



ORIENT

Photocoupler

Product Data Sheet

P/N: Photocoupler
Customer:
Mfg P/N: OR-354
Date:

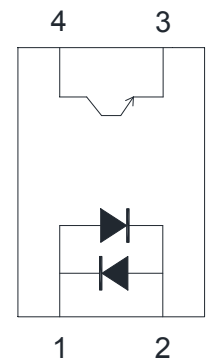
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1. Features

- Current transfer ratio(CTR : MIN. 20% at $I_F = \pm 1\text{mA}$, $V_{CE} = 5\text{V}$, $T_a = 25^\circ\text{C}$)
- High input -output isolation voltage ($V_{ISO} = 3,750\text{Vrms}$)
- High collector-emitter voltage ($V_{CEO} = 35\text{V}$)
- SOP-4 package
- -55°C to 115°C
- RoHS Compliance



1 Anode 2 Cathode
3 Emitter 4 Collector

2. Instructions

- The OR-354 series device consists of two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor detector. They are encapsulated in a 4 pin SOP encapsulation.
- Pin pitch of OR-354 is 2.54mm

3. Application Range

- Hybrid substrates that require high density mounting.
- Programmable controllers
- System appliance, measuring instruments

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

| Parameter | | Symbol | Rated Value | Unit |
|-----------------------|-------------------------------|-----------|-------------|------------------|
| Input | Forward Current | I_F | ± 50 | mA |
| | Junction Temperature | T_J | 125 | $^\circ\text{C}$ |
| | Consume Power | P | 70 | mW |
| Output | Collector and emitter Voltage | V_{CEO} | 35 | V |
| | Emitter and collector Voltage | V_{ECO} | 6 | |
| | Collector Current | I_C | 50 | mA |
| | Consume Power | P_C | 150 | mW |
| | Junction Voltage | T_J | 125 | $^\circ\text{C}$ |
| Total Consume Power | | P_{tot} | 170 | mW |
| *1 Insulation Voltage | | V_{iso} | 3750 | Vrms |

| | | | |
|--------------------------|------------------|--------------|----|
| Working Temperature | Topr | -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.

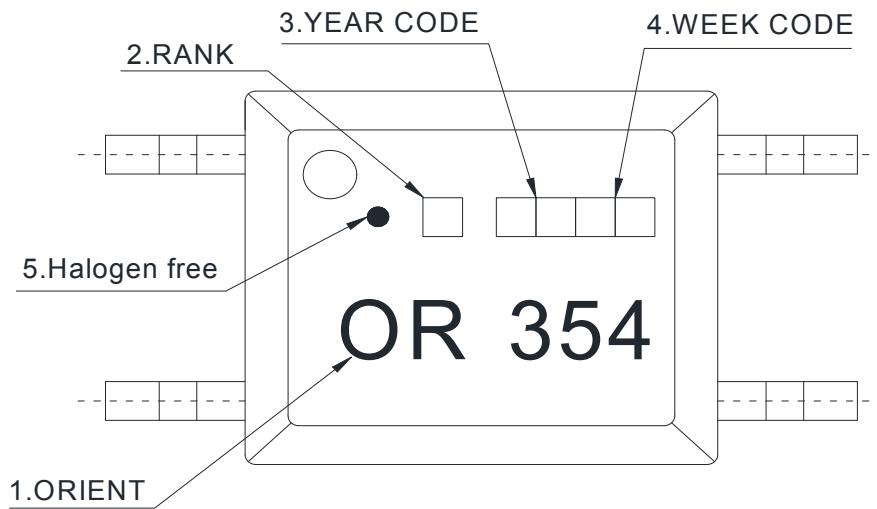
5. Opto-electronic Characteristics

| Parameter | | Symbol | Condition | Min | Typ.* | Max | Unit |
|--------------|---|----------------------|--|--------------------|--------------------|-----|------|
| Input | Forward Current | V _F | I _F =±20mA | --- | 1.2 | 1.4 | V |
| | Collector capacitance | C _t | V=0, f=1KHz | --- | 30 | 250 | pF |
| Output | Collector to emitter Current | I _{CEO} | V _{CE} =20V, I _F =0mA | --- | --- | 100 | nA |
| | Collector and Emitter attenuation Voltage | BV _{CEO} | I _C =0.1mA I _F =0mA | 35 | --- | --- | V |
| | Emitter and Collector attenuation Voltage | BV _{ECO} | I _E =10μA I _F =0mA | 6 | --- | --- | V |
| | Collector and Emitter Saturation Voltage | V _{CE(sat)} | I _F =±20mA I _C = 1mA | --- | --- | 0.2 | V |
| | Insulation Impedance | R _{iso} | DC500V 40~60%R.H. | 5×10 ¹⁰ | 1×10 ¹¹ | --- | Ω |
| | Floating Capacitance | C _f | V=0, f=1MHz | --- | 0.6 | 1 | pF |
| | Response Time | t _r | V _{CC} =2V, I _C =2mA R _L =100Ω | --- | 4 | 18 | μs |
| Descend Time | t _f | --- | | 3 | 18 | μs | |

6. Rank table of current transfer ratio CTR

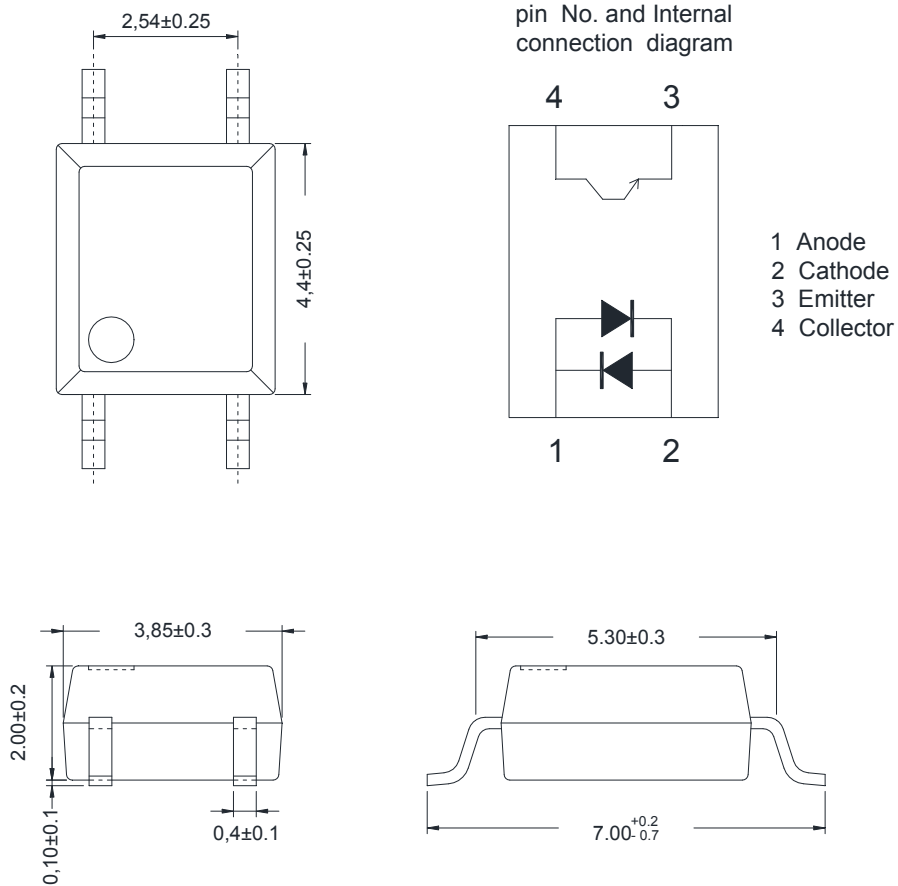
| CTR Rank | Min. | Max. | Condition |
|----------|------|------|--|
| A | 50 | 150 | $I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$ |
| B | 80 | 400 | |
| B2 | 100 | 400 | |
| C | 200 | 400 | |
| No mark | 20 | 400 | |

7. Naming Rule

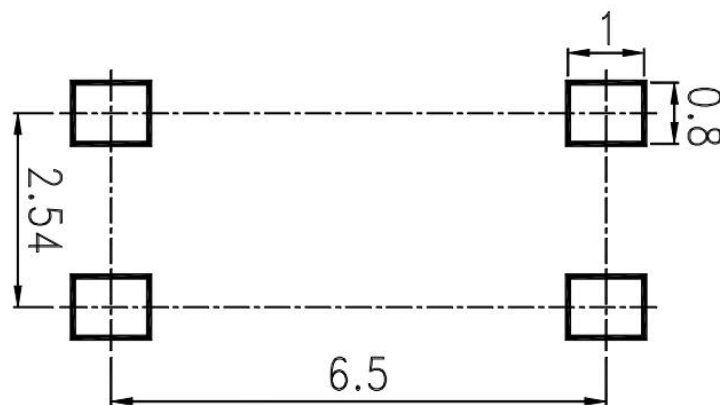


1. ORIENT
2. Rank shall be or shall not be marked.
3. Year Code, Example : 2010 = 10
4. Work Week Ranging from '01' to '53'
5. "●" indicates halogen free option.

8. Outer Dimension



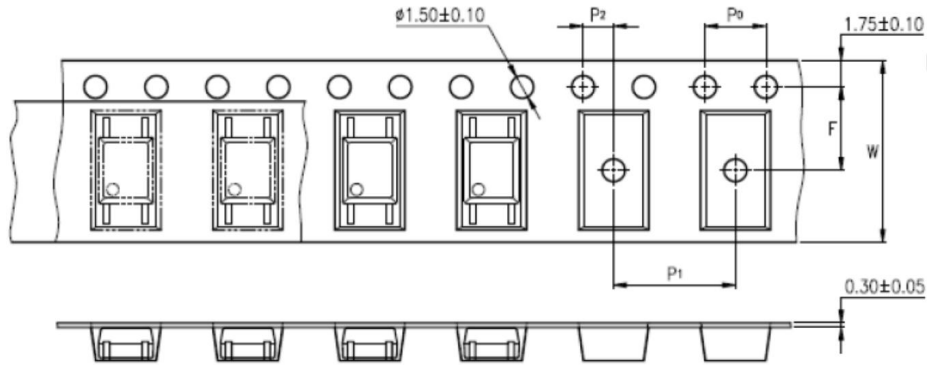
9. Recommended Foot Print Patterns (Mount Pad)



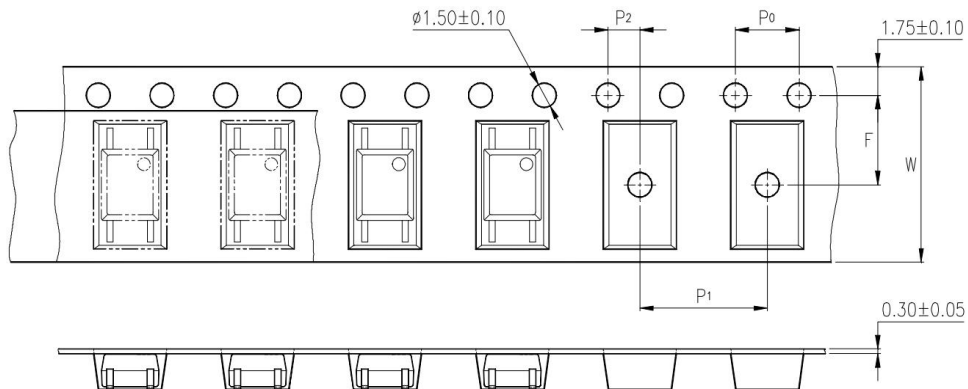
unit: mm

10. Taping Dimensions

(1) OR-354-TP



(2) OR-354-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) |

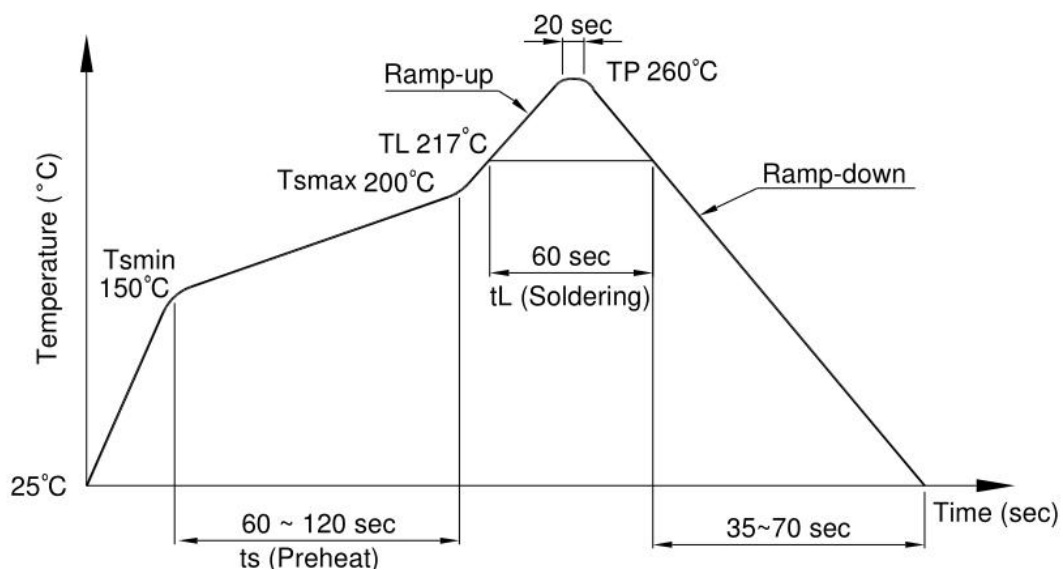
| Package Type | OR-354 series |
|-----------------|---------------|
| Quantities(pcs) | 3000 |

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.

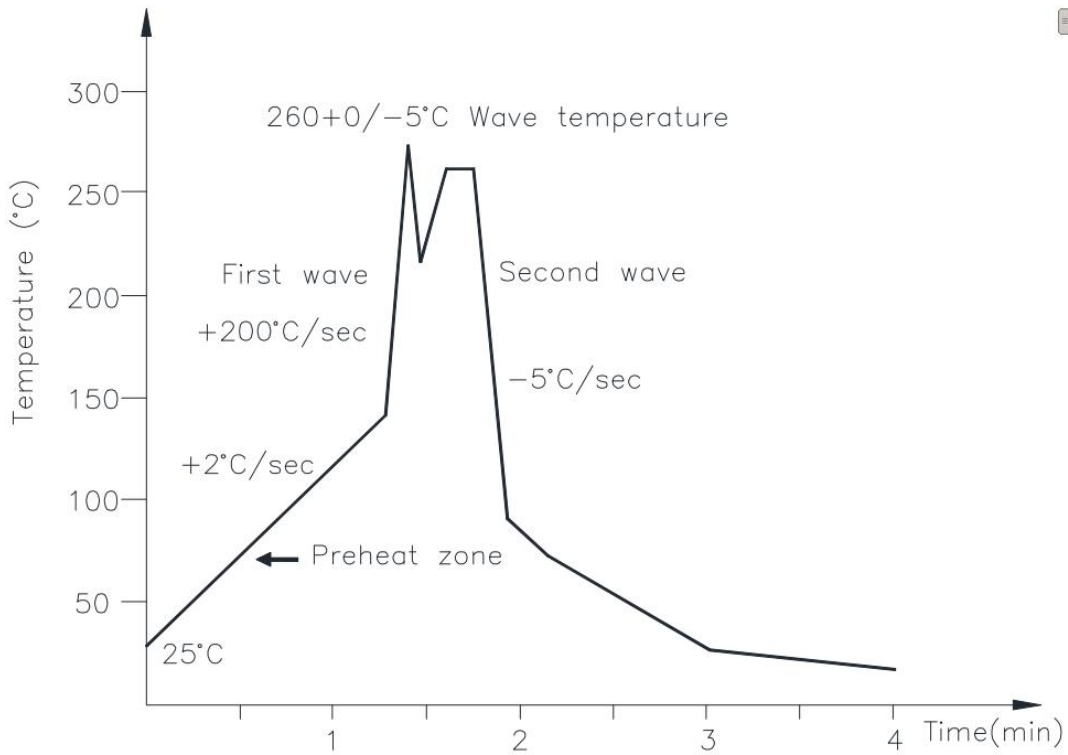
| Profile item | Conditions |
|-----------------------------|----------------|
| Preheat | |
| - Temperature Min (T Smin) | 150°C |
| - Temperature Max (T Smax) | 200°C |
| - Time (min to max) (ts) | 90±30 sec |
| Soldering zone | |
| - Temperature (TL) | 217°C |
| - Time (t L) | 60 sec |
| Peak Temperature | 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 |

12. Characteristics Curve

Fig.1 Forward Current vs. Ambient Temperature

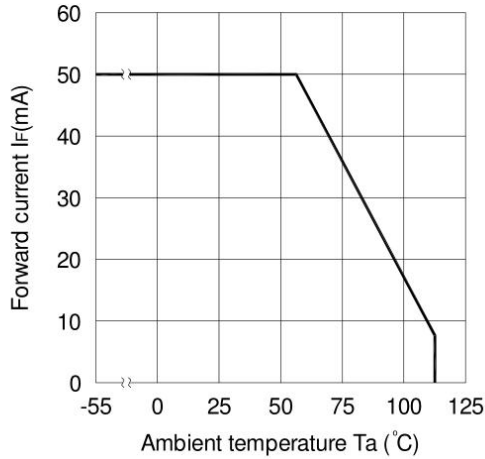


Fig.2 Collector Power Dissipation vs. Ambient Temperature

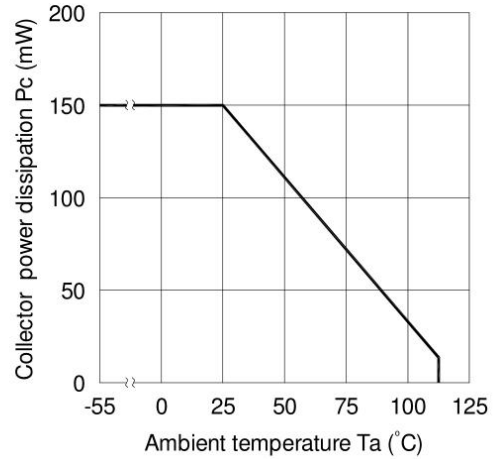


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

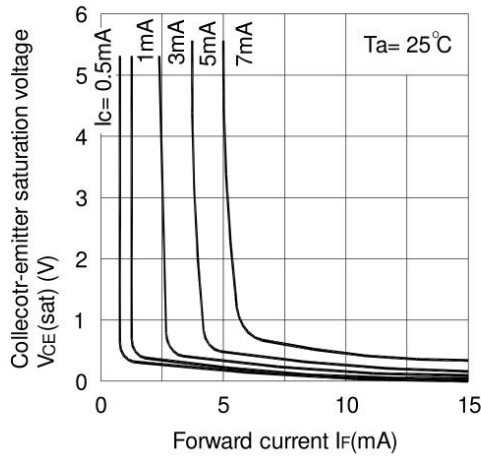


Fig.4 Forward Current vs. Forward Voltage

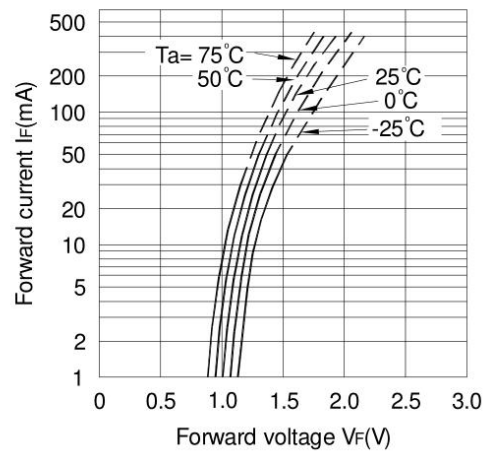


Fig.5 Current Transfer Ratio vs. Forward Current

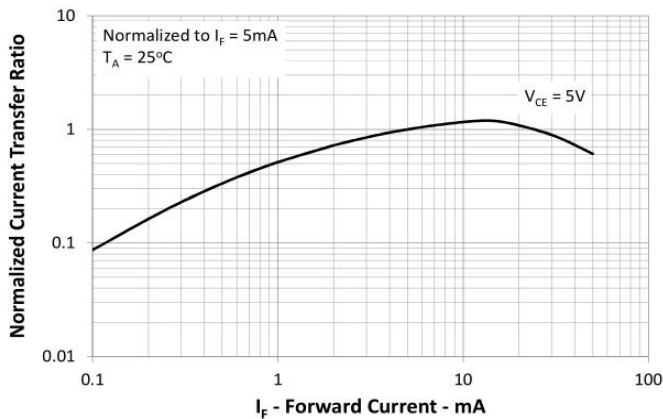


Fig.6 Collector Current vs. Collector-emitter Voltage

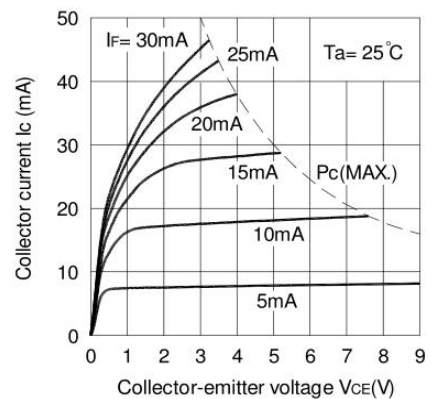


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

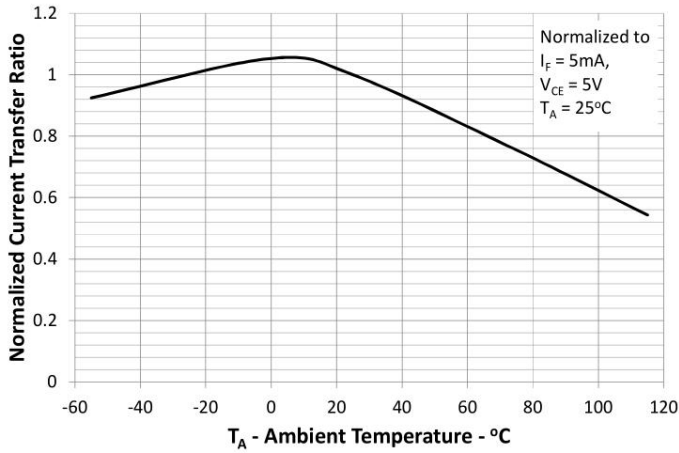


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

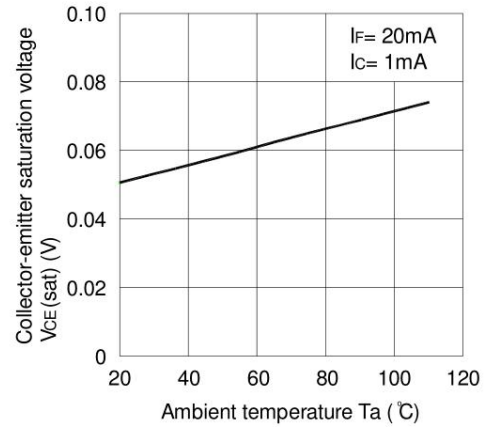


Fig.9 Collector Dark Current vs. Ambient Temperature

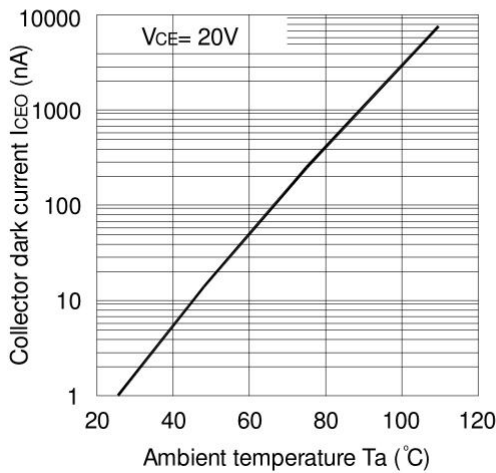


Fig.10 Response Time vs. Load Resistance

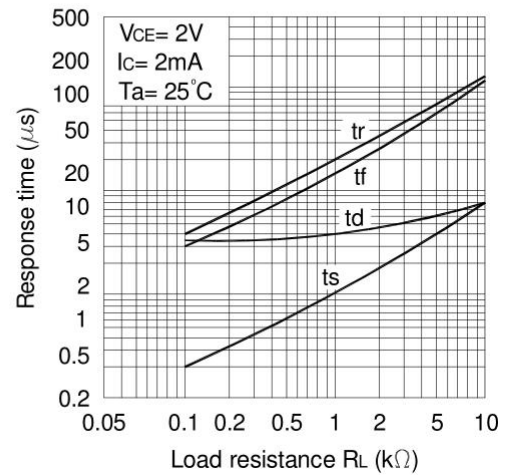
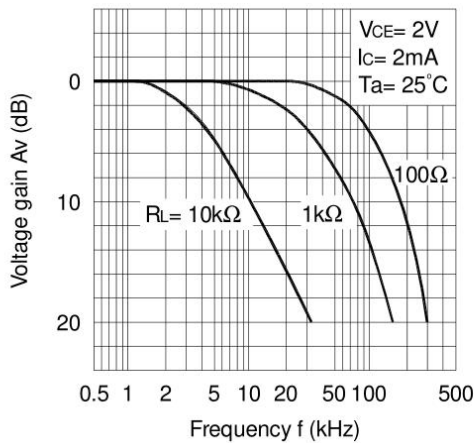
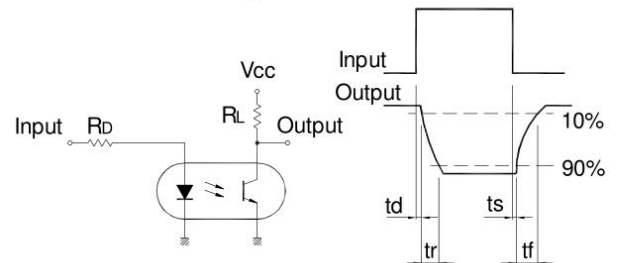


Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

