

QRD1313 Reflective Object Sensor

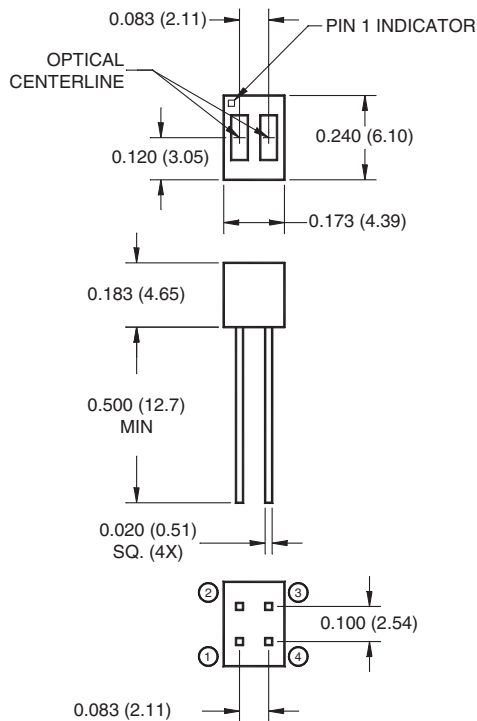
Features

- Photodarlington output
- Unfocused for sensing diffused surfaces
- Low cost plastic housing
- Designed for paper path and other non-contact surface sensing

Description

The QRD1313 reflective sensor consists of an infrared emitting diode and an NPN silicon photodarlington 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 QRD1313. The photodarlington responds to radiation emitted from the diode only when a reflective object or surface is in the field of view of the detector.

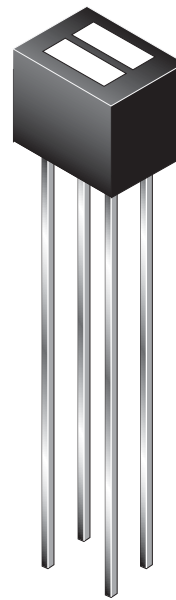
Package Dimensions



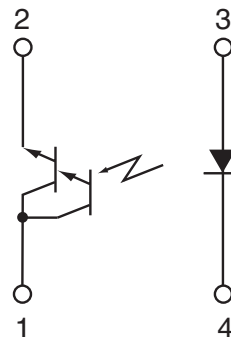
PIN 1 COLLECTOR	PIN 3 ANODE
PIN 2 EMITTER	PIN 4 CATHODE

NOTES:

1. Dimensions for all drawings are in inches (millimeters).
2. Tolerance of $\pm .010$ (.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.



Schematic



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

Parameter	Symbol	Rating	Units
Operating Temperature	T_{OPR}	-40 to +85	$^\circ\text{C}$
Storage Temperature	T_{STG}	-40 to +100	$^\circ\text{C}$
Lead Temperature (Iron) ^(2,3,4)	$T_{\text{SOL-I}}$	240 for 5 sec	$^\circ\text{C}$
Lead Temperature (Flow) ^(2,3)	$T_{\text{SOL-F}}$	260 for 10 sec	$^\circ\text{C}$
Emitter			
Continuous Forward Current	I_F	50	mA
Reverse Voltage	V_R	5	V
Power Dissipation ⁽¹⁾	P_D	100	mW
Sensor			
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Collector Voltage	V_{ECO}	5	V
Power Dissipation ⁽¹⁾	P_D	100	mW

NOTES:

- Derate power dissipation linearly 1.33 mW/ $^\circ\text{C}$ above 25°C .
- RMA flux is recommended.
- Soldering iron tip 1/16" (1.6 mm) minimum from housing.
- As long as leads are not under any stress or spring tension.
- D is the distance from the sensor face to the reflective surface.
- Crosstalk (I_{CK}) is the collector current measured with the indicated current on the input diode and with no reflective surface.
- Measured using Eastman Kodak neutral white test card with 90% diffused reflecting as a reflecting surface.

Electrical / Optical Characteristics ($T_A = 25^\circ\text{C}$)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
Input (Emitter)						
Forward Voltage	$I_F = 20 \text{ mA}$	V_F	—	—	1.7	V
Reverse Leakage Current	$V_R = 2 \text{ V}$	I_R	—	—	100	μA
Output (Sensor)						
Emitter to Collector Breakdown	$I_E = 100 \mu\text{A}, E_e = 0$	BV_{ECO}	5	—	—	V
Collector to Emitter Breakdown	$I_C = 100 \mu\text{A}, E_e = 0$	BV_{CEO}	15	—	—	V
Collector to Emitter Leakage	$V_{\text{CE}} = 5 \text{ V}, E_e = 0$	I_{CEO}	—	—	250	nA
Coupled						
On-State Collector Current ^(5,7)	$I_F = 20 \text{ mA}, V_{\text{CE}} = 5 \text{ V}, D = .050"$	$I_{\text{C(ON)}}$	10.0	—	—	mA
Crosstalk ⁽⁸⁾	$I_F = 20 \text{ mA}, V_{\text{CE}} = 5.0 \text{ V}, E_e = 0$	I_{CK}	—	—	10	μA
Saturation Voltage ^(5,7)	$I_F = 20 \text{ mA}, I_C = 2 \text{ mA}, D = .050"$	$V_{\text{CE(SAT)}}$	—	—	1.10	V

Typical Performance Curves

Fig. 1 Forward Voltage vs. Forward Current

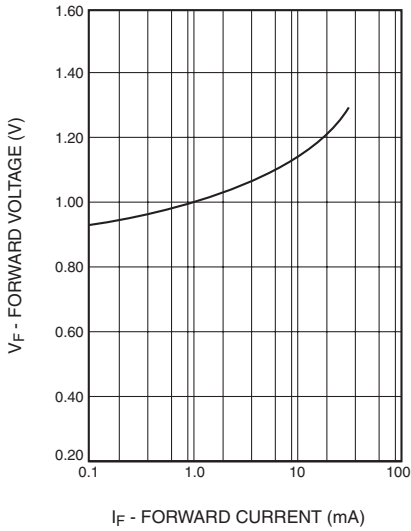


Fig. 2 Normalized Collector Current vs. Forward Current

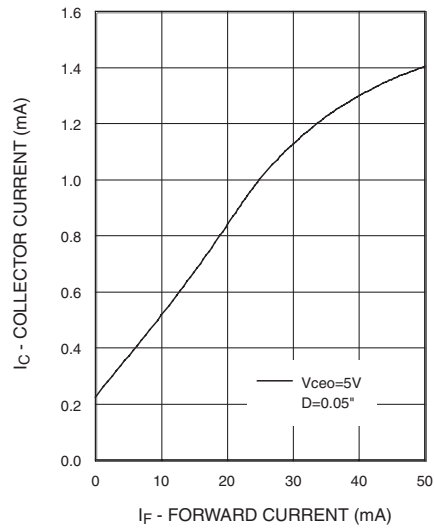


Fig. 3 Normalized Collector Current vs. Temperature

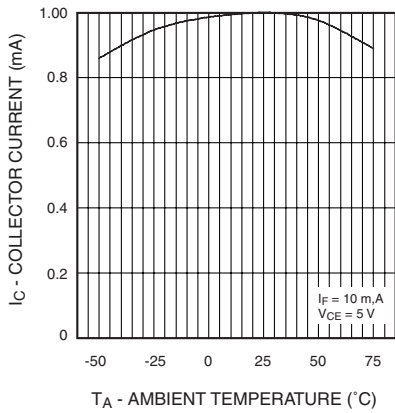


Fig. 4 Normalized Collector Dark Current vs. Temperature

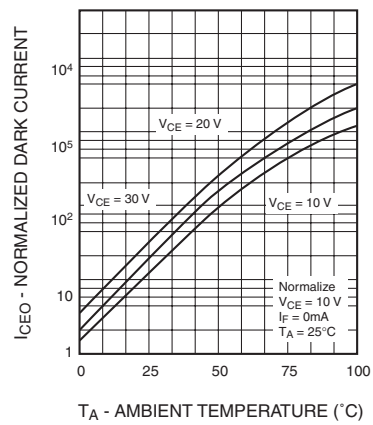
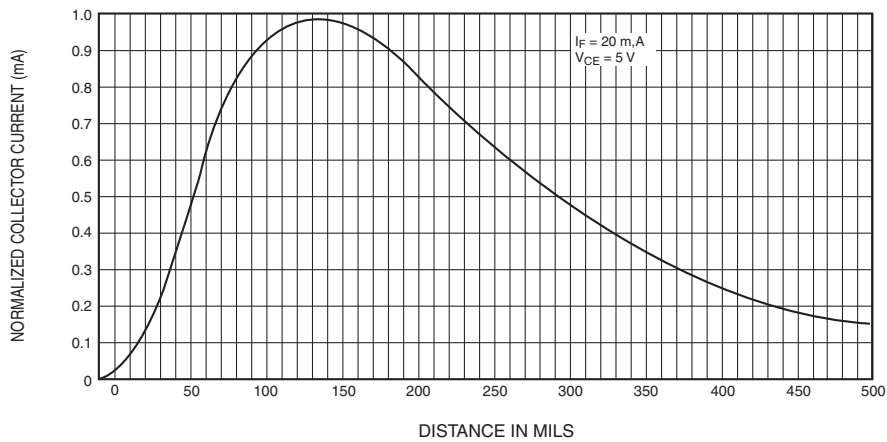


Fig. 5 Normalized Collector Current vs. Distance



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Rev. I15