



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-4N2X_OR-4N3X

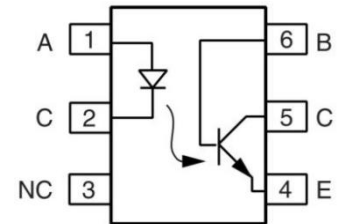
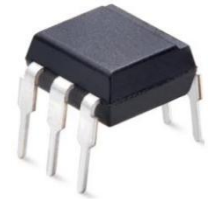
Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

1. Features

- 4N2X series: 4N25, 4N26, 4N27, 4N28
- 4N3X series: 4N35, 4N36, 4N37, 4N38
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to +115°C
- Compact dual-in-line package
- Pb free and RoHS compliant.



Pin Configuration

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

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

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

4. Max Absolute rated Value (Normal Temperature=25°C)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	60	mA
	Junction Temperature	T_J	125	°C
	Reverse Voltage	V_R	6	V
	Power dissipation (T A = 25°C) Derating factor (above 100°C)	P_D	100 3.8	mW mW/°C
Output	Collector-emitter Voltage	V_{CEO}	80	V
	Collector-Base voltage	V_{CBO}	80	
	Emitter-Collector voltage	V_{ECO}	7	
	Emitter-Base voltage	V_{EBO}	7	
	Power dissipation (T A = 25°C) Derating factor (above 100°C)	P_C	150 9.0	mW mW/°C
Total Consume Power		P_{tot}	200	mW
*1 Insulation Voltage		V_{iso}	5000	Vrms
Working Temperature		T_{opr}	-55 to + 115	°C
Deposit Temperature		T_{STG}	-55 to + 150	
*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.

5. Opto-electronic Characteristics

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit		
Input	Forward Current	V_F	$I_F=10mA$	---	1.2	15	V		
	Reverse Voltage	I_R	$V_R=6V$	---	---	10	μA		
	Collector capacitance	C_{in}	$V=0, f=1MHz$	---	30	---	pF		
Output	Collector-Base dark current	I_{CBO}	$V_{CB}=10V$	---	---	20	nA		
	Collector to emitter Current	4N2X	I_{CEO}	$V_{CE}=10V, I_F=0mA$	---	---	50	nA	
		4N3X			$V_{CE}=60V, I_F=0mA$	---	---		50
	Collector-Emitter attenuation Voltage	BV_{CEO}	$I_C=1mA$	80	---	---	V		
	Collector-Base breakdown voltage	BV_{CBO}	$I_C=0.1mA$	80					
	Emitter-Collector attenuation Voltage	BV_{ECO}	$I_E=0.1mA$	7	---	---	V		
	Emitter-Base breakdown voltage	BV_{EBO}	$I_E=0.1mA$	7					
Transforming Characteristics	Current Transfer ratio	4N35, 4N36,4N37	CTR	$I_F=10mA, V_{CE}=10V$	100	---	---	%	
		4N25, 4N26,4N38			20	---	---		
		4N27, 4N28			10	---	---		
	Collector and Emitter Saturation Voltage	4N25, 4N26,4N27, 4N28	$V_{CE(sat)}$	$I_F=50mA, I_C=2mA$	---	---	0.5	V	
		4N35, 4N36,4N37			$I_F=100mA, I_C=0.5mA$	---	---		0.3
		4N38			$I_F=200mA, I_C=4mA$	---	---		1.0
	Isolation resistance	R_{iso}	DC500V 40~60%R.H.	10^{11}	---	---	Ω		
	Floating Capacitance	C_f	$V=0, f=1MHz$	---	0.2	---	pF		
	Response Time	t_r	$V_{CC}=10V, I_C=10mA, R_L=100\Omega$	---	3	10	μs		
	Descend Time	t_f		---	6	10	μs		

● Current Conversion Ratio = $I_C / I_F \times 100\%$



6. Order Information

Part Number

OR-4NXX-Y-Z

Note

XX = Part Number for 4NXX series(25,26,27,28,35,36,37 or 38).

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

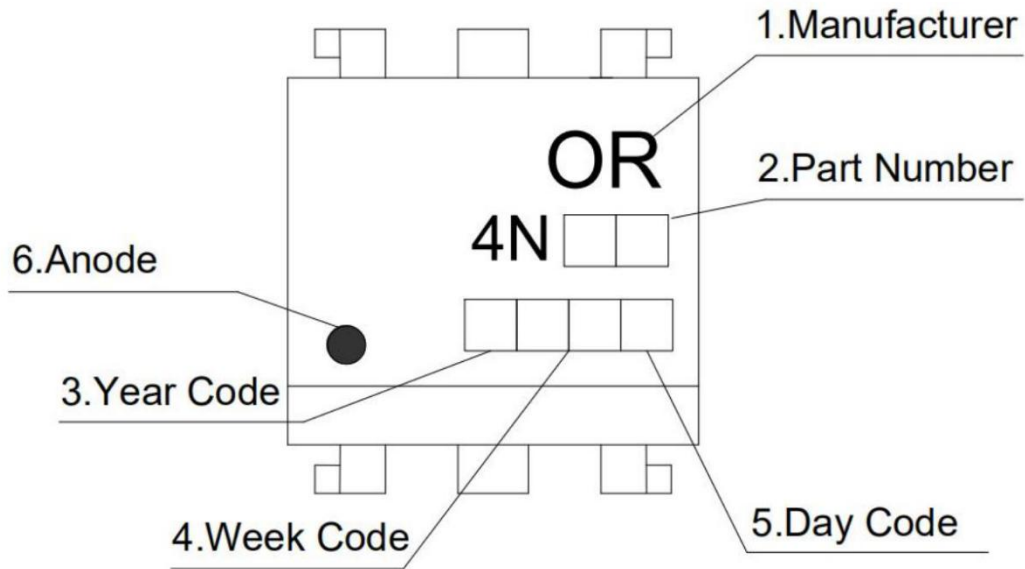
Z = Tape and reel option (TA,TA1 or none).

* Halogen Free can be selected.

* 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

7. Naming Rule



1. ORIENT.

2. 4NXX denotes Device Part Number.

3. denotes Year code.

4. denotes Week code.

5. denotes Day code.

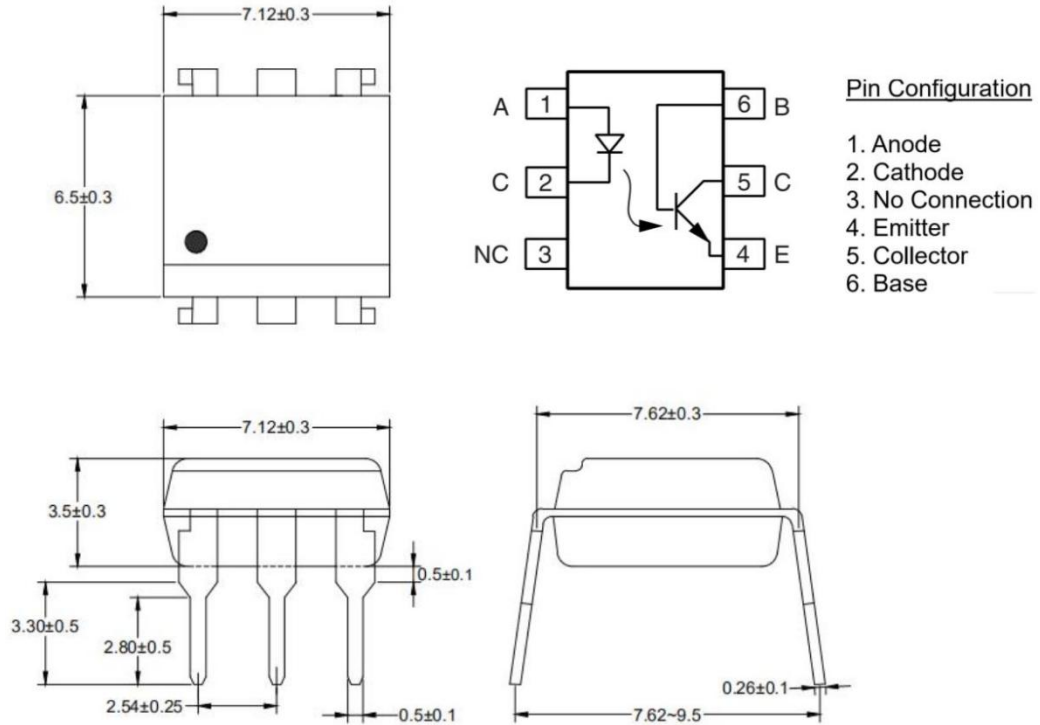
6. Anode.

* If the photo coupler is Free from Halogen, there will be a ' G ' mark in the upper left corner.

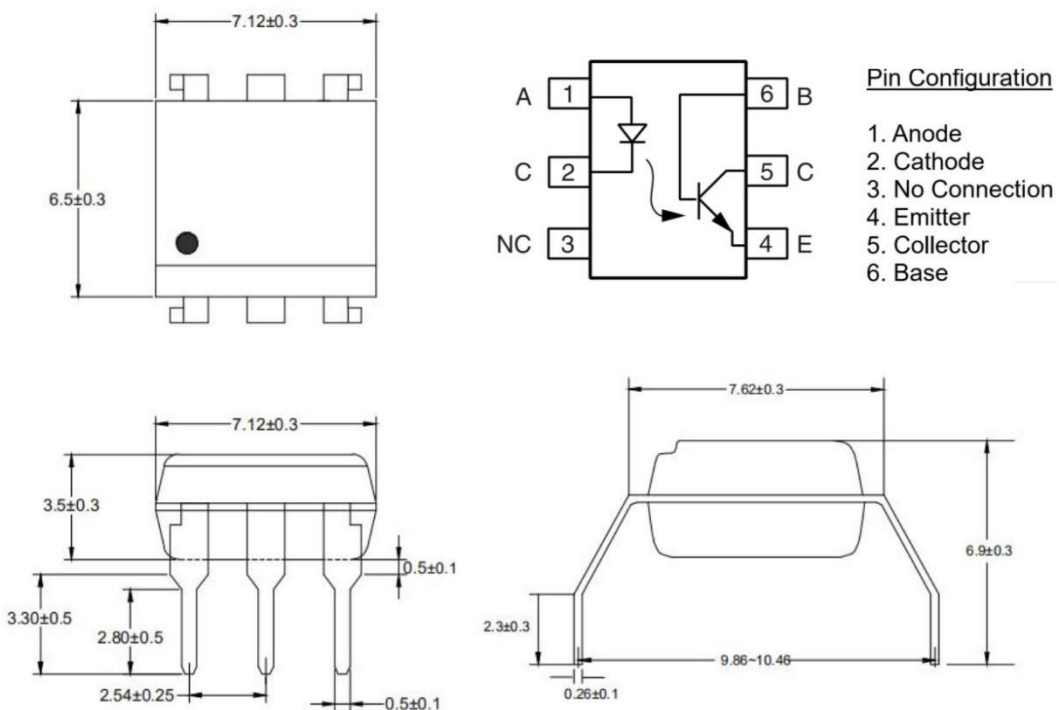
* VDE Code can be selected.

8. Outer Dimension

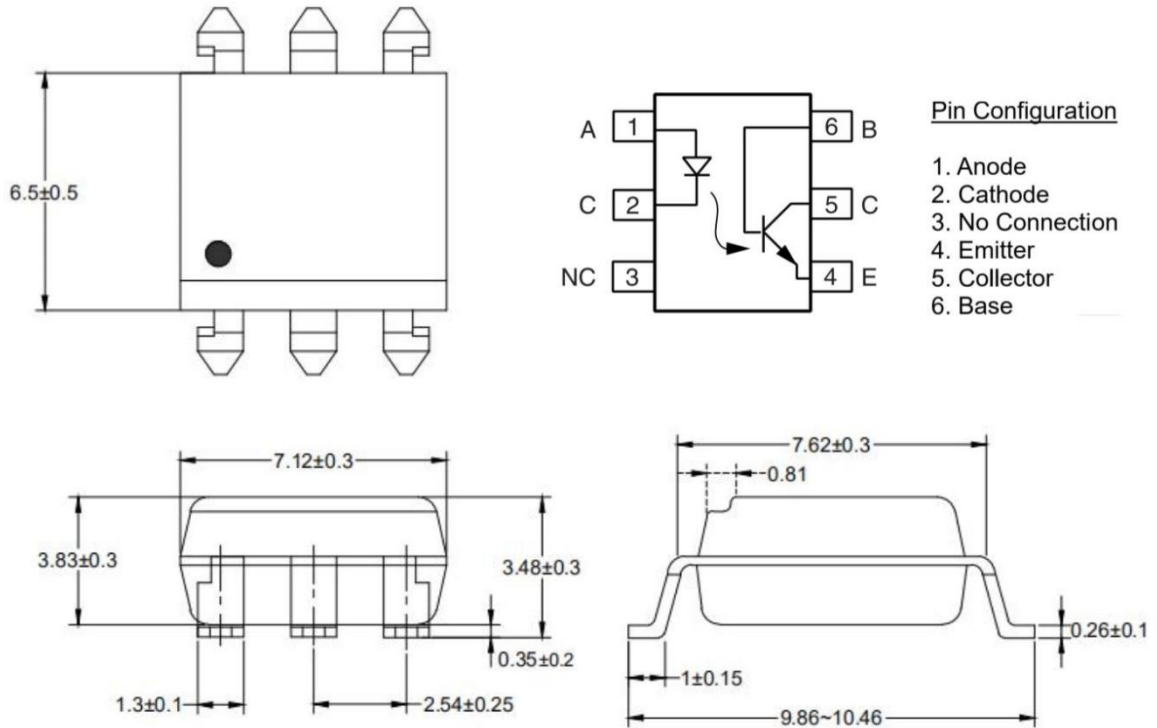
(1) OR-4NXX



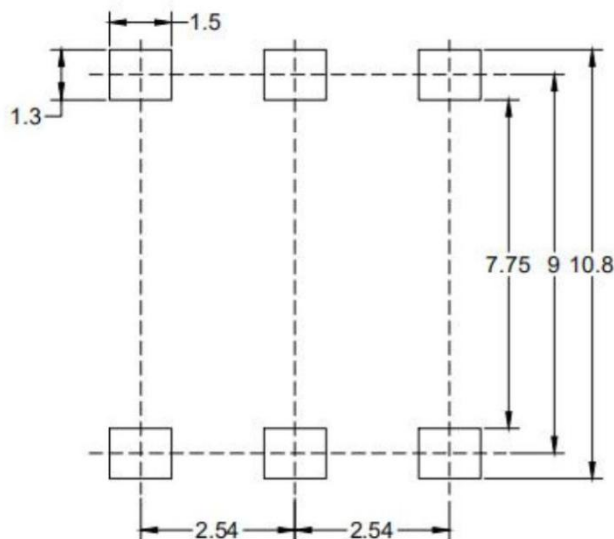
(2) OR-4NXXM



(3) OR-4NXXS



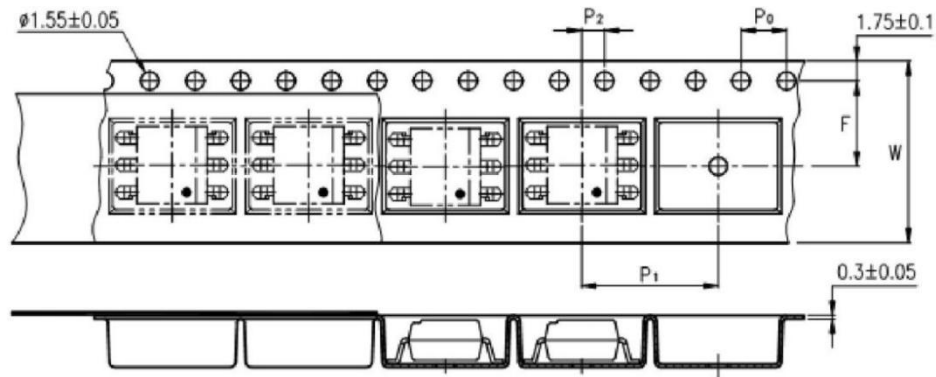
9. Recommended Foot Print Patterns (Mount Pad)



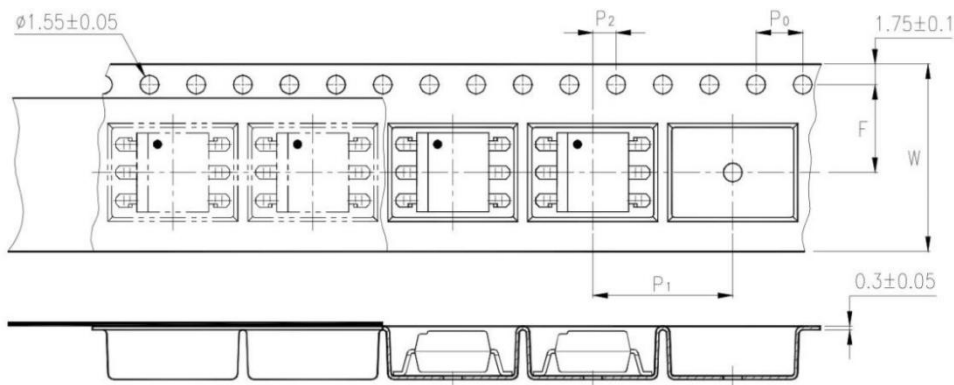
unit: mm

10. 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	TATA1
Quantities(pcs)	1000

11. Package Dimension

(1) package dimension

DIP/M type

Packing Information	
Packing type	Tube(Plug)
Qty per Tube	66
Small box (inner) Dimenaion	525*132*60mm
Max qty per small box	3300
Large box (Outer) Dimenaion	530*290*335mm
Max qty per large box	26400

SOP type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1000
Small box (inner) Dimenaion	345*345*60mm
Max qty per small box	2000
Large box (Outer) Dimenaion	620x360x360mm
Max qty per large box	20000

(2)Packing Label Sample



- 1.MTL NO:Contents with "Order Information" in the specification.
- 2.LOT NO:The production cycle of the product.
- 3.BATCH:The CTR RANK of the product.
- 4.Quantity:Product packaging quantity.
5. Product Data: The data when product be made.

12. Reliability Test

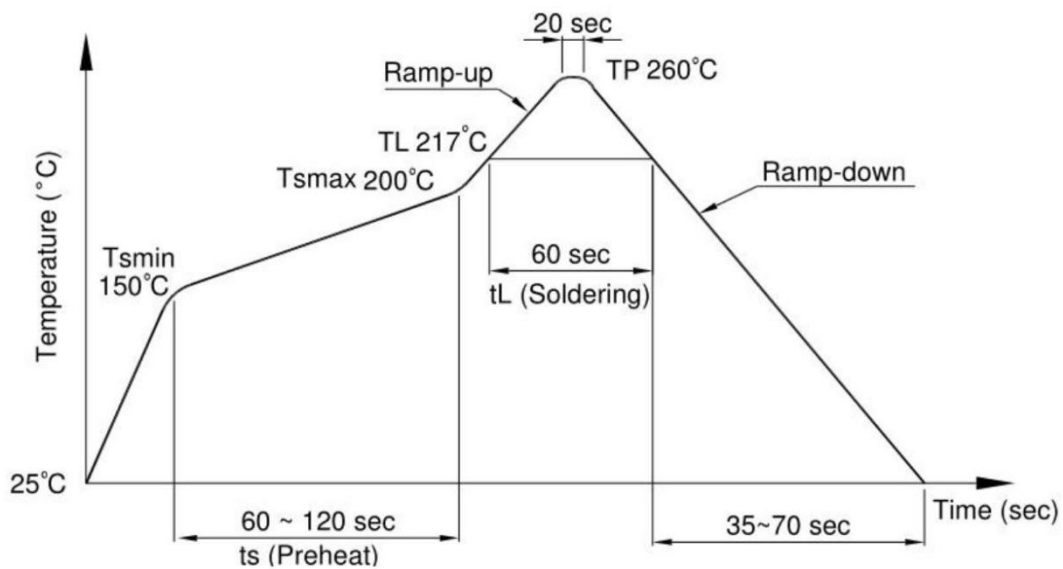
N0.	Item	Condition	Quantity	Cycle	Reference Standards
1	RSH, Resistance to Solder Heat	260±5°C, 10s/cycle	22	3cycles	JESC22A-106
2	SD, Solderability	260±5°C, 2-3s/cycle	22	1cycle	JESD22-B102
3	TC, Temperature Cycle	H: 125°C 15min ∫ 5min L: -55°C 15min	77	300cycles	JESC22A-104
4	TS, Thermal Shock	H:100°C 5min ∫ 15s L:-10°C 5min	77	300cycles	JESC22A-106
5	LTSL, Low Temperature Storage	T:-55°C	77	1000h	JESD22-A119
6	HTSL, High Temperature Storage	T:125°C	77	1000h	JESC22A-103
7	THB, High Temperature High Humidity	T:85°C RH: 85%	77	1000h	JESC22A-101
8	HTOL DC Operating Life	T: 110°C IF=10mA VCC=5V	77	1000h	MIL-STD-750 Method 1037
9	ESD-HBM Human Body Model ESD	Ta=25° C, Reference JESD22-A114	6	1cycle	JESD22-A114

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.

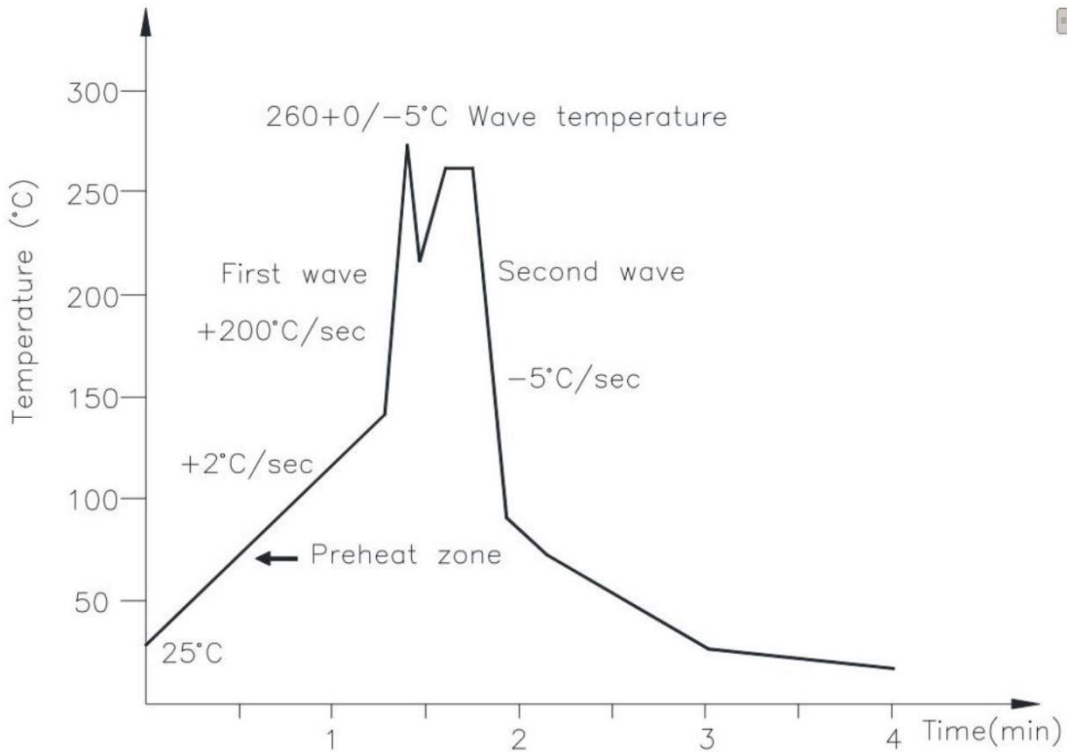
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Ramp-up rate	3°C / sec max.
3°C / sec max.	3~6°C / sec



(2) 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 Curve

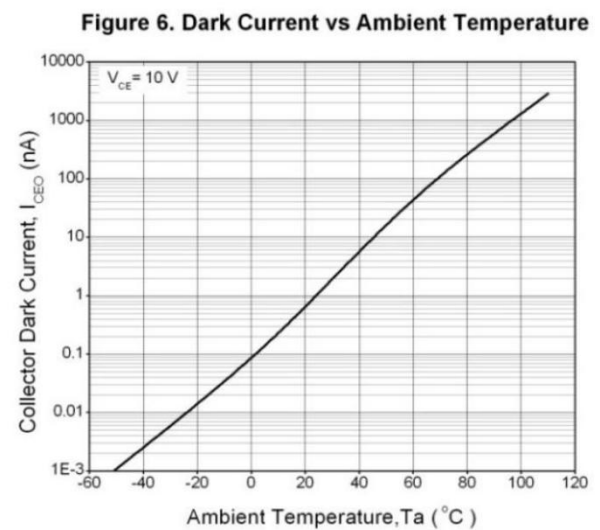
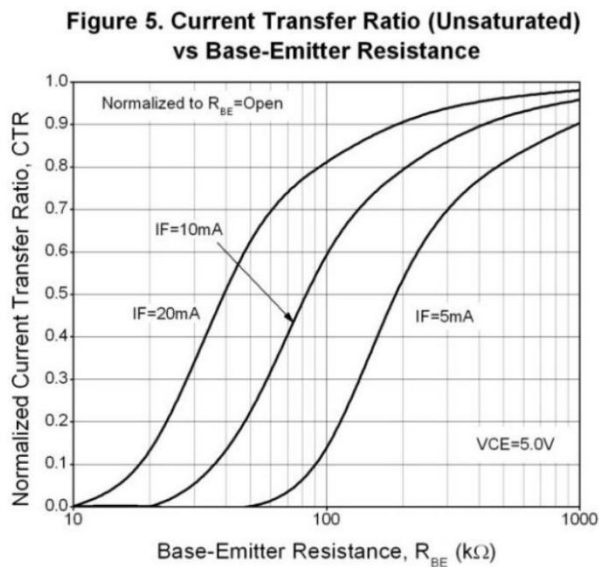
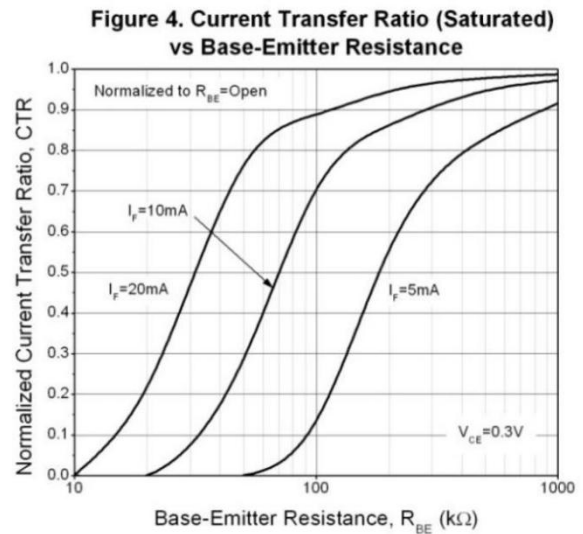
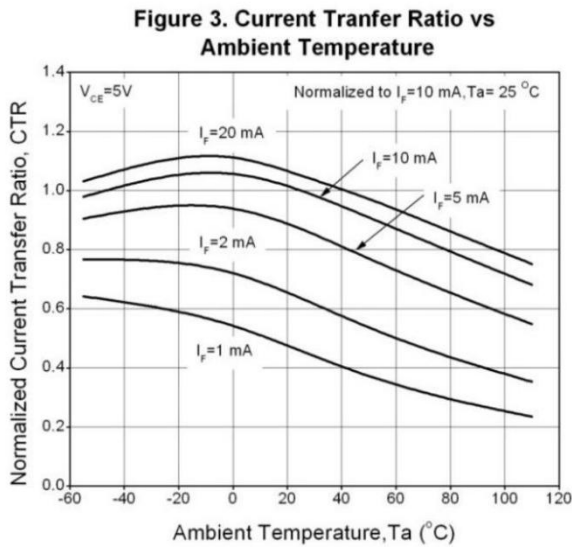
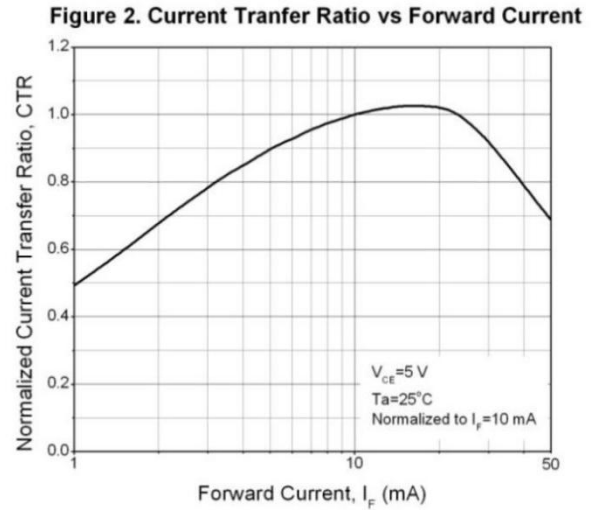
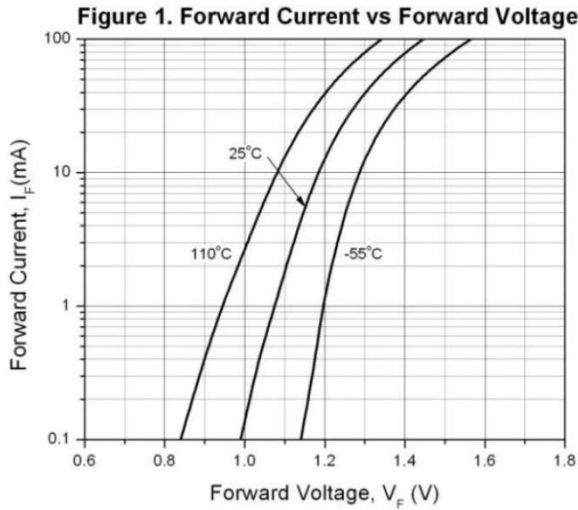


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

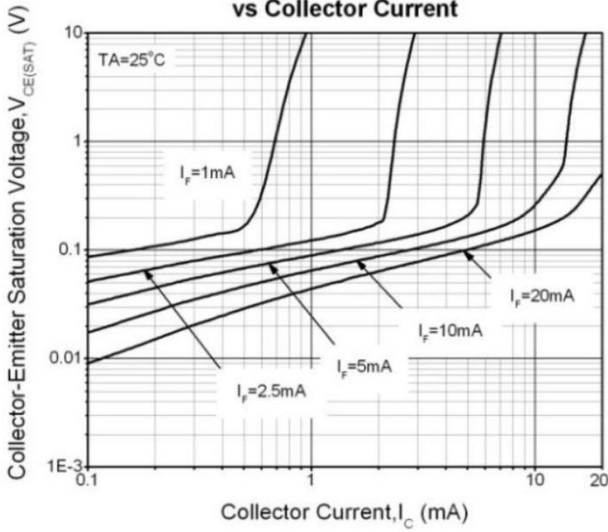


Figure 8. Switching Time vs Load Resistance

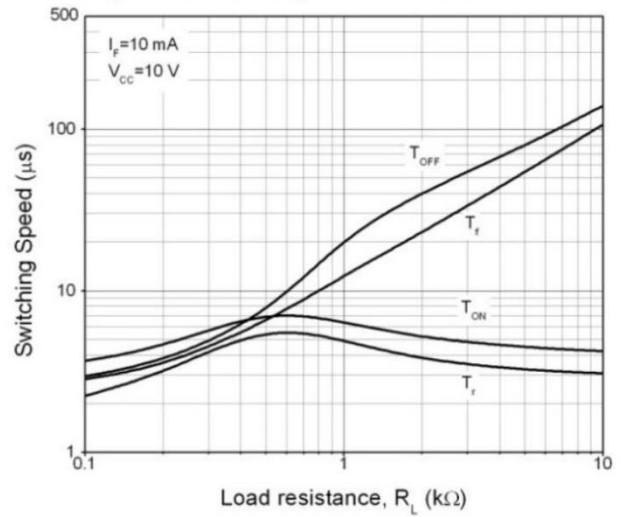


Figure 9. Turn-on Time vs Base-Emitter Resistance

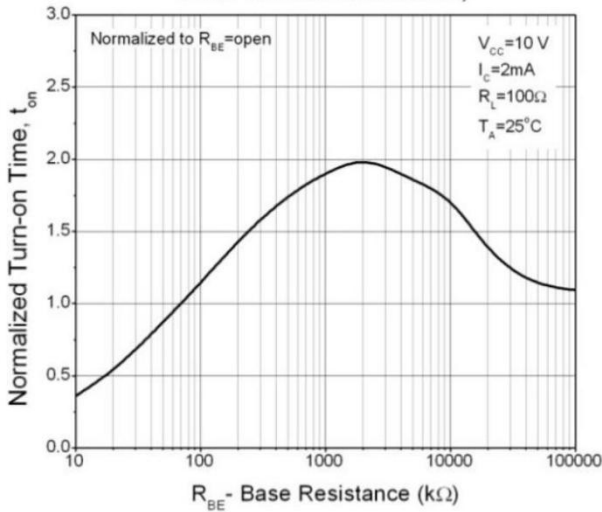


Figure 10. Turn-off Time vs Base-Emitter Resistance

