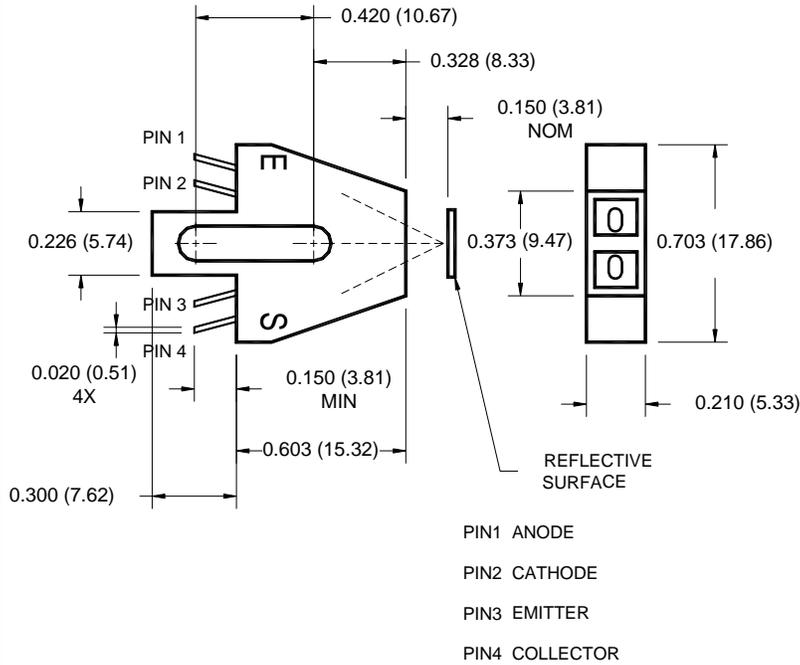
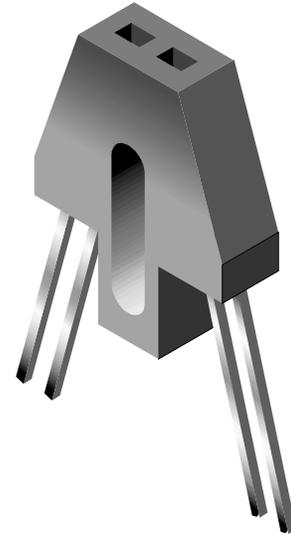


PACKAGE DIMENSIONS

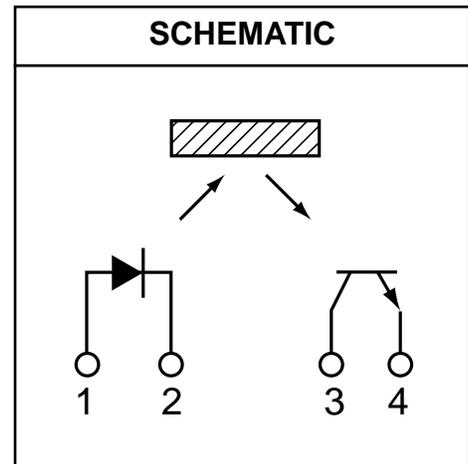


NOTES:

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 QRC1113 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

- Phototransistor output
- High sensitivity
- Low cost plastic housing

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}	5	V
Collector Current	I_C	20	mA
Power Dissipation ⁽¹⁾	P_D	100	mW

NOTES

- Derate power dissipation linearly 1.67 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.
- D is the distance from the assembly face to the reflective surface.
- Cross talk is the photo current measured with current to the input diode and no reflecting surface.
- Measured using an Eastman Kodak neutral test card with 90% diffused 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	$V_R = 2.0 \text{ V}$	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	$I_F = 40 \text{ mA}, V_{CE} = 5 \text{ V}, D = .150^{(5,7)}$	$I_{C(ON)}$	0.20	—	—	mA
Collector-Emitter Saturation Voltage	$I_F = 40 \text{ mA}, I_C = 0.1 \text{ mA}$ $D = .150^{(5,7)}$	$V_{CE(SAT)}$	—	—	0.4	V
Rise Time	$V_{CE} = 5 \text{ V}, R_L = 100 \Omega$	t_r	—	8	—	μs
Fall Time	$I_{C(ON)} = 5 \text{ mA}$	t_f	—	8	—	
Crosstalk	$I_F = 40 \text{ mA}, V_{CE} = 5 \text{ V}^{(6)}$	I_{CX}	—	—	1.00	μA

TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Voltage vs. Forward Current

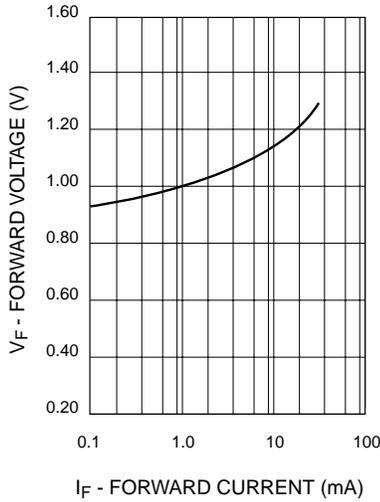


Fig. 2 Normalized Collector Current vs. Forward Current

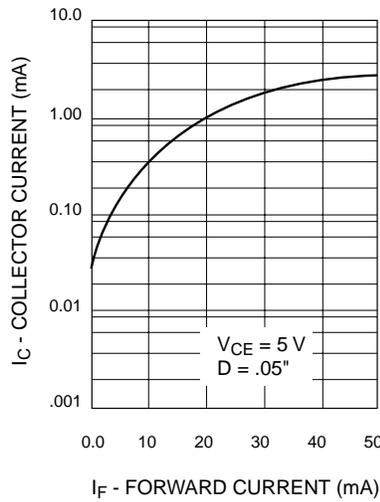


Fig. 3 Normalized Collector Current vs. Temperature

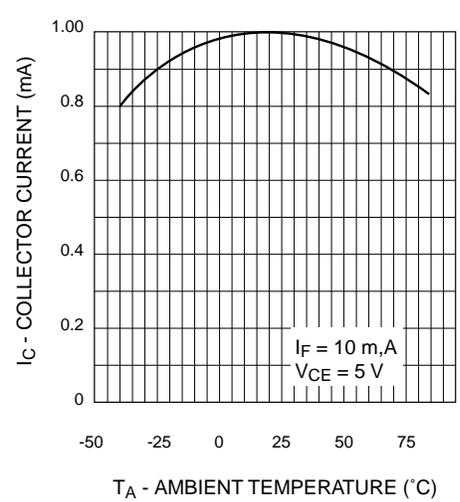


Fig. 4 Normalized Collector Dark Current vs. Temperature

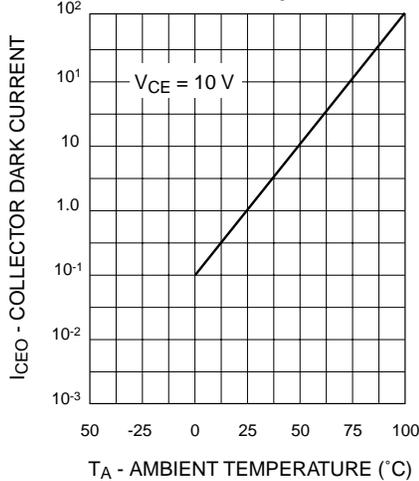
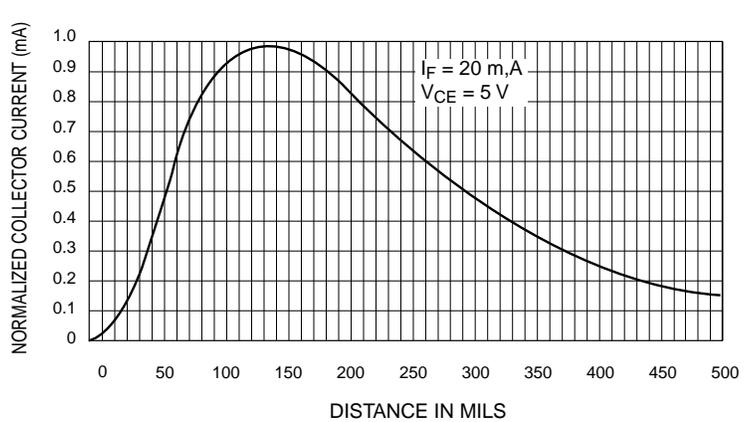


Fig. 5 Normalized Collector Current vs. Distance



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