ORIENT

Photo coupler Product

Data Sheet

MPN: OR-357 series of GK

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) Current transfer ratio(CTR : MIN. 50% at IF = 5mA, VCE = 5V, Ta=25℃)

(2) High input -output isolation voltage （VISO=3,750Vrms）

(3) High collector-emitter voltage （VCEO = 80V）

(4) SOP-4 package

(5) Operating Temperature -55 ℃ to 125 ℃

(6) ESD pass HBM 8000V/MM 2000V

(7) Safety approval

UL approved(No.E323844)

VDE approved(No.40029733)

CQC approved (No.CQC19001231256)

(8) In compliance with RoHS, REACH standards

(9) MSL Class I

2. Instructions

- The OR-357-(GK) series device consists of an infrared led, photo transistor detector. They are encapsulated in a 4 pin SOP encapsulation.
- Pin pitch of OR-357-(GK) is 2.54mm

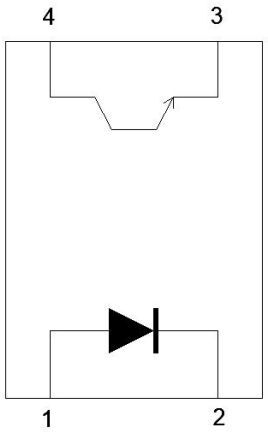
3. Application Range

(1) Hybrid substrates that require high density mounting.

(2) Programmable controllers

(3) System appliance, measuring instruments

4. Functional Diagram



pin No. and Internal connection diagram

1 Anode
2 Cathode
3 Emitter
4 Collector

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

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	50	mA
	Junction Temperature	T_J	125	℃
	Reverse Voltage	V_R	6	V
	Consume Power	P	70	mW
Output	Collector and emitter Voltage	V_{CEO}	80	V
	Emitter and collector Voltage	V_{ECO}	7	
	Collector Current	I_C	50	mA
	Consume Power	P_C	150	mW
Total Consume Power		P_{tot}	200	mW
*1 Insulation Voltage		V_{iso}	3750	Vrms
Operation Temperature		T_{opr}	-55 to + 125	℃
Storage 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 photo coupler.
(2) No Current when testing insulationvoltage.
(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	1.4	V	I_F=20mA
	Reverse Current	I_R	---	---	5	μA	V_R=5V
	Collector capacitance	C_t	---	30	250	pF	V=0, f=1KHz
Output	Collector to emitter Current	I_{CEO}	---	---	100	nA	V_{CE}=20V, I_F=0mA
	Collector-Emitter Breakdown Voltage	BV_{CEO}	80	---	---	V	I_C=0.1mA I_F=0mA
	Emitter-Collector Breakdown Voltage	BV_{ECO}	7	---	---	V	I_E=0.1mA I_F=0mA
Transforming Characteristics	*1.Current conversion ratio	CTR	50	---	600	%	I_F=5mA V_{CE}=5V
	Collector Current	I_C	2.5	---	30	mA	
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	---	---	0.2	V	I_F=20mA I_C= 1mA
	Insulation Impedance	R_{iso}	5×10^{10}	1×10^{11}	---	Ω	DC500V 40~60%R.H.
	Floating Capacitance	C_f	---	0.6	1	pF	V=0, f=1MHz
	Rise Time	t_r	---	2.9	10	μs	V_{CC}=2V, I_C=2mA , R_L=100Ω
	Fall Time	t_f	---	4.5	10	μs	

- Current Conversion Ratio = I_C / I_F × 100%

7. Rank table of current transfer ratio CTR

CTR BIN	Min (%)	Max (%)	Condition
A	80	160	V_{CE} = 5V /I_F = 5mA, Ta=25℃
	40	100	V_{CE} = 5V /I_F = 1mA, Ta=25℃
B	130	260	V_{CE} = 5V /I_F = 5mA, Ta=25℃
	50	150	V_{CE} = 5V /I_F = 1mA, Ta=25℃
C	200	400	V_{CE} = 5V /I_F = 5mA, Ta=25℃
	80	300	V_{CE} = 5V /I_F = 1mA, Ta=25℃
D	300	600	V_{CE} = 5V /I_F = 5mA, Ta=25℃
	120	400	V_{CE} = 5V /I_F = 1mA, Ta=25℃

8. Order Information

Part Number

OR-357X-W-Y-Z-(GK)

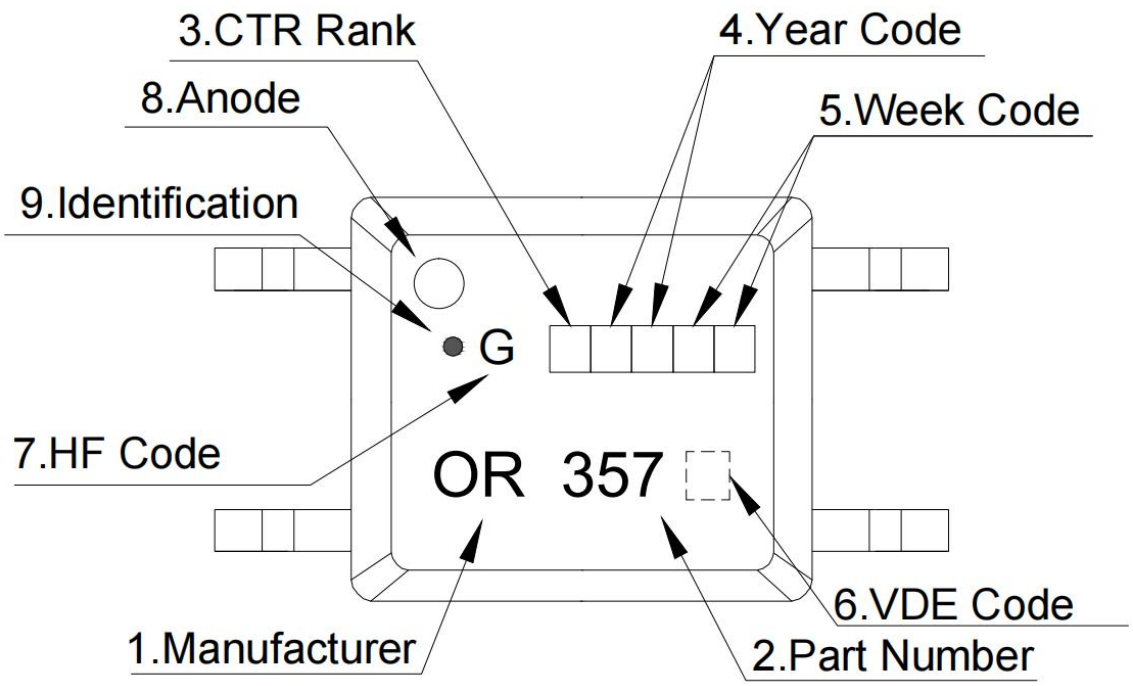
Note

X = CTR Rank (A, B, C, D or none)
W = Tape and reel option (TP or TP1).
Y = 'V' code for VDE safety (This options is not necessary).
Z = 'G' code for Halogen free .
GK = Field Code.

* VDE Code can be selected.

Option	Description	Packing quantity
TP	Surface mount lead form (low profile) + TP tape & reel option	3000 units per reel
TP1	Surface mount lead form (low profile) + TP1 tape & reel option	3000 units per reel

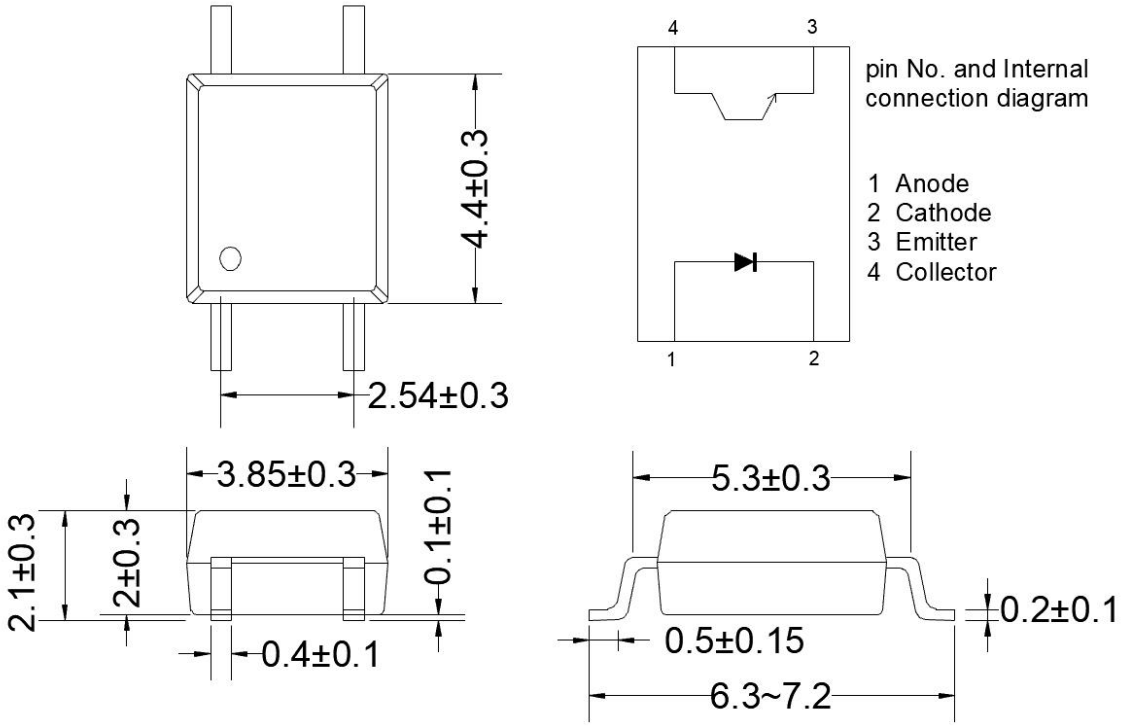
9. Naming Rule



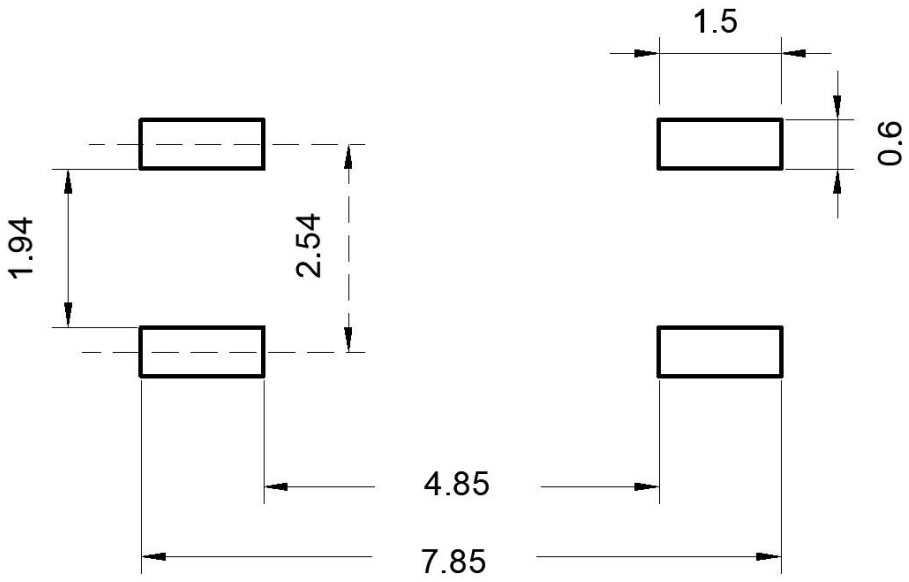
1. Manufacturer : ORIENT.
2. Part Number : 357.
3. Rank Code □: CTR Rank
4. Year Code □□ : '0' means '2020' and so on.
5. Week Code □□: 01 means the first week, 02 means the second week and so on.
6. VDE Code ⬚. (Optional)
7. HF Code 'G': Halogen Free.
8. Anode.
9. Identification.

* VDE Code can be selected.

10. Outer Dimension



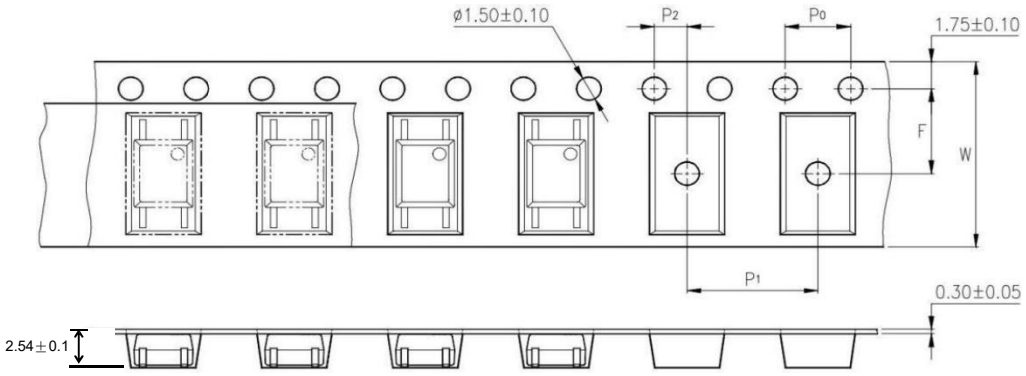
11. Recommended Foot Print Patterns (Mount Pad)



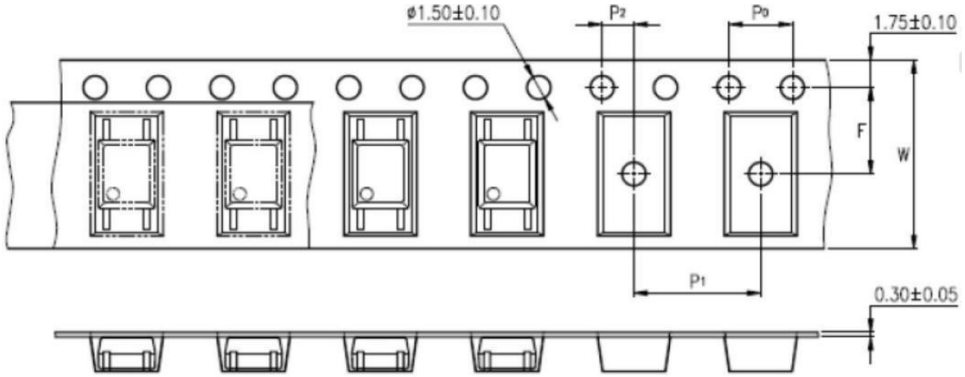
unit：mm

12. Taping Dimensions

(1) OR-357-TP



(2) OR-357-TP1



Description	Symbol	Dimension in mm(inch)
Tape wide	W	12±0.3 (0.472)
Pitch of sprocket holes	P0	4±0.1 (0.157)
Distance of compartment	F	5.5±0.1 (0.217)
	P2	2±0.1 (0.079)
Distance of compartment to compartment	P1	8±0.1 (0.315)

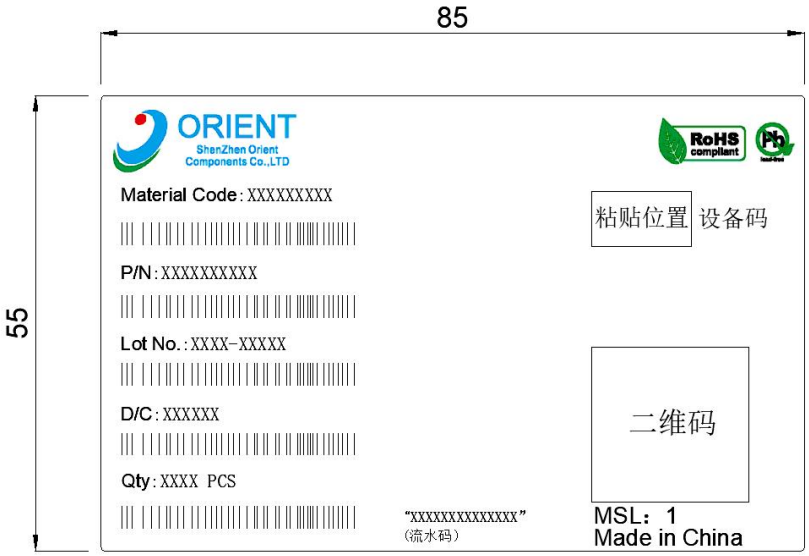
Package Type	TP/TP1
Quantities(pcs)	3000

13. Package Dimension

(1) package dimension

Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	3,000pcs
Small box (inner) Dimension	345*345*45mm
Large box (Outer) Dimension	480x360x360mm
Max qty per small box	6,000pcs
Max qty per large box	60,000pcs

(2)Packing Label Sample



Note：

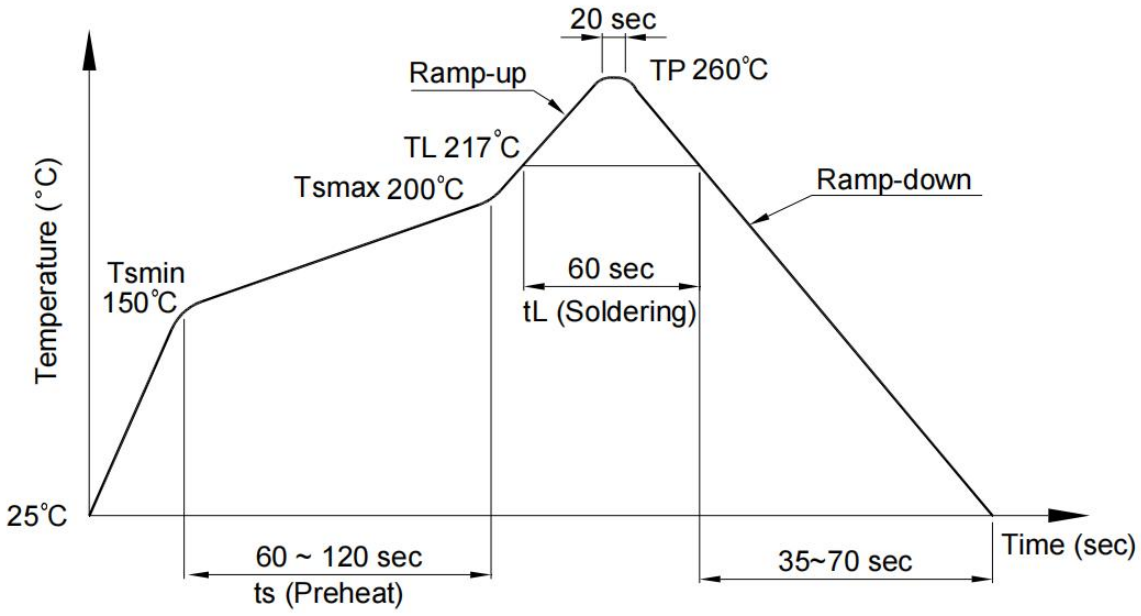
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product weeks.
4. D/C :Product data.
5. Quantity :Packaging quantity.

14. Temperature Profile Of Soldering

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

One time soldering reflow is recommended within the condition of temperature and time profile shown below.
Do not solder more than three times.

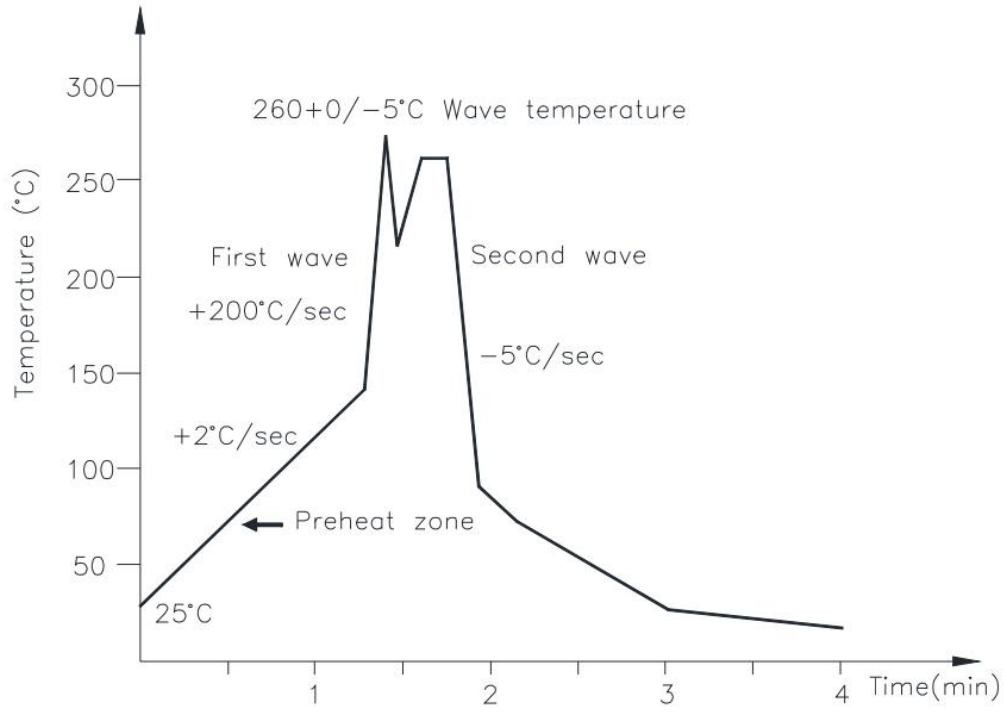
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature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



（2） Wave soldering (JEDEC22 A111 compliant)

One time soldering is recommended within the condition of temperature.

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

15. Characteristics Curve

Fig.1 Forward current vs Ambient temperature

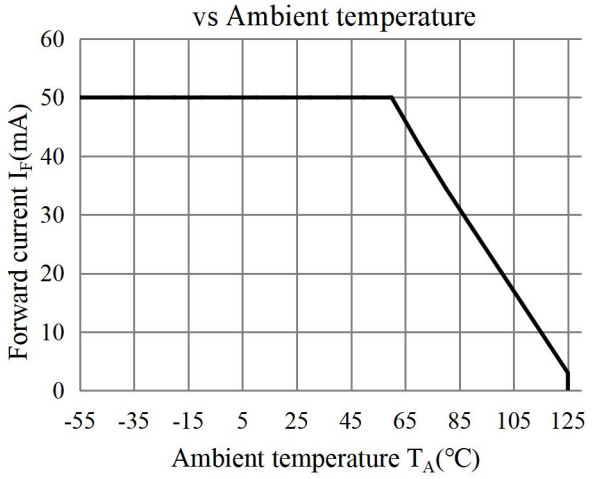


Fig.2 Collector Power Dissipation vs. Ambient temperature

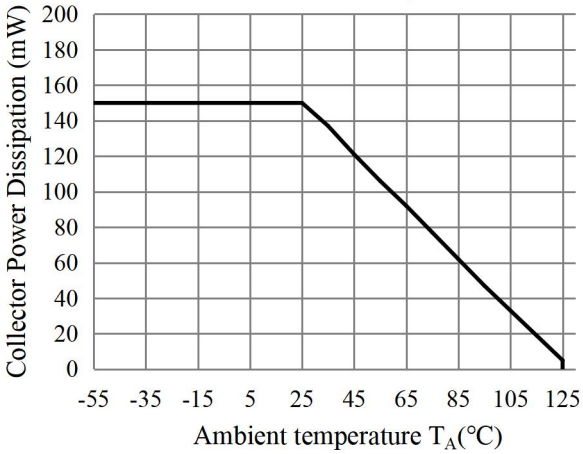


Fig.3 Forward Current vs. Forward Voltage

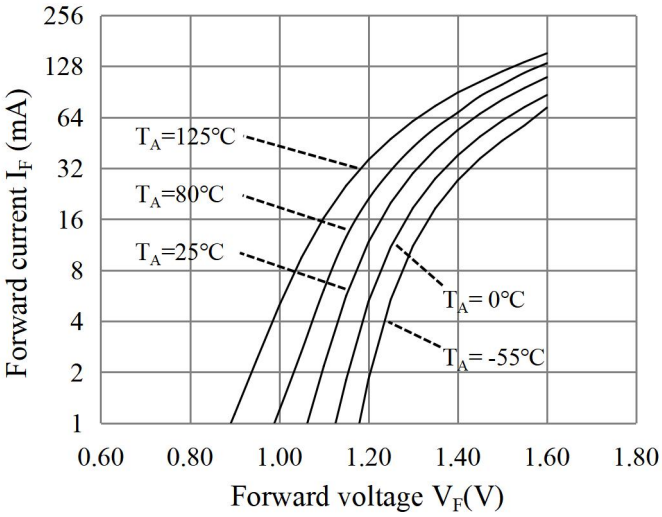


Fig.4 Collector-emitter Saturation Voltage vs. Forward Current

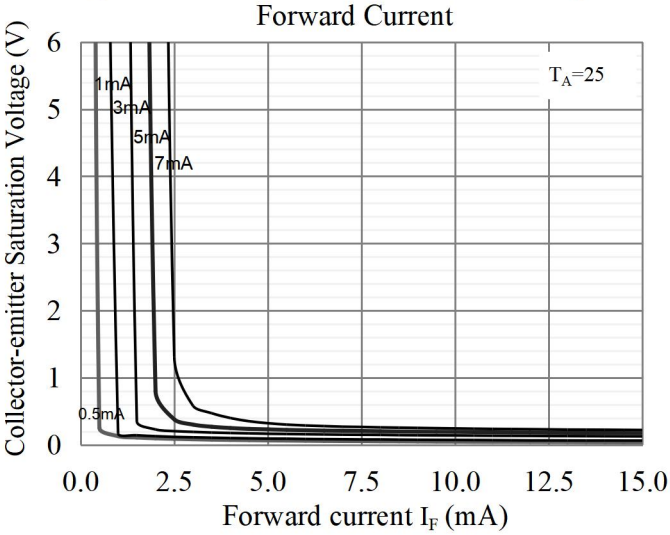


fig.5 Collector Current vs. Non-Saturated Collector Emitter Voltage

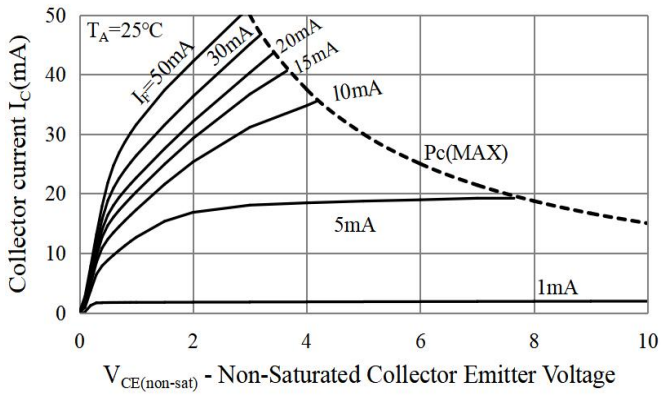


fig.6 Collector Current vs. Non-Saturated Collector Emitter Voltage

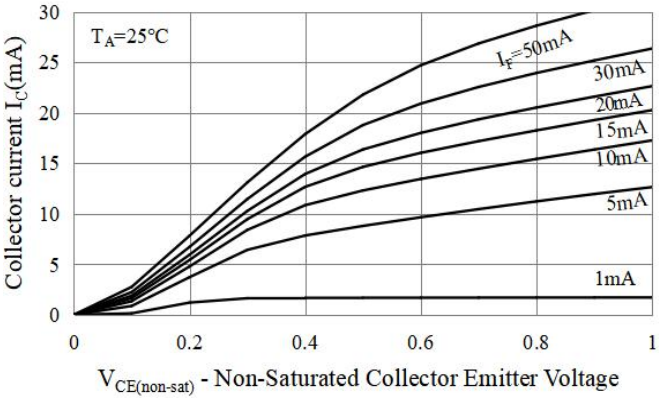


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

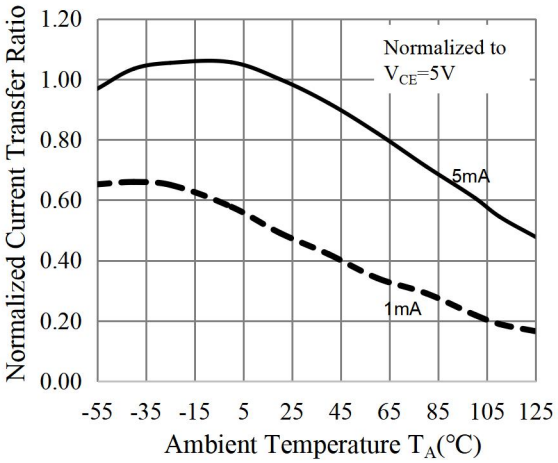


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature

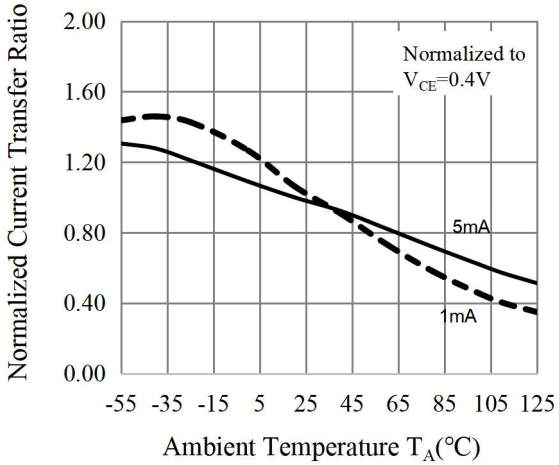


Fig.9 Forward Current vs. Current Transfer Ration

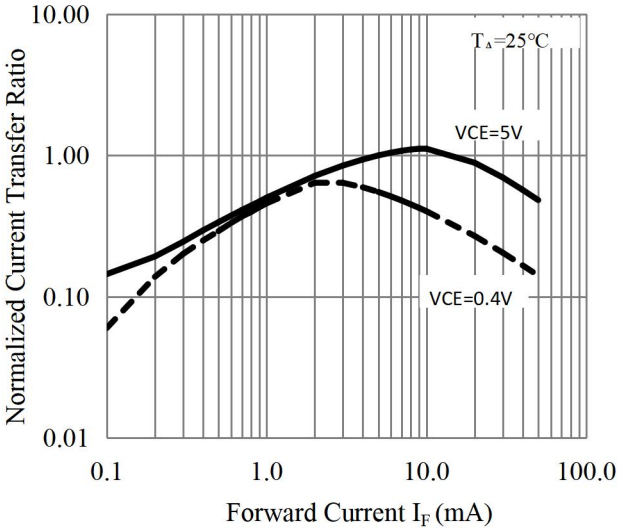


Fig.10 Collector Dark Current vs. Ambient Temperature

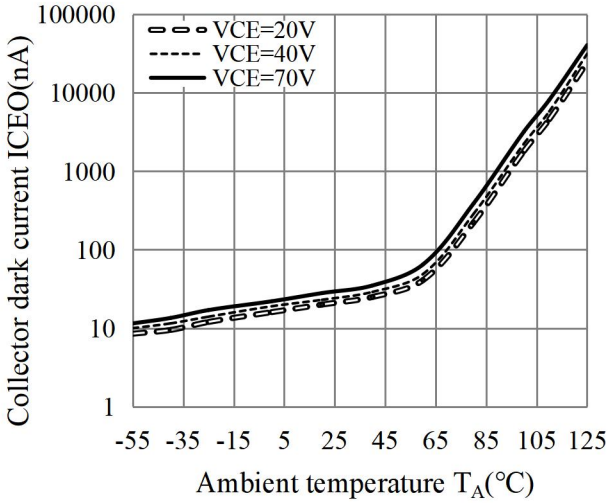


Fig.11 Collector-emitter Saturation Voltage vs. Ambient Temperature

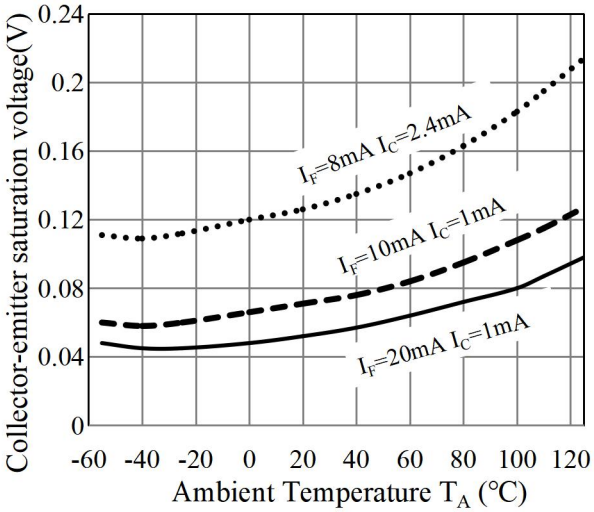


Fig.12 Switching Time vs. Load Resistance

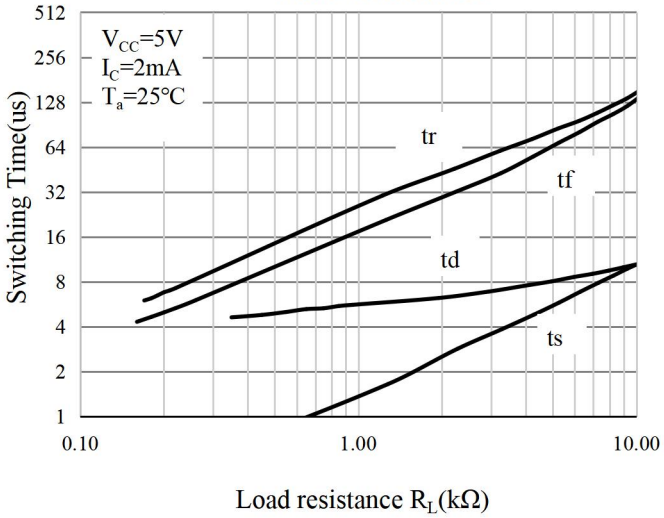


Fig.13 Respinse Time vs. Ambient temperature

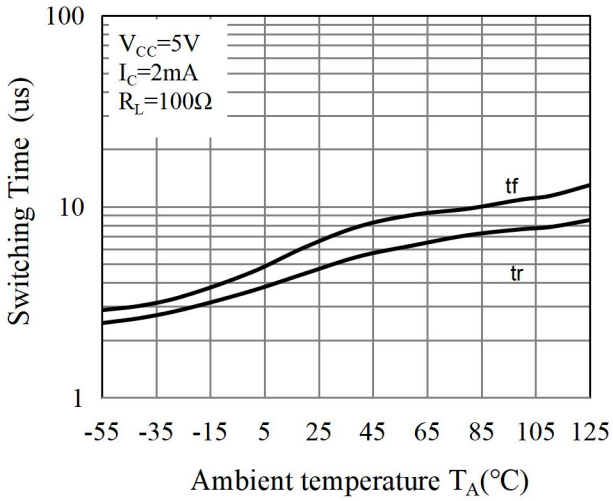
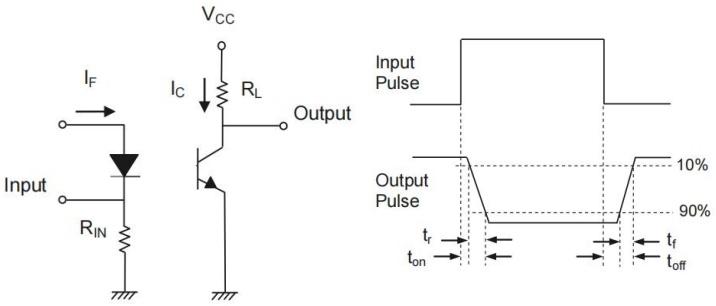


Fig.14 Switching Time Test Circuit & Waveforms



16. NOTES

1. Orient is continually improving the quality, reliability, function or design and Orient reserves the right to make changes

2. 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.