

# QSC112, QSC113, QSC114 Plastic Silicon Infrared Phototransistor

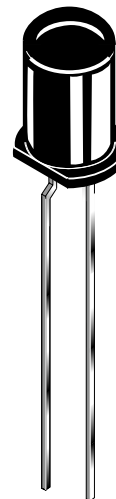
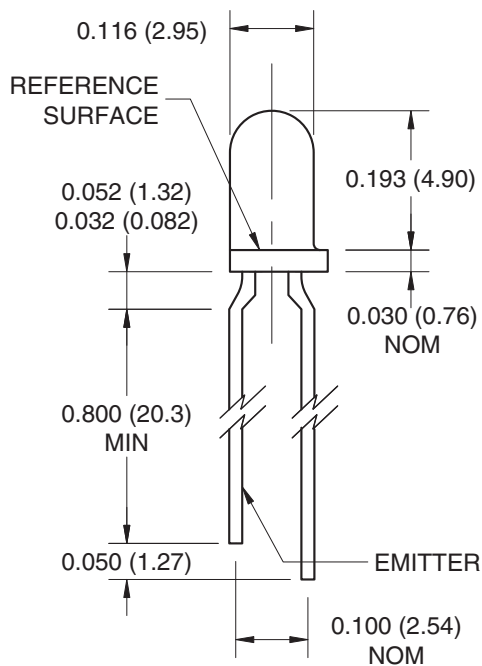
## Features

- 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

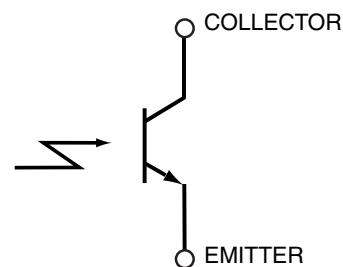
## Description

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

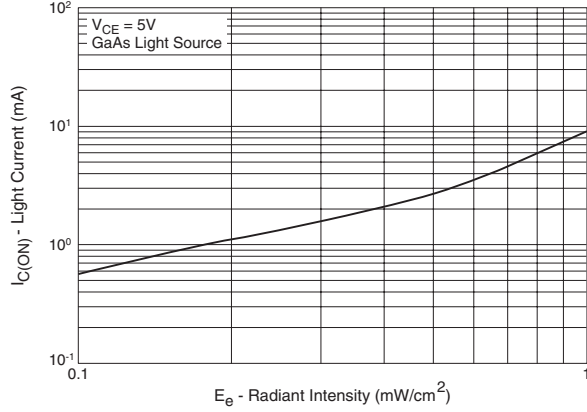


Figure 2. Angular Response Curve

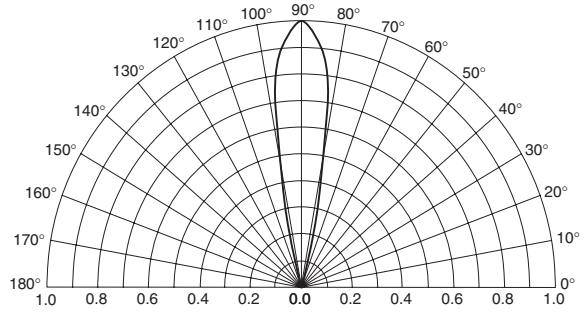


Figure 3. Dark Current vs. Collector - Emitter Voltage

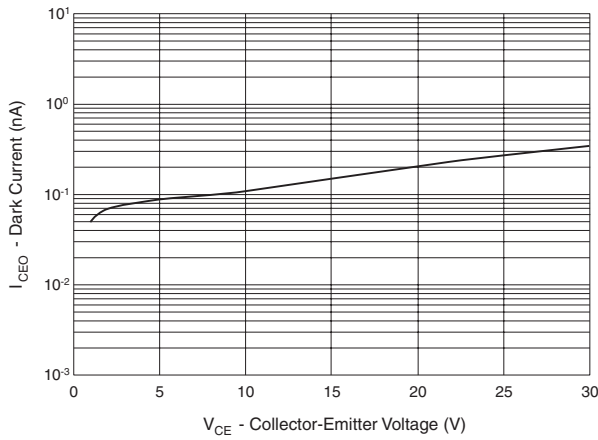


Figure 4. Light Current vs. Collector - Emitter Voltage

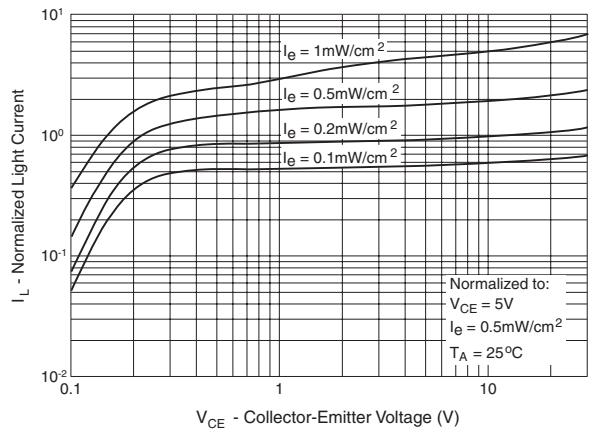
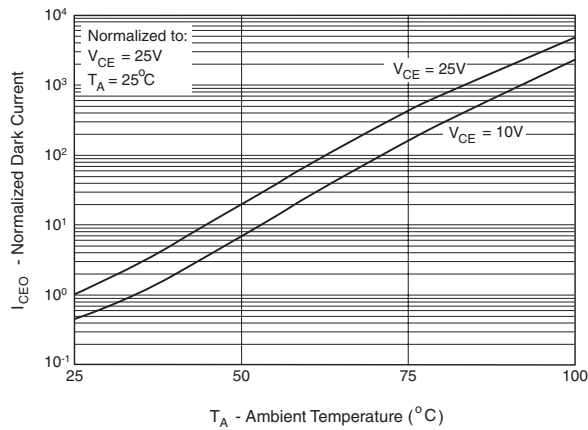



Figure 5. Dark Current vs. Ambient Temperature



## TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE <sup>x</sup>	<i>i-Lo</i> <sup>TM</sup>	Power-SPM <sup>TM</sup>	TinyBoost <sup>TM</sup>
Across the board. Around the world. <sup>TM</sup>	ImpliedDisconnect <sup>TM</sup>	PowerTrench <sup>®</sup>	TinyBuck <sup>TM</sup>
ActiveArray <sup>TM</sup>	IntelliMAX <sup>TM</sup>	Programmable Active Droop <sup>TM</sup>	TinyLogic <sup>®</sup>
Bottomless <sup>TM</sup>	ISOPLANAR <sup>TM</sup>	QFET <sup>®</sup>	TINYOPTO <sup>TM</sup>
Build it Now <sup>TM</sup>	MICROCOUPLER <sup>TM</sup>	QS <sup>TM</sup>	TinyPower <sup>TM</sup>
CoolFET <sup>TM</sup>	MicroPak <sup>TM</sup>	QT Optoelectronics <sup>TM</sup>	TinyWire <sup>TM</sup>
CROSSVOLT <sup>TM</sup>	MICROWIRE <sup>TM</sup>	Quiet Series <sup>TM</sup>	TruTranslation <sup>TM</sup>
CTL <sup>TM</sup>	Motion-SPM <sup>TM</sup>	RapidConfigure <sup>TM</sup>	μSerDes <sup>TM</sup>
Current Transfer Logic <sup>TM</sup>	MSX <sup>TM</sup>	RapidConnect <sup>TM</sup>	UHC <sup>®</sup>
DOME <sup>TM</sup>	MSXPro <sup>TM</sup>	ScalarPump <sup>TM</sup>	UniFET <sup>TM</sup>
E <sup>2</sup> CMOS <sup>TM</sup>	OCX <sup>TM</sup>	SMART START <sup>TM</sup>	VCX <sup>TM</sup>
EcoSPARK <sup>®</sup>	OCXPro <sup>TM</sup>	SPM <sup>®</sup>	Wire <sup>TM</sup>
EnSigna <sup>TM</sup>	OPTOLOGIC <sup>®</sup>	STEALTH <sup>TM</sup>	
FACT Quiet Series <sup>TM</sup>	OPTOPLANAR <sup>®</sup>	SuperFET <sup>TM</sup>	
FACT <sup>®</sup>	PACMAN <sup>TM</sup>	SuperSOT <sup>TM</sup> -3	
FAST <sup>®</sup>	PDP-SPM <sup>TM</sup>	SuperSOT <sup>TM</sup> -6	
FASTr <sup>TM</sup>	POP <sup>TM</sup>	SuperSOT <sup>TM</sup> -8	
FPS <sup>TM</sup>	Power220 <sup>®</sup>	SyncFET <sup>TM</sup>	
FRFET <sup>®</sup>	Power247 <sup>®</sup>	TCM <sup>TM</sup>	
GlobalOptoisolator <sup>TM</sup>	PowerEdge <sup>TM</sup>	The Power Franchise <sup>®</sup>	
GTO <sup>TM</sup>	PowerSaver <sup>TM</sup>		
HiSeC <sup>TM</sup>			

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

- Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
- A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

Rev. 126