ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-50L

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO ., LTD

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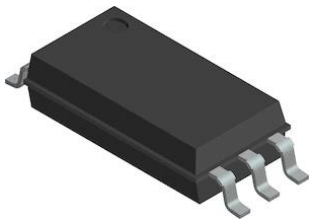
1. Features



(1) Long creepage distance
(2) SO-6 package
(3) High supply voltage (V_{CC} = 35 V)
(4) High isolation voltage (V_{ISO} = 5000 Vrms.)
(5) High-speed 1Mbit/s
(6) Safety approval
UL approved(No.E323844)
VDE approved(No.40029733)
CQC approved (No.CQC19001231480)
(7) In compliance with RoHS, REACH standards
(8) MSL Level 1

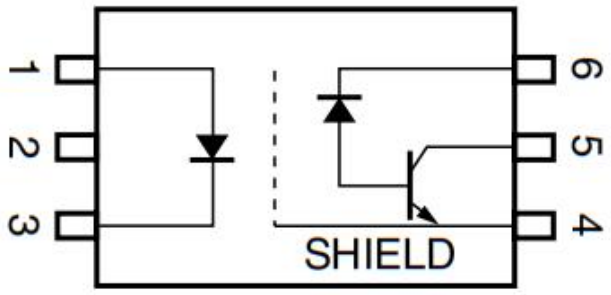
2. Description

The OR-50L are optical coupled isolators containing a GaAlAs LED on the input side and a PIN photodiode and a high-speed amplifier transistor on the output side on one chip. They are packaged in SO-6. Designed specifically for high supply voltage and high common mode transient immunity (CMR).

3. Application Range

(1) Computer and peripheral manufactures
(2) General purpose inverter
(3) Substitutions for relays and pulse transformers
(4) Power supply

4. Functional Diagram



1. Anode
2. NC
3. Cathode
4. GND
5. Vo
6. Vcc

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5. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Ratings	Unit
Input	Forward Current	I_F	20	mA
	Peak Forward Input Currentb (50% duty cycle, 1-ms pulse width)	$I_{F(peak)}$	40	mA
	Peak Transient Input Current (≤1 μs pulse width, 300 ps)	$I_{F(trans)}$	1	A
	Reverse Voltage	V_R	5	V
	Input Power Dissipation	P_{IN}	36	mW
Output	Supply Voltage	V_{CC}	-0.5∽35	V
	Output Voltage	V_O	-0.5∽20	V
	Output Current	$I_{O(avg)}$	8	mA
	Peak Output Current	$I_{O(peak)}$	16	mA
	Power Dissipation	P_O	45	mW
Insulation Voltage*1		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-40 to 105	°C
Storage Temperature		T_{STG}	-55 to 125	°C
Soldering Temperature*2		T_{SOL}	260	°C

*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. Recommended Operating Conditions (Note)

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{CC}	2.7	---	24	V
Forward current	I_F	4	---	10	mA
Forward Input Voltage (OFF)	$V_{F(off)}$	---	---	0.8	V
Operating temperature	T_{OPR}	-40	---	105	°C
Output Pull-up Resistor	R_L	1.9	---	4.7	KΩ

Note:
Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

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7. Electrical Optical Characteristics

Parameter		Symbol	MIN.	TYP.	MAX.	Unit	Conditions
INPUT	Forward Voltage	V_F	---	1.4	2.0	V	I_F = 16mA
	Reverse Current	I_R	---	---	10	μA	V_R = 5 V
	Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T_A$	---	2.1	---	mV/C	I_F = 16mA
	Terminal Capacitance	Ct	---	30	---	pF	V = 0 V, f = 1 MHz
OUTPUT	High Level Output Current	I_{OH}	---	0.002	0.5	μA	I_F = 0mA V_{CC}=V_O=5.5V
			---	0.01	5		I_F = 0mA V_{CC}=V_O=15V
			---	---	50		I_F = 0mA V_{CC}=V_O=20V
	Low Level Output Voltage	V_{OL}	---	0.2	0.4	V	I_F = 16mA V_{CC} = 4.5V I_O =2.4mA
	High Level Supply Current	I_{CCH}	---	0.01	1	μA	I_F = 0mA V_O = open V_{CC} = 30V
	Low Level Supply Current	I_{CCL}	---	200	---		I_F = 16mA V_O = open, V_{CC} = 30V
COUPLED	Current Transfer Ratio	CTR	20	---	---	%	I_F = 16mA V_{CC} = 4.5V V_O = 0.4V
	Input-Output Isolation Resistance	RI-O	10^{11}	---	---	Ω	V_{I-O} = 500V DC
	Input-Output Isolation Capacitance	CI-O	---	0.7	---	pF	V = 0V, f = 1MHz
	Propagation Delay Time (H →L)*2	T_{PHL}	---	---	0.5	μs	IF=16mA R_L =4.7KΩ
	Propagation Delay Time (L→H) *2	T_{PLH}	---	---	0.5		
	Common Mode Transient Immunity at High Level Output*3	CM_H	---	10	---	KV/μs	I_F = 0mA , V_{CM} =1500Vp-p, R_L =1.9KΩ
	Common Mode Transient Immunity at Low Level Output*3	CM_L	---	10	---		I_F = 16mA , V_{CM} =1500Vp-p, R_L =1.9KΩ

(1) Typical values at T_A = 25℃

(2) Test circuit for propagation delay time(Figure on Page 14)

(3) Test circuit for common mode transient immunity(Figure on Page 14)

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8. Order Information

Part Number

OR-50LX-Y-Z

Note

50L = Part Number.

X = 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

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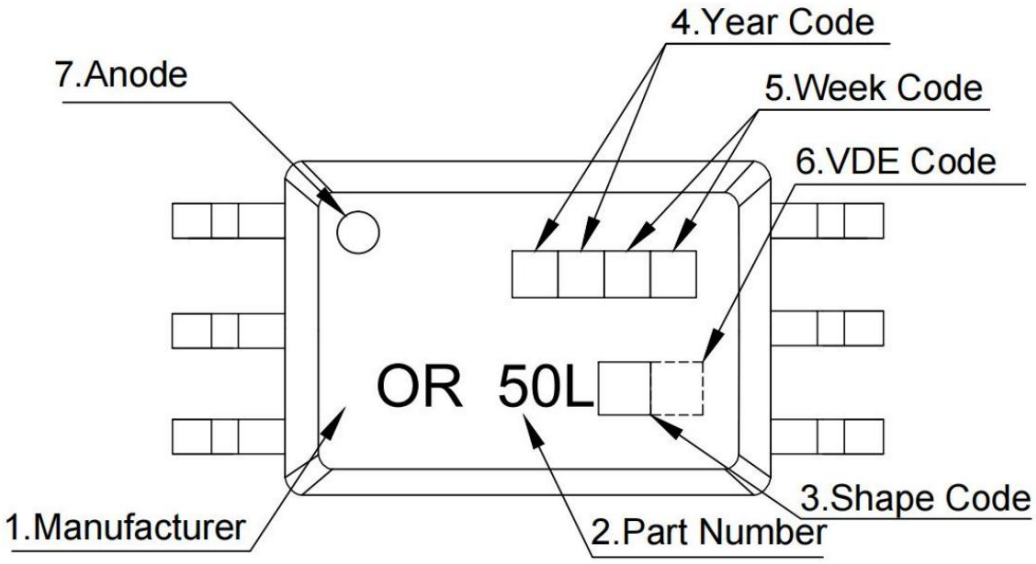
9. Naming Rule



1. Manufacturer : ORIENT.
2. Part Number : 50L.
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.
7. Anode.

* VDE Mark can be selected.

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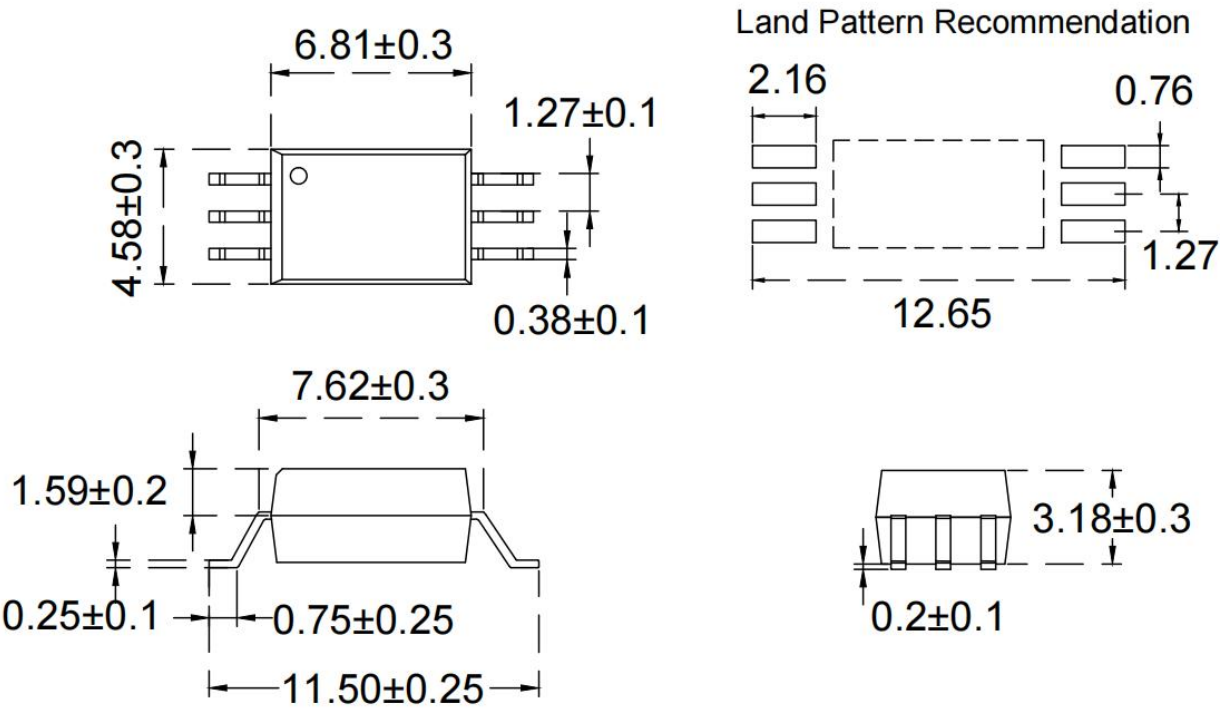
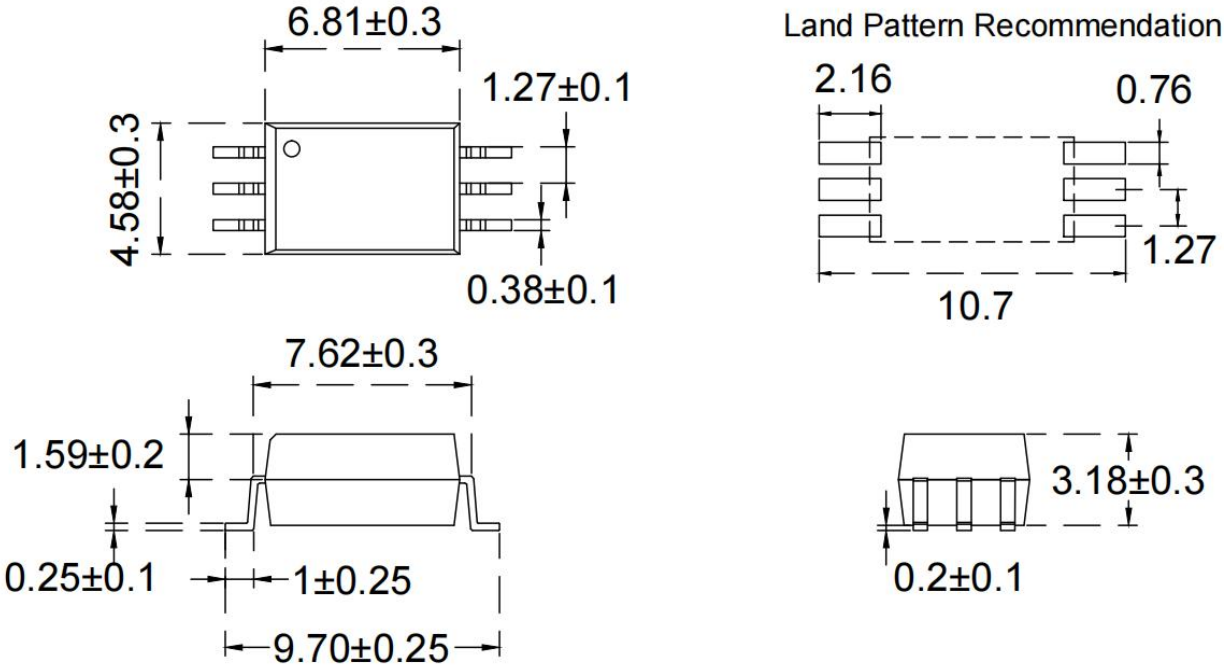
10. Package Dimension

(1).OR-50LW



(2).OR-50LW1



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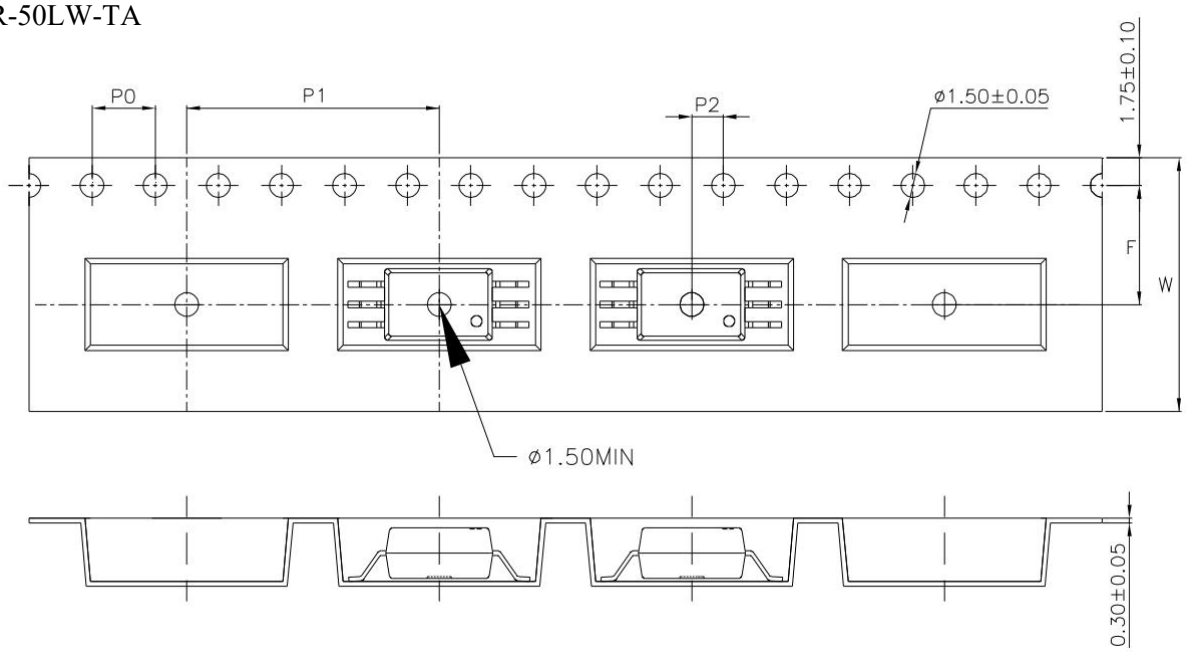
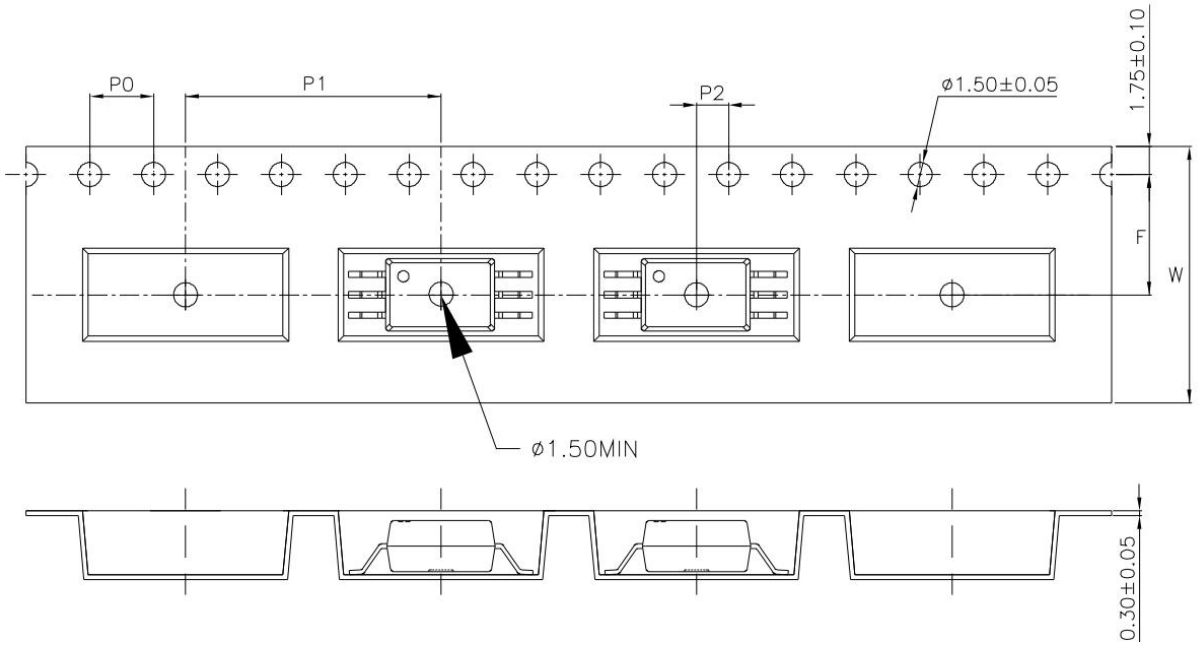
11. Taping Dimensions

(1)OR-50LW-TA



(2)OR-50LW-TA1



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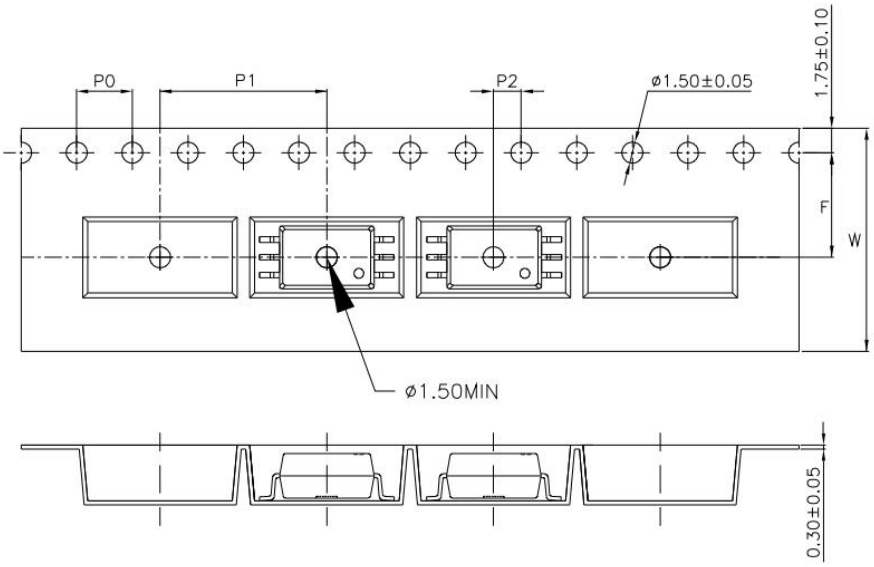
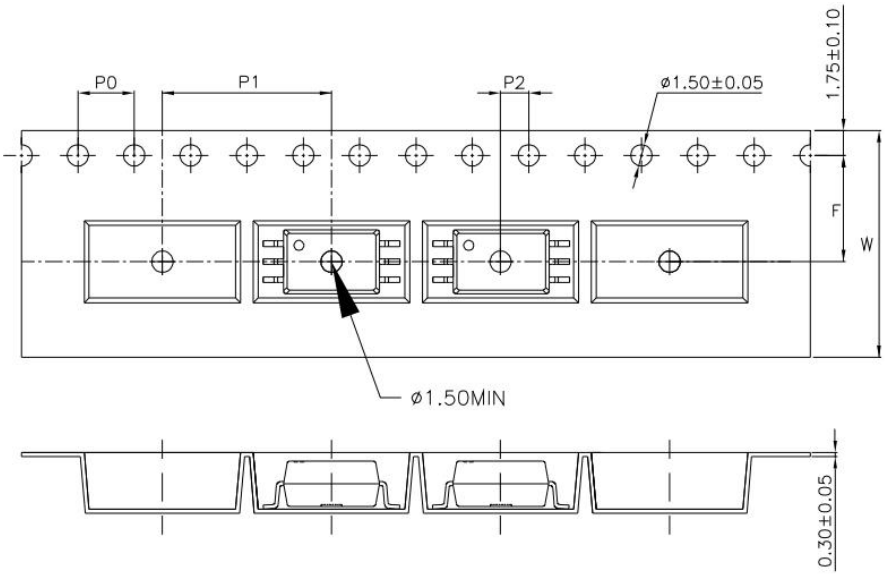
(3)OR-50LW1-TA



(4)OR-50LW1-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

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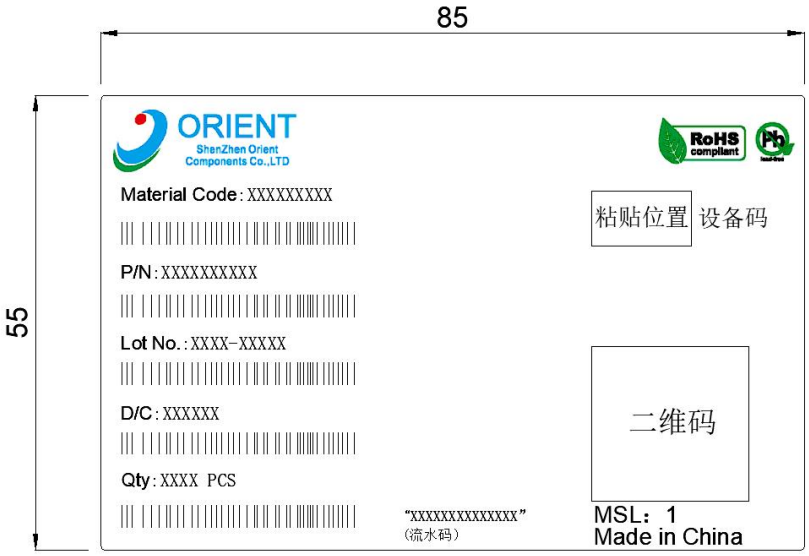
12. Package Dimension

(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 weeks.
4. D/C :Product data.
5. Quantity :Packaging quantity.

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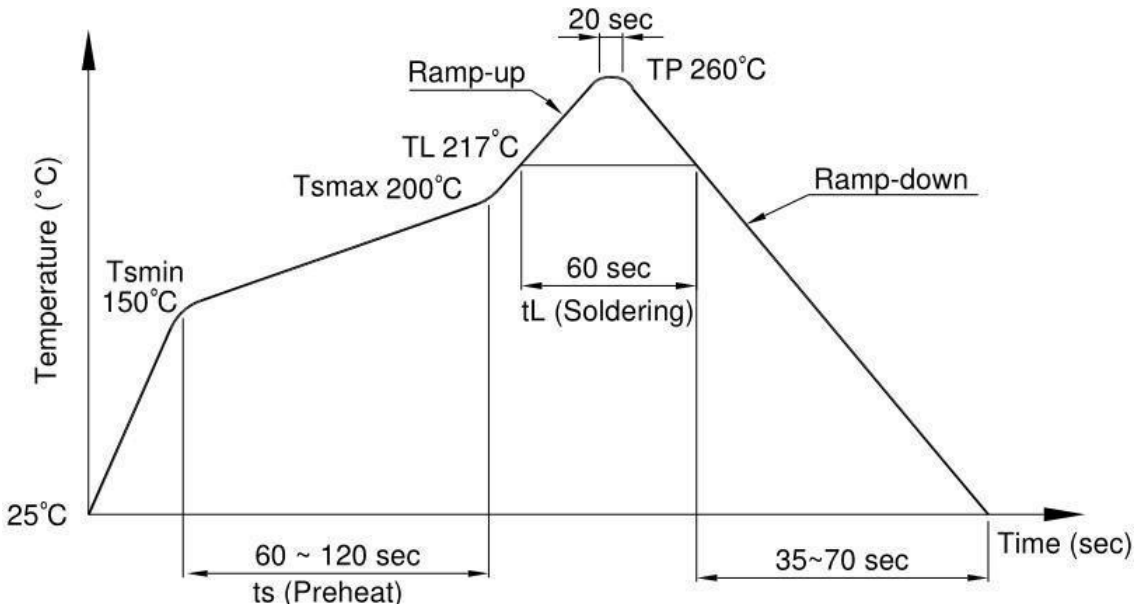
13. Temperature Profile Of Soldering

1. IR Reflow soldering (JEDEC-STD-020 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



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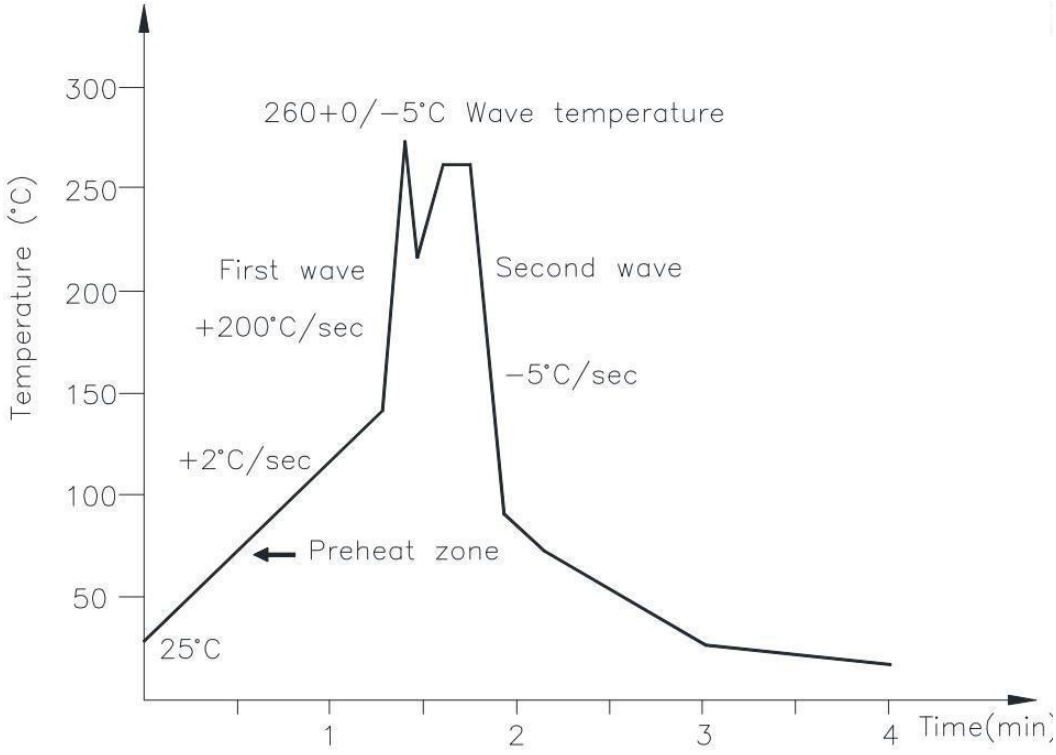
2. Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

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



3. Hand soldering by soldering iron

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

Temperature Time	380+0/-5˚C 3 sec max

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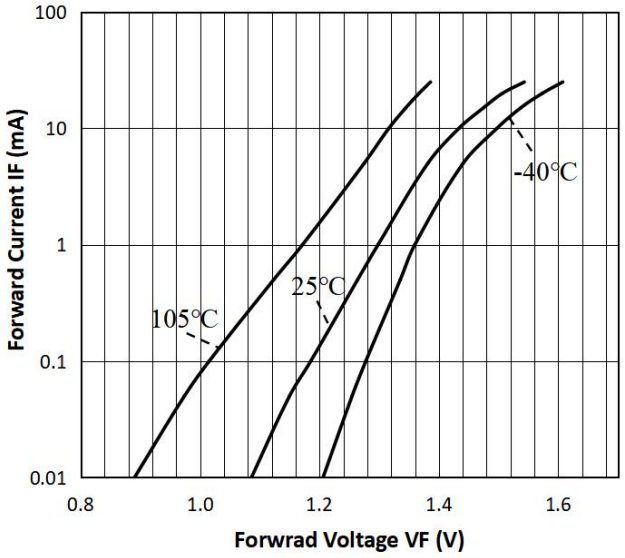
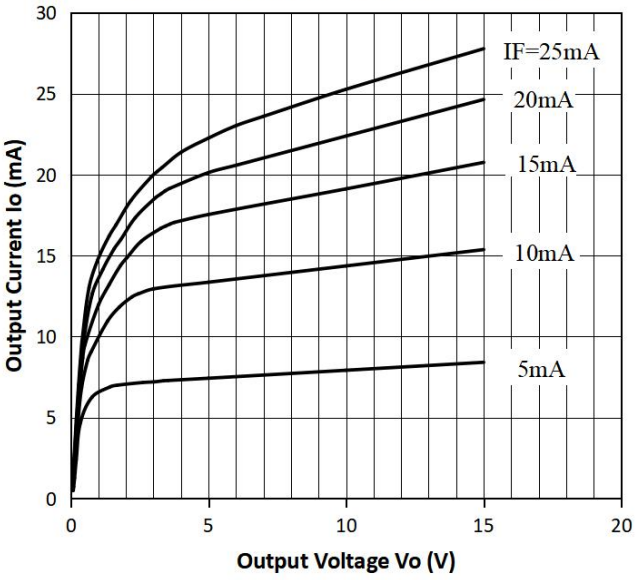
14. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

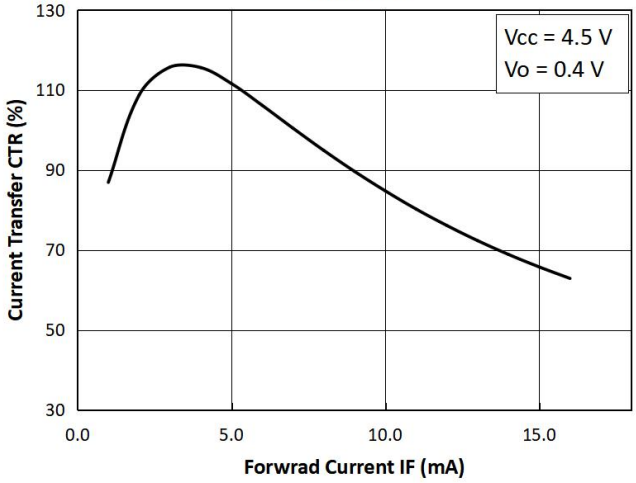
FORWARD CURRENT vs. FORWARD VOLTAGE



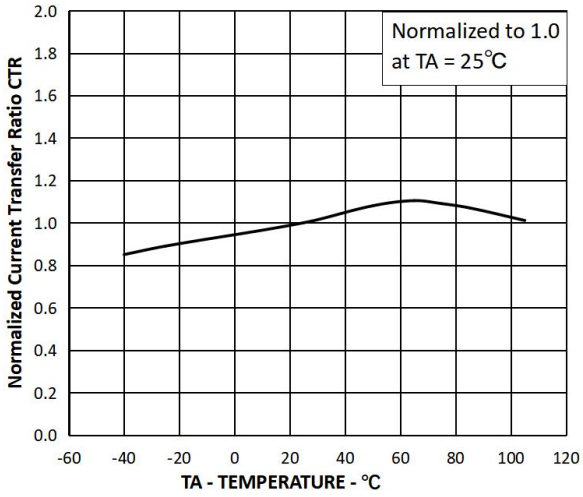
OUTPUT CURRENT vs. OUTPUT VOLTAGE



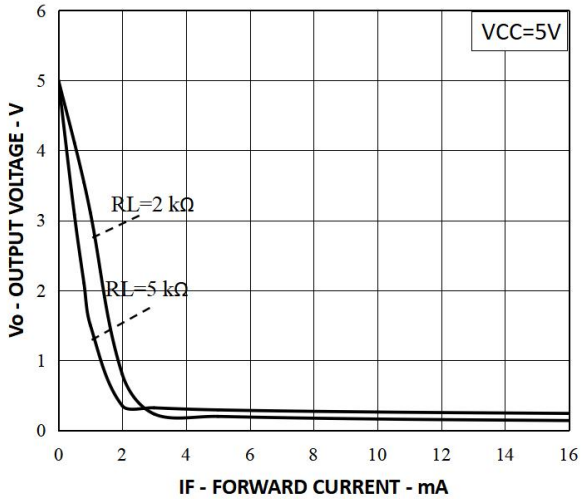
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



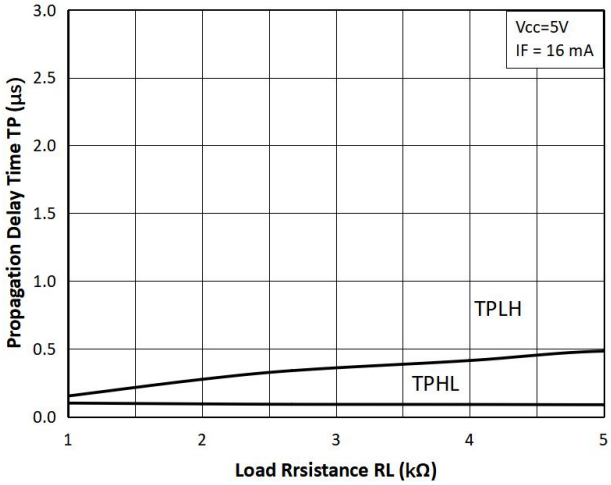
CURRENT TRANSFER RATIO vs. TEMPERATURE



OUTPUT VOLTAGE vs. FORWARD CURRENT



PROPAGATION DELAY TIME vs. LOAD RESISTANCE



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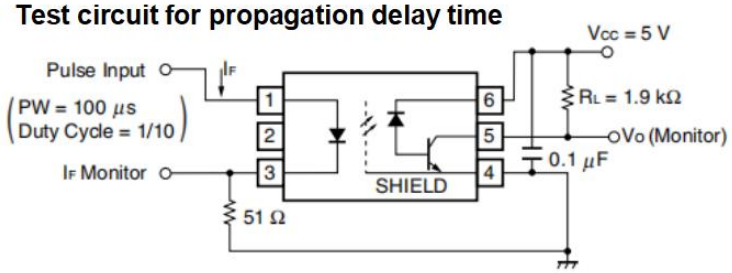
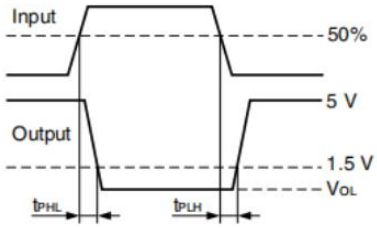
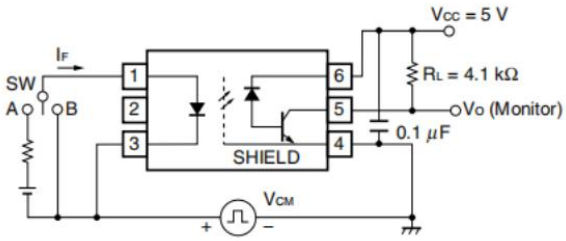
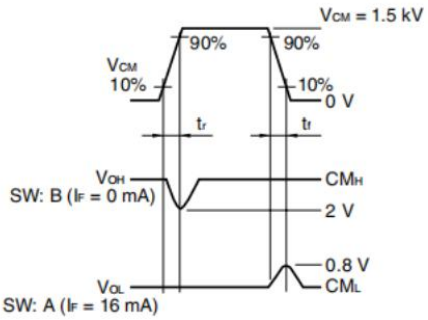
Test circuit for propagation delay time





Test circuit for common mode transient immunity





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15. 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.

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