ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-6N135&6N136

Customer: _____

Date: _____

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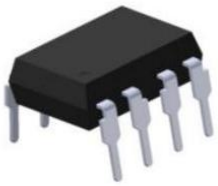
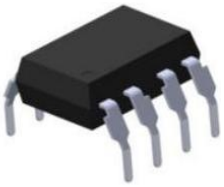
Preliminary

This datasheet is a preliminary design specification, and the formal specifications are subject to the recognition letter with jointly signed

1. Features


(1) High speed - 1MBd model

(2) Adapted to the dual-in-line, lead spacing width, surface installation.

(3) Store output.

(4) Safety approval

UL approved (No.E323844)

VDE approved (No.40029733)

CQC approved (No.CQC19001231254)

(5) In compliance with RoHS, REACH standards

(6) MSL Class I

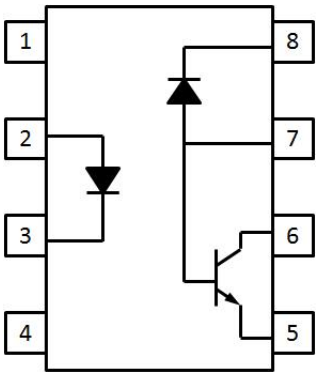
2. Instructions

OR-6N135/6N136 consists of highly efficient AlGaAs light-emitting diodes and high-speed optical detectors. The design provides good ac and dc isolation at the input and output ends of the photoelectric coupler. Connections related to photo diode biasing can improve the speed of conventional photo transistor couplers by reducing the capacitance of the matrix collector. Internal shielding ensures high transient immunity in general mode. Ensure the common-mode transient immunity to 1 kv/μsec.

3. Application Range

(1) line receiver isolation
(2) A/ D, D/A converted digital signal isolation
(3) eliminate noise from the ground loop
(4) switching power supply
(5) alternative pulse transformers
(6) motor control system
(7) interface of microprocessor system, computer and peripheral equipment

4. Functional Diagram



Pin Configuration

1. No Connection
2. Anode
3. Cathode
4. No Connection
5. Gnd
6. V_{out}
7. V_B
8. V_{CC}

5. Absolute Maximum Ratings (Ta=25℃) *1

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	45	mW
Output	Output Collector Current	I_O	8	mA
	Output Collector Voltage	V_O	20	V
	Output Collector Power Dissipation	P_O	100	mW
Supply Voltage		V_{CC}	30	V
Insulation Voltage		V_{iso}	5000	Vrms
Operating Temperature		T_{opr}	-40 ~ + 105	℃
Storage Temperature		T_{stg}	-55 ~ + 125	
*2 Soldering Temperature		T_{sol}	260	

*1. Room temperature = 25 ℃. 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℃)

Parameter			Symbol	Min	Typ	Max	Unit	Condition
Input	Forward Voltage		V_F	---	1.4	1.7	V	I_F= 16mA
	Reverse Voltage		V_R	5	---	---	V	I_R = 10μA
Output	High Level Output Current		I_{OH}	---	---	0.5	uA	V_{CC}=5.5V, V_O=5.5V, I_F=0mA
				---	---	1		V_{CC}=15V, V_O=15V, IF=0mA
	Low Level Supply Current		I_{CCL}	---	140	300	uA	I_F=16mA, Vo=open, V_{CC}=15 V
	High Level Supply Current		I_{CCH}	---	0.01	1	uA	I_F=0mA, Vo=open, V_{CC}=15V
Transfer Characteristics	Current Transfer Ratio	OR-6N135	CTR	7	---	50	%	I_F = 16mA , V_O = 0.4V, V_{CC}=4.5V
		OR-6N136		19	---	50		
		OR-6N135		5	---	---		I_F = 16mA , V_O = 0.5V, V_{CC}=4.5V
		OR-6N136		15	---	---		
	Logic Low Output Voltage	OR-6N135	V_{OL}	---	0.18	0.4	V	I_F = 16mA ,I_O = 1.1mA, V_{CC}=4.5V
		OR-6N136		---	0.25	0.4		I_F = 16mA ,I_O = 3mA, V_{CC}=4.5V
		OR-6N135		---	---	0.5		I_F = 16mA ,I_O =0.8mA, V_{CC}=4.5V
		OR-6N136		---	---	0.5		I_F= 16mA ,I_O=2.4mA, V_{CC}=4.5V

7. Switching Characteristics (at TA=25℃)

Parameter		Symbol	Min	Typ	Max	Unit	Condition
Propagation delay time to output Low level	OR-6N135	t_{PHL}	---	0.09	1.5	us	R_L=4.1kΩ I_F=16mA
	OR-6N136		---	0.1	0.8	us	R_L=1.9kΩ I_F=16mA
Propagation delay time to output High level	OR-6N135	t_{PLH}	---	0.8	1.5	us	R_L=4.1kΩ I_F=16mA
	OR-6N136		---	0.4	0.8	us	R_L=1.9kΩ I_F=16mA

Recommended temperature range (TA = 0 ℃ ~ 85 ℃), unless otherwise specified power supply for 5V.

Typical values of TA = 25 ℃.

8. Isolation characteristics (at TA=25℃)

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, T_A =25 C
Withstand Insulation Test Voltage	V_{ISO}	5000	—	—	V_{RMS}	RH ≤ 50%, t =1min, T_A=25℃
Input-Output Resistance	R_{I-O}	$5x10^{10}$	10^{12}	—	Ω	V_{I-O}=500V DC

9. Order Information

Part Number

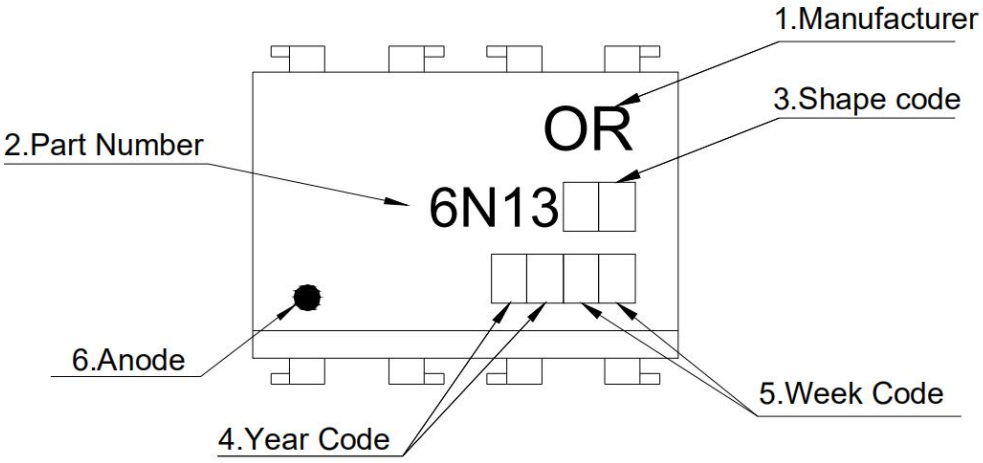
OR-6N13XY-Z

Note

6N13X = Part Number (6N135 or 6N136)
Y = Lead form option (S, M or none)
Z = Tape and reel option (TA,TA1 or none).

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) + TA tape & reel option	1000 units per reel
TA1	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

10. Naming Rule

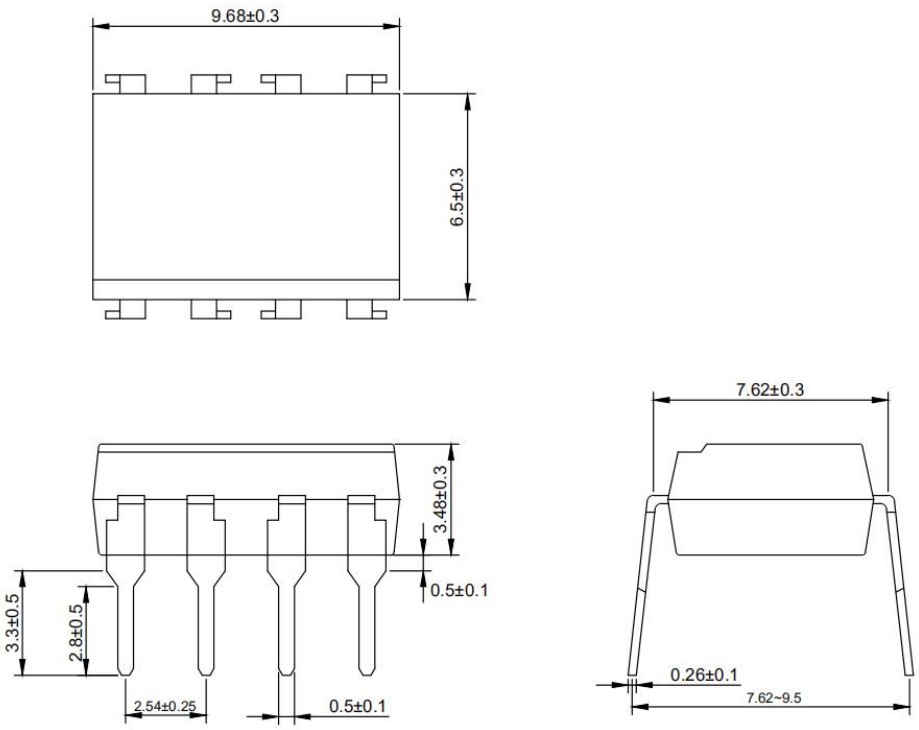


NOTE:

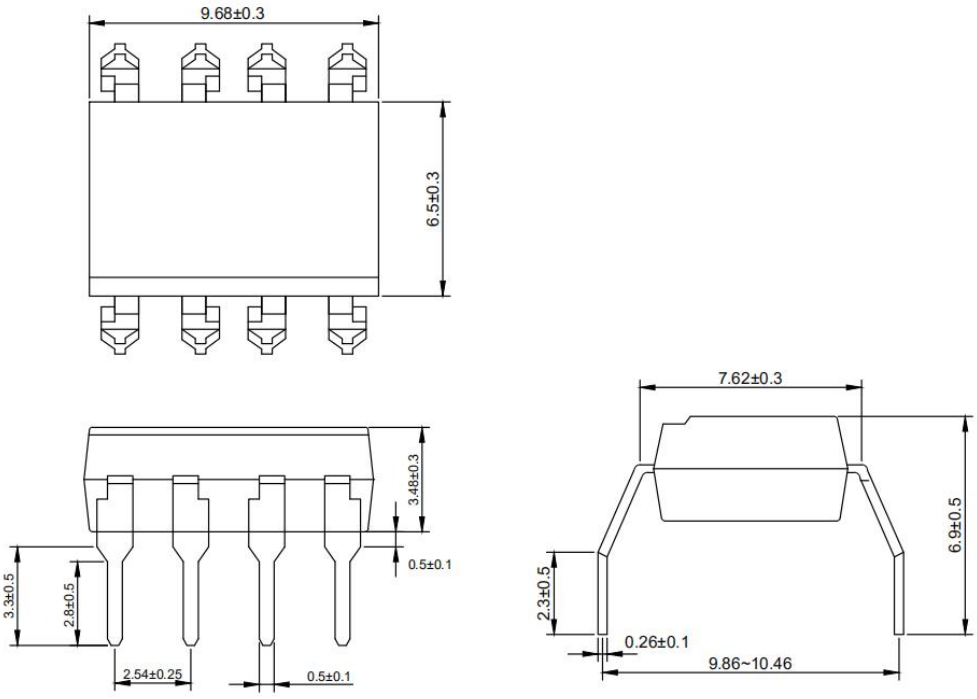
1. Manufacturer : ORIENT.
2. Part Number : 6N135 or 6N136 .
3. Shape Code □.
4. Year Code □□ : '21' means '2021' and so on.
5. Week Code □□: 01 means the first week, 02 means the second week and so on.
6. Anode.

11. Outer Dimension

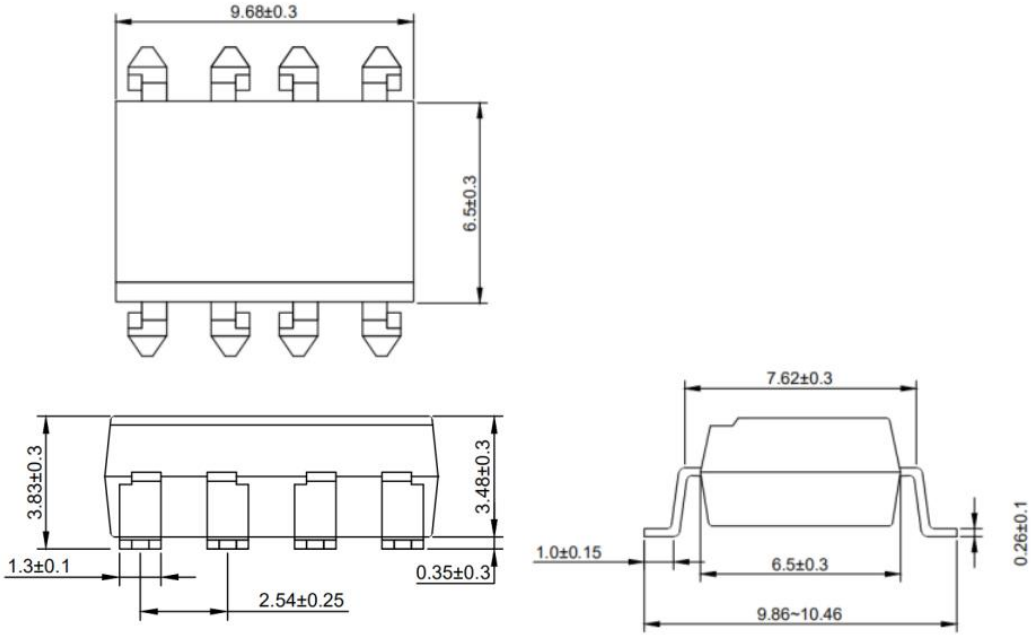
(1) OR-6N13X



(2) OR-6N13XM

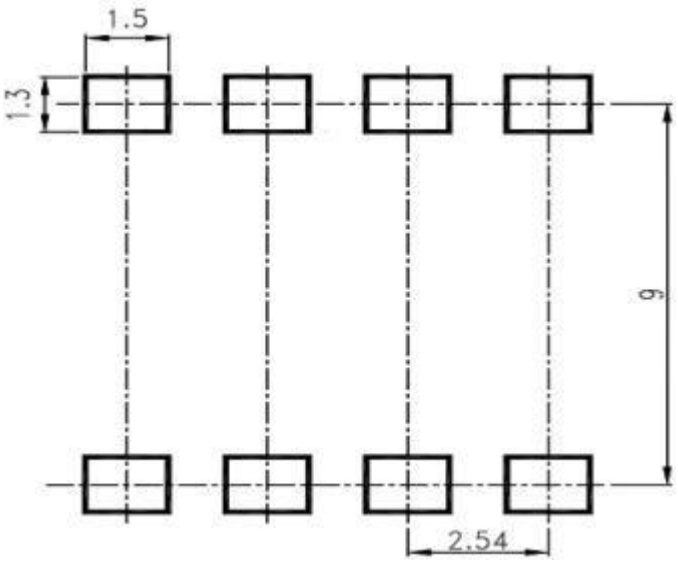


(3) OR-6N13XS



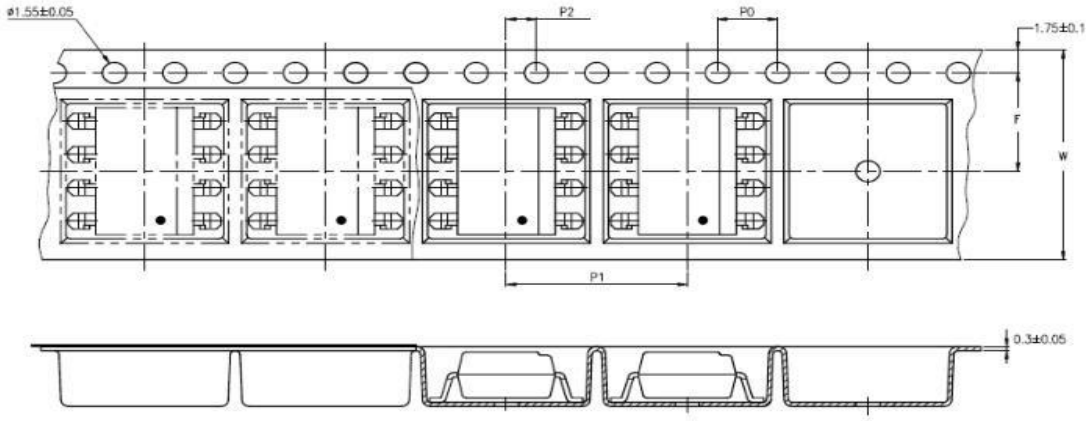
12. Recommended Foot Print Patterns (Mount Pad))

(unit：mm)

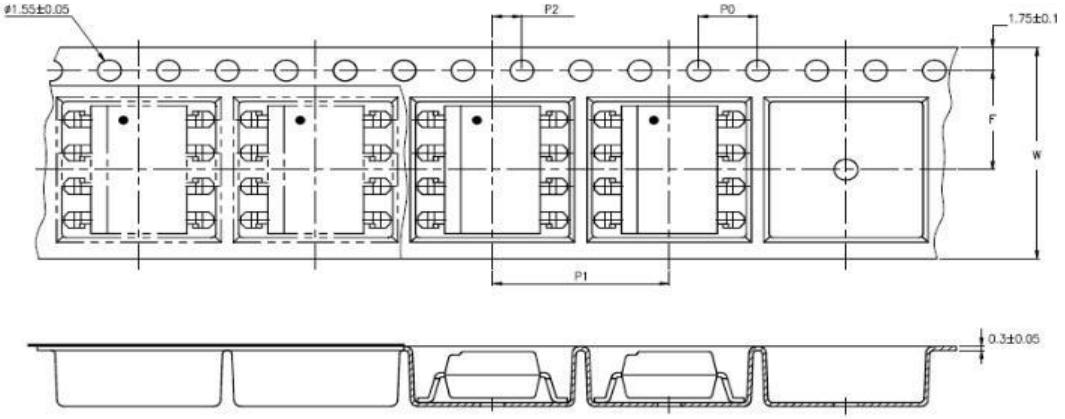


13. Taping Dimensions

(1)OR-6N13XS-TA



(2)OR-6N13XS-TA1



type	symbol	Dimensions: 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

14. Package Dimension

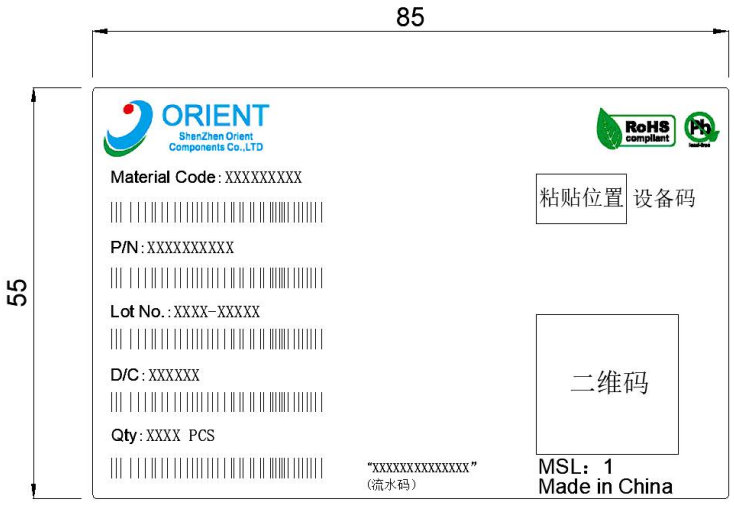
DIP Type

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



Note:

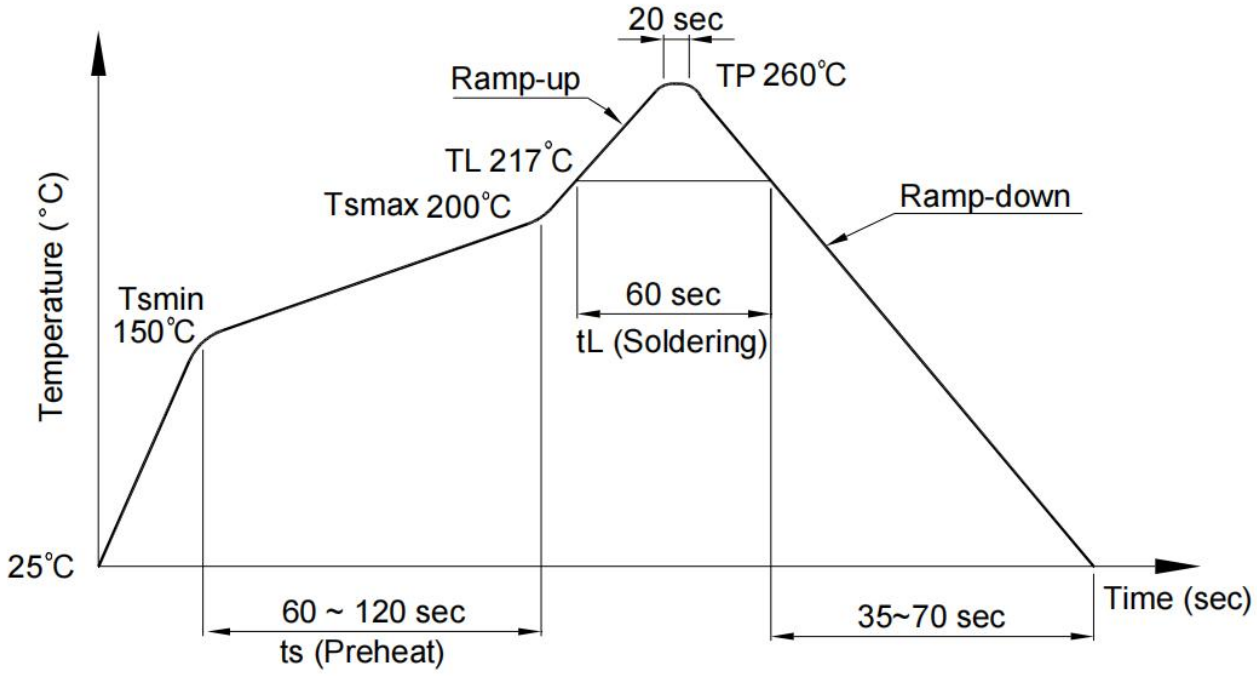
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product weeks.
4. D/C :Product data.
5. Quantity :Packaging quantity.

15. 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.

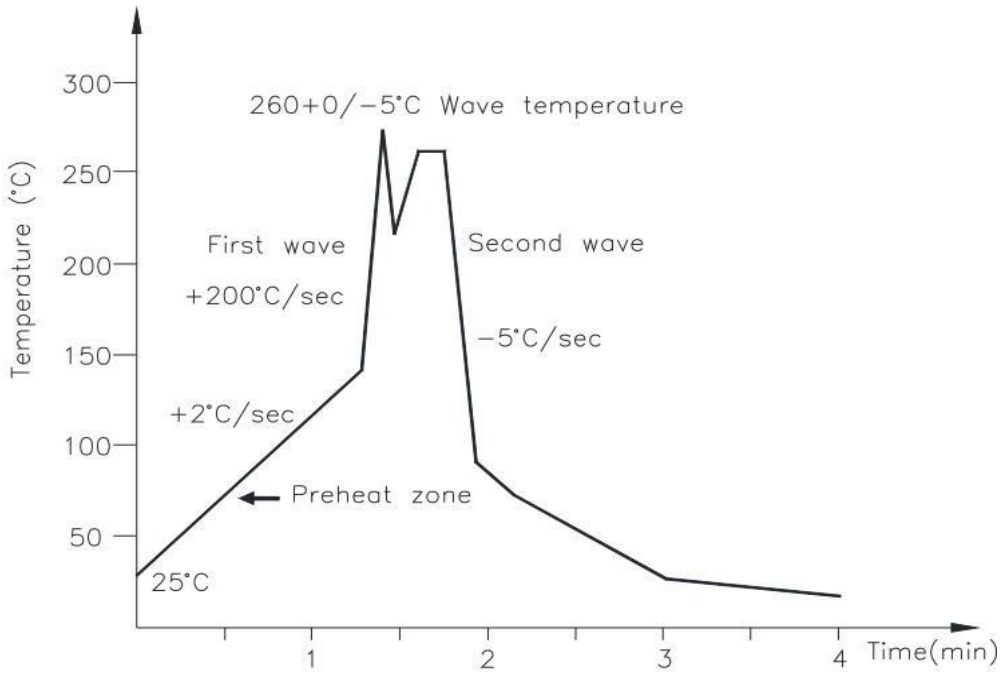
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	30 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature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



(2) Wave soldering (JEDEC22A111 compliant)

One-time welding is recommended under the temperature condition.

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



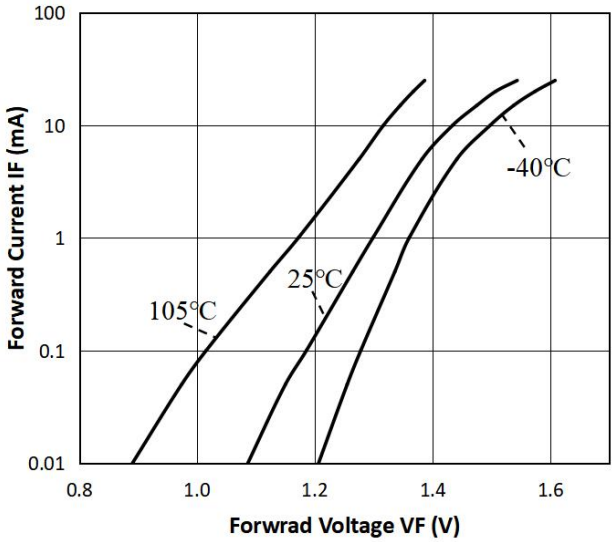
(3) Hand soldering by soldering iron

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

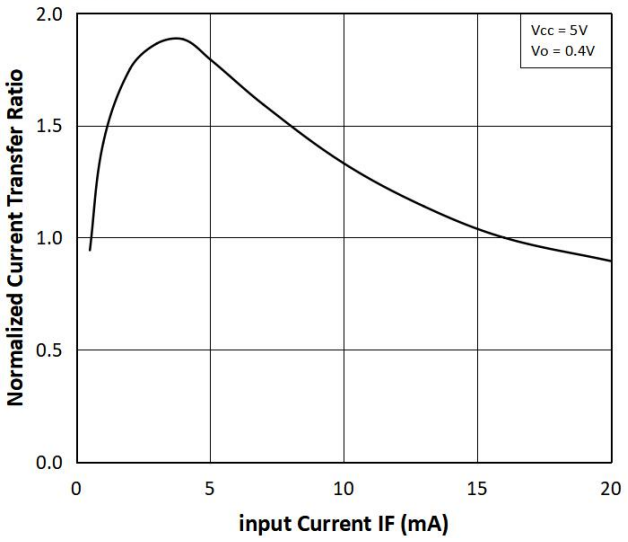
Temperature Time	380+0/-5˚C 3 sec max

16. Characteristics Curve

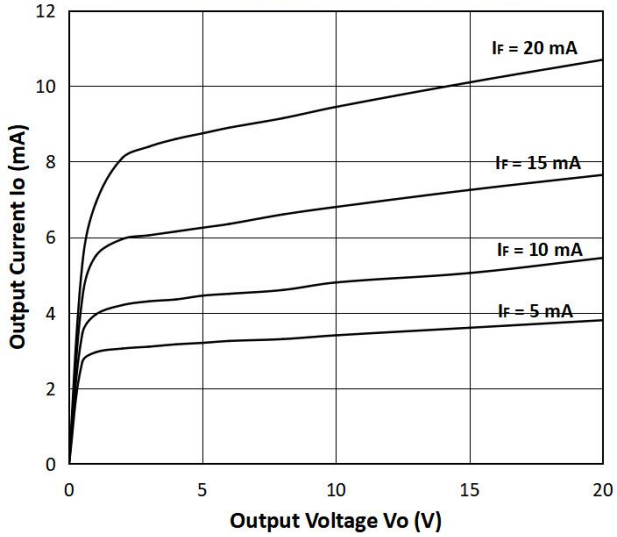
FORWARD CURRENT vs. FORWARD VOLTAGE



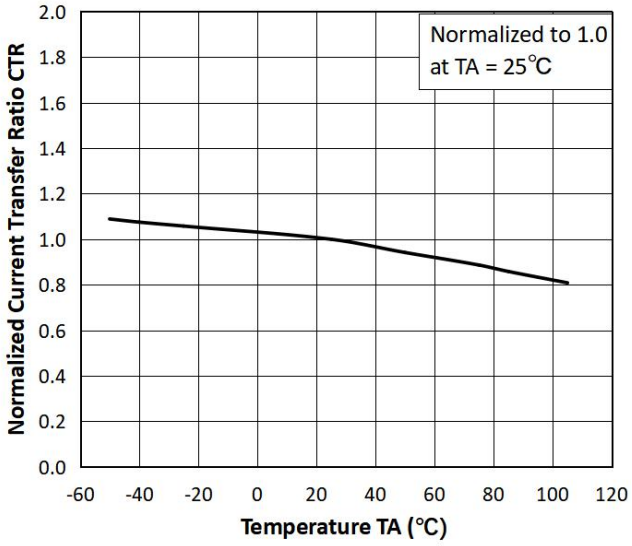
CURRENT TRANSFER RATIO vs. INPUT CURRENT



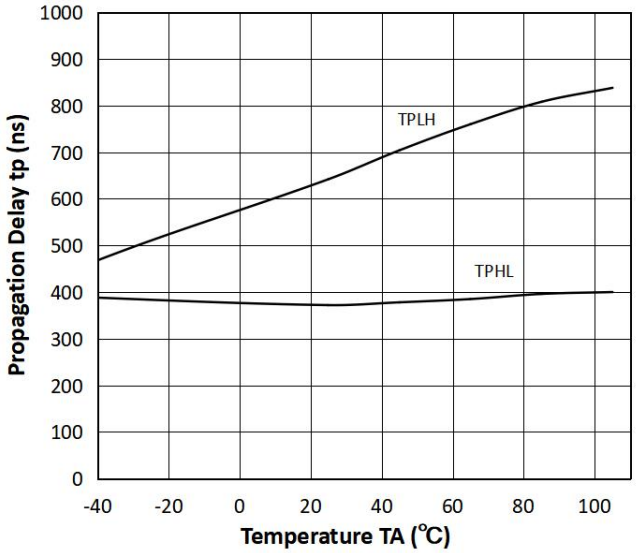
OUTPUT CURRENT vs. OUTPUT VOLTAGE



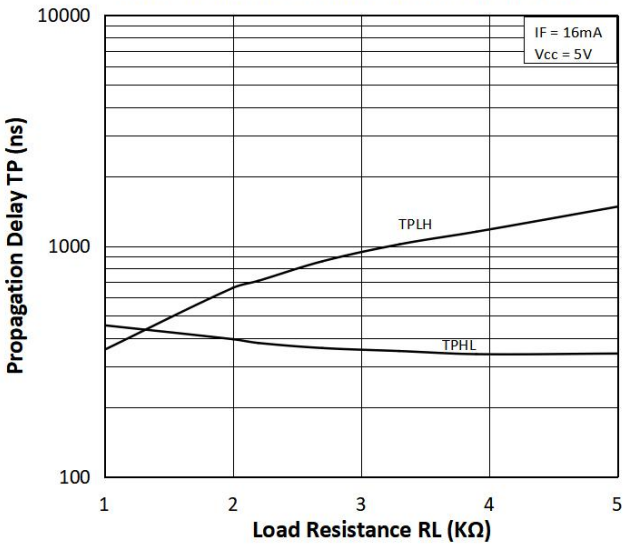
CURRENT TRANSFER RATIO vs. TEMPERATURE



PROPAGATION DELAY TIME vs. TEMPERATURE



PROPAGATION DELAY vs. LOAD RESISTANCE



17. Switching time test circuit

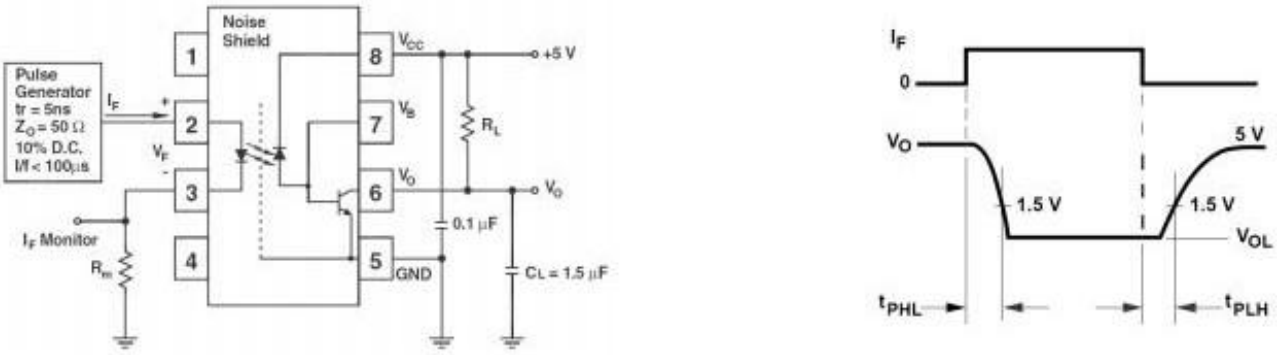


Figure 1: Test Circuit for t_{PHL} and t_{PLH}

18. 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.