ORIENT

Photo coupler

Product Data Sheet

MPN: OR-4N2X_OR-4N3X series

Customer: _____

Date: _____

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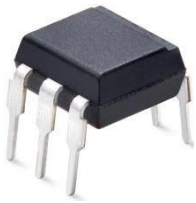
Preliminary

This datasheet is a preliminary design specification, and the formal specifications are

1. Features



(1) 4N2X series: 4N25, 4N26, 4N27, 4N28;4N3X series: 4N35, 4N36, 4N37, 4N38
(2) High isolation voltage between input and output (Viso=5000 V rms)
(3) Creepage distance >7.62 mm
(4) Operating temperature -55°C~110°C
(5) Compact dual-in-line package
(6) ESD pass HBM 8000V/MM 2000V
(7) Safety approval
UL approved(No.E323844)
VDE approved(No.40029733)
CQC approved (No.CQC19001231480)
(8) In compliance with RoHS, REACH standards.
(9) MSL Class I

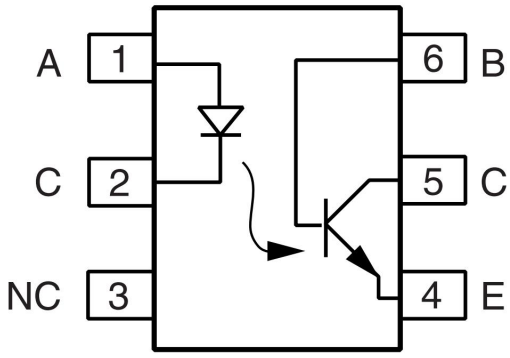
2. Instructions

The 4N2X, 4N3X, series of devices each consist of an infrared emitting diode optically coupled to a photo transistor.They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

3. Application Range

(1) Power supply regulators
(2) Digital logic inputs
(3) Microprocessor inputs

4. Functional Diagram



Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. Base

5. Max Absolute rated Value (Normal Temperature=25℃)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	60	mA
	Junction Temperature	T_J	125	℃
	Reverse Voltage	V_R	6	V
	Power dissipation (T A = 25°C)	P_D	100	mW
	Derating factor (above 100°C)		3.8	mW/°C
Output	Collector-emitter Voltage	V_{CEO}	80	V
	Collector-Base voltage	V_{CBO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
	Emitter-Base voltage	V_{EBO}	7	V
	Collector Current	I_C	100	mA
	Power dissipation (T A = 25°C)	P_C	300	mW
	Derating factor (above 100°C)		9.0	mW/°C
Total Consume Power		P_{tot}	350	mW
*1 Insulation Voltage		V_{iso}	5000	Vrms
Operation Temperature		T_{opr}	-55 to + 110	℃
Storage Temperature		T_{STG}	-55 to + 125	℃
*2 Soldering Temperature		T_{SOL}	260	℃

*1. AC Test, 1 minute, humidity = 40~60%
Insulation test method as below:
(1) Short circuit both terminals of photocoupler.
(2) No Current when testing insulation voltage.
(3) Adding sine wave voltage when testing

*2. soldering time is 10 seconds.

6. Opto-electronic Characteristics

Parameter			Symbol	Min	Typ.*	Max	Unit	Condition
Input	Forward Voltage		V_F	---	1.2	1.5	V	I_F=10mA
	Reverse Current		I_R	---	---	10	μA	V_R=6V
	Collector capacitance		C_{in}	---	30	---	pF	V=0, f=1MHz
Output	Collector-Base dark current		I_{CBO}	---	---	20	nA	V_{CB}=10V
	Collector to emitter Current	4N2X	I_{CEO}	---	---	50	nA	V_{CE}=10V, I_F=0mA
		4N3X		---	---	50		V_{CE}= 60V, IF=0mA
	Collector-Emitter attenuation Voltage		BV_{CEO}	80	---	---	V	I_C=1mA
	Collector-Base breakdown voltage		BV_{CBO}	80				I_C=0.1mA
	Emitter-Collector attenuation Voltage		BV_{ECO}	7	---	---	V	I_E=0.1mA
	Emitter-Base breakdown voltage		BV_{EBO}	7				I_E=0.1mA
Transforming Characteristics	Current Transfer ratio	4N35, 4N36,4N37	CTR	100	---	---	%	IF=10mA VCE=10V
		4N25, 4N26,4N38		20	---	---		
		4N27, 4N28		10	---	---		
	Collector and Emitter Saturation Voltage	4N25, 4N26,4N27, 4N28	$V_{CE(sat)}$	---	---	0.5	V	I_F=50mA I_C=2mA
		4N35, 4N36,4N37		---	---	0.3		I_F=10mA, I_C=0.5mA
		4N38		---	---	1.0		I_F=20mA, I_C=4mA
	Isolation resistance		R_{iso}	10^{11}	---	---	Ω	DC500V 40~60%R.H.
	Floating Capacitance		C_f	---	0.2	---	pF	V=0, f=1MHz
	Rise Time		t_r	---	3	10	μs	V_{CC}=10V, I_C=10mA R_L=100Ω
	Fall Time		t_f	---	6	10	μs	

- Current Conversion Ratio = I_C / I_F × 100%

7. Order Information

Part Number

OR-4NXXU-Y-Z

Note

4NXX = Part Number, 4N25,4N26,4N27,4N28,4N35,4N36,4N37 or 4N38.

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

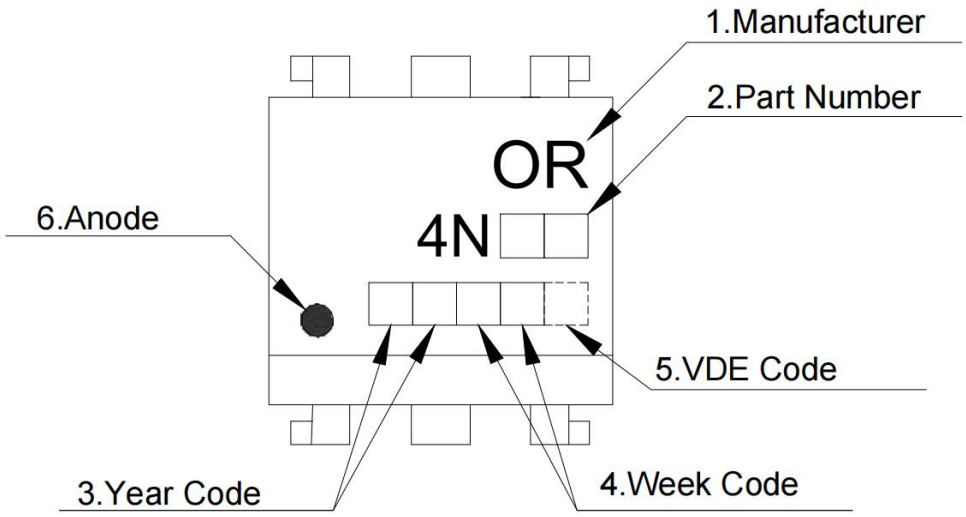
Y = Tape and reel option (TA,TA1 or none).

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

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-6	66 units per tube
M	Wide lead bend (0.4 inch spacing)	66 units per tube
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

8. Naming Rule



1. Manufacturer : ORIENT.

2. Part Number : 4N25,4N26,4N27,4N28,4N35,4N36,4N37 or 4N38.

3. Year Code □□ : '21' means '2021' and so on.

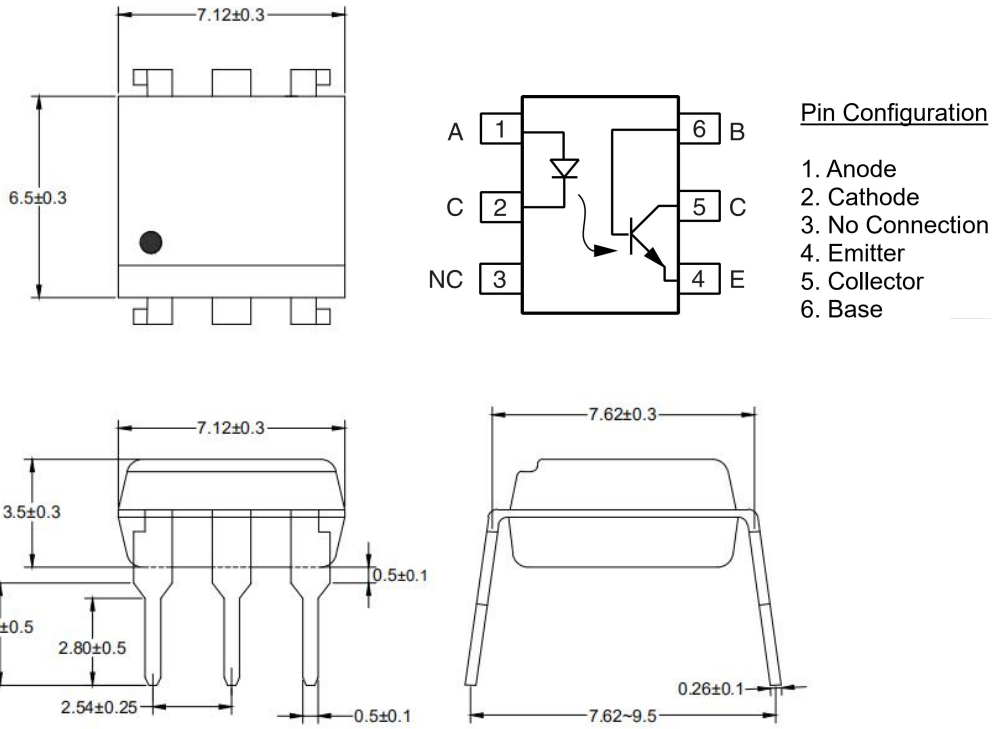
4. Week Code □□ : 01 means the first week, 02 means the second week and so on.

5. VDE Code ⬚ . (Optional)

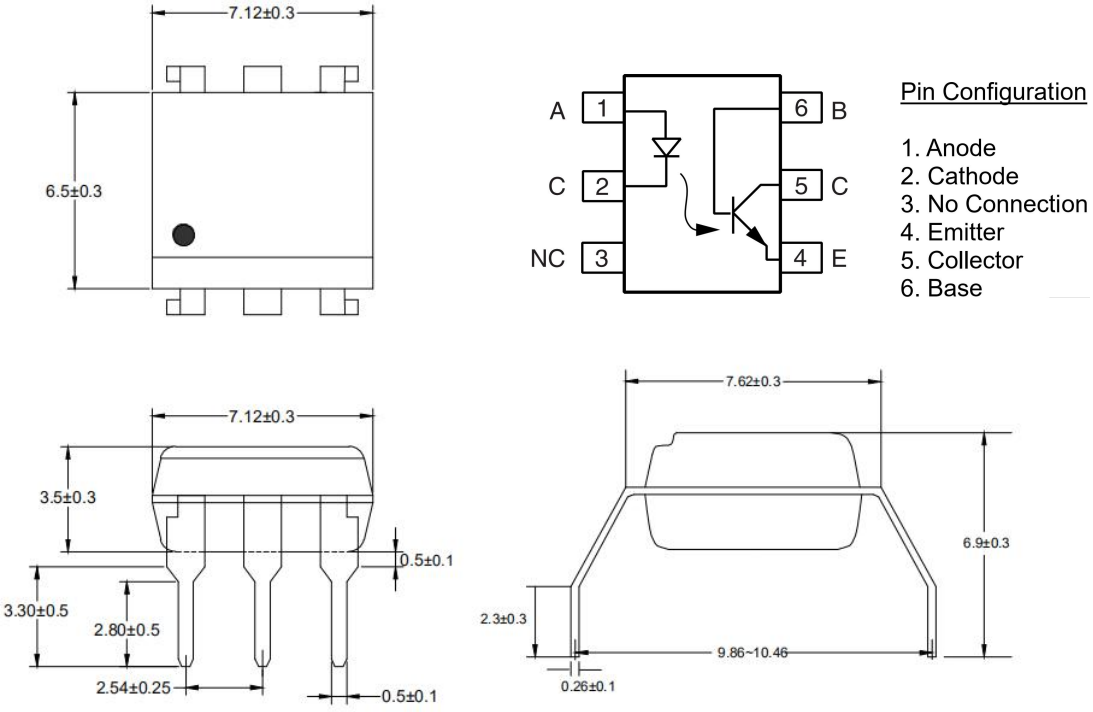
6. Anode.

9. Outer Dimension

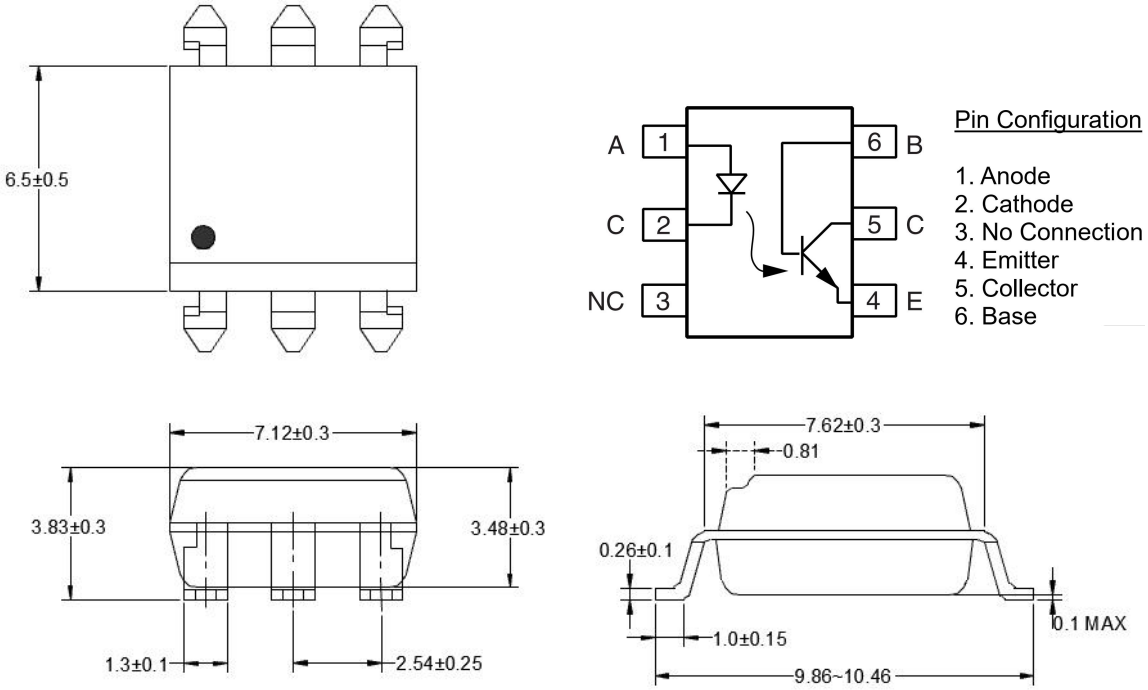
(1) OR-4NXX



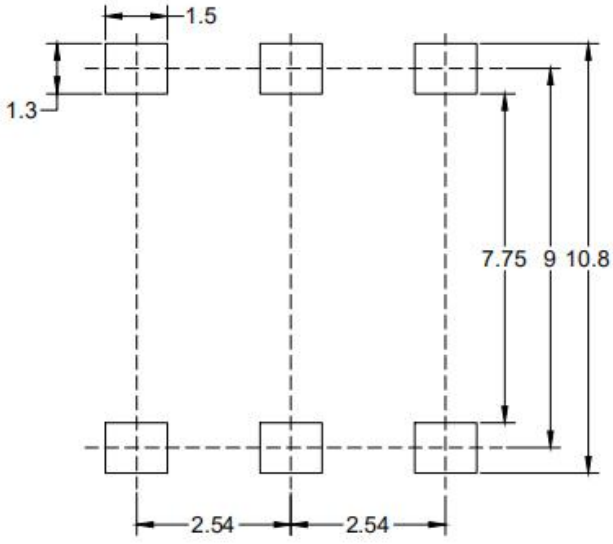
(2) OR-4NXXM



(3) OR-4NXXS



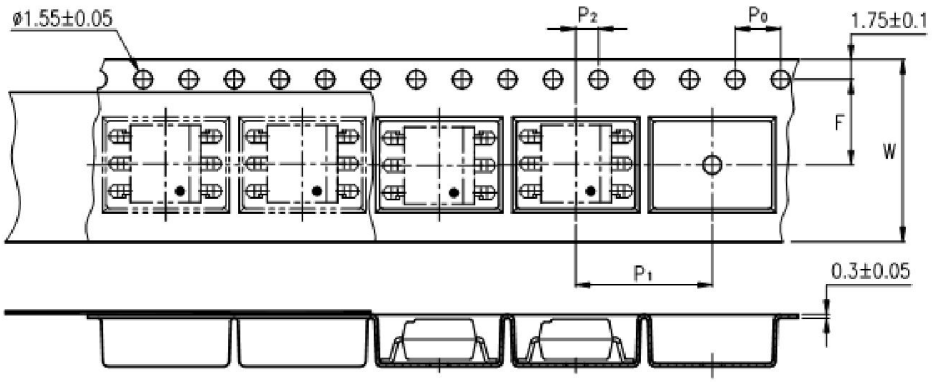
10. Recommended Foot Print Patterns (Mount Pad)



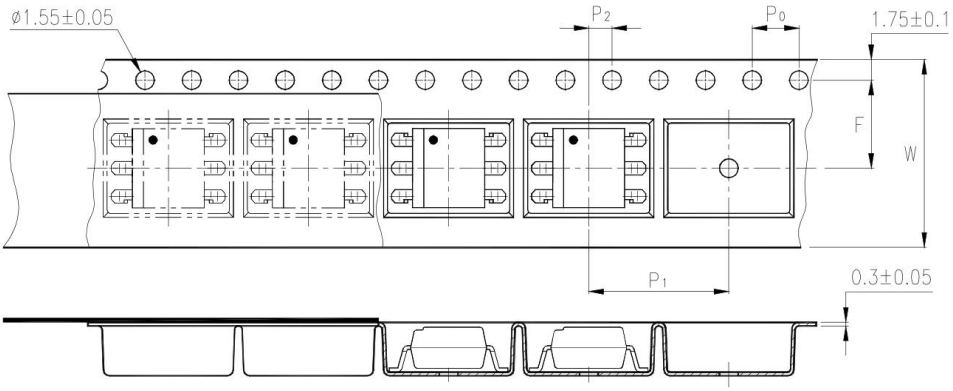
unit：mm

11. Taping Dimensions

(1) OR-4NXXS-TA



(2) OR-4NXXS-TA1



Description	Symbol	Dimension in mm(inch)
Tape wide	W	16±0.3（0.63）
Pitch of sprocket holes	P0	4±0.1（0.15）
Distance of compartment	F	7.5±0.1（0.295）
	P2	2±0.1（0.079）
Distance of compartment to compartment	P1	12±0.1（0.472）

Package Type	TA/TA1
Quantities(pcs)	1000

12. Package Dimension

(1) package dimension

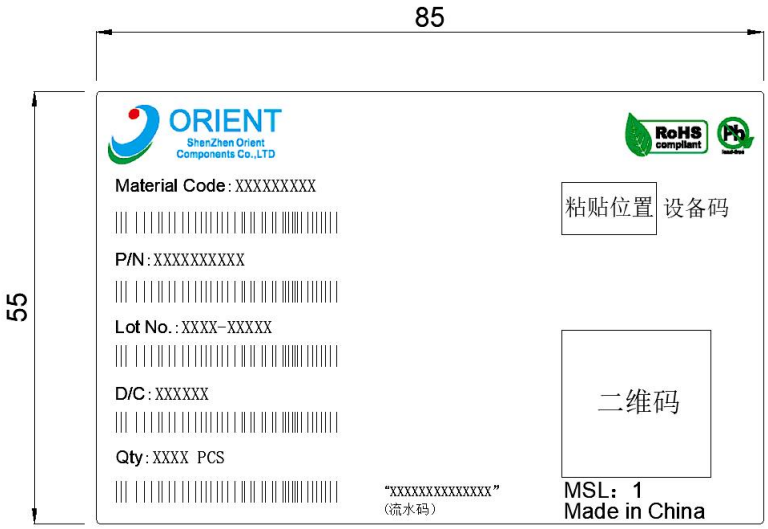
DIP/M type

Packing Information	
Packing type	Tube
Qty per Tube	66pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	3,300pcs
The Amount per Outer Box	33,000pcs

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：

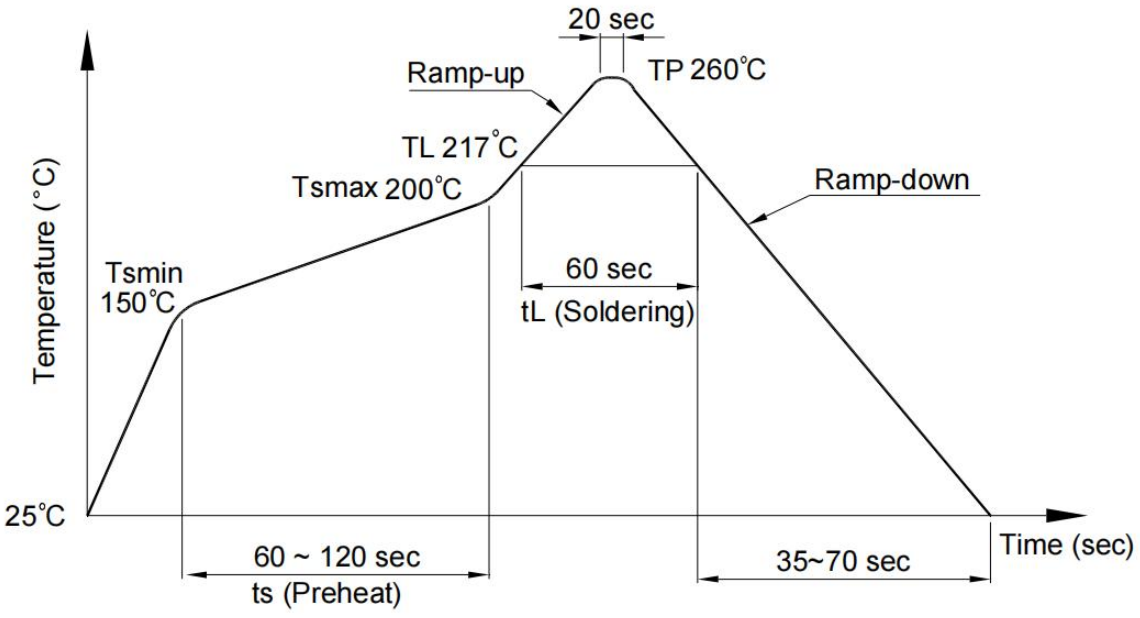
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product weeks.
4. D/C :Product data.
5. Quantity :Packaging quantity.

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.

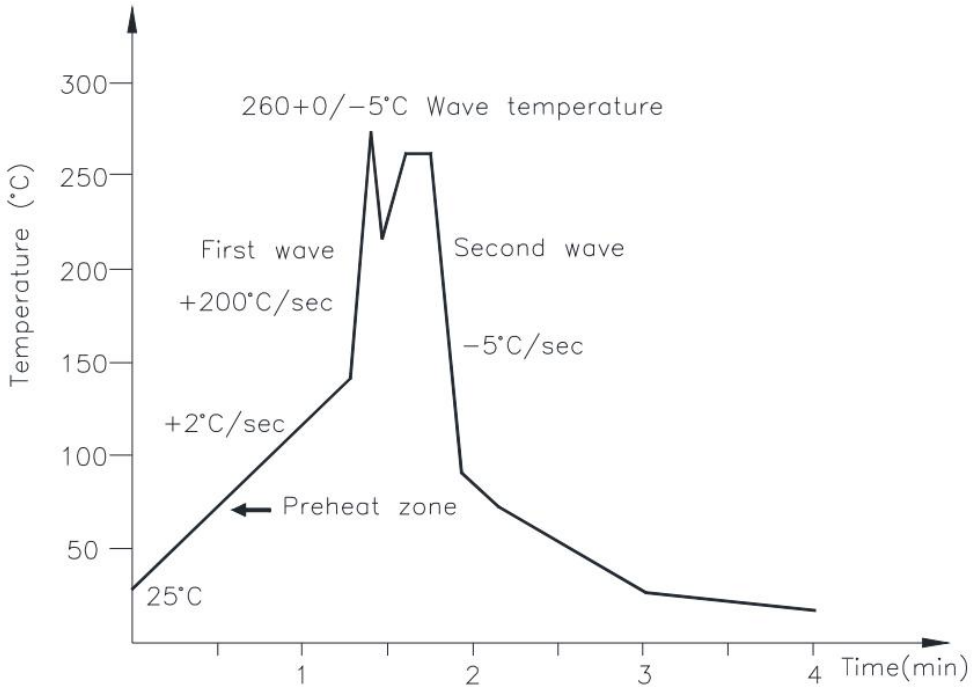
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature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



（2）Wave soldering (JEDEC22 A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature Time	260+0/-5˚C 10 sec
Preheat temperature Preheat time	25 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

14. Characteristics Curves

Fig.1 Forward current vs Ambient temperature

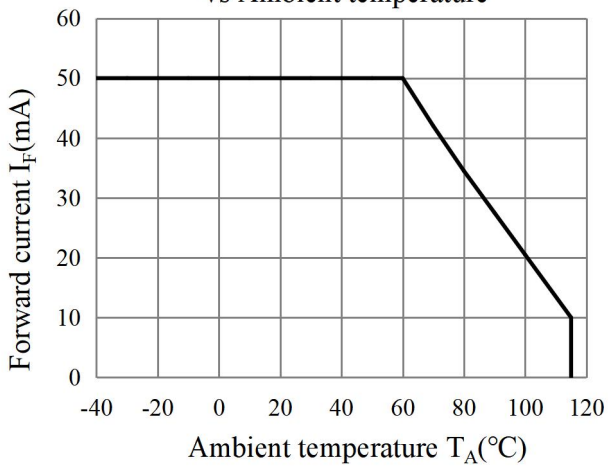


Fig.2 Collector Power Dissipation vs. Ambient temperature

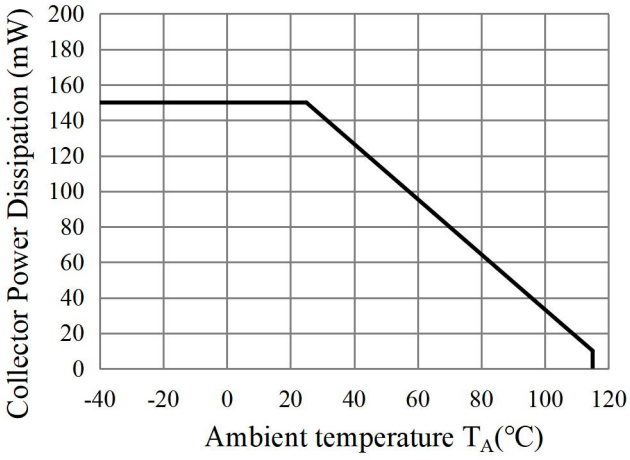


Fig.3 Forward Current vs. Forward Voltage

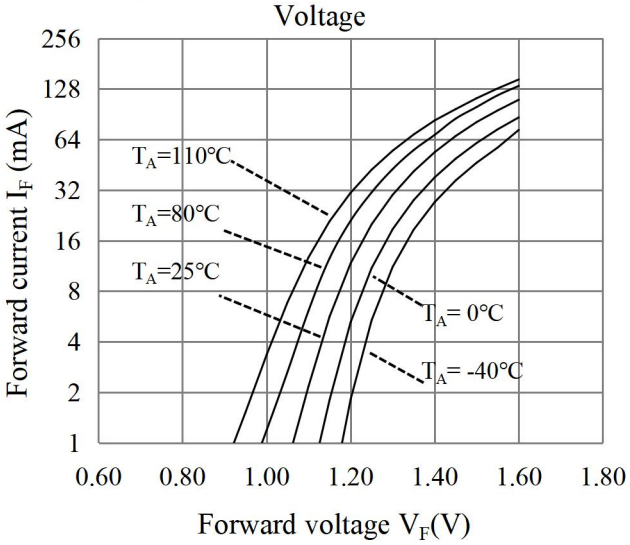


Fig.4 Collector-emitter Saturation Voltage vs. Forward Current

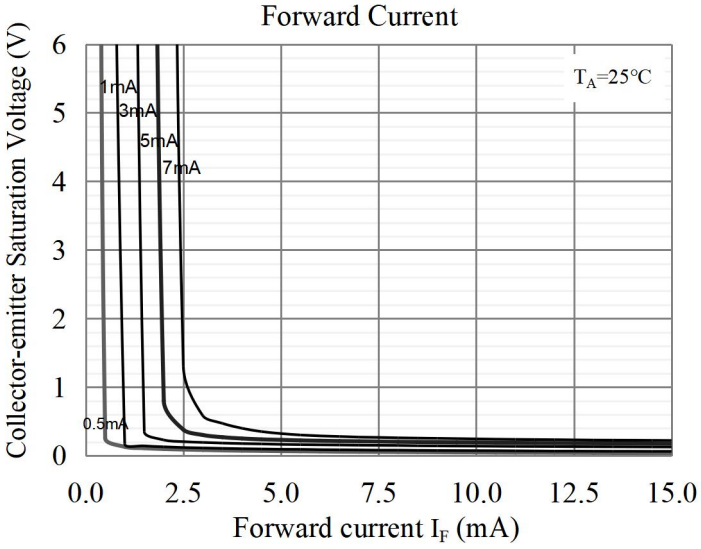


fig.5 Collector Current vs. Non-Saturated Collector Emitter Voltage

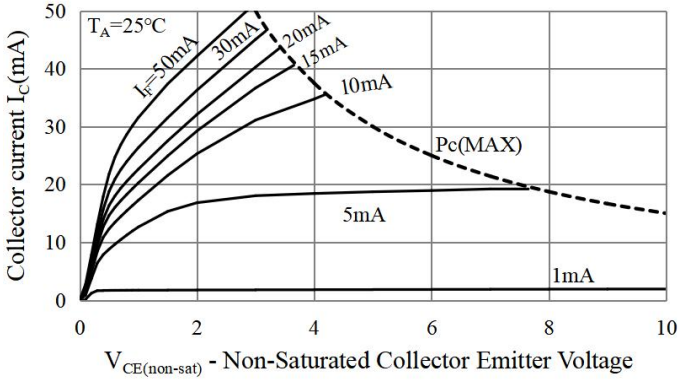


fig.6 Collector Current vs. Non-Saturated Collector Emitter Voltage

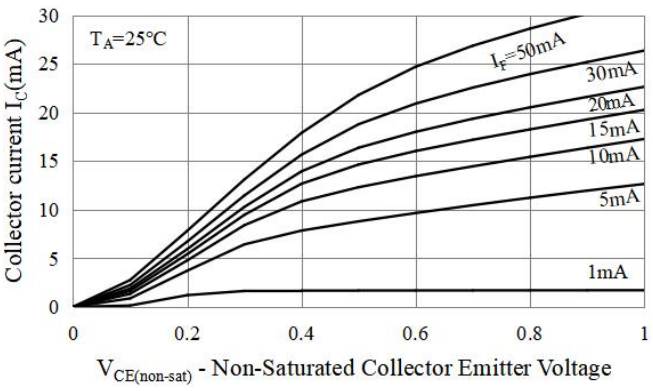


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

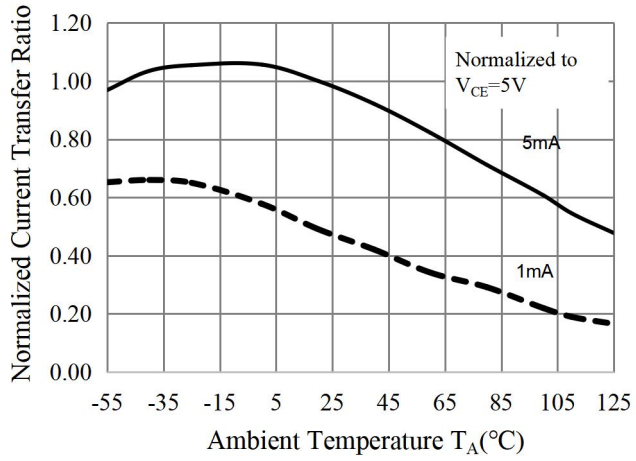


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature

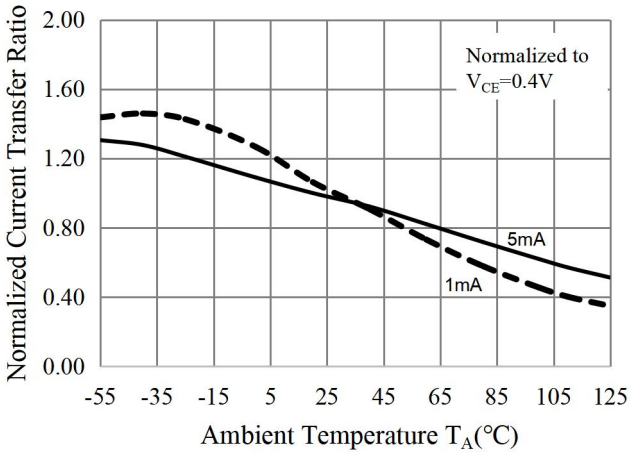


Fig.9 Forward Current vs. Current Transfer Ration

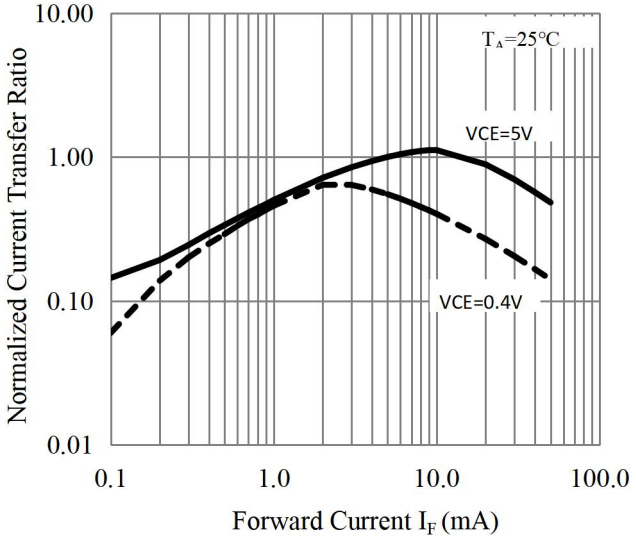


Fig.10 Collector Dark Current vs. Ambient Temperature

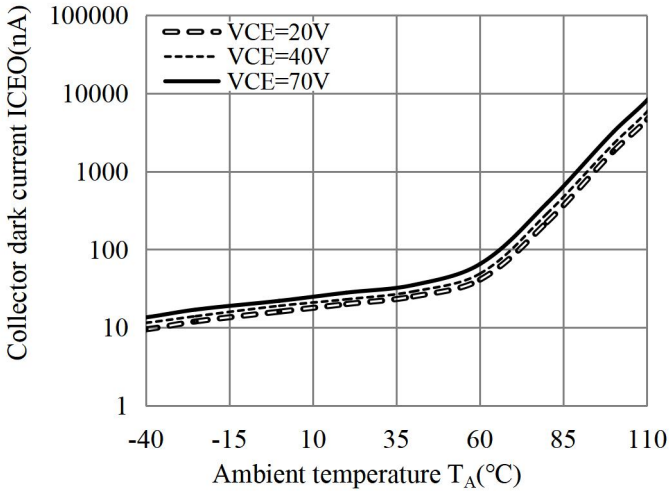


Fig.11 Collector-emitter Saturation Voltage vs. Ambient Temperature

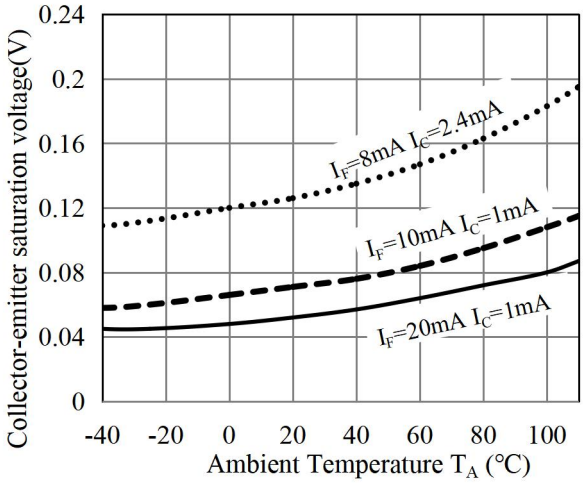


Fig.12 Switching Time vs. Load Resistance

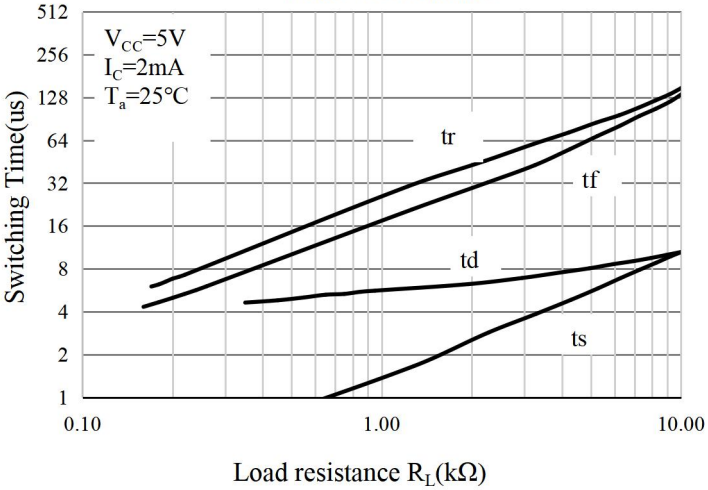


Fig.13 Respinse Time vs. Ambient temperature

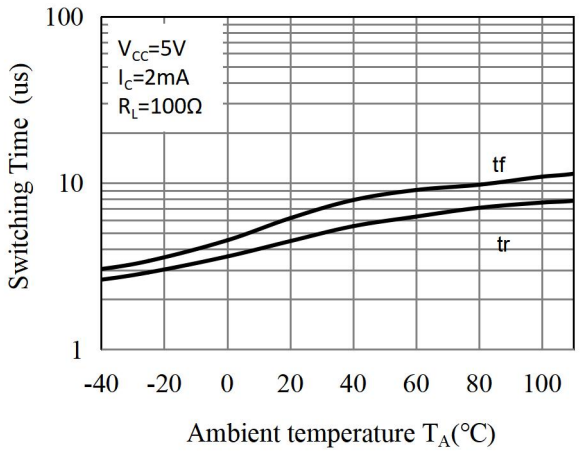
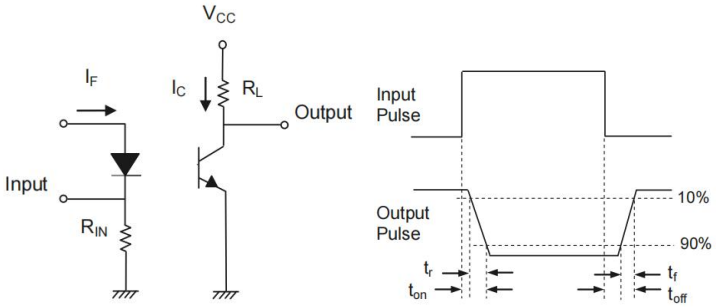


Fig.14 Switching Time Test Circuit & Waveforms



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.