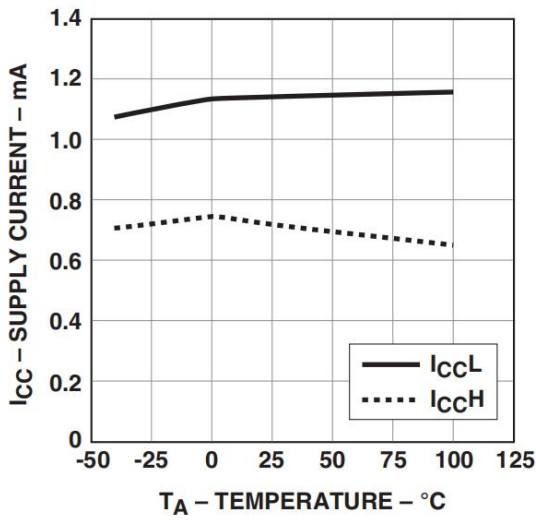


Figure 7. I_{CC} vs. Temperature.

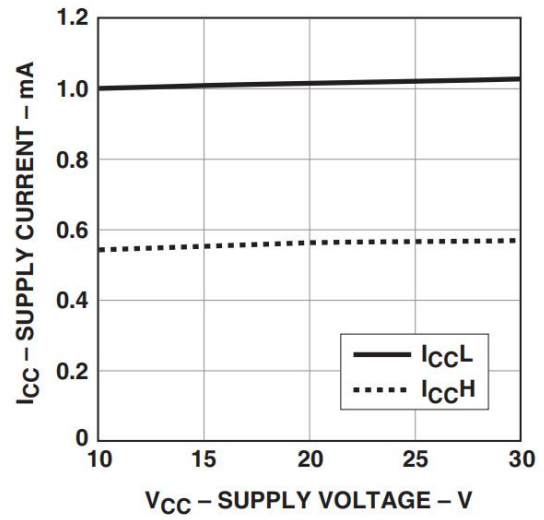


Figure 8. I_{CC} vs. V_{CC}.

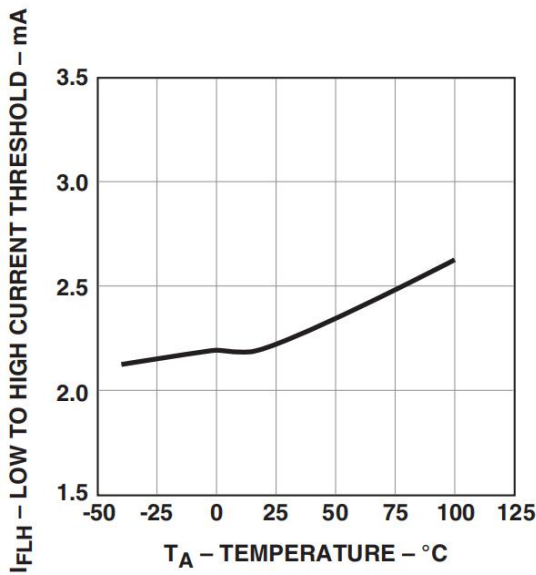


Figure 9. I_{FLH} vs. Temperature.

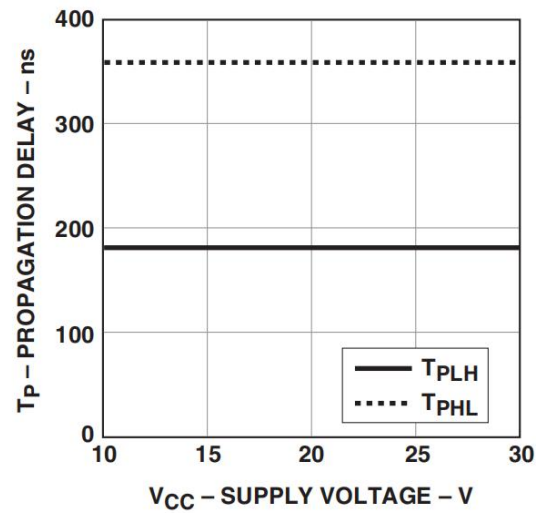


Figure 10. Propagation Delay vs. V_{CC}.

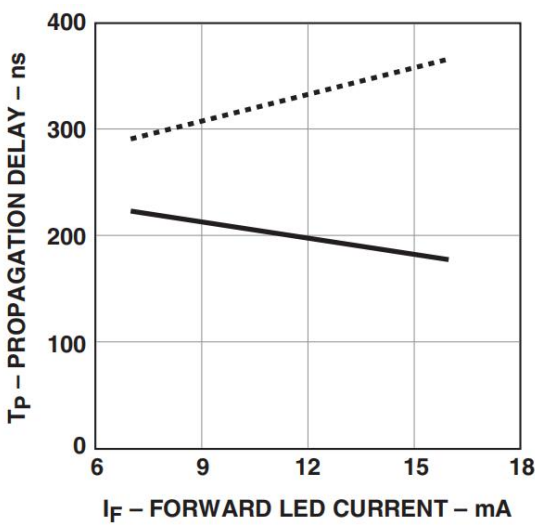


Figure 11. Propagation Delay vs. I_F.

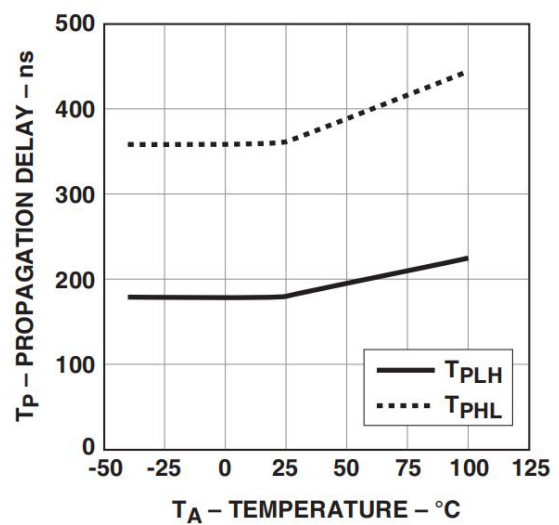


Figure 12. Propagation Delay vs. Temperature.

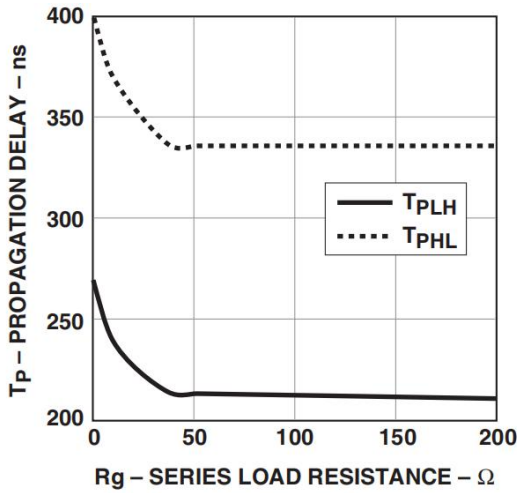


Figure 13. Propagation Delay vs. Rg.

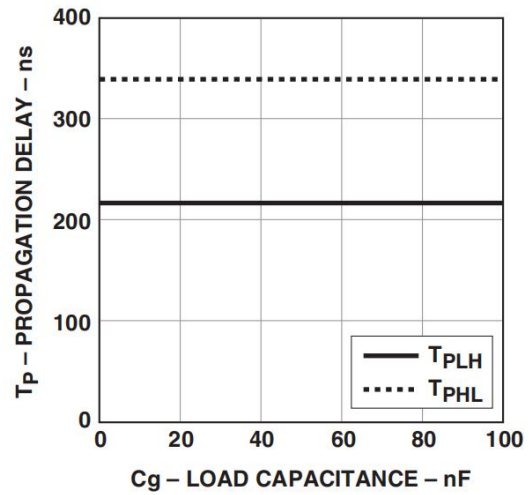


Figure 14. Propagation Delay vs. Cg.

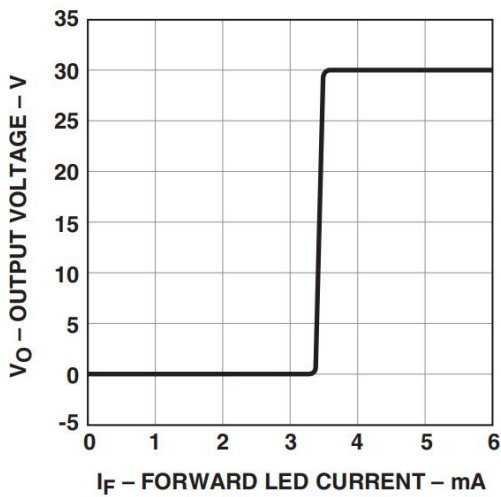


Figure 15. Transfer Characteristics.

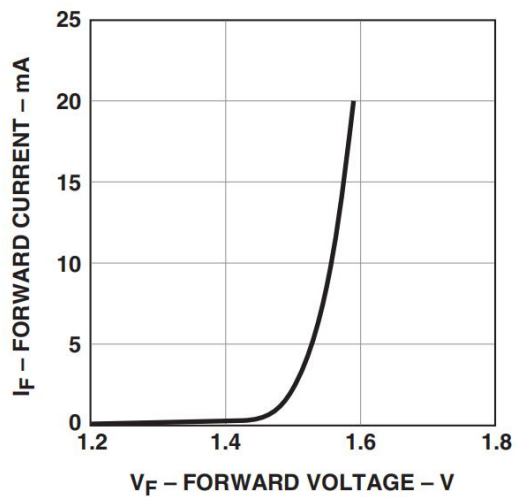


Figure 16. Input Current vs. Forward Voltage.

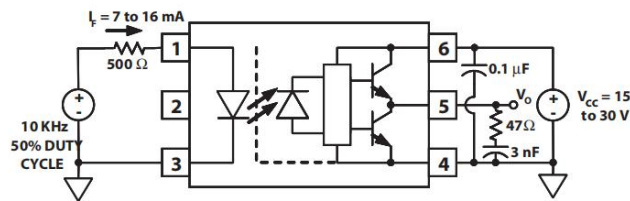


Figure 17. Propagation Delay Test Circuit and Waveforms.

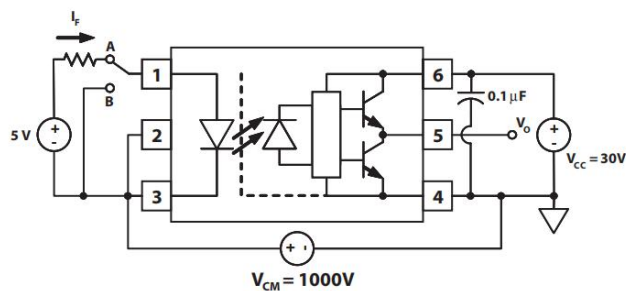


Figure 18. CMR Test Circuit and Waveforms.

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[TLP5772H\(D4LF4,E](#) [TLP5774H\(LF4,E](#) [TLP5771H\(D4LF4,E](#) [TLP5771H\(LF4,E](#) [TLP5774H\(E](#) [TLP5214A\(E\(O](#) [LTV-5341-TP1](#) [OR-314W-](#)
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[ACPL-W343-500E](#) [TLP351H\(TP1,F\)](#) [TLP352](#) [FOD3120SDV](#) [FOD3184TSR2V](#) [6N140A](#) [6N140A#300](#) [HCPL-0466-500E](#)