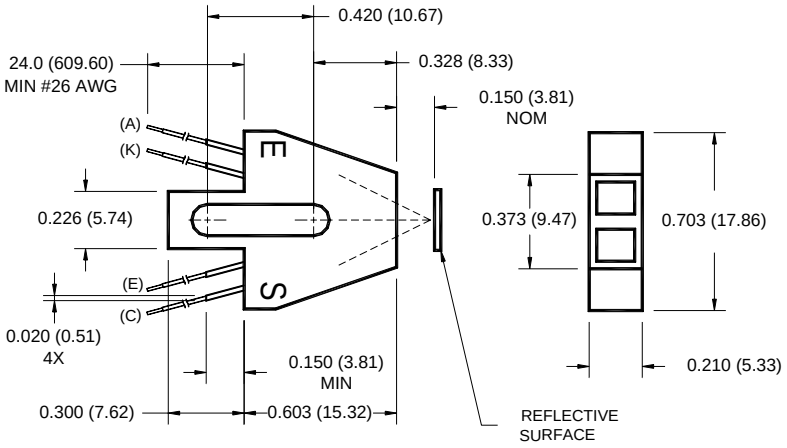
FAIRCHILD
SEMICONDUCTOR®

PHOTOTRANSISTOR REFLECTIVE OBJECT SENSORS

QRB1133 QRB1134

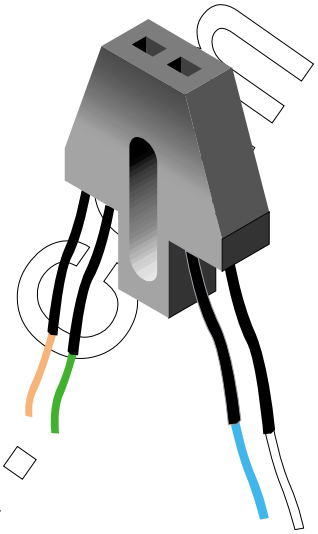
PACKAGE DIMENSIONS



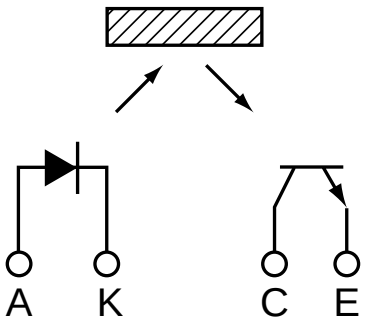
FUNCTION	WIRE COLOR
(C) COLLECTOR	WHITE
(E) EMITTER	BLUE
(K) CATHODE	GREEN
(A) ANODE	ORANGE

NOTES:

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



SCHEMATIC



DESCRIPTION

The QRB1133/1134 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
- #26 AWG, 24 inch PVC wire termination
- Infrared transparent plastic covers for dust protection

PHOTOTRANSISTOR REFLECTIVE OBJECT SENSORS

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Rating	Units
Operating Temperature	T_{OPR}	-40 to +85	°C
Storage Temperature	T_{STG}	-40 to +85	°C
Soldering Temperature (Iron)(2,3,4)	T_{SOL-I}	240 for 5 sec	°C
Soldering Temperature (Flow)(2,3)	T_{SOL-F}	260 for 10 sec	°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}	50	V
Collector Current	I_C	20	mA
Power Dissipation(1)	P_D	100	mW

NOTES
1. Derate power dissipation linearly 1.67 mW/°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°C)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
EMITTER Forward Voltage	I_F = 40 mA	V_F	—	—	1.7	V
Reverse Current	V_R = 2.0 V	I_R	—	—	100	µA
Peak Emission Wavelength	I_F = 20 mA	λ_{PE}	—	940	—	nm
SENSOR Collector-Emitter Breakdown Voltage	I_C = 1 mA	BV_{CEO}	30	—	—	V
Emitter-Collector Breakdown Voltage	I_E = 0.1 mA	BV_{ECO}	5	—	—	V
Collector-Emitter Dark Current	V_{CE} = 10 V, I_F = 0 mA	I_{CEO}	—	—	100	nA
COUPLED On-state Collector Current QRB1133	I_F = 40 mA, V_{CE} = 5 V D = .150"(5,6)	$I_{C(ON)}$	0.20	—	—	mA
QRB1134			0.60	—		
Collector-Emitter Saturation Voltage	I_F = 20 mA, I_C = 0.5 mA	$V_{CE\ (SAT)}$	—	—	0.4	V
Rise Time	V_{CE} = 5 V, R_L = 100 Ω	t_r	—	8	—	µs
Fall Time	$I_{C(ON)}$ = 5 mA	t_f	—	8	—	
Cross Talk	I_F = 40 mA, V_{CE} = 5 V(7)	I_{CX}	—	—	1.00	µA

TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Voltage vs. Forward Current

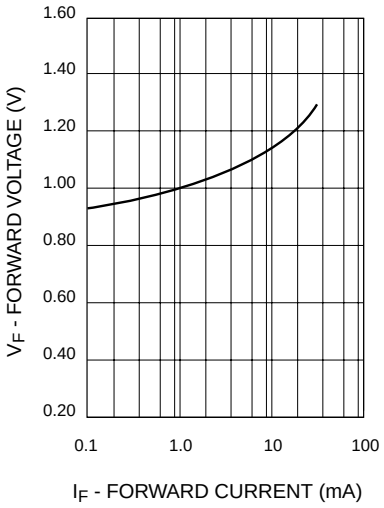


Fig. 2 Normalized Collector Current vs. Forward Current

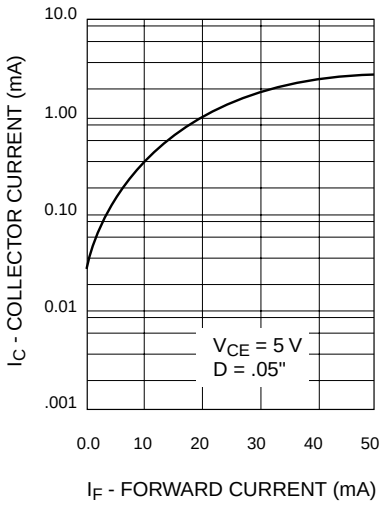


Fig. 3 Normalized Collector Current vs. Temperature

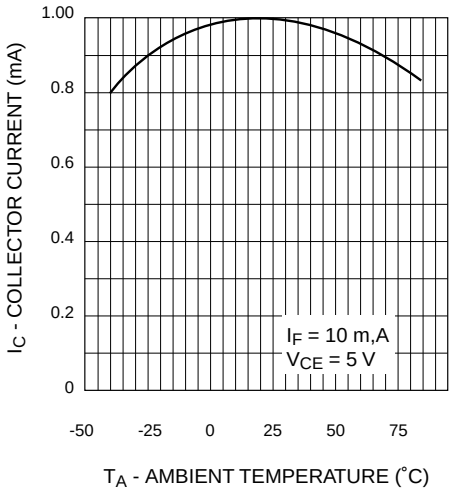


Fig. 4 Normalized Collector Dark Current vs. Temperature

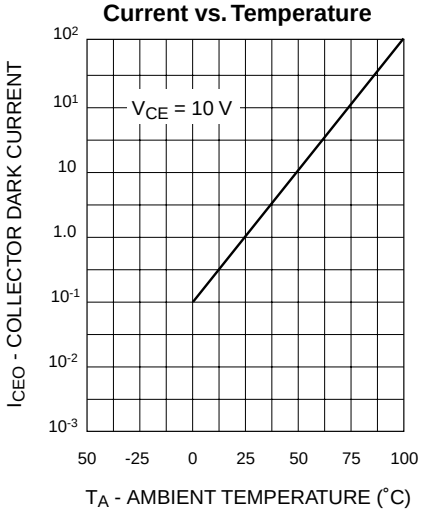
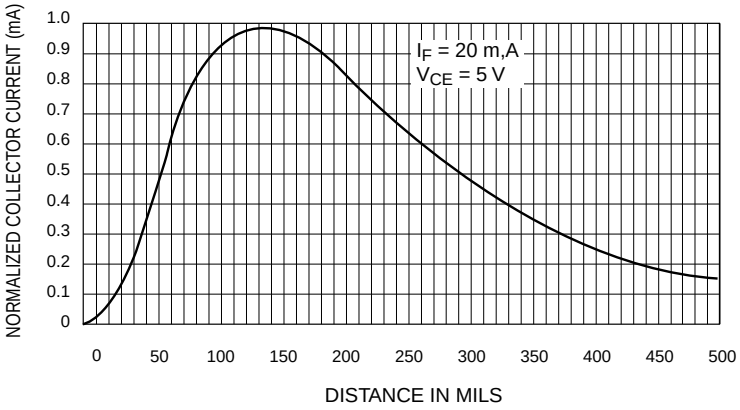


Fig. 5 Normalized Collector Current vs. Distance



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