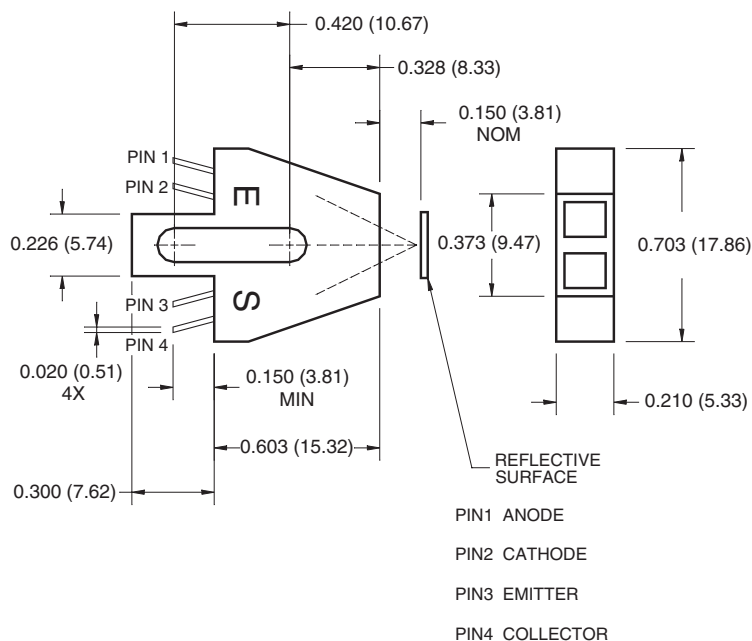


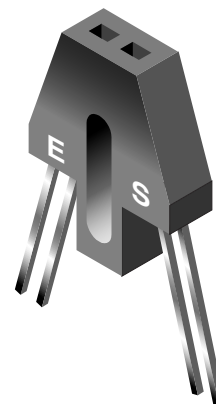
QRB1113 QRB1114

PACKAGE DIMENSIONS

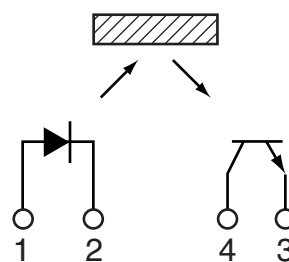


NOTES:

1. Dimensions for all drawings are in inches (mm).
2. Tolerance of $\pm .010$ (.25) on all non-nominal dimensions unless otherwise specified.



SCHEMATIC



DESCRIPTION

The QRB1113/1114 consists of an infrared emitting diode and an NPN silicon phototransistor mounted side by side on a converging optical axis in a black plastic housing. The phototransistor responds to radiation from the emitting diode only when a reflective object passes within its field of view. The area of the optimum response approximates a circle .200" in diameter.

FEATURES

- No contact surface sensing
- Phototransistor output
- Focused for sensing specular reflection
- Daylight filter on photosensor
- Dust cover

QRB1113 QRB1114

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 +85	$^\circ\text{C}$
Soldering Temperature (Iron) ^(2,3,4)	T_{SOL-I}	240 for 5 sec	$^\circ\text{C}$
Soldering Temperature (Flow) ^(2,3)	T_{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}	30	V
Emitter-Collector Voltage	V_{ECO}	4.5	V
Collector Current		20	mA
Power Dissipation ⁽¹⁾	P_D	100	mW

NOTES

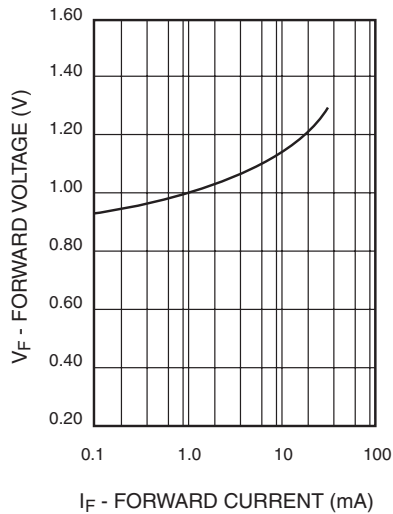
1. Derate power dissipation linearly 1.67 mW/ $^\circ\text{C}$ above 25°C .
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16" (1.6mm) minimum from housing.
5. D is the distance from the assembly face to the reflective surface.
6. Measured using an Eastman Kodak neutral test card with 90% diffused reflecting surface.
7. Cross talk is the photo current measured with current to the input diode and no reflecting surface.

ELECTRICAL/OPTICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

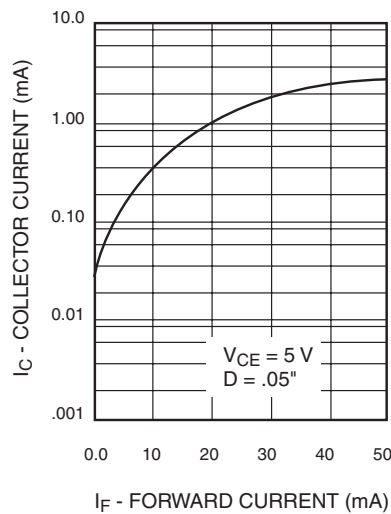
Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
EMITTER						
Forward Voltage	$I_F = 40\text{ mA}$	V_F	—	—	1.7	V
Reverse Current	$V_R = 5.0\text{ V}$	I_R	—	—	100	μA
Peak Emission Wavelength	$I_F = 20\text{ mA}$	λ_{PE}	—	940	—	nm
SENSOR						
Collector-Emitter Breakdown Voltage	$I_C = 1\text{ mA}$	BV_{CEO}	30	—	—	V
Emitter-Collector Breakdown Voltage	$I_E = 0.1\text{ mA}$	BV_{ECO}	5	—	—	V
Collector-Emitter Dark Current	$V_{CE} = 10\text{ V}, I_F = 0\text{ mA}$	I_{CEO}	—	—	100	nA
COUPLED						
On-state Collector Current	$I_F = 40\text{ mA}, V_{CE} = 5\text{ V}$ $D = .150''^{(5,6)}$	$I_{C(ON)}$				mA
QRB1113			0.20	—	—	
QRB1114			0.60	—	—	
Collector-Emitter Saturation Voltage	$I_F = 20\text{ mA}, I_C = 0.5\text{ mA}$	$V_{CE(SAT)}$	—	—	0.4	V
Rise Time	$V_{CE} = 5\text{ V}, R_L = 100\text{ V}$ $I_{C(ON)} = 5\text{ mA}$	t_r	—	8	—	μs
Fall Time		t_f	—	8	—	
Cross Talk	$I_F = 40\text{ mA}, V_{CE} = 5\text{ V}^{(7)}$	I_{CX}	—	—	1.00	μA

TYPICAL PERFORMANCE CURVES

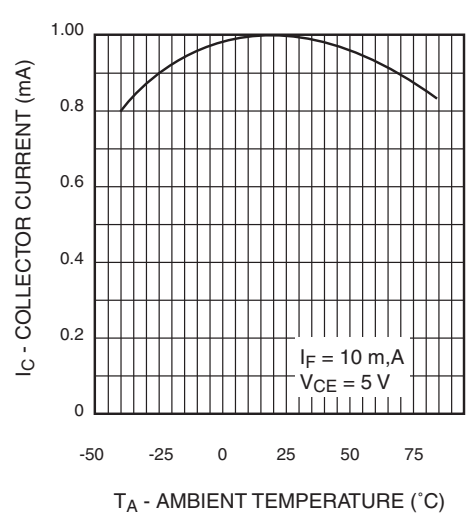
**Fig. 1 Forward Voltage
vs. Forward Current**



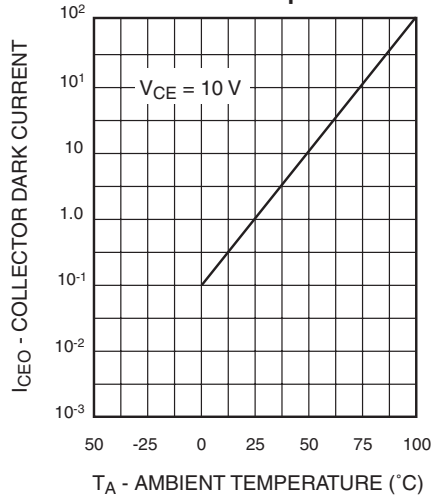
**Fig. 2 Normalized Collector Current
vs. Forward Current**



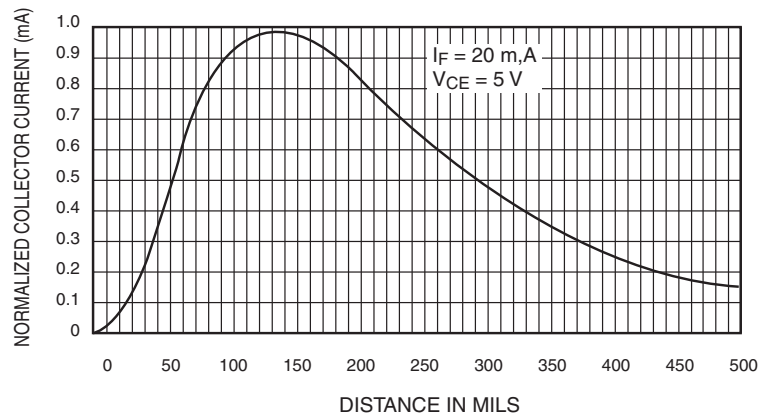
**Fig. 3 Normalized Collector Current
vs. Temperature**



**Fig. 4 Normalized Collector Dark
Current vs. Temperature**



**Fig. 5 Normalized Collector Current
vs. Distance**



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2. 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.