



ORIENT

Photocoupler

Product Data Sheet

Name: OR-3H7

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO.,LTD.

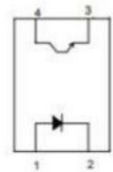
1、Features

- 1.Current transfer ratio(CTR) : MIN. 50% at $I_F = 5mA, V_{CE} = 5V, T_a=25^{\circ}C$
2. High input-output isolation voltage.($V_{ISO}=3,750V_{rms}$)
3. $V_{CEO} = 80V$
4. $T:-55^{\circ}C$ to $125^{\circ}C$
- 5.Lead free, in compliance with RoHS standards



2、Instructions

The orpc-3H7 series device contains an infrared led and a phototransistor detector. They are encapsulated in a 4-pin SOP, free of halogens and Sb_2O_3



1 Anode 2 Cathode
3 Emitter 4 Collector

3、Application Range

- (1). Mixed PCB substrate requiring high density installation
- (2). Programmable controller
- (3). System apparatus and measuring instruments

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

| Parameter | | Symbol | Rated Value | Unit |
|----------------------------------|----------------------------------|------------|--------------|-------------|
| Input | Forward Current | I_F | 50 | mA |
| | Peak forward current($t=10us$) | I_{FM} | 1 | A |
| | Reverse Voltage | V_R | 6 | V |
| | Power Dissipation | P | 70 | mW |
| | Junction Temperature | T_j | 125 | $^{\circ}C$ |
| Output | Collector and emitter Voltage | V_{CEO} | 80 | V |
| | Emitter and collector Voltage | V_{ECO} | 7 | |
| | Collector Current | I_C | 50 | mA |
| | Power Dissipation | P_C | 150 | mW |
| | Junction Temperature | T_j | 125 | $^{\circ}C$ |
| Total Power Dissipation | | P_{tot} | 200 | mW |
| *1 Insulation Voltage | | V_{iso} | 3750 | Vrms |
| Rated Impulse Insulation Voltage | | V_{IORM} | 630 | V |
| Operating Temperature | | T_{opr} | -55 to + 110 | $^{\circ}C$ |
| Storage Temperature | | T_{stg} | -55 to + 125 | |
| *2 Soldering Temperature | | I_{sol} | 260 | |

*1. AC For 1 Minute, R.H. = 40 ~ 60%

Isolation voltage shall be measured using the following method.

- (1) Short between anode and cathode on the primary side and between collector and emitter on thesecondary side
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave.

*2.soldering time is 10 seconds

5、 Opto-electronic Characteristics(Normal Temperature=25°C)

| Parameter | | Symbol | Condition | Min | Typ. * | Max | Unit |
|--------------------------------|--------------------------------------|---------------|---|--------------------|--------------------|-----|---------------|
| Input | Forward Current | V_F | $I_F=20\text{mA}$ | --- | 1.2 | 1.4 | V |
| | Reverse Voltage | I_R | $V_R=4\text{V}$ | --- | --- | 10 | μA |
| | Terminal Capacitance | C_t | $V=0, f=1\text{KHz}$ | --- | 30 | 250 | pF |
| Output | Collector Dark Current | I_{CEO} | $V_{CE}=20\text{V}, I_F=0\text{mA}$ | --- | --- | 100 | nA |
| | Collector-Emitter Breakdown Voltage | BV_{CEO} | $I_C=0.1\text{mA}$ $I_F=0\text{mA}$ | 80 | --- | --- | V |
| | Emitter-Collector Breakdown Voltage | BV_{ECO} | $I_E=10\mu\text{A}$ $I_F=0\text{mA}$ | 7 | --- | --- | V |
| (Transforming Characteristics) | *1 Current Transfer Ratio | CTR | $I_F=5\text{mA}$ $V_{CE}=5\text{V}$ | 50 | --- | 600 | % |
| | Collector Current | I_C | | 2.5 | --- | 30 | mA |
| | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F=8\text{mA}$ $I_C=2.4\text{mA}$ | --- | --- | 0.4 | V |
| | Insulation Impedance | R_{iso} | DC500V 40~60%R.H. | 5×10^{10} | 1×10^{11} | --- | Ω |
| | Floating Capacitance | C_f | $V=0, f=1\text{MHz}$ | --- | 0.6 | 1 | pF |
| | Response Time | t_r | $V_{CE}=5\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$ $f=100\text{Hz}$ | --- | 2 | 18 | μs |
| | Descend Time | t_f | | --- | 3 | 18 | μs |

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



6. Order Information

Part Number

OR-3H7(Y)(Z)-(V)-(G)

Note

Y = CTR Rank (A, A1, B, C, D or none)

Z = Tape and reel option (TP, TP1 or none).

V = VDE safety (optional).

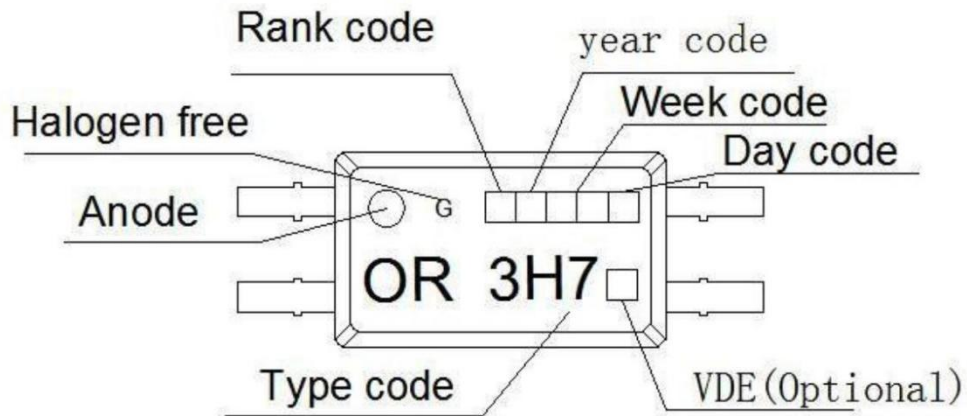
G = Halogen free (optional).

| Option | Description | Packing quantity |
|--------|--|---------------------|
| None | Standard SMD Option | 100 units per tube |
| 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 |

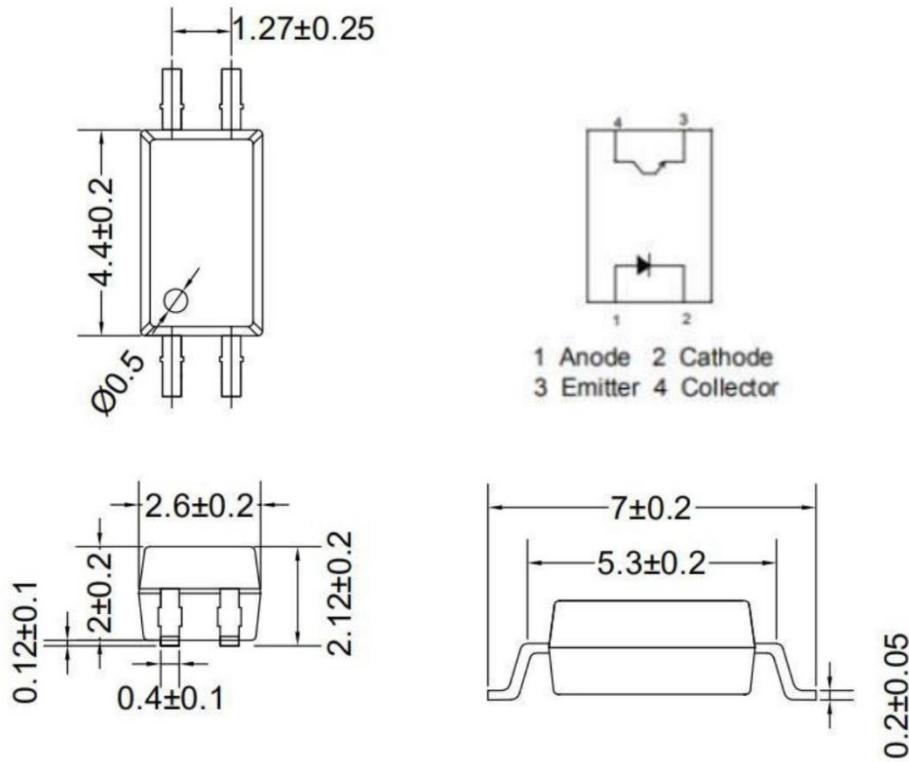
7、 Rank table of current transfer ratio CTR

| MODEL NO. | CTR Rank | Min. | Max. | Unit | Condition |
|-----------|----------|------|------|------|--------------------------------------|
| OR-3H7 | A | 80 | 160 | % | IF=5mA, V _{CE} =5V, Ta=25°C |
| | A1 | 100 | 160 | | |
| | B | 130 | 260 | | |
| | C | 200 | 400 | | |
| | D | 300 | 600 | | |
| | No mark | 50 | 600 | | |

8、 Naming Rule

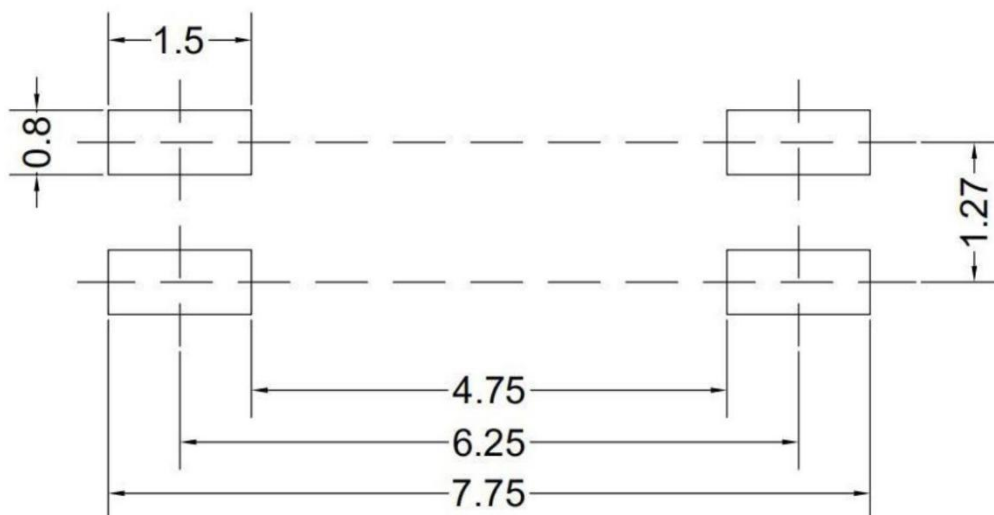


9、Outer Dimension



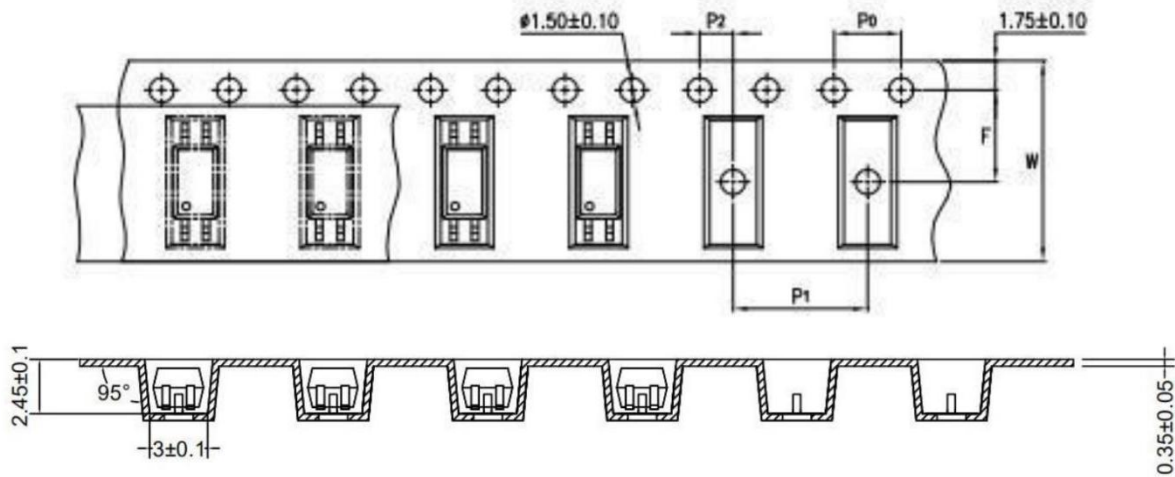
10、Recommended Foot Print Patterns (Mount Pad)

unit: mm

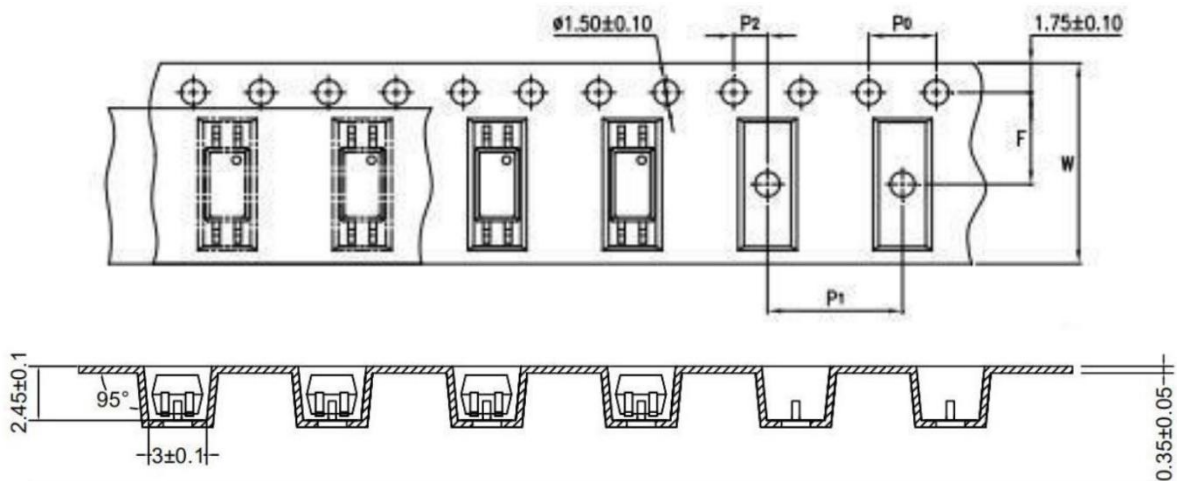


11、Taping Dimensions

(1) .OR-3H7-TP



(2) .OR-3H7-TP1



| type | Symbol | Dimensions: mm (in.) |
|-----------|--------|----------------------|
| bandwidth | W | 12±0.3 (0.47) |
| pitch | P0 | 4±0.1 (0.15) |
| pitch | F | 5.5±0.1 (0.217) |
| | P2 | 2±0.1 (0.079) |
| interval | P1 | 8±0.1 (0.315) |

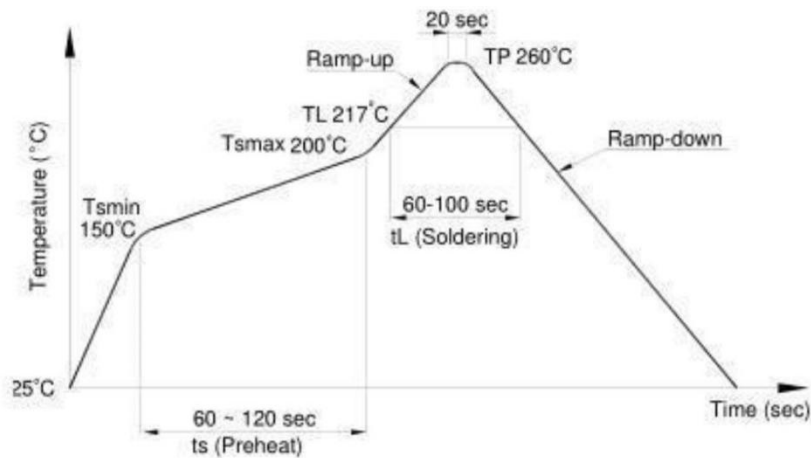
| | |
|--------------------|--------|
| Encapsulation type | OR-3H7 |
| Quantity (pieces) | 3000 |

12、 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 (TSmin) | 150°C |
| - Temperature Max (TSmax) | 200°C |
| - Time (min to max) (ts) | 90±30 sec |
| Soldering zone | |
| - Temperature (TL) | 217°C |
| - Time (tL) | 60~100 sec |
| Peak Temperature | 260°C |
| Ramp-up rate | 3°C / sec max. |
| 3°C / sec max. | 3~6°C / sec |





(2) .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 |

13、Characteristics Curve

Figure 1. Collector Power Dissipation vs. Ambient Temperature

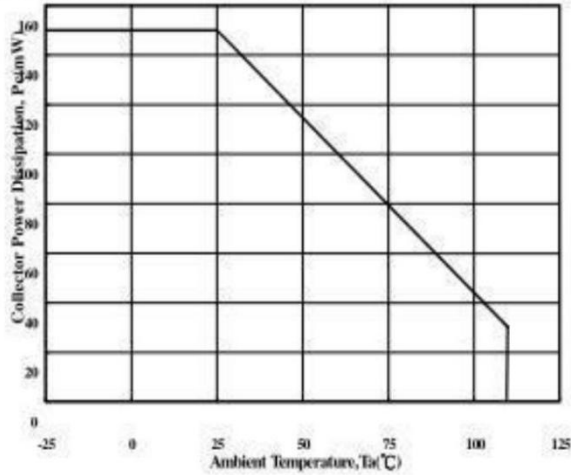


Figure 2. Forward Current vs. Ambient Temperature

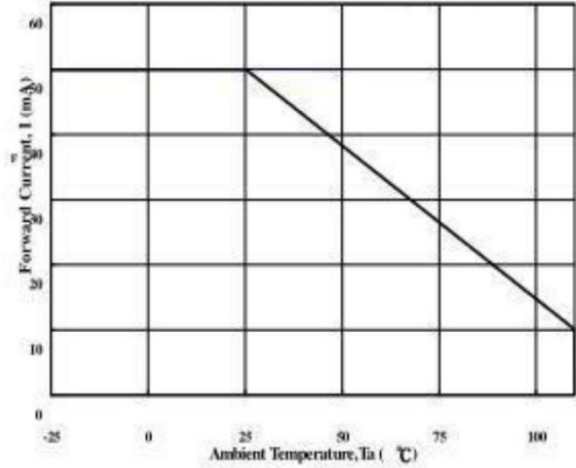


Figure 3. Forward Current vs. Forward Voltage

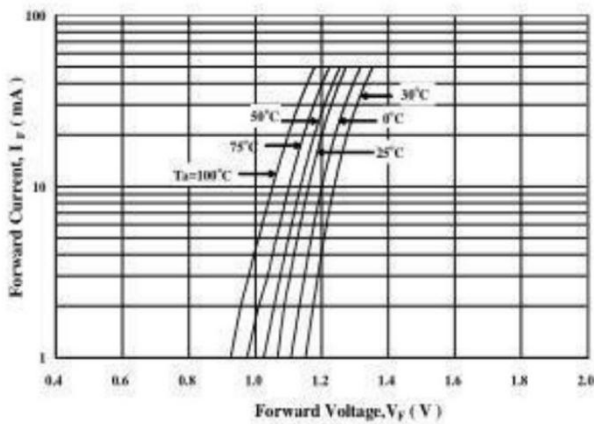


Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current

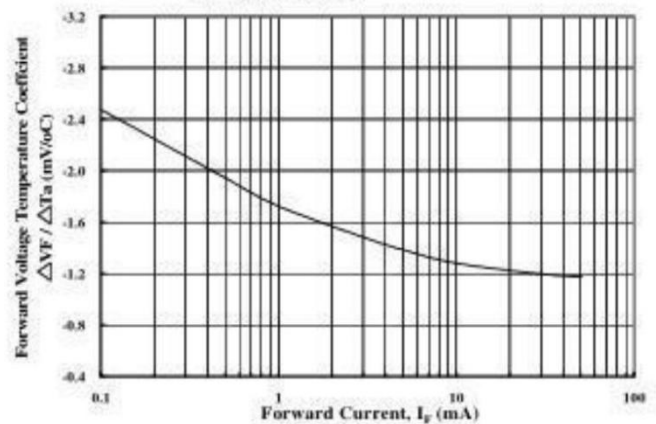


Figure 5. Pulse Forward Current vs. Duty Cycle Ratio

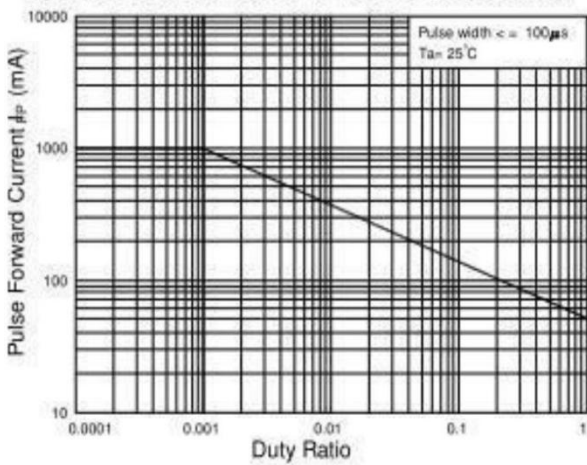


Figure 6. Pulse Forward Current vs. Pulse Forward Voltage

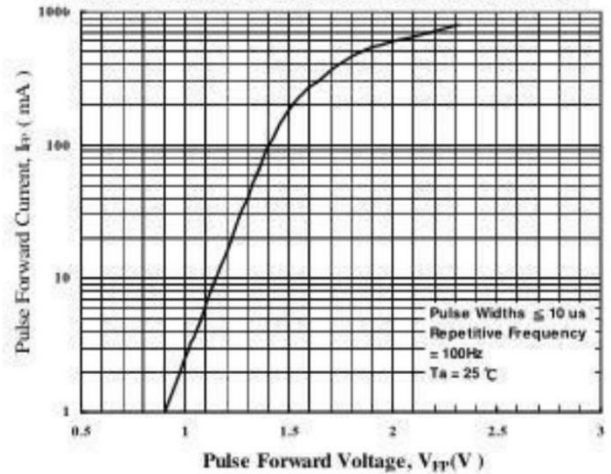


Figure 7. Collector-Emitter Saturation Voltage vs. Forward

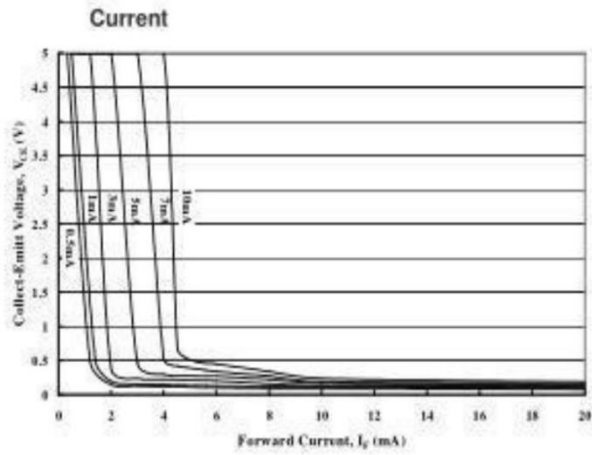


Figure 8. Collector Current vs. Collector-Emitter

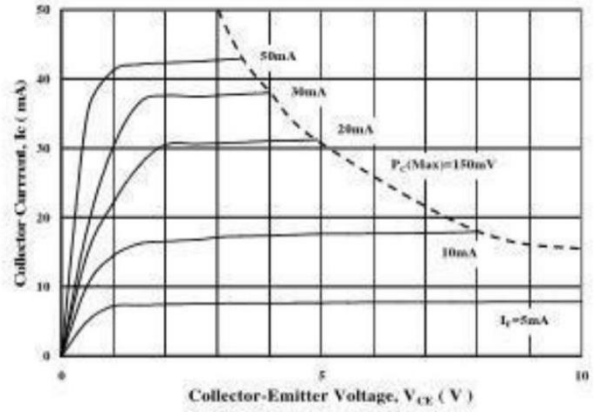


Figure 9. Collector Current vs. Small Collector-Emitter

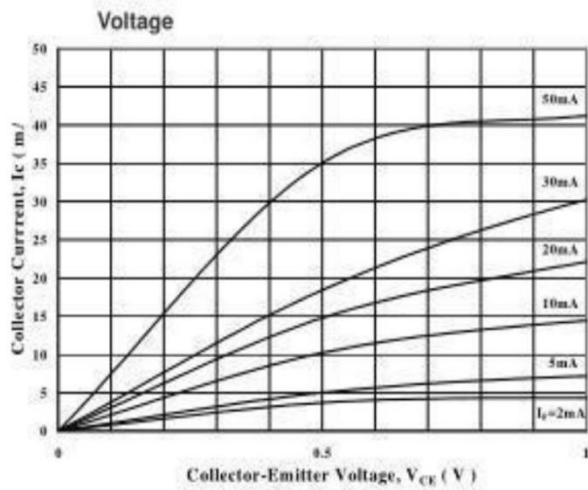


Figure 10. Normalized CTR vs. Forward Current

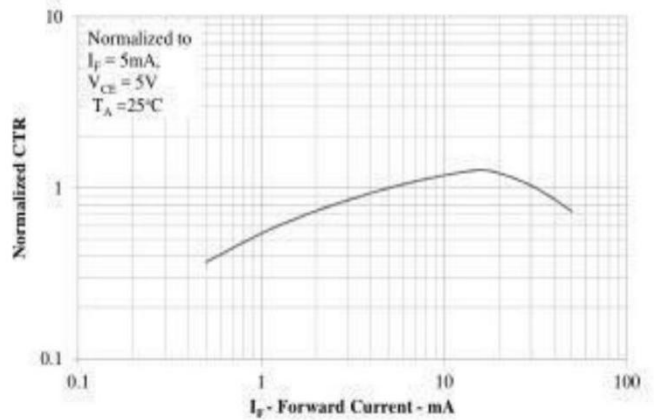


Figure 11. Collector Dark Current vs. Ambient Temperature

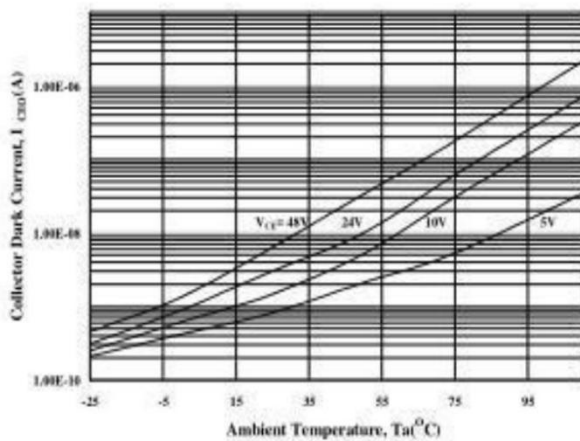


Figure 12. Current Transfer Ratio vs. Forward

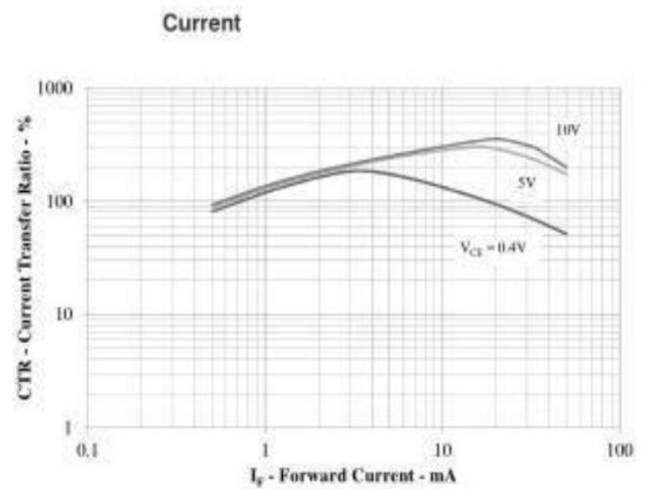


Figure 13. Normalized CTR vs. Ambient Temperature

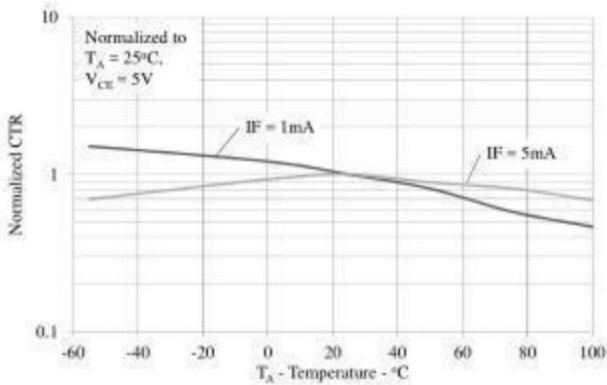


Figure 14. Collector-Emitter Saturation Voltage vs. Ambient Temperature

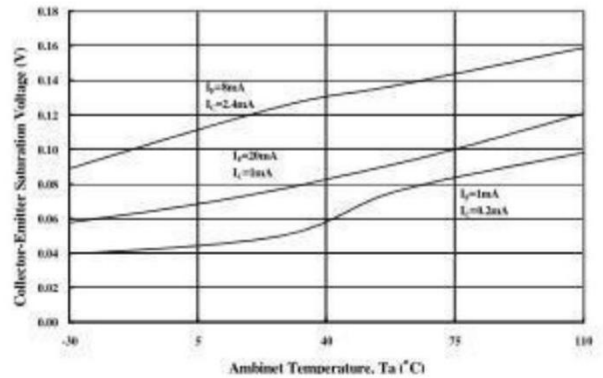


Figure 15. Collector Current vs. Ambient Temperature

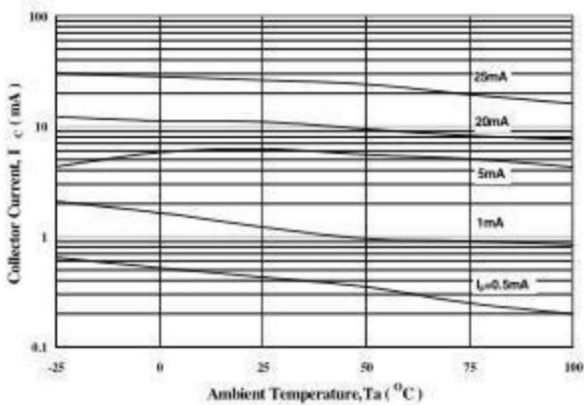


Figure 16. Switching Time vs. Load Resistance

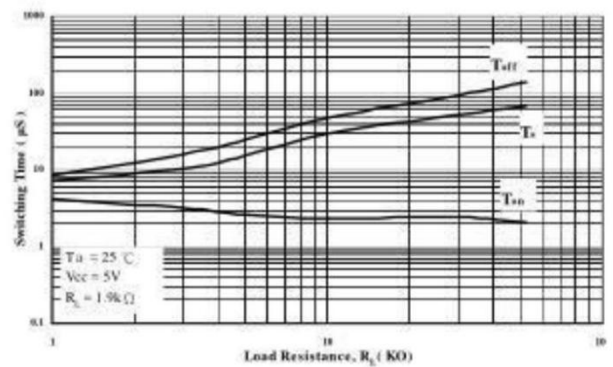


Figure 17. Switching Time vs. Ambient Temperature

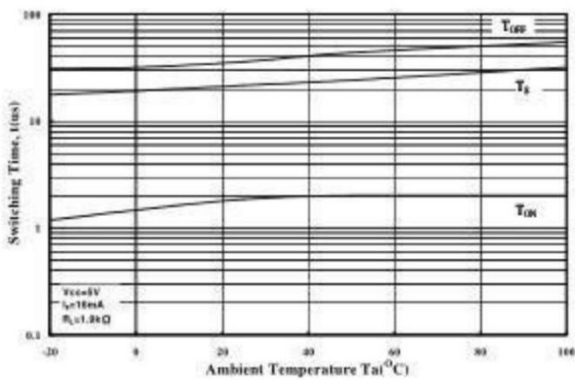


Figure 18. Frequency Response

