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May 2015

QSE113 / QSE114 — Plastic Silicon Infrared Phototransistor

# QSE113 / QSE114 Plastic Silicon Infrared Phototransistor

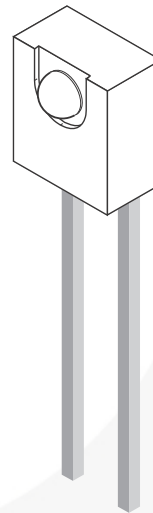
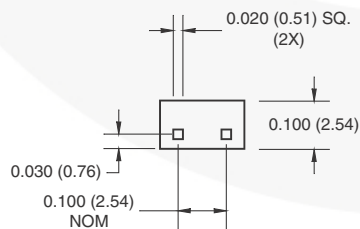
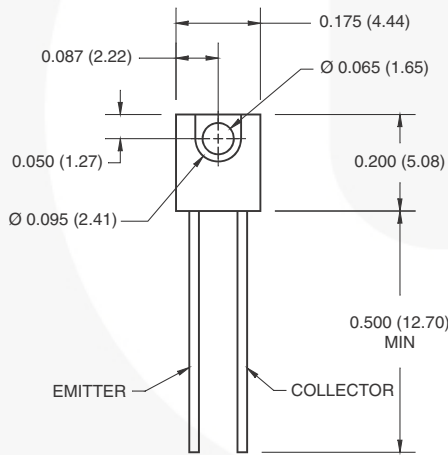
## Features

- NPN Silicon Phototransistor
- Package Type: Sidelooker
- Medium Wide Reception Angle, 50°
- Package Material and Color: Black Epoxy
- Matched Emitter: QEE113
- Daylight Filter
- High Sensitivity
- Blue dot marking on the top side

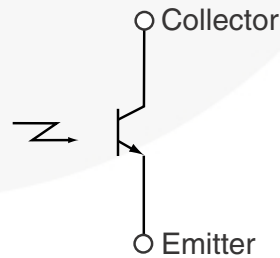
## Description

The QSE113/114 is a silicon phototransistor encapsulated in a wide angle, infrared transparent, black plastic sidelooker package.

## Package Dimensions<sup>(1, 2)</sup>



## 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

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. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$T_{\text{OPR}}$	Operating Temperature	-40 to +100	$^\circ\text{C}$
$T_{\text{STG}}$	Storage Temperature	-40 to +100	$^\circ\text{C}$
$T_{\text{SOL-I}}$	Soldering Temperature (Iron) <sup>(4, 5, 6)</sup>	240 for 5 sec	$^\circ\text{C}$
$T_{\text{SOL-F}}$	Soldering Temperature (Flow) <sup>(4, 5)</sup>	260 for 10 sec	$^\circ\text{C}$
$V_{\text{CE}}$	Collector Emitter Voltage	30	V
$V_{\text{EC}}$	Emitter Collector Voltage	5	V
$P_{\text{D}}$	Power Dissipation <sup>(3)</sup>	100	mW

### Notes:

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

## Electrical / Optical Characteristics

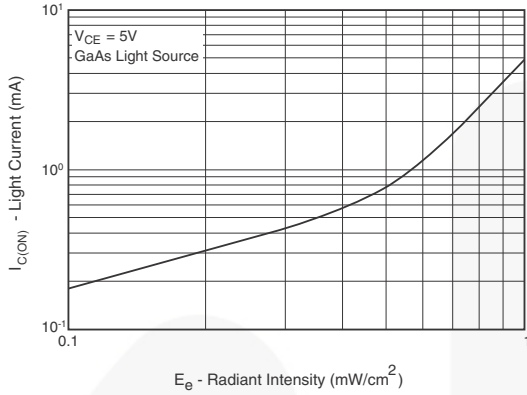
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\lambda_{\text{PS}}$	Peak Sensitivity			880		nm
$\Theta$	Reception Angle			$\pm 25$		$^\circ$
$I_{\text{CEO}}$	Collector Emitter Dark Current	$V_{\text{CE}} = 10 \text{ V}, E_e = 0$			100	nA
$BV_{\text{CEO}}$	Collector-Emitter Breakdown	$I_{\text{C}} = 1 \text{ mA}$	30			V
$BV_{\text{ECO}}$	Emitter-Collector Breakdown	$I_{\text{E}} = 100 \mu\text{A}$	5			V
$I_{\text{C(ON)}}$	On-State Collector Current <sup>(7)</sup> QSE113	$E_e = 0.5 \text{ mW/cm}^2, V_{\text{CE}} = 5 \text{ V}$	0.25		1.50	mA
	On-State Collector Current <sup>(7)</sup> QSE114		1.00			
$V_{\text{CE(SAT)}}$	Saturation Voltage <sup>(7)</sup>	$E_e = 0.5 \text{ mW/cm}^2, I_{\text{C}} = 0.1 \text{ mA}$			0.4	V
$t_{\text{r}}$	Rise Time	$I_{\text{C}} = 1 \text{ mA}, V_{\text{CC}} = 5 \text{ V}, R_{\text{L}} = 100 \Omega$		8		$\mu\text{s}$
$t_{\text{f}}$	Fall Time			8		$\mu\text{s}$

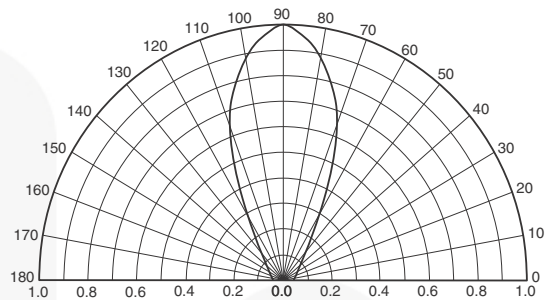
### Note:

7.  $\lambda = 880 \text{ nm}$  (AlGaAs)

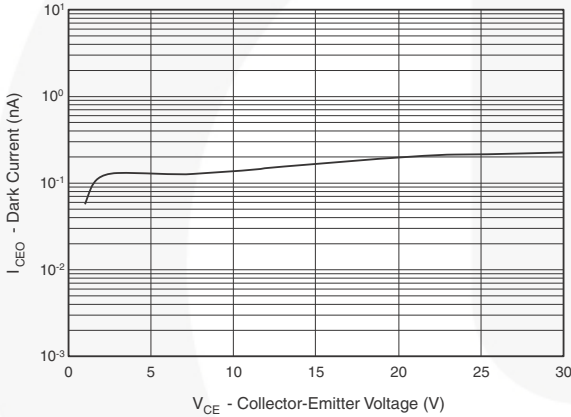
## Typical Performance Characteristics



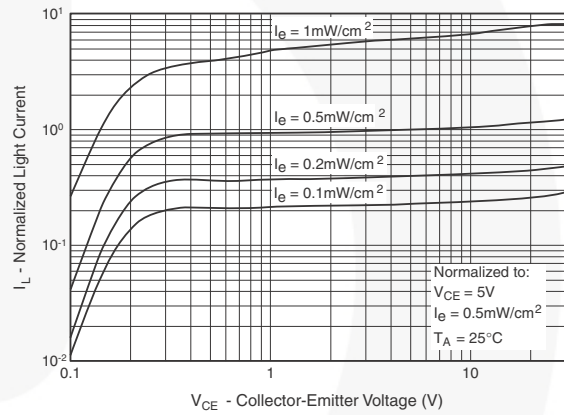
**Figure 1. Light Current vs. Radiant Intensity**



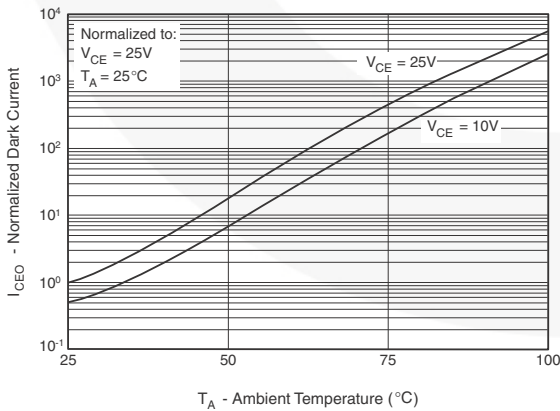
**Figure 2. Angular Response Curve**



**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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