

# QSC112, QSC113, QSC114 Plastic Silicon Infrared Phototransistor

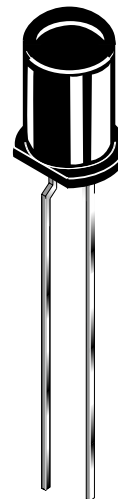
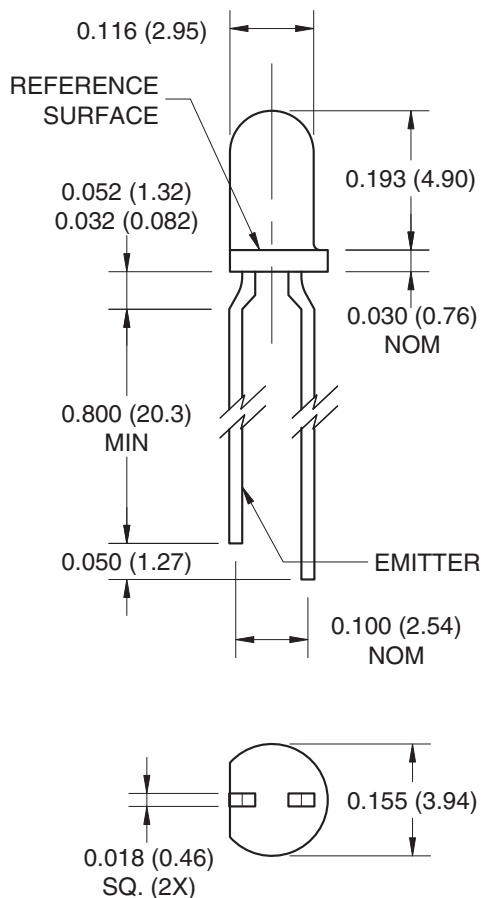
## Features

- Tight production distribution
- Steel lead frames for improved reliability in solder mounting
- Good optical-to-mechanical alignment
- Plastic package is infrared transparent black to attenuate visible light
- Can be used with QECXXX LED
- Black plastic body allows easy recognition from LED

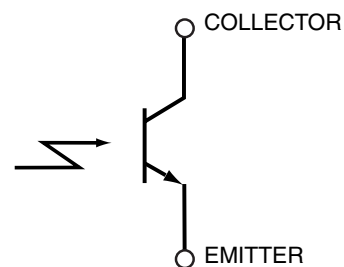
## Description

The QSC112/113/114 is a silicon phototransistor encapsulated in an infrared transparent, black T-1 package.

## Package Dimensions



## Schematic



### Notes:

1. Dimensions of all drawings are in inches (mm).
2. Tolerance is  $\pm 0.10$  (.25) on all non-nominal dimensions unless otherwise specified.

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

| Symbol      | Parameter                                       | Rating         | Units            |
|-------------|-------------------------------------------------|----------------|------------------|
| $T_{OPR}$   | 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:**

- Derate power dissipation linearly 1.33 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$ .
- RMA flux is recommended.
- Methanol or isopropyl alcohols are recommended as cleaning agents.
- Soldering iron 1/16" (1.6mm) minimum from housing.

**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                   |                                                             |      | $\pm 4$ |      | $^\circ$      |
| $I_{CEO}$      | 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 QSC112 | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(5)}$       | 1    |         | 4    | mA            |
|                | On-State Collector Current QSC113 |                                                             | 2.40 |         | 9.60 |               |
|                | On-State Collector Current QSC114 |                                                             | 4.00 |         |      |               |
| $V_{CE(sat)}$  | Saturation Voltage                | $E_e = 0.5\text{ mW/cm}^2, I_C = 0.5\text{ mA}^{(5)}$       |      |         | 0.4  | V             |
| $t_r$          | Rise Time                         | $V_{CC} = 5\text{ V}, R_L = 100\ \Omega, I_C = 2\text{ mA}$ |      | 5.0     |      | $\mu\text{s}$ |
| $t_f$          | Fall Time                         |                                                             |      | 5.0     |      |               |

**Note:**

- $\lambda = 880\text{ nm}, \text{AlGaAs}$ .

## Typical Performance Curves

Figure 1. Light Current vs. Radiant Intensity

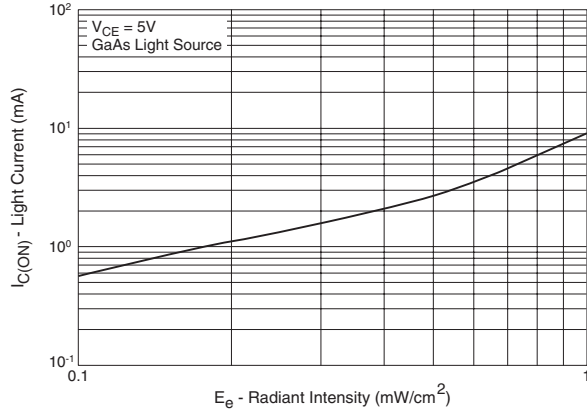


Figure 2. Angular Response Curve

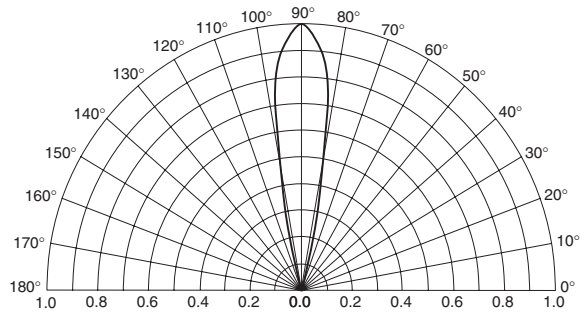


Figure 3. Dark Current vs. Collector - Emitter Voltage

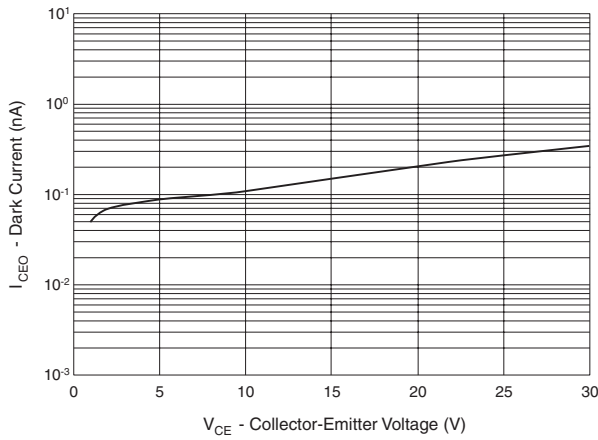


Figure 4. Light Current vs. Collector - Emitter Voltage

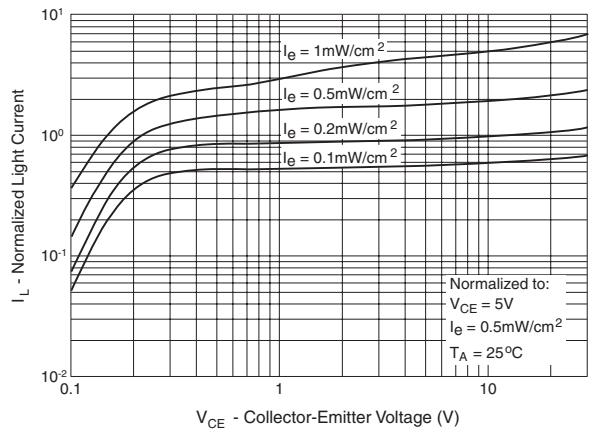
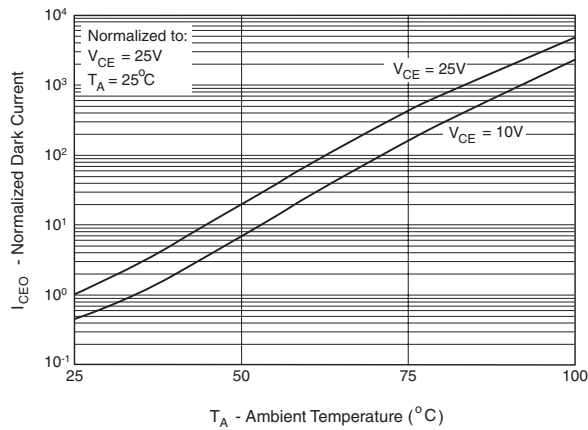



Figure 5. Dark Current vs. Ambient Temperature



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