Reflective Object Sensor

QRD1113, QRD1114

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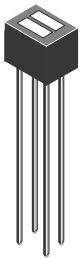


REFLECTIVE RECTANGULAR SENSOR
CASE 100BY

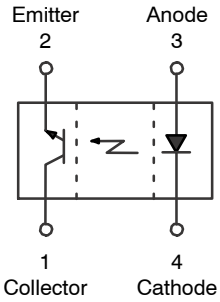
Description

The QRD1113 and QRD1114 reflective sensors consist of an infrared emitting diode and an NPN silicon phototransistor mounted side by side in a black plastic housing. The on−axis radiation of the emitter and the on−axis response of the detector are both perpendicular to the face of the QRD1113 and QRD1114. The phototransistor responds to radiation emitted from the diode only when a reflective object or surface is in the field of view of the detector.

Features

- Phototransistor Output
- No−Contact Surface Sensing
- Unfocused for Sensing Diffused Surfaces
- Compact Package
- Daylight Filter on Sensor
- This Device is Pb−Free and RoHS Compliant

PIN ASSIGNMENT



ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

ABSOLUTE MAXIMUM RATINGS

(Values are at T_A = 25°C unless otherwise specified)

Symbol	Parameter	Min.	Unit
T_{OPR}	Operating Temperature	−40 to +85	°C
T_{STG}	Storage Temperature	−40 to +100	
$T_{SOL−I}$	Lead Temperature (Solder Iron) (Notes 1, 2, 3)	240 for 5 s	
$T_{SOL−F}$	Lead Temperature (Solder Flow) (Notes 1, 2)	260 for 10 s	
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	5	V
P_D	Power Dissipation	100	mW
SENSOR			
V_{CEO}	Collector−Emitter Voltage	30	V
V_{ECO}	Emitter−Collector Voltage	5	V
P_D	Power Dissipation (Note 4)	100	mW

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. RMA flux is recommended.
2. Methanol or isopropyl alcohols are recommended as cleaning agents.
3. Soldering iron tip 1/16 inch (1.6 mm) minimum from housing.
4. Derate power dissipation linearly 1.33 mW/°C.

ELECTRICAL/OPTICAL CHARACTERISTICS (Values are at T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
INPUT (EMITTER)						
V_F	Forward Voltage	I_F = 20 mA			1.7	V
I_R	Reverse Leakage Current	V_R = 5 V			100	μA
λ_{PE}	Peak Emission Wavelength	I_F = 20 mA		940		nm
OUTPUT (SENSOR)						
BV_{CEO}	Collector−Emitter Breakdown	I_C = 1 mA	30			V
BV_{ECO}	Emitter−Collector Breakdown	I_E = 0.1 mA	5			V
I_D	Dark Current	V_{CE} = 10 V, I_F = 0 mA			100	nA
COUPLED						
$I_{C(ON)}$	QRD1113 Collector Current	I_F = 20 mA, V_{CE} = 5 V, D = 0.050 inch (Notes 5, 7)	0.300			mA
$I_{C(ON)}$	QRD1114 Collector Current		1			mA
$V_{CE(SAT)}$	Collector Emitter Saturation Voltage	I_F = 40 mA, I_C = 100 μA, D = 0.050 inch (Notes 5, 7)			0.4	V
I_{CX}	Cross Talk	I_F = 20 mA, V_{CE} = 5 V, E_E = 0 (Note 6)		0.2	10.0	μA
t_r	Rise Time	V_{CE} = 5 V, R_L = 100 Ω, $I_{C(ON)}$ = 5 mA		10		μs
t_f	Fall time			50		μs

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. D is the distance from the sensor face to the reflective surface.
6. Crosstalk (I_{CX}) is the collector current measured with the indicated current on the input diode and with no reflective surface.
7. Measured using Eastman Kodak natural white test card with 90% diffused reflecting as a reflecting surface.

ORDERING INFORMATION

Part Number	Operating Temperature	Package	Top Mark	Packing Method
QRD1113	−40 to +85°C	Reflective Rectangular Sensor PCB Mount	QRD1113	Bulk
QRD1114	−40 to +85°C		QRD1114	

TYPICAL PERFORMANCE CHARACTERISTICS

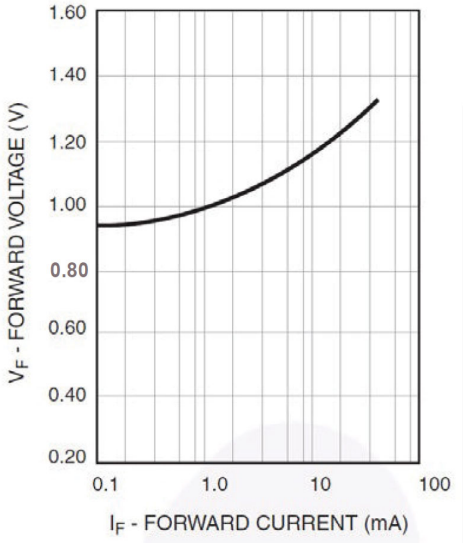


Figure 1. Forward Voltage vs. Forward Current

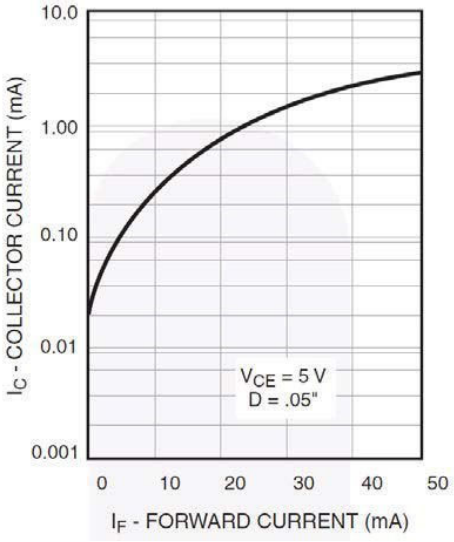


Figure 2. Normalized Collector Current vs. Forward Current

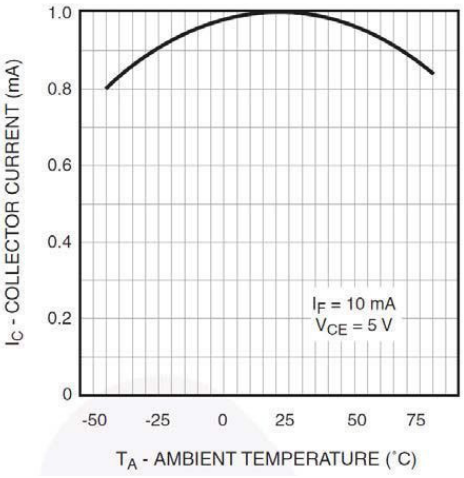


Figure 3. Normalized Collector Current vs. Temperature

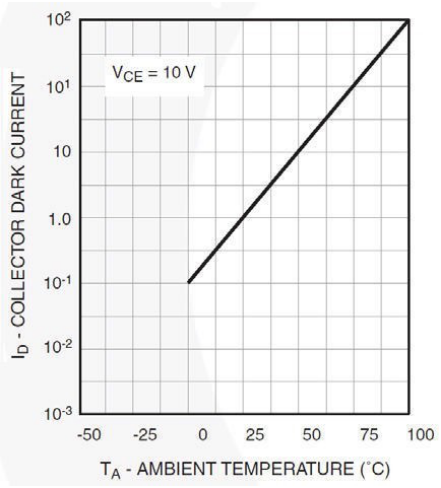


Figure 4. Normalized Collector Dark Current vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

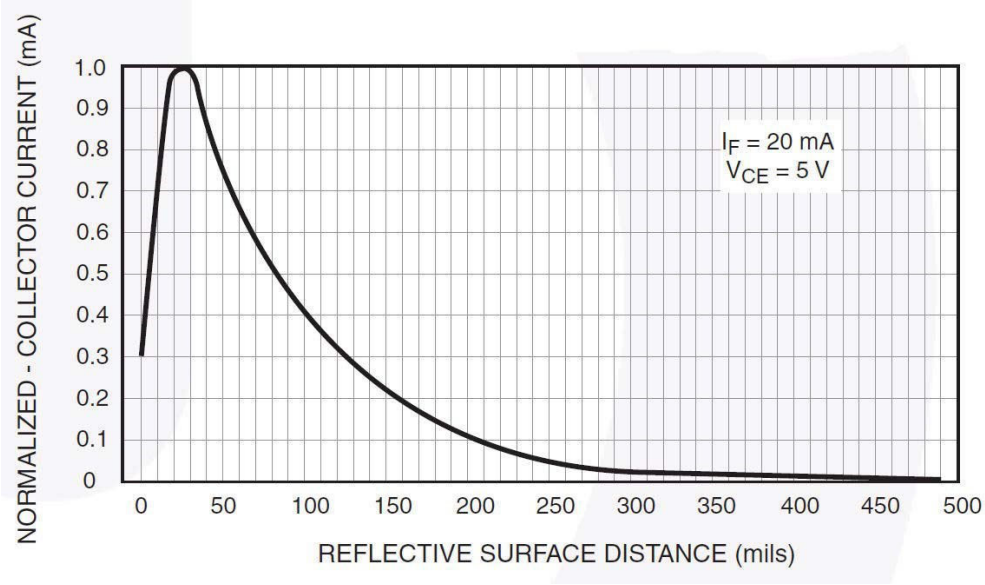


Figure 5. Normalized Collector Current vs. Distance

REFLECTIVE RECTANGULAR SENSOR PCB MOUNT
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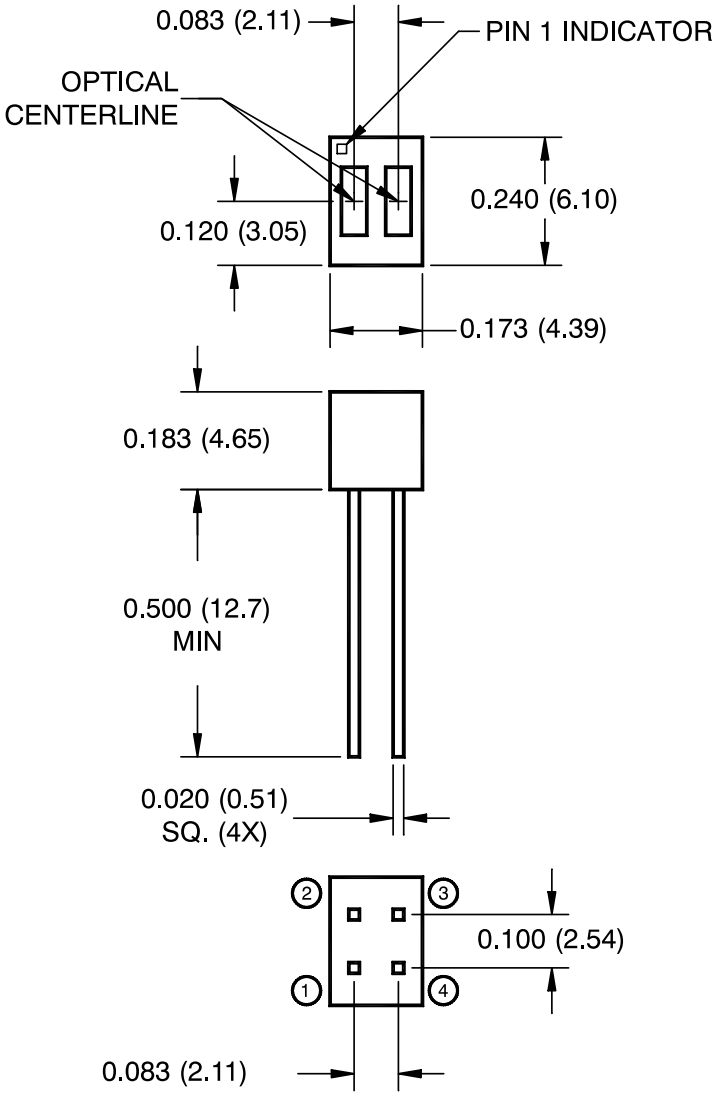
ISSUE O

DATE 30 SEP 2016



Notes:
1.Dimensions for all drawings are in inches (millimeters).
2. Tolerance of ± .010 (.25) on all non−nominal dimensions unless otherwise specified.
3.Pins 2 and 4 typically .050” shorter than pins 1 and 3.
4.Dimensions controlled at housing surface.

ISSUE	REVISION	DATE
O	RELEASED FOR PRODUCTION FROM FAIRCHILD ARU311A TO ON SEMICONDUCTOR. REQ. BY D. TRUHITTE.	30 SEP 2016

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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