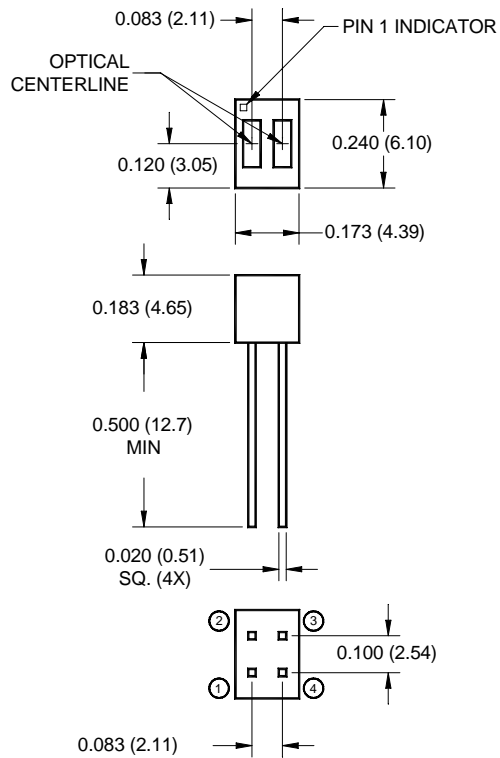


### PACKAGE DIMENSIONS



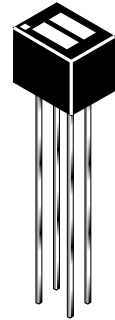
PIN 1 COLLECTOR      PIN 3 ANODE  
PIN 2 EMITTER      PIN 4 CATHODE

**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.

### FEATURES

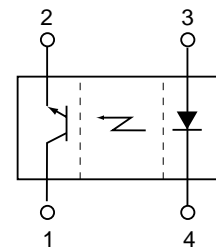
- Phototransistor Output
- No contact surface sensing
- Unfocused for sensing diffused surfaces
- Compact Package
- Daylight filter on sensor



### NOTES (Applies to Max Ratings and Characteristics Tables.)

1. Derate power dissipation linearly 1.33 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) from housing.
5. As long as leads are not under any spring tension.
6. D is the distance from the sensor face to the reflective surface.
7. Cross talk ( $I_{CX}$ ) is the collector current measured with the indicator current on the input diode and with no reflective surface.
8. Measured using an Eastman Kodak neutral white test card with 90% diffused reflecting as a reflective surface.

### SCHEMATIC



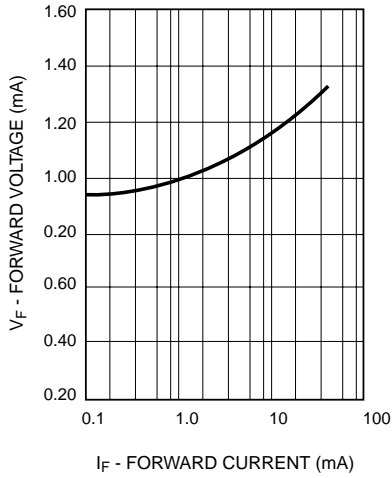
### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Units
Operating Temperature	$T_{OPR}$	-40 to +85	°C
Storage Temperature	$T_{STG}$	-40 to +85	°C
Lead Temperature (Solder Iron) <sup>(2,3)</sup>	$T_{SOL-I}$	240 for 5 sec	°C
Lead Temperature (Solder Flow) <sup>(2,3)</sup>	$T_{SOL-F}$	260 for 10 sec	°C
<b>EMITTER</b>			
Continuous Forward Current	$I_F$	50	mA
Reverse Voltage	$V_R$	5	V
Power Dissipation <sup>(1)</sup>	$P_D$	100	mW
<b>SENSOR</b>			
Collector-Emitter Voltage	$V_{CEO}$	30	V
Emitter-Collector Voltage	$V_{ECO}$		V
Power Dissipation <sup>(1)</sup>	$P_D$	100	mW

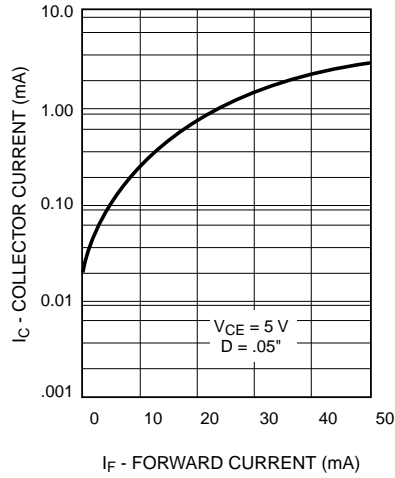
ELECTRICAL / OPTICAL CHARACTERISTICS (T <sub>A</sub> = 25°C)						
PARAMETER	TEST CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
<b>EMITTER</b>						
Forward Voltage	I <sub>F</sub> = 20 mA	V <sub>F</sub>	—	—	1.7	V
Reverse Current	V <sub>R</sub> = 5 V	I <sub>R</sub>	—	—	100	μA
Peak Emission Wavelength	I <sub>F</sub> = 20 mA	λ <sub>PE</sub>	—	940	—	nm
<b>SENSOR</b>						
Collector-Emitter Breakdown	I <sub>C</sub> = 1 mA	BV <sub>CEO</sub>	30	—	—	V
Emitter-Collector Breakdown	I <sub>E</sub> = 0.1 mA	BV <sub>ECO</sub>	5	—	—	V
Dark Current	V <sub>CE</sub> = 10 V, I <sub>F</sub> = 0 mA	I <sub>D</sub>	—	—	100	nA
<b>COUPLED</b>						
QRD1113 Collector Current	I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5 V D = .050" (6,8)	I <sub>C(ON)</sub>	0.300	—	—	mA
QRD1114 Collector Current	I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5 V D = .050" (6,8)	I <sub>C(ON)</sub>	1	—	—	mA
Collector Emitter Saturation Voltage	I <sub>F</sub> = 40 mA, I <sub>C</sub> = 100 μA D = .050" (6,8)	V <sub>CE (SAT)</sub>	—	—	0.4	V
Cross Talk	I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5 V, E <sub>E</sub> = 0 (7)	I <sub>CX</sub>	—	.200	10	μA
Rise Time	V <sub>CE</sub> = 5 V, R <sub>L</sub> = 100 Ω	t <sub>r</sub>	—	10	—	μs
Fall Time	I <sub>C(ON)</sub> = 5 mA	t <sub>f</sub>	—	50	—	μs

**TYPICAL PERFORMANCE CURVES**

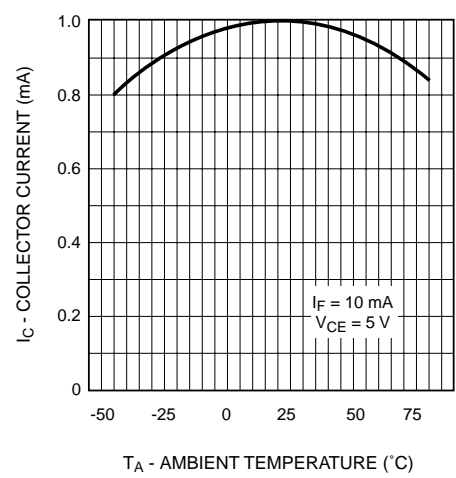
**Fig. 1 Forward Voltage vs. Forward Current**



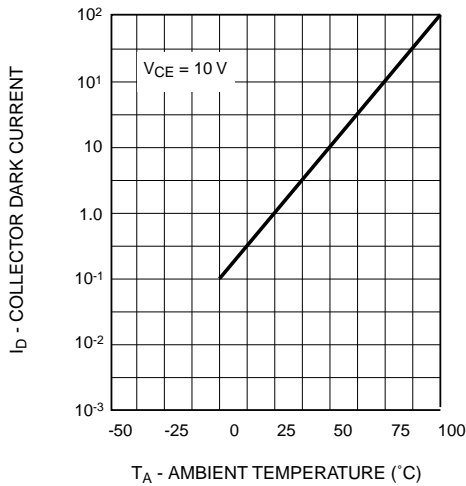
**Fig. 2 Normalized Collector Current vs. Forward Current**



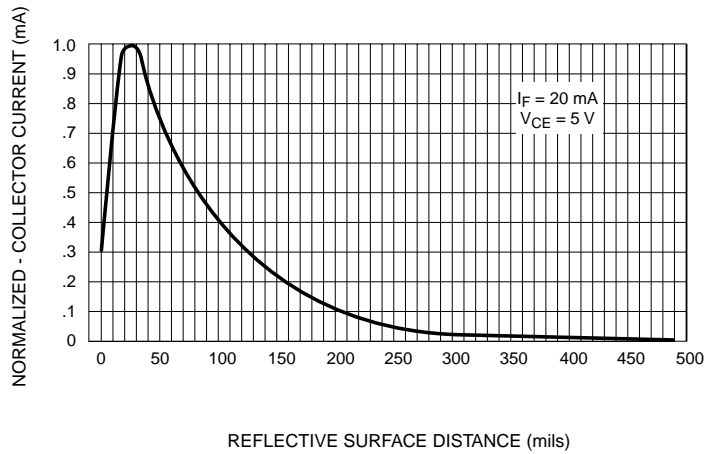
**Fig. 3 Normalized Collector Current vs. Temperature**



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



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



### DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.