# Specification Sheet

P/N: Photocoupler

Customer:

Mfg P/N: OR-3H7

Date:

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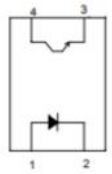
## 1、Features

1.Current transfer ratio(CTR) : MIN. 50% at $I_F$ = 5mA, $V_{CE}$ = 5V, Ta=25 ℃
2.High input-output isolation voltage.($V_{ISO}$=3,750Vrms)
3.$V_{CEO}$ = 80V
4.Operating Temperature:-55 ℃ to 115 ℃
5.Lead free, in compliance with RoHS standards

## 2、Instructions

The or-3h7 series device contains an infrared led and a phototransistor detector. They are encapsulated in a 4-pin SOP, free of halogens and Sb2O3




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℃)

| 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 |
| 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 |
| Total Power Dissipation | | $P_{tot}$ | 200 | mW |
| *1 Insulation Voltage | | $V_{iso}$ | 3750 | Vrms |
| Rated Impulse Insulation Voltag | | $V_{IORM}$ | 630 | V |
| Operating Temperature | | $T_{opr}$ | -55 to + 115 | ℃ |
| Storage Temperature | | $T_{stg}$ | -55 to + 150 | |
| *2 Soldering Temperature | | $T_{sol}$ | 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℃)

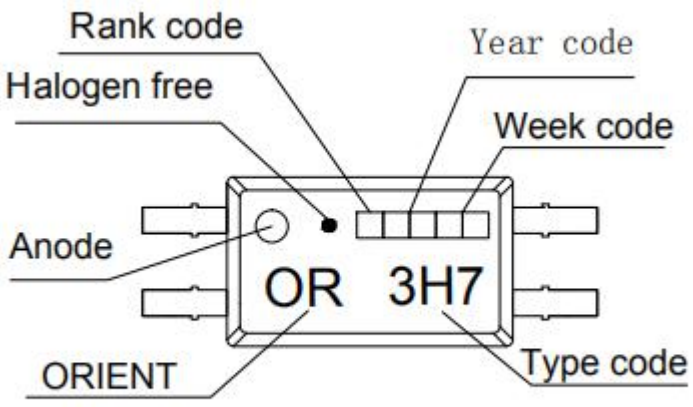
| Parameter | | Symbol | Condition | Min | Typ.* | Max | Unit |
|---|---|---|---|---|---|---|---|
| Input | Forward Current | $V_F$ | $I_F$=20mA | --- | 1.2 | 1.4 | V |
| | Reverse Voltage | $I_R$ | $V_R$=4V | --- | --- | 10 | μA |
| | Terminal Capacitance | $C_t$ | V=0, f=1KHz | --- | 30 | 250 | pF |
| Output | Collector Dark Currentt | $I_{CEO}$ | $V_{CE}$=20V, $I_F$=0mA | --- | --- | 100 | nA |
| | Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=0.1mA $I_F$=0mA | 80 | --- | --- | V |
| | Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | $I_E$=10uA $I_F$=0mA | 7 | --- | --- | V |
| (Transforming Characteristics) | *1 Current Transfer Ratio | CTR | IF=5mA VCE=5V | 50 | --- | 600 | % |
| | Collector Current | $I_C$ | | 2.5 | --- | 30 | mA |
| | Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F$=8mA $I_C$= 2.4mA | --- | --- | 0.4 | V |
| | Insulation Impedance | $R_{iso}$ | DC500V 40~60%R.H. | $5\times10^{10}$ | $1\times10^{11}$ | --- | Ω |
| | Floating Capacitance | $C_f$ | V=0, f=1MHz | --- | 0.6 | 1 | pF |
| | Response Time | $t_r$ | $V_{CE}$=5V, $I_C$=2mA $R_L$=100Ω f=100Hz | --- | 2 | 18 | μs |
| | Descend Time | $t_f$ | | --- | 3 | 18 | μs |

- Current Conversion Ratio = $I_C$ / $I_F$ × 100%

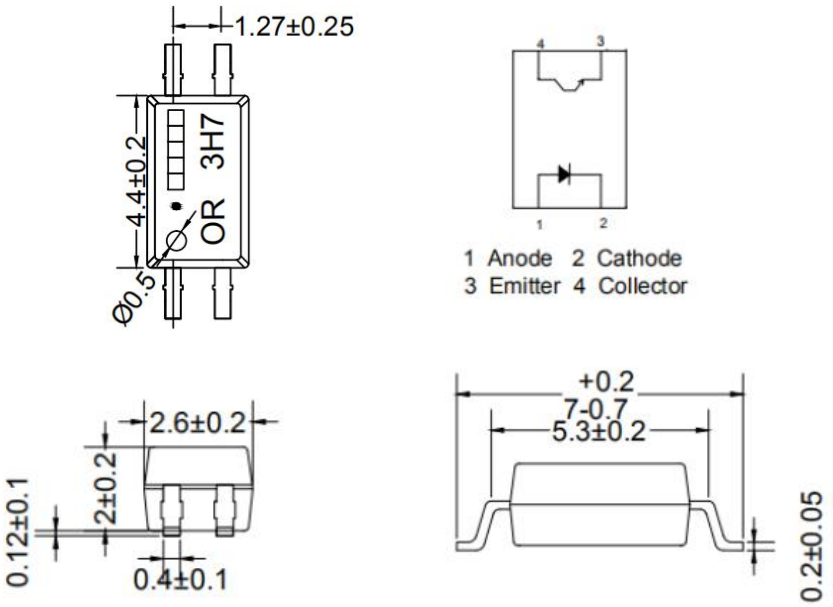
## 6、Rank table of current transfer ratio CTR

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

## 7、Naming Rule

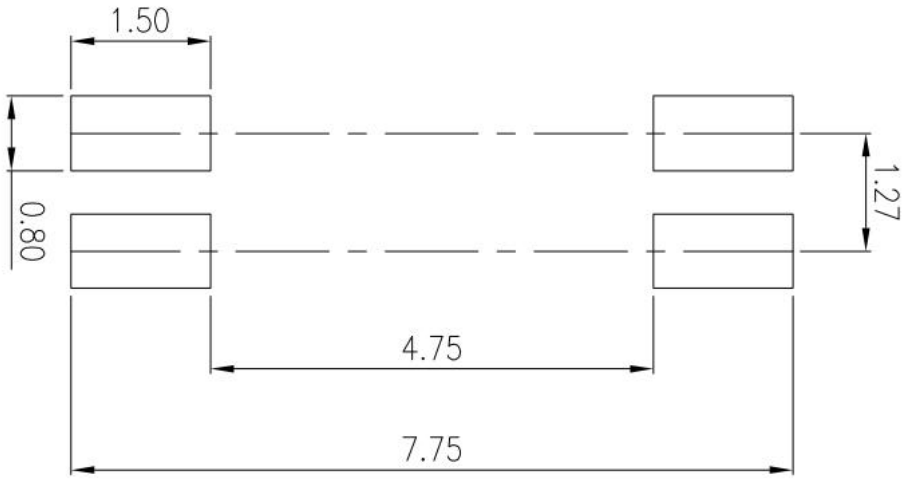


## 8、Outer Dimension



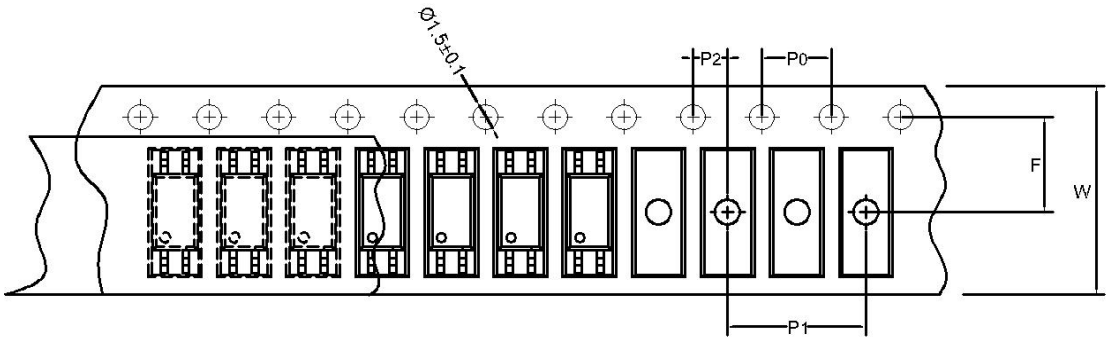

## 9、Recommended Foot Print Patterns (Mount Pad))

unit : mm

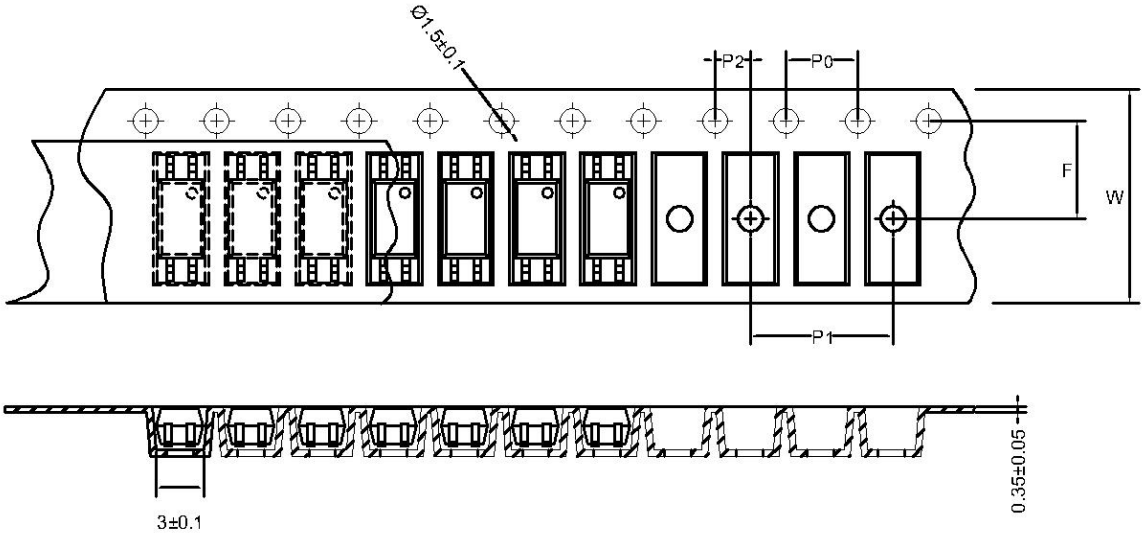


## 10、Taping Dimensions

### ( 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) |

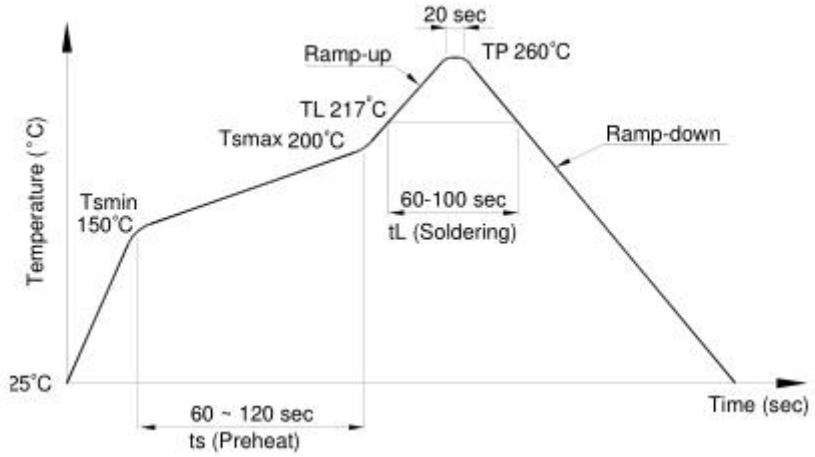
| Encapsulation type | OR-3H7 |
|---|---|
| Quantity (pieces) | 6000 |

## 11、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.

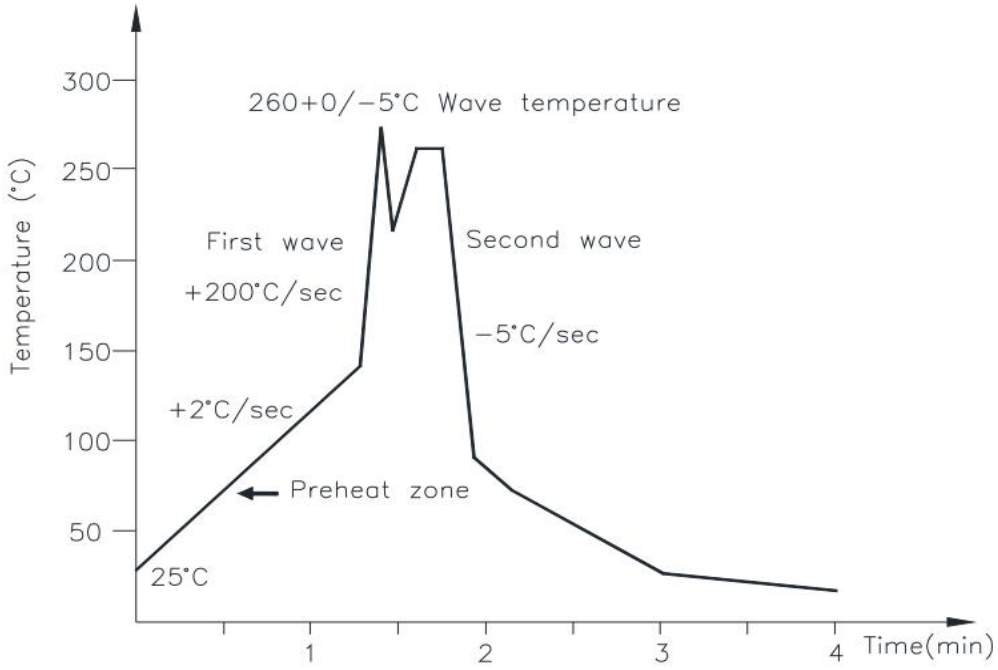
| Profile item | Conditions |
|---|---|
| Preheat<br>- Temperature Min (TSmin)<br>- Temperature Max (TSmax)<br>- Time (min to max) (ts) | <br>150˚C<br>200˚C<br>90±30 sec |
| Soldering zone<br>- Temperature (TL)<br>- Time (tL) | <br>217˚C<br>60~100 sec |
| Peak Temperature | 260˚C |
| Ramp-up rate | 3˚C / 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<br><br>Time | 260+0/-5˚C<br><br>10 sec |
| Preheat temperature<br><br>Preheat time | 25 to 140˚C<br><br>30 to 80 sec |




**( 3 ) .Hand soldering by soldering iron**

Allow single lead soldering in every single process. One time soldering is recommended.

| | |
|---|---|
| Temperature<br><br>Time | 380+0/-5˚C<br><br>3 sec max |

## 12、Characteristics Curve

Figure 1. Collector Power Dissipation vs. Ambient Temperature

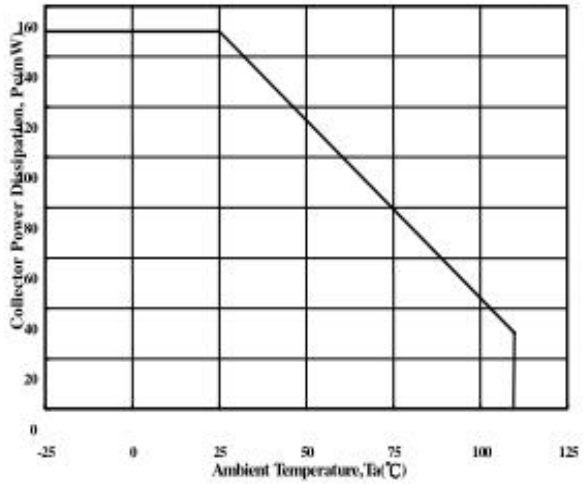



Figure 2. Forward Current vs. Ambient Temperature

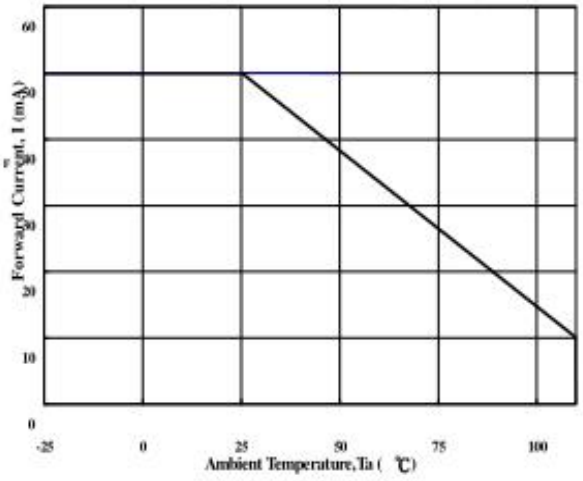



Figure 3. Forward Current vs. Forward Voltage

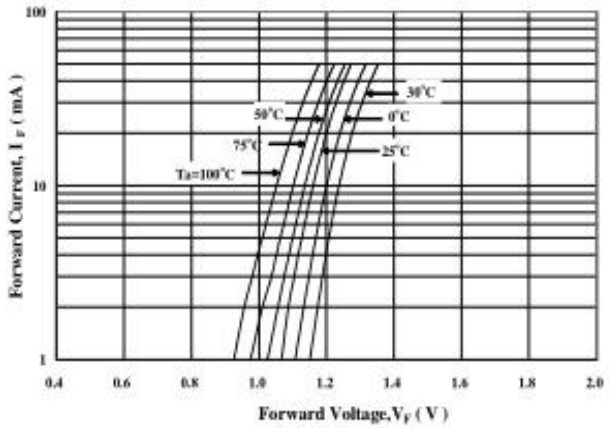



Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current

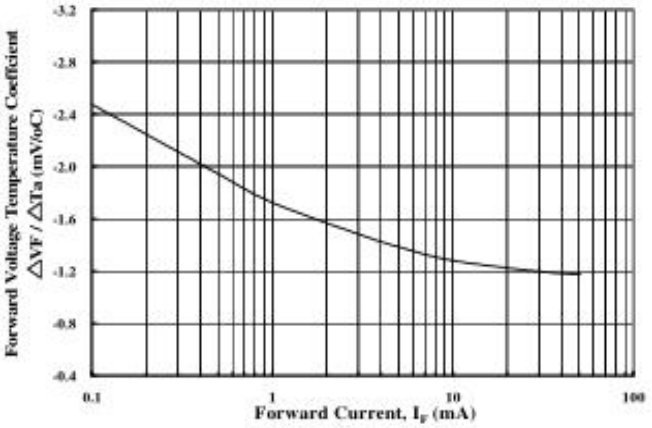



Figure 5. Pulse Forward Current vs. Duty Cycle Ratio

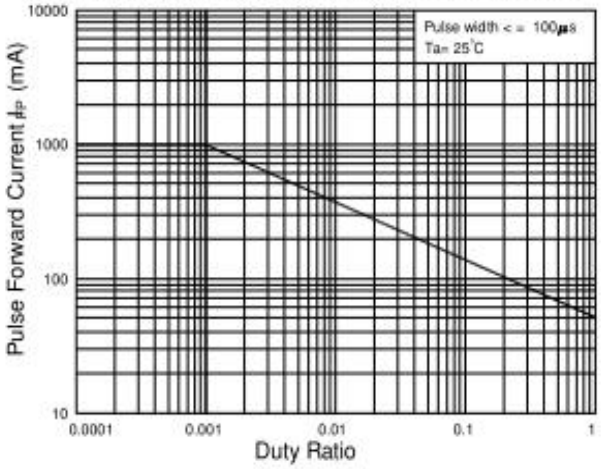



Figure 6. Pulse Forward Current vs. Pulse Forward

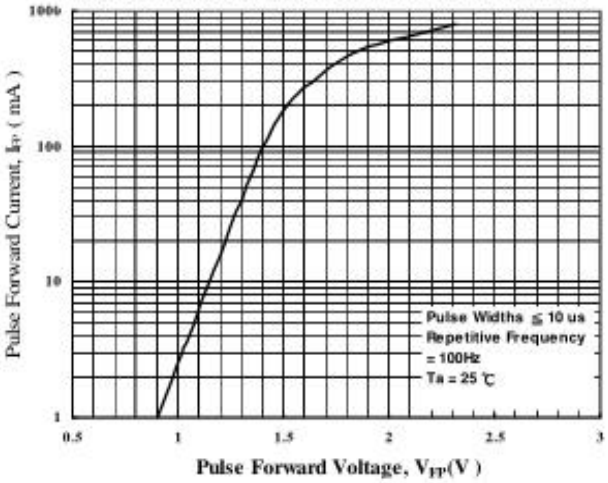


Figure 7. Collector-Emitter Saturation Voltage vs. Forward Current

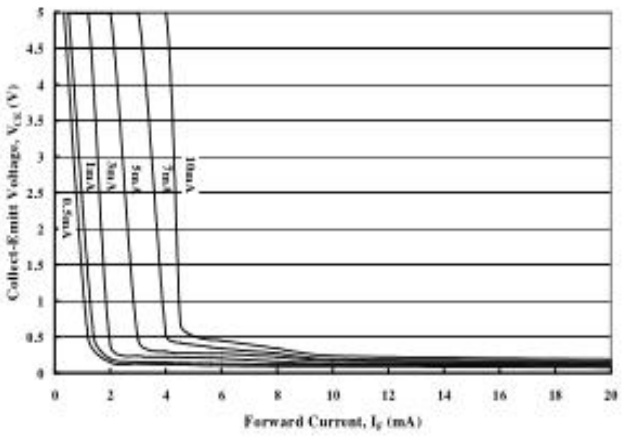



Figure 8. Collector Current vs. Collector-Emitter

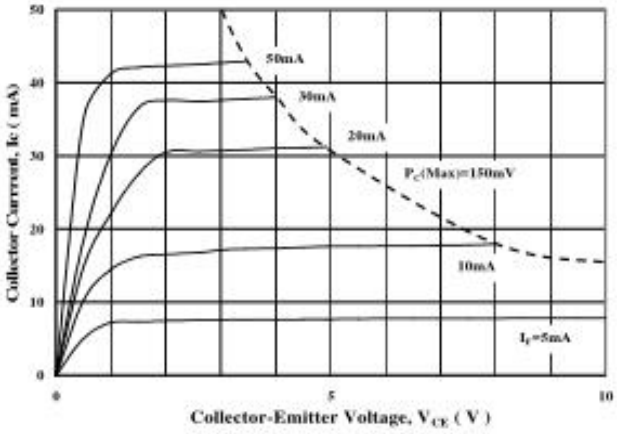



Figure 9. Collector Current vs. Small Collector-Emitter Voltage

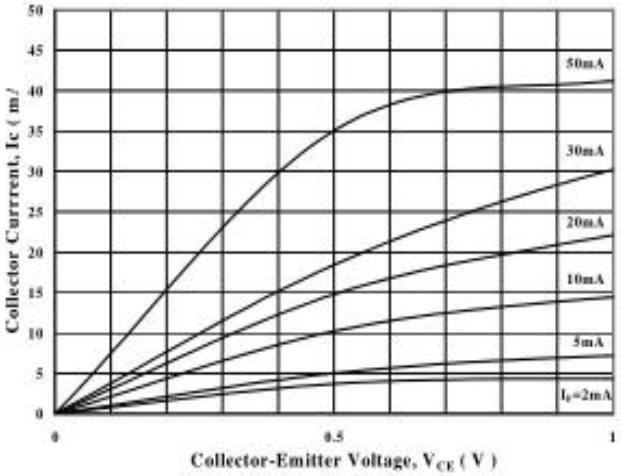



Figure 10. Normalized CTR vs. Forward Current

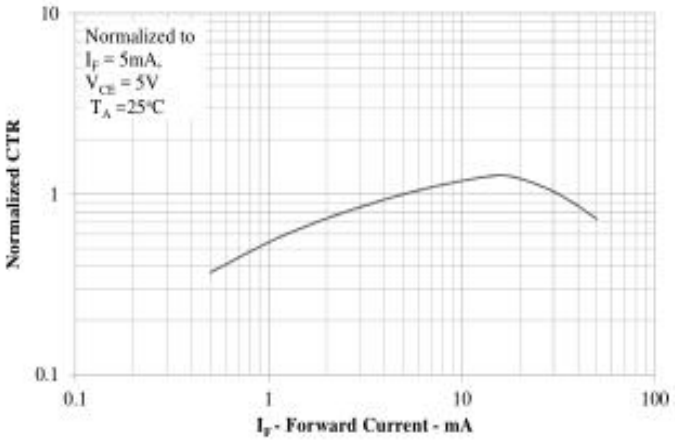



Figure 11. Collector Dark Current vs. Ambient Temperature

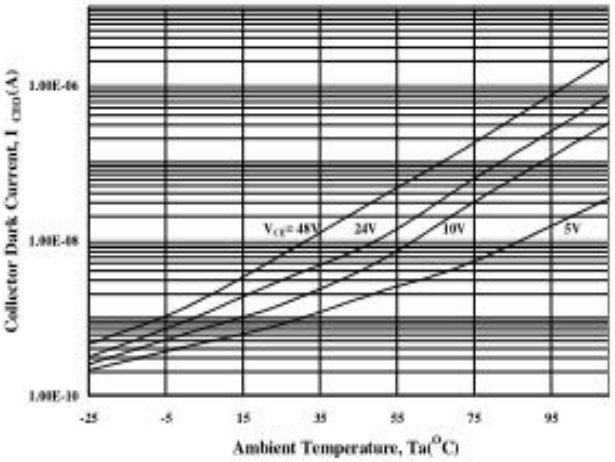



Figure 12. Current Transfer Ratio vs. Forward Current

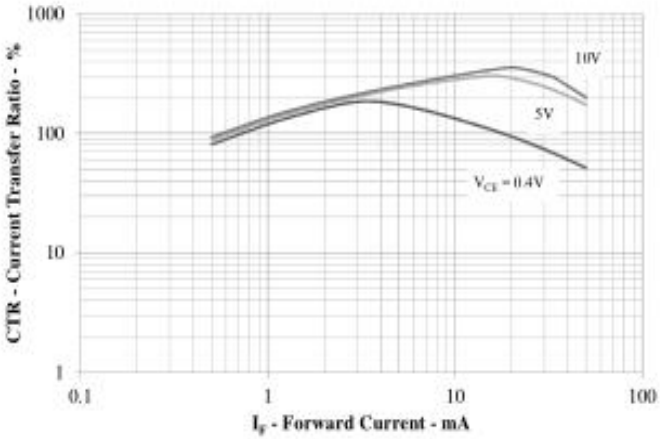


**Figure 13. Normalized CTR vs. Ambient Temperature**

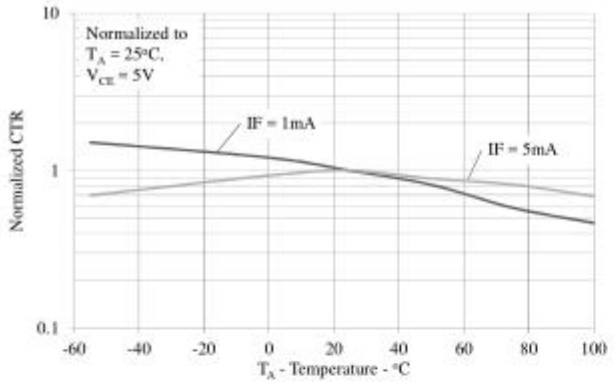



**Figure 14. Collector-Emitter Saturation Voltage vs. Ambient Temperature**

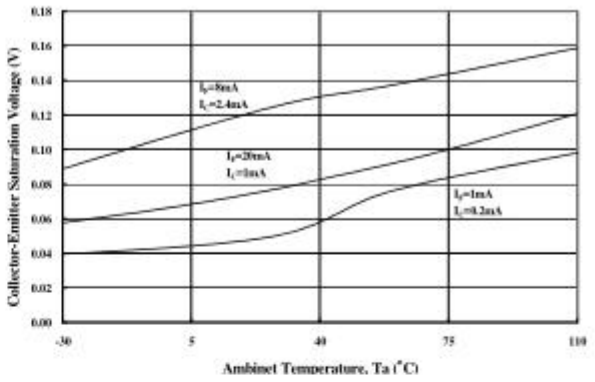



**Figure 15. Collector Current vs. Ambient Temperature**

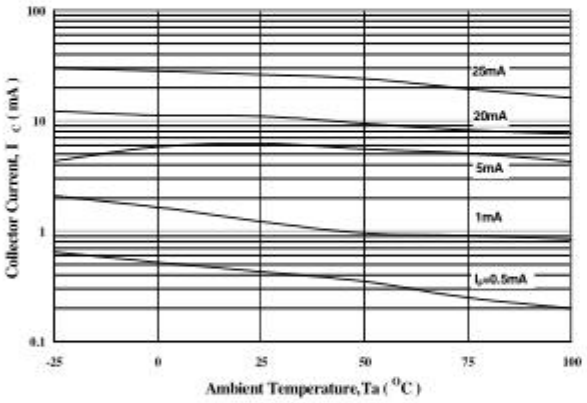



**Figure 16. Switching Time vs. Load Resistance**

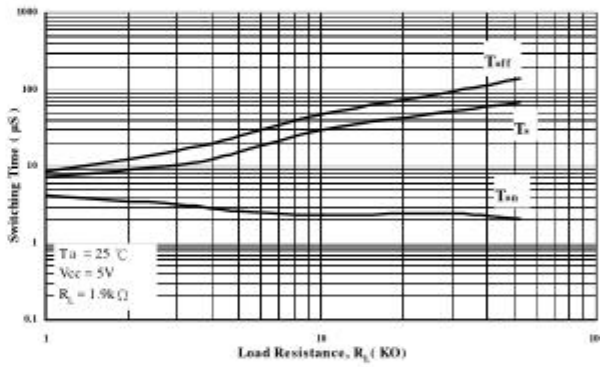



**Figure 17. Switching Time vs. Ambient Temperature**

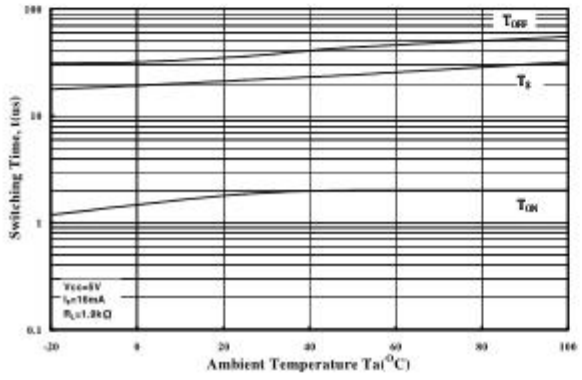



**Figure 18. Frequency Response**