



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-06XX

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

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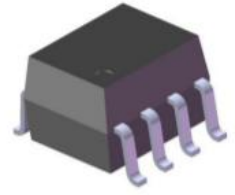
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www.orient-opto.com

1. Features

- (1) High speed 10MBd.
- (2) Guaranteed performance from -40 to 105°C.
- (3) Logic gate output.
- (4) High isolation voltage between input and output(Viso=3750 V rms).
- (5) Safety approval
 - UL approved(No.E323844)
 - VDE approved(No.40029733)
 - CQC approved (No.CQC19001231254)
- (6) In compliance with RoHS, REACH standards
- (7) MSL Level 1



2. Instructions

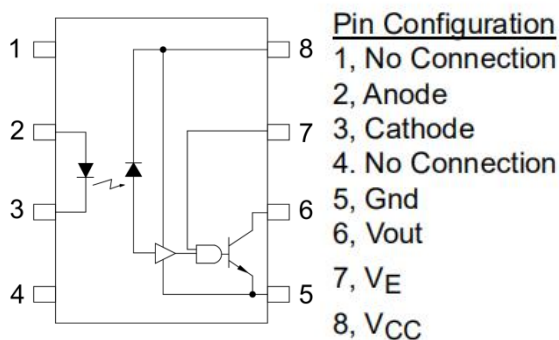
The OR-06XX devices each consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output.

The devices are packaged in an 8-pin small outline package which conforms to the standard SO8 footprint.

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



Truth Table (Positive Logic)		
Input	Enable	Output
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

A 0.1μF bypass capacitor must be connected between pins 8 and 5

5. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rated Value	Unit
Input	Average Forward Input Current	I _F	20	mA
	Reverse Input Voltage	V _R	5	V
	Power Dissipation	P _I	40	mW
	Enable Input Voltage	V _E	5.5	V
	Enable Input current	I _E	5	mA
Output	Output Collector Current	I _O	50	mA
	Output Collector Voltage	V _O	7	V
	Output Collector Power Dissipation	P _O	85	mW
	Supply Voltage	V _{CC}	7	V
*1 Insulation Voltage		V _{ISO}	3750	V _{rms}
Working Temperature		T _{OPR}	-40 to 105	°C
Storage Temperature		T _{STG}	-55 to 125	
*2 Soldering Temperature		T _{SOL}	260	

*1. AC for 1 minutr, 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. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_A	-40	105°C	°C
Supply Voltage	V_{CC}	2.7	5.5	V
Low Level Input Current	I_{FL}	0	250	μA
High Level Input Current	I_{FH}	5	15	mA
Low Level Enable Voltage	V_{EL}	0	0.8	V
High Level Enable Voltage	V_{EH}	2	V_{CC}	V
Output Pull-up Resistor	R_L	330	2k	Ω
Fan Out (at $R_L=1k\Omega$ per channel)	N	—	5	TTL Loads

7. Opto-electronic Characteristics

	Parameter	Symbol	Min	Typ	Max	Unit	Condition
Input	Forward Voltage	V_F	—	1.39	1.8	V	$I_F = 10\text{mA}$
	Temperature Coefficient OF Forward Voltage	$\Delta V_F / \Delta T$	—	-0.9	—	mV/°C	$I_F = 10\text{mA}$
	Reverse Voltage	BV_R	5	—	—	V	$I_R = 10\mu\text{A}$
	Input Threshold Current	I_{TH}	—	2.2	5	mA	$V_E = 2\text{V}, V_{CC} = 3.3\text{V}$ $V_O = 0.6\text{V}$ $I_{OL} (\text{sinking}) = 13\text{mA}$
	Input Capacitance	C_{IN}	—	34	—	pF	$f = 1\text{MHz}, V_F = 0\text{V}$
Detector	High Level Supply Current	I_{CCH}	—	7.6	10	μA	$V_E = 0.5\text{V},$ $V_{CC} = 5.5\text{V}, I_F = 0\text{mA}$
	Low Level Supply Current	I_{CCL}	—	9.8	13	mA	$V_E = 0.5\text{V},$ $V_{CC} = 5.5\text{V}, I_F = 10\text{mA}$
	High Level Enable Current	I_{EH}	—	—	-1.6	mA	$V_{CC} = 5.5\text{V}, V_E = 2\text{V}$
	Low Level Enable Current	I_{EL}	—	—	-1.6	mA	$V_{CC} = 5.5\text{V}, V_E = 0.5\text{V}$
	High Level Enable Voltage	V_{EH}	2	—	—	V	
	Low Level Enable Voltage	V_{EL}	—	—	0.8	V	
	High Level Output Current	I_{OH}	—	5	100	μA	$V_E = 2\text{V}, V_{CC} = 5.5\text{V}$ $V_O = 5.5\text{V}, I_F = 250\mu\text{A}$
	Low Level Output Voltage	V_{OL}	—	0.4	0.6	V	$V_E = 2\text{V}, V_{CC} = 5.5\text{V}$ $I_F = 5\text{mA}, I_{OL} = 13\text{mA}$

Recommended temperature range ($T_A = -40^\circ\text{C}$ to 105°C , $4.5\text{V} \leq V_{CC} \leq 5.5\text{V}$), $I_F = 7.5\text{mA}$ Unless otherwise stated.
Typical values $T_A = 25^\circ\text{C}, V_{CC} = 5.5\text{V}$.

8. Switching Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Propagation delay time to output High level	t _{PLH}	25	40	90	ns	R _L =350Ω C _L =15pF
Propagation delay time to output Low level	t _{PHL}	25	32	75	ns	
Pulse Width Distortion	t _{PLH} -t _{PHL}	—	8	—	ns	
Output Rise Time (10 to 90%)	t _r	—	22	—	ns	
Output Fall Time (90 to 10%)	t _f	—	6.9	—	ns	
Propagation Delay Time of Enable from V _{EH} to V _{EL}	t _{ELH}	—	28	—	ns	R _L =350Ω C _L =15pF V _{EL} =0V V _{EH} =3V
Propagation Delay Time of Enable from V _{EL} to V _{EH}	t _{EHL}	—	12	—	ns	

Recommended temperature range (T_A= -40 to 105°C, 4.5V ≤ V_{CC} ≤ 5.5V), I_F = 7.5mA Unless otherwise stated.

Typical values T_A =25°C, V_{CC} = 5.0 V.

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Input-Output Insulation Leakage Current	I _{I-O}	—	—	1	μA	45% RH, t=5s, V _{I-O} = 3kV DC
Withstand Insulation Test Voltage	V _{ISO}	3750	—	—	V _{RMS}	RH ≤ 50%, t =1min
Input-Output Resistance	R _{I-O}	—	10 ¹²	—	Ω	V _{I-O} = 500V DC
Input-Output Capacitance	C _{I-O}	—	1		p	f = 1MHz

Recommended temperature range (T_A= -40°C to 105°C) Unless otherwise stated. Typical values T_A =25°C.



9. Order Information

Part Number

OR-06XX-Y-Z

Note

06XX = Part Number. (XX=00,01,11)

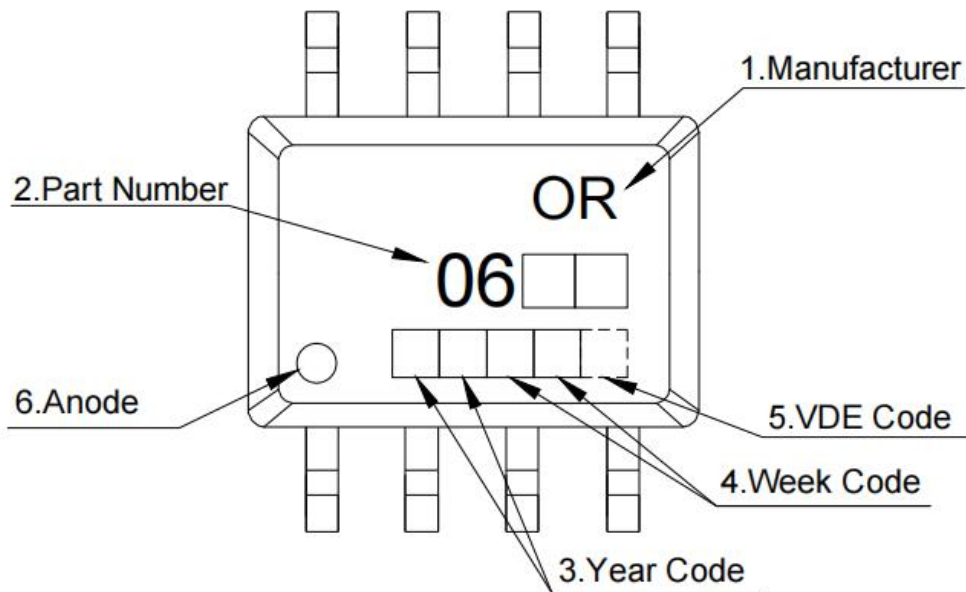
Y = Tape and reel option (TA,TA1 or none).

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

* VDE Code can be selected.

Option	Description	Packing quantity
TA	Surface mount lead form (low profile) + TA tape & reel option	2000 units per reel
TA1	Surface mount lead form (low profile) + TA1 tape & reel option	2000 units per reel

10. Naming Rule

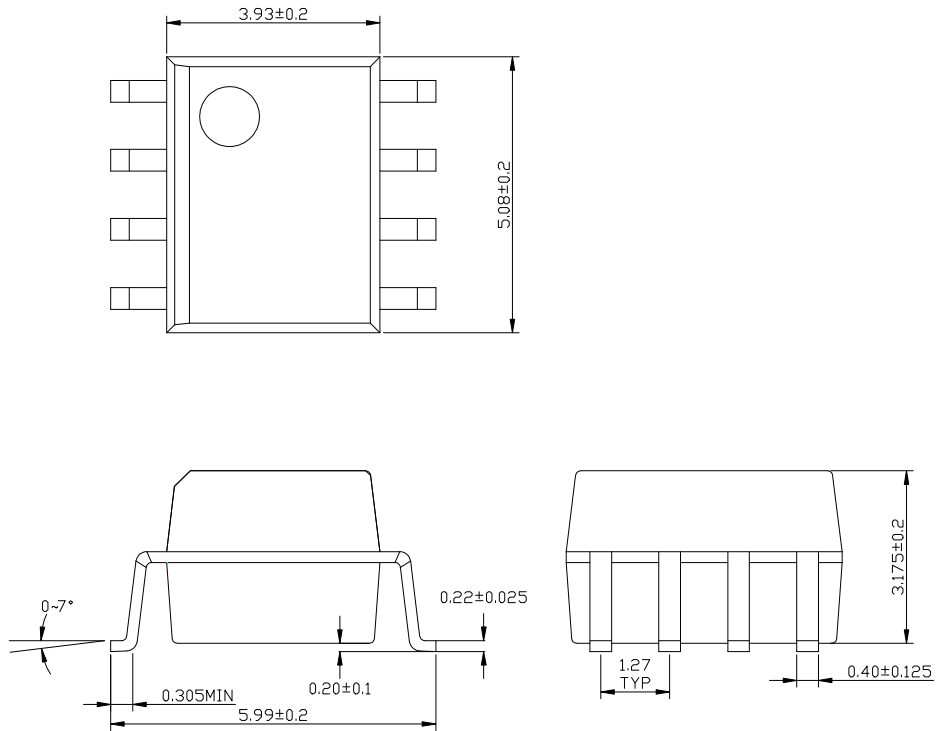


1. Manufacturer : ORIENT.
2. Part Number : 0600,0601,0611
3. Year Code : '23' means '2023' and so on.
4. Week Code : 01 means the first week, 02 means the second week and so on.
5. VDE Code . (Optional)
6. Anode.

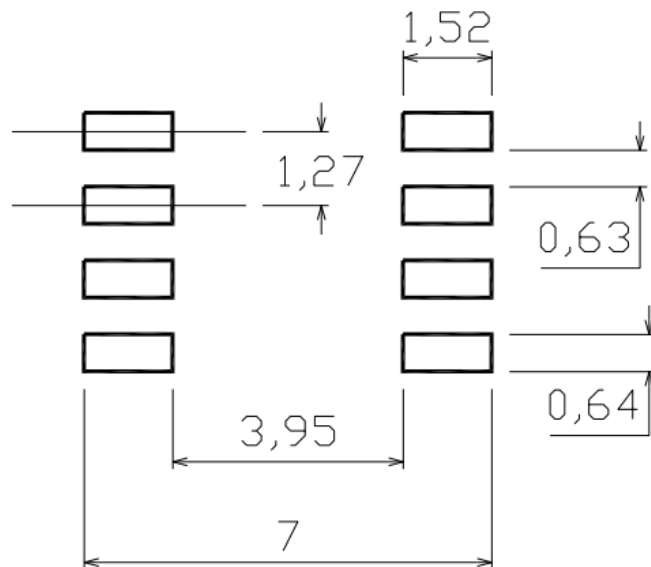
* VDE Mark can be selected.

11. Outer Dimension

OR-06XX



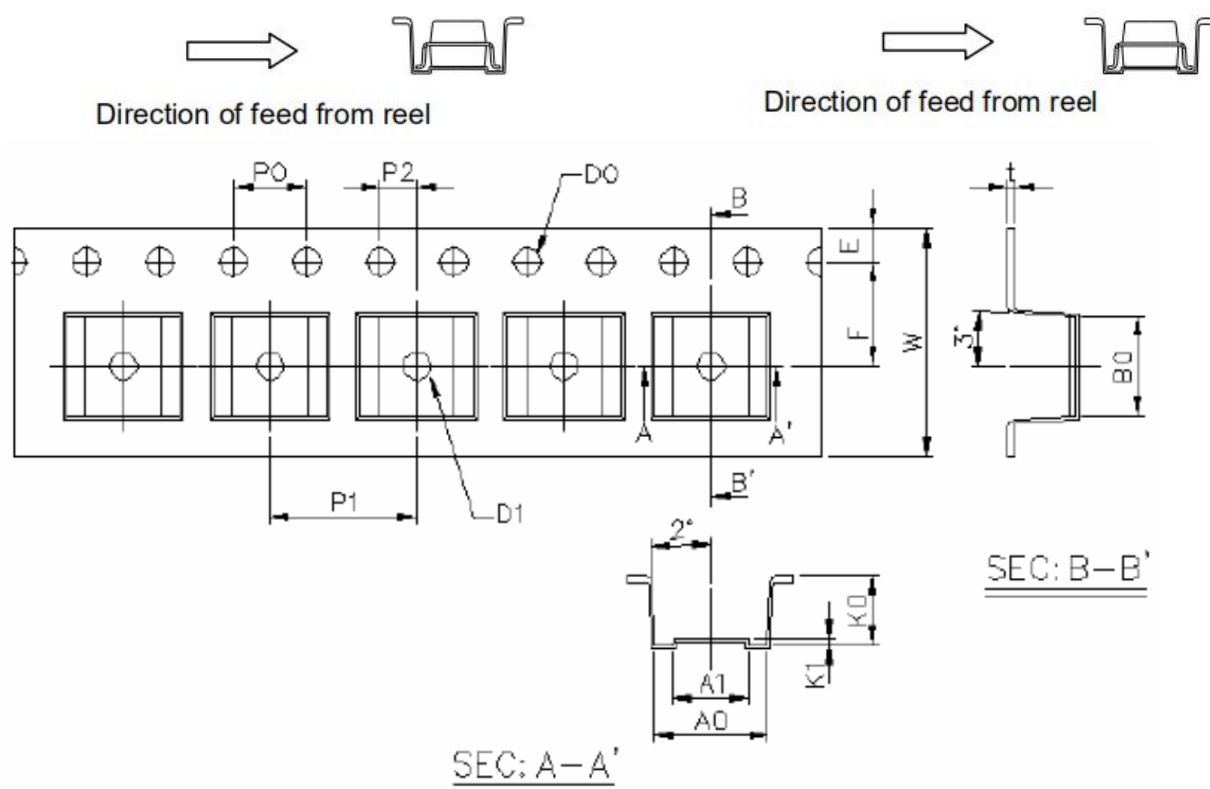
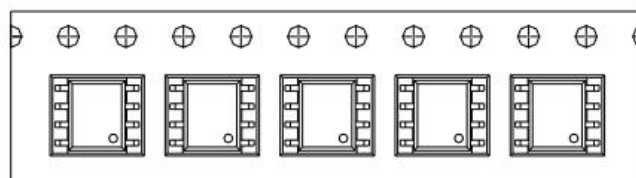
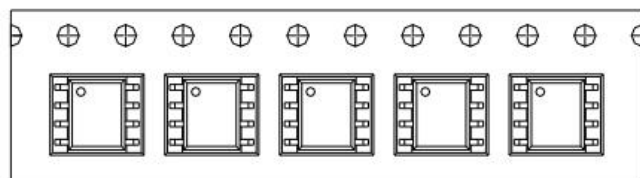
12. Recommended Foot Print Patterns (Mount Pad)



12. Taping Dimensions

(1)OR-06XX-TA1

(2)OR-06XX-TA



Dimension No.	A0	A1	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	4.1±0.1	5.28±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	Po	P1	P2	t	W	K0	K1
Dimension(mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.4±0.1	12.0+0.3/-0.1	3.7±0.1	0.3±0.1

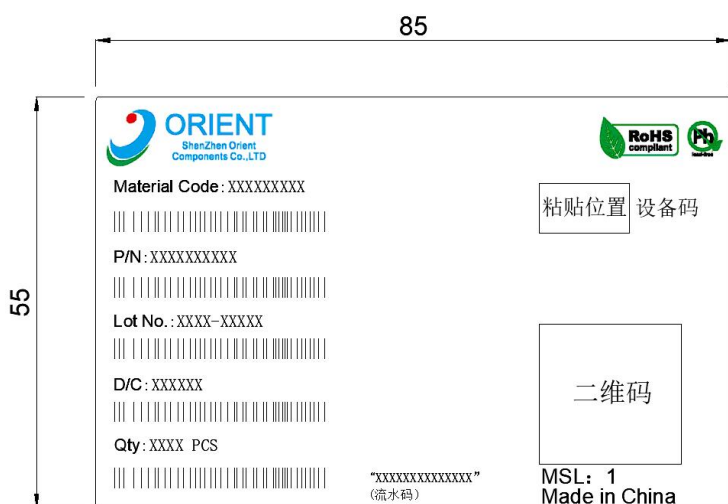
Encapsulation type	TA1/TA
Amount (pcs)	2000

13. Package Dimension

(1) package dimension

Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	2,000pcs
Small box (inner) Dimension	345*345*45mm
Large box (Outer) Dimension	480x360x360mm
Max qty per small box	4,000pcs
Max qty per large box	40,000pcs

(2)Packing Label Sample



Note:

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

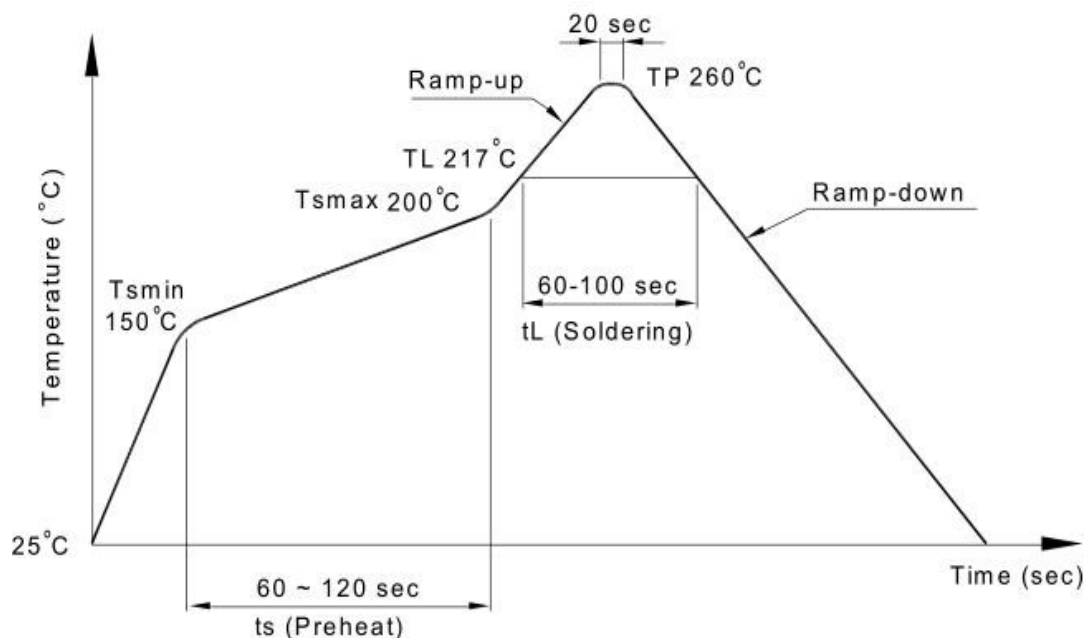
14. Temperature Profile Of Soldering

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

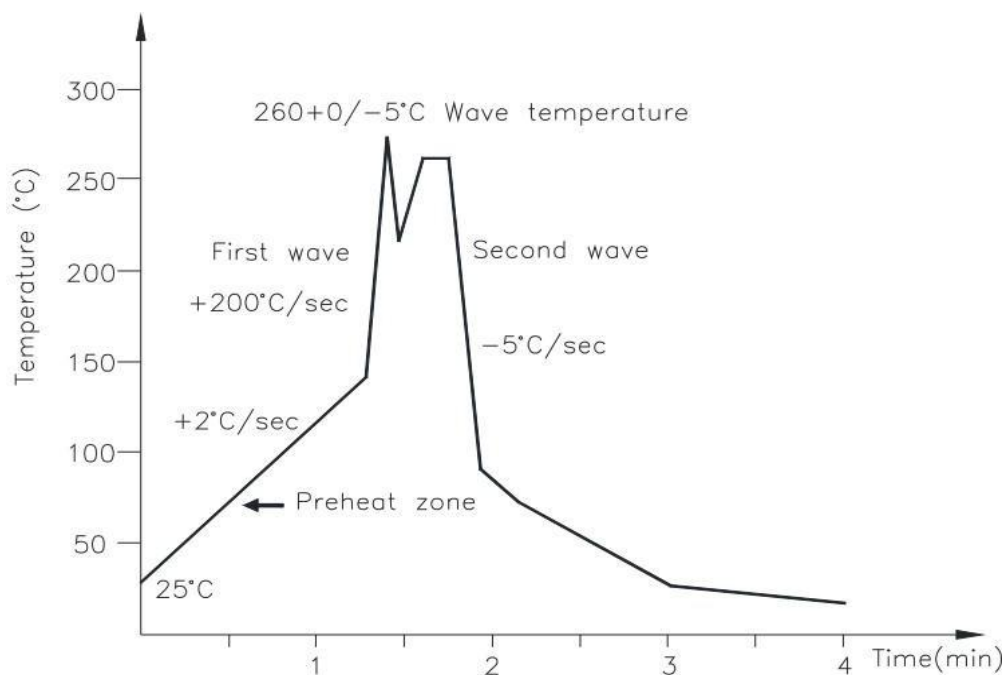
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature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



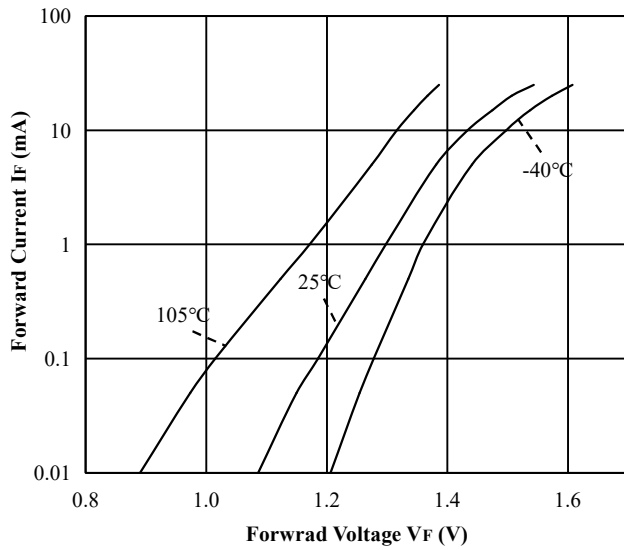
(3)Hand soldering by soldering iron

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

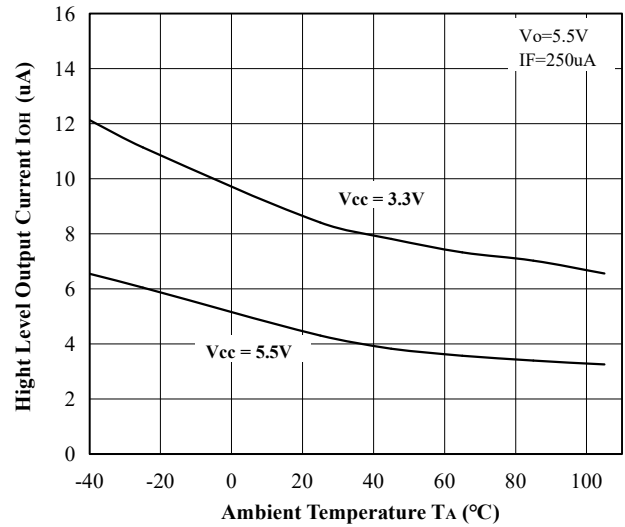
Temperature	380+0/-5°C
Time	3 sec max

15. Characteristics Curve

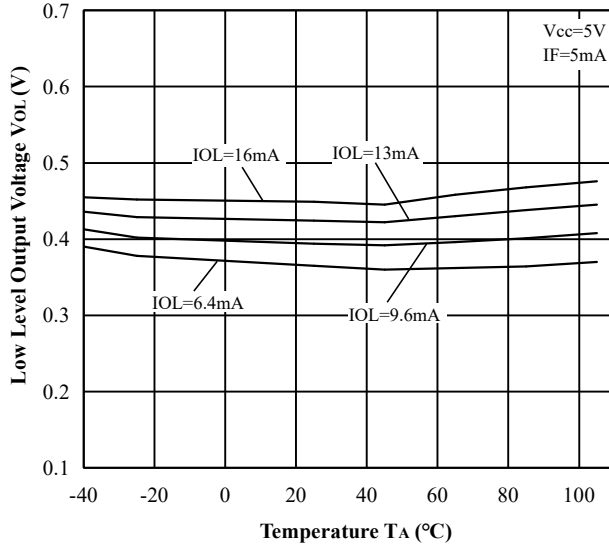
FORWARD CURRENT vs. FORWARD VOLTAGE



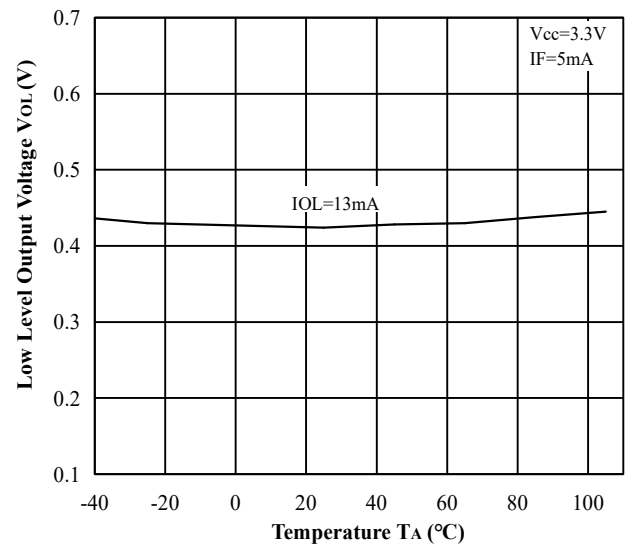
HIGHT LEVEL OUTPUT CURRENT vs. AMBIENT TEMPERATURE



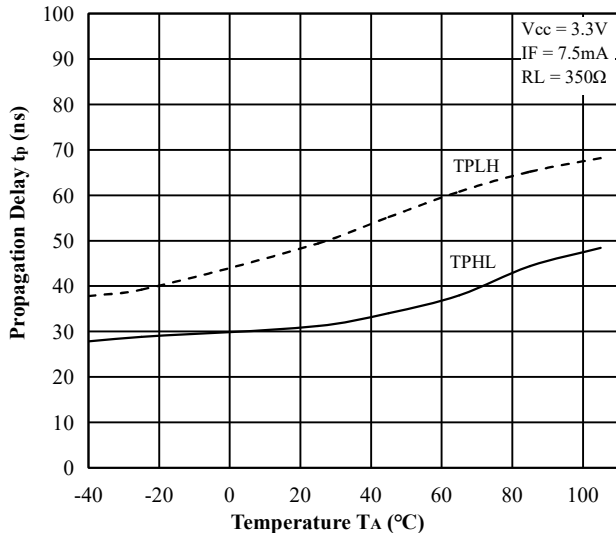
LOW LEVEL OUTPUT VOLTAGE vs. TEMPERATURE



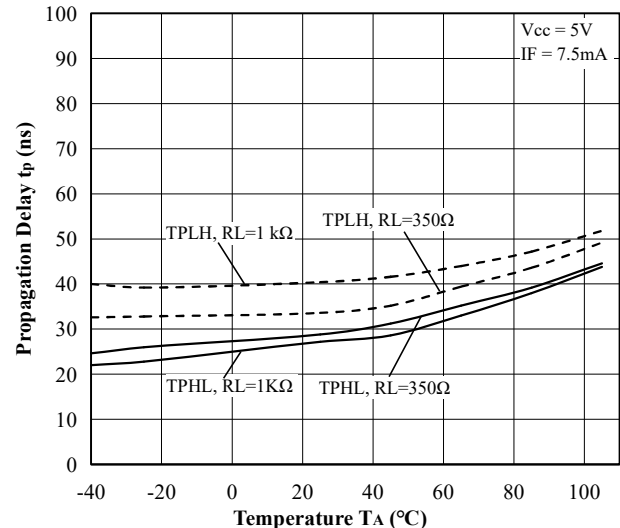
LOW LEVEL OUTPUT VOLTAGE vs. TEMPERATURE



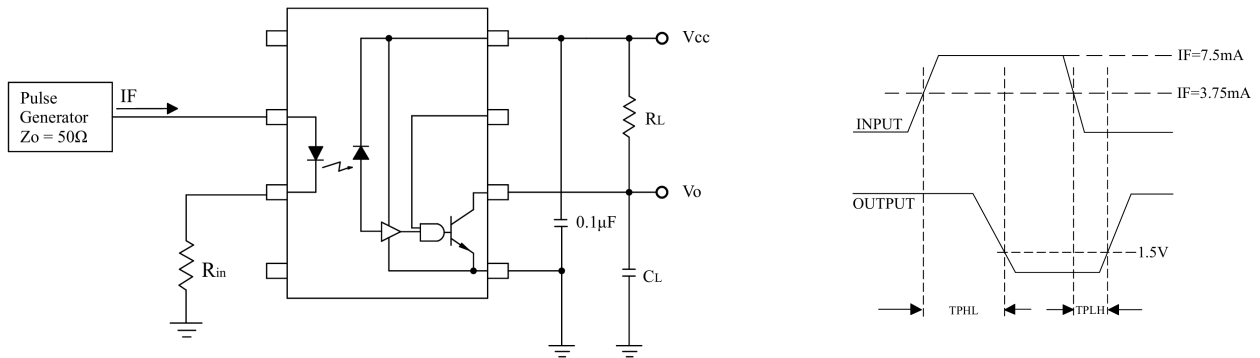
PROPAGATION DELAY TIME vs. TEMPERATURE



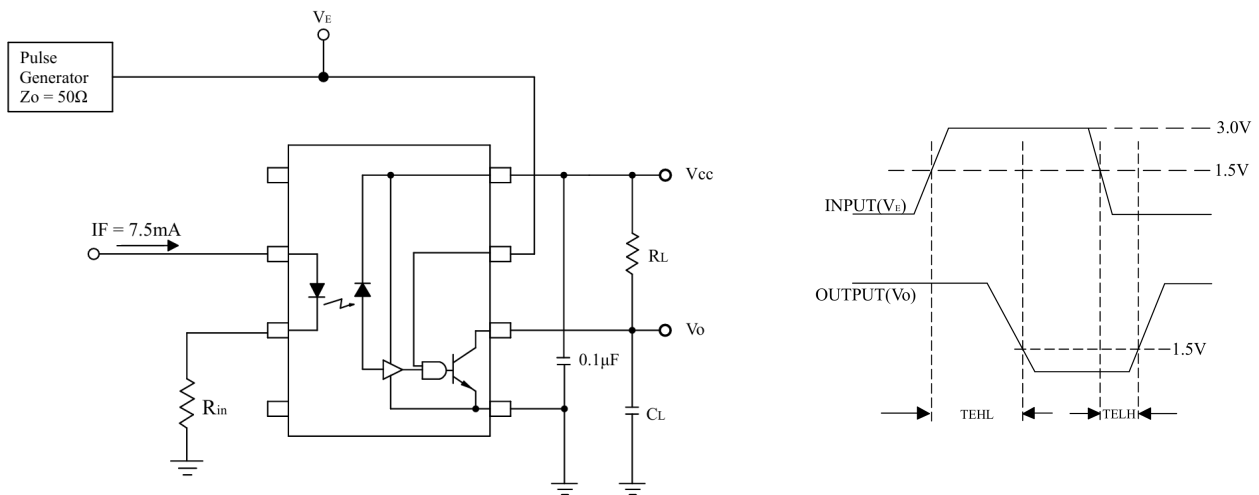
PROPAGATION DELAY TIME vs. TEMPERATURE



16. Switching time test circuit



Test Circuit for TPHL and TPLH



Single Channel Test Circuit for Common Mode Transient Immunity

17. Notes

- (1) Orient is continually improving the quality, reliability, function or design and Orient reserves the right to make changes without further notices.
- (2) The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- (3) For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- (4) When requiring a device for any “specific” application, please contact our sales in advice.
- (5) If there are any questions about the contents of this publication, please contact us at your convenience.
- (6) The contents described herein are subject to change without prior notice.
- (7) Immerge unit’s body in solder paste is not recommended.