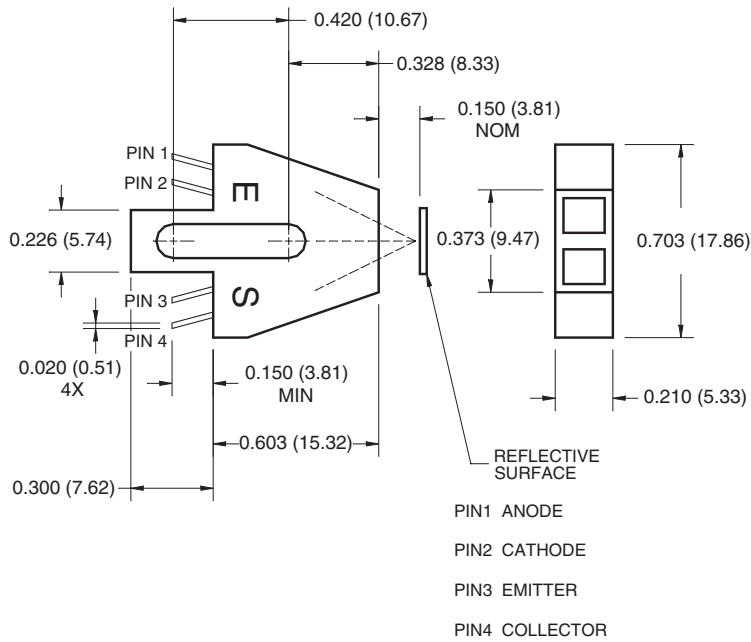
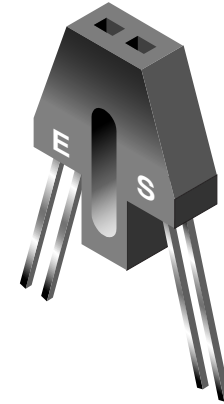


PACKAGE DIMENSIONS

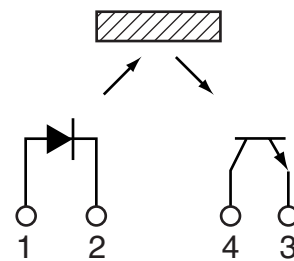


NOTES:

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 $^\circ\text{C}$.
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	$I_F = 40\text{ mA}, V_{CE} = 5\text{ V}$ $D = .150^{(5,6)}$	$I_{C(ON)}$	0.20	—	—	mA
QRB1113						
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

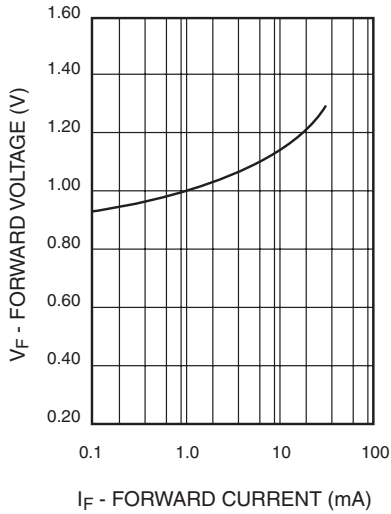


Fig. 2 Normalized Collector Current vs. Forward Current

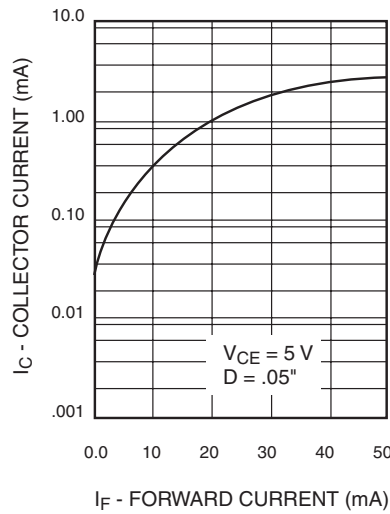


Fig. 3 Normalized Collector Current vs. Temperature

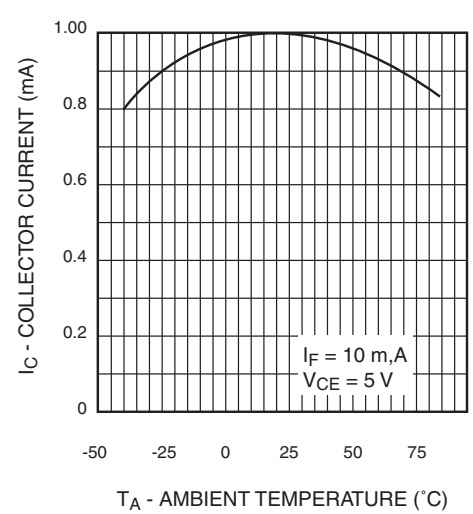


Fig. 4 Normalized Collector Dark Current vs. Temperature

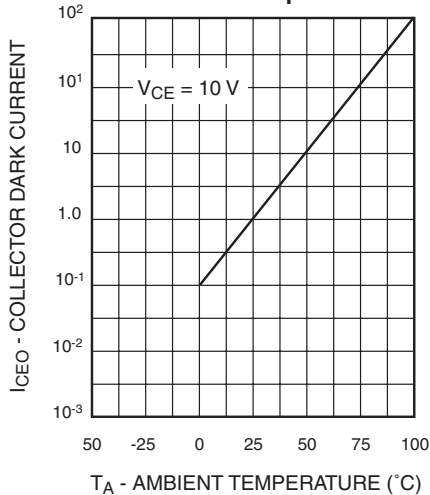
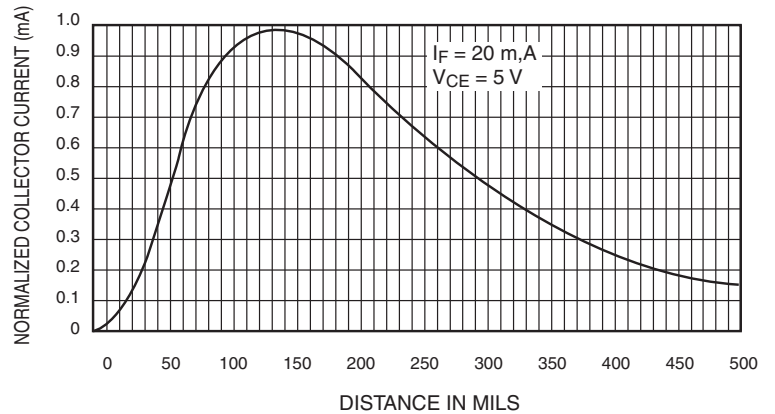


Fig. 5 Normalized Collector Current vs. Distance



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