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November 2016

# QSD123, QSD124 Plastic Silicon Infrared Phototransistor

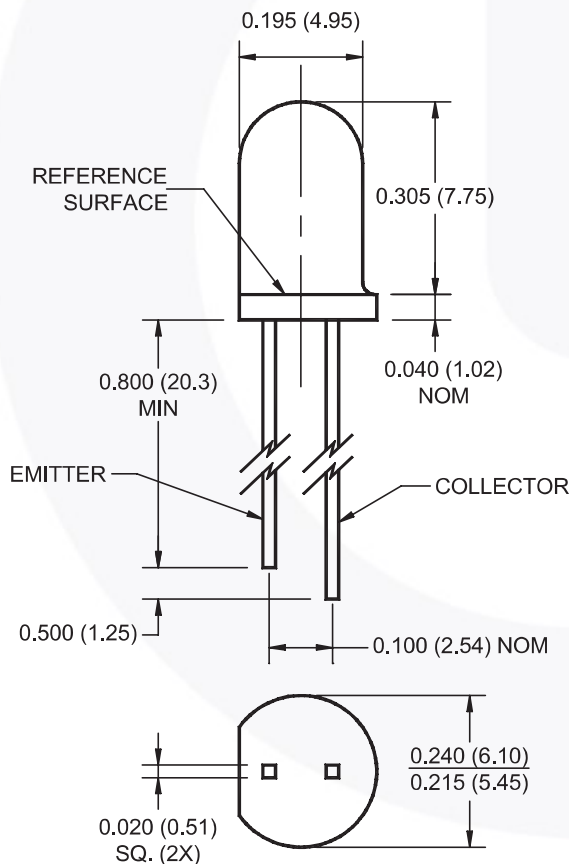
## Features

- NPN Silicon Phototransistor
- Package Type: T-1 3/4
- Matched Emitter: QED12X/QED22X/QED23X
- Narrow Reception Angle: 24°C
- Daylight Filter
- Package Material and Color: Black Epoxy
- High Sensitivity

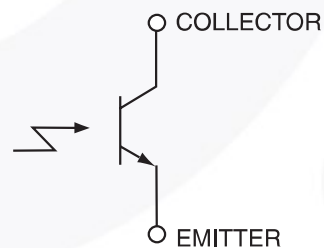
## Description

The QSD123/124 is a phototransistor encapsulated in an infrared transparent, black T-1 3/4 package.

## Package Dimensions



## Schematic



### Notes:

1. Dimensions for all drawings are in inches (mm).
2. Tolerance of  $\pm 0.010$  (0.25) on all non-nominal dimensions unless otherwise specified.

**Absolute Maximum Ratings** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol      | Parameter                                       | Rating         | Unit             |
|-------------|-------------------------------------------------|----------------|------------------|
| $T_{OPR}$   | Operating Temperature                           | -40 to +100    | $^\circ\text{C}$ |
| $T_{STG}$   | Storage Temperature                             | -40 to +100    | $^\circ\text{C}$ |
| $T_{SOL-I}$ | Soldering Temperature (Iron) <sup>(2,3,4)</sup> | 240 for 5 sec  | $^\circ\text{C}$ |
| $T_{SOL-F}$ | Soldering Temperature (Flow) <sup>(2,3)</sup>   | 260 for 10 sec | $^\circ\text{C}$ |
| $V_{CE}$    | Collector-Emitter Voltage                       | 30             | V                |
| $V_{EC}$    | Emitter-Collector Voltage                       | 5              | V                |
| $P_D$       | Power Dissipation <sup>(1)</sup>                | 100            | mW               |

**Notes:**

1. Derate power dissipation linearly 1.33mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$ .
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16" (1.6mm) minimum from housing.
5.  $\lambda = 880\text{nm}$ , AlGaAs.

**Electrical/Optical Characteristics** ( $T_A = 25^\circ\text{C}$ )

| Symbol         | Parameter                                 | Test Conditions                                                 | Min. | Typ.     | Max. | Units         |
|----------------|-------------------------------------------|-----------------------------------------------------------------|------|----------|------|---------------|
| $\lambda_{PS}$ | Peak Sensitivity Wavelength               |                                                                 |      | 880      |      | nm            |
| $\Theta$       | Reception Angle                           |                                                                 |      | $\pm 12$ |      | $^\circ$      |
| $I_{CEO}$      | Collector-Emitter Dark Current            | $V_{CE} = 10\text{V}$ , $E_e = 0$                               |      |          | 100  | nA            |
| $BV_{CEO}$     | Collector-Emitter Breakdown               | $I_C = 1\text{mA}$                                              | 30   |          |      | V             |
| $BV_{ECO}$     | Emitter-Collector Breakdown               | $I_E = 100\mu\text{A}$                                          | 5    |          |      | V             |
| $I_{C(ON)}$    | On-State Collector Current <sup>(5)</sup> | $E_e = 0.5\text{mW}/\text{cm}^2$ , $V_{CE} = 5\text{V}$         |      |          |      |               |
|                | QSD123                                    |                                                                 | 4    |          | 16   | mA            |
|                | QSD124                                    |                                                                 | 6    |          | 29   | mA            |
| $V_{CE(SAT)}$  | Saturation Voltage <sup>(5)</sup>         | $E_e = 0.5\text{mW}/\text{cm}^2$ , $I_C = 0.5\text{mA}$         |      |          | 0.4  | V             |
| $t_r$          | Rise Time                                 | $V_{CC} = 5\text{V}$ , $R_L = 100\Omega$ , $I_C = 0.2\text{mA}$ |      | 7        |      | $\mu\text{s}$ |
| $t_f$          | Fall Time                                 |                                                                 |      | 7        |      | $\mu\text{s}$ |

## Typical Performance Characteristics

Figure 1. Light Current vs. Radiant Intensity

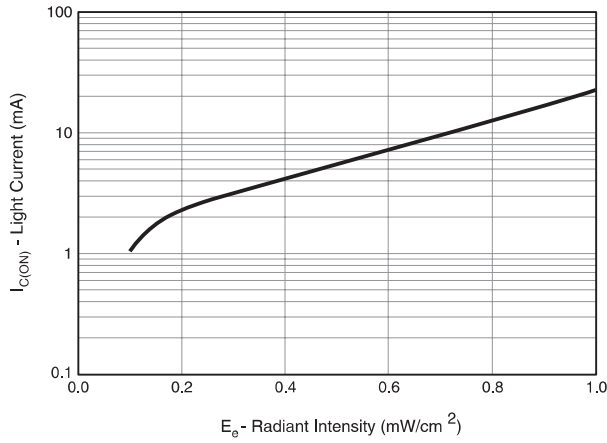


Figure 2. Angular Response Curve

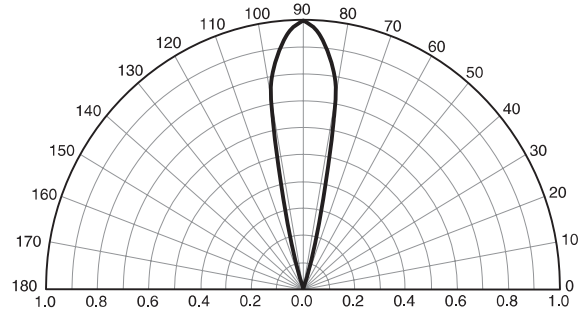


Figure 3. Dark Current vs. Collector - Emitter Voltage

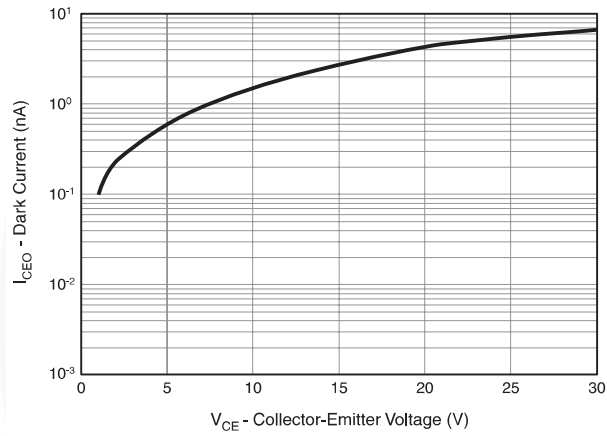


Figure 4. Light Current vs. Collector - Emitter Voltage

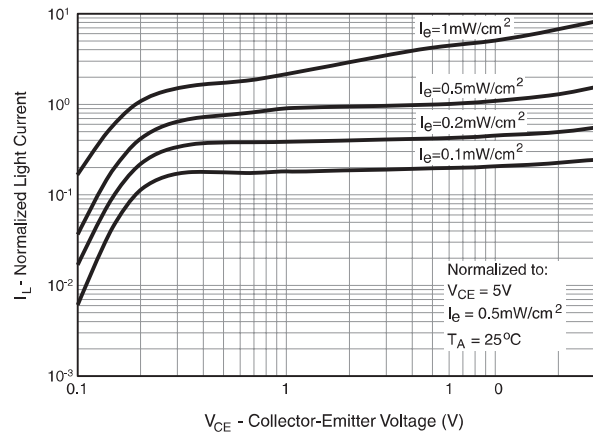
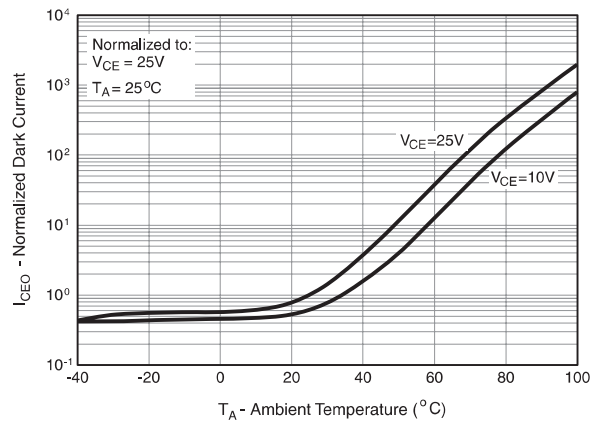


Figure 5. Dark Current vs. Ambient Temperature





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