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QSC112, QSC113, QSC114 Plastic Silicon Infrared Phototransistor

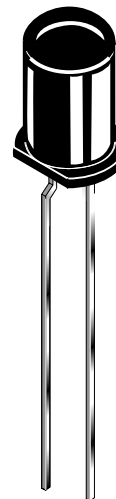
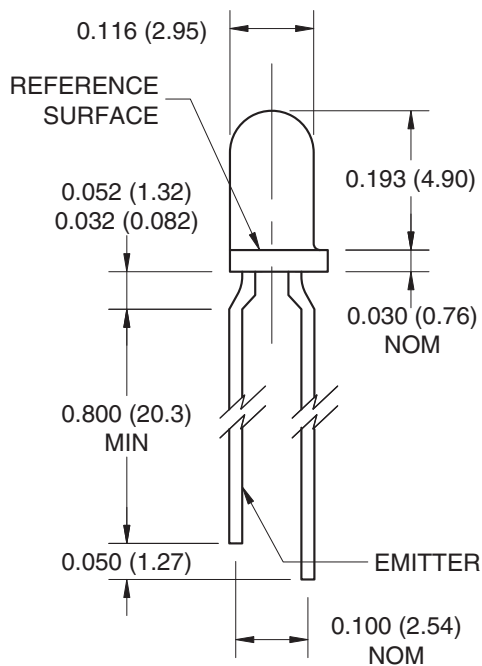
Features

- 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

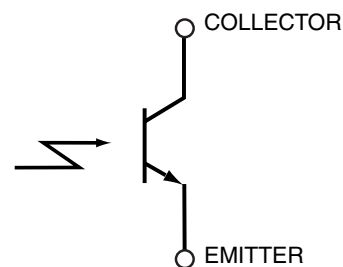
Description

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 ± 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) ^(2,3,4) | 240 for 5 sec | $^\circ\text{C}$ |
| T_{SOL-F} | Soldering Temperature (Flow) ^(2,3) | 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 ⁽¹⁾ | 100 | mW |

Notes:

- Derate power dissipation linearly 1.33 mW/ $^\circ\text{C}$ above 25°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 |
|----------------|-----------------------------------|---|------|---------|------|---------------|
| λ_{PS} | Peak Sensitivity Wavelength | | | 880 | | nm |
| Θ | Reception Angle | | | ± 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 | | μs |
| t_f | Fall Time | | | 5.0 | | |

Note:

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

Typical Performance Curves

Figure 1. Light Current vs. Radiant Intensity

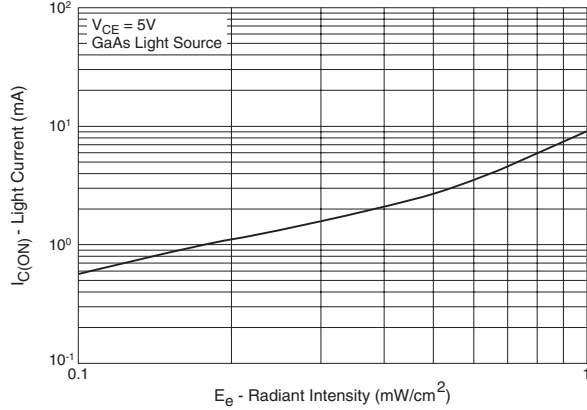


Figure 2. Angular Response Curve

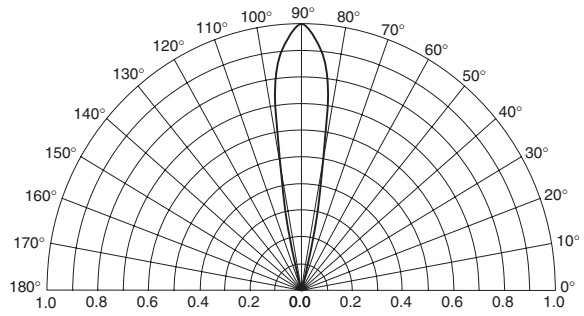


Figure 3. Dark Current vs. Collector - Emitter Voltage

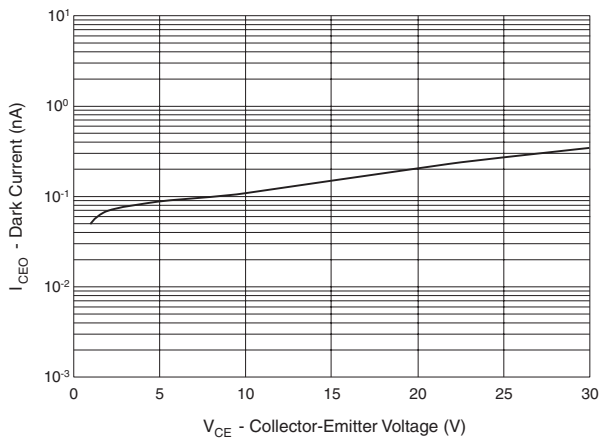


Figure 4. Light Current vs. Collector - Emitter Voltage

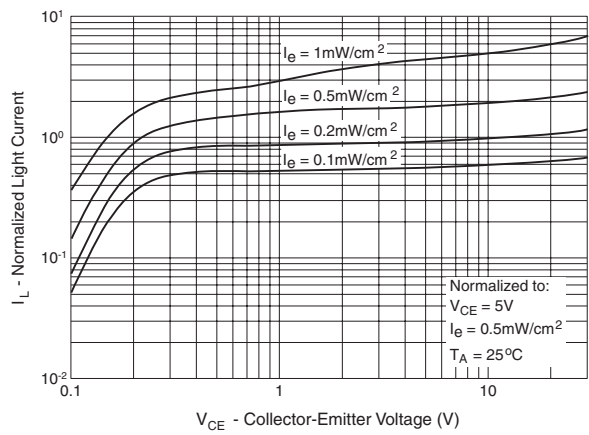
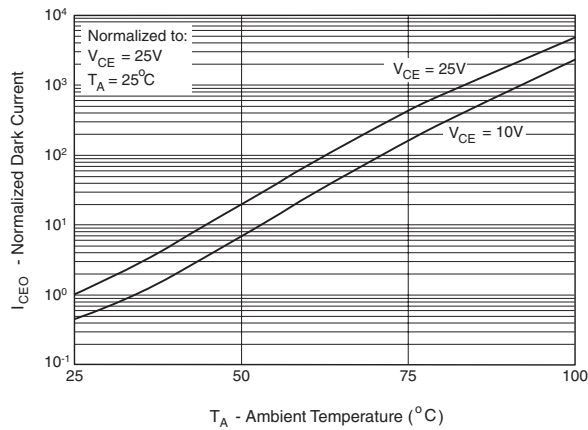



Figure 5. Dark Current vs. Ambient Temperature



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