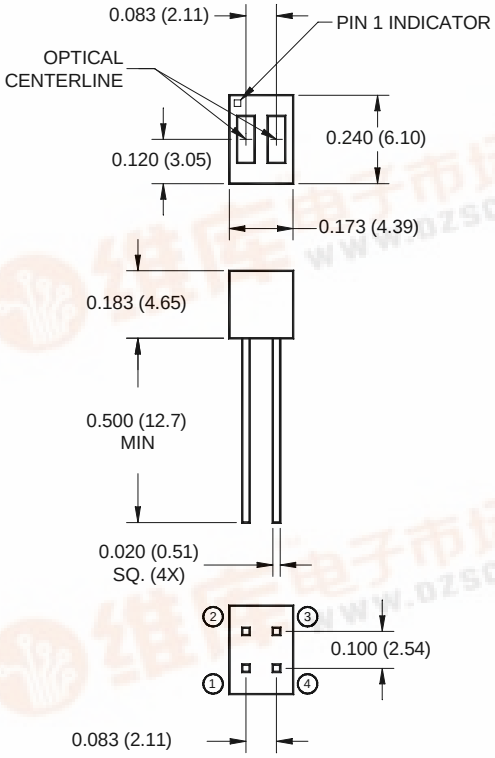
FAIRCHILD SEMICONDUCTOR™

QRD1113/1114

REFLECTIVE OBJECT SENSOR

PACKAGE DIMENSIONS



PIN 1 COLLECTOR — PIN 3 ANODE

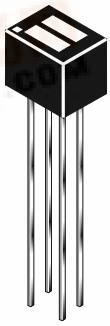
PIN 2 EMITTER — PIN 4 CATHODE

NOTES:

1. Dimensions for all drawings are in inches (millimeters).
2. Tolerance of ± .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

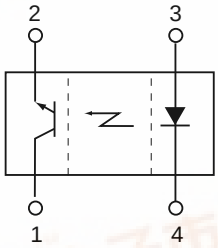
- Phototransistor Output
- No contact surface sensing
- Unfocused for sensing diffused surfaces
- Compact Package
- Daylight filter on sensor



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°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)(2,3)	T_{SOL-I}	240 for 5 sec	°C
Lead Temperature (Solder 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}		V
Power Dissipation(1)	P_D	100	mW

ELECTRICAL / OPTICAL CHARACTERISTICS (T_A = 25°C)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN	TYP	MAX	UNITS
EMITTER Forward Voltage	I_F = 20 mA	V_F	—	—	1.7	V
Reverse Current	V_R = 5 V	I_R	—	—	100	µA
Peak Emission Wavelength	I_F = 20 mA	λ_{PE}	—	940	—	nm
SENSOR Collector-Emitter Breakdown	I_C = 1 mA	BV_{CEO}	30	—	—	V
Emitter-Collector Breakdown	I_E = 0.1 mA	BV_{ECO}	5	—	—	V
Dark Current	V_{CE} = 10 V, I_F = 0 mA	I_D	—	—	100	nA
COUPLED QRD1113 Collector Current	I_F = 20 mA, V_{CE} = 5 V D = .050" (6,8)	$I_{C(ON)}$	0.300	—	—	mA
QRD1114 Collector Current	I_F = 20 mA, V_{CE} = 5 V D = .050" (6,8)	$I_{C(ON)}$	1	—	—	mA
Collector Emitter Saturation Voltage	I_F = 40 mA, I_C = 100 µA D = .050" (6,8)	$V_{CE\ (SAT)}$	—	—	0.4	V
Cross Talk	I_F = 20 mA, V_{CE} = 5 V, E_E = 0 (7)	I_{CX}	—	.200	10	µA
Rise Time	V_{CE} = 5 V, R_L = 100 Ω	t_r	—	10	—	µs
Fall Time	$I_{C(ON)}$ = 5 mA	t_f	—	50	—	µs

TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Voltage vs. Forward Current

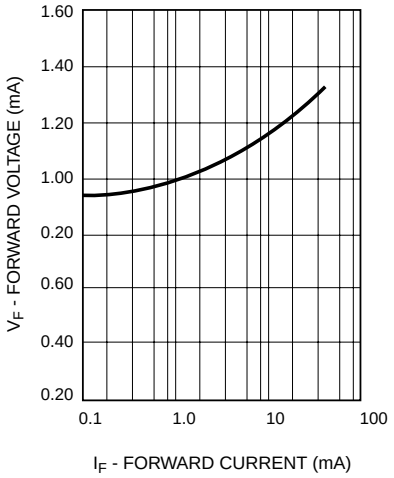


Fig. 2 Normalized Collector Current vs. Forward Current

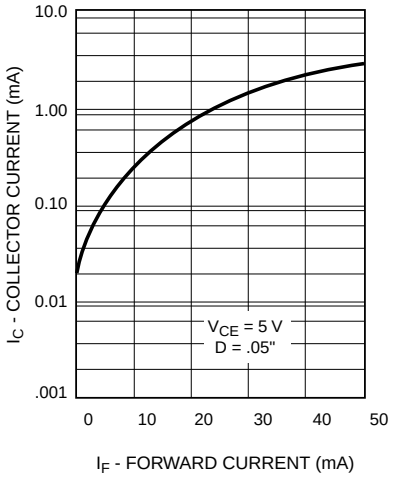


Fig. 3 Normalized Collector Current vs. Temperature

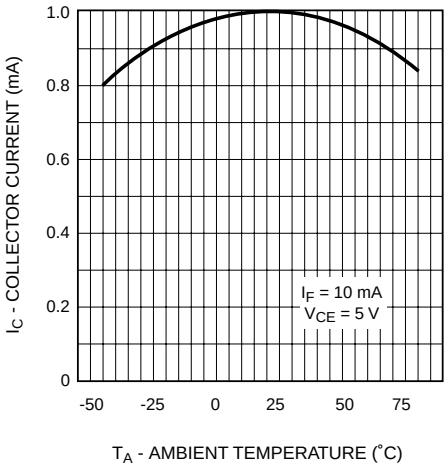


Fig. 4 Normalized Collector Dark Current vs. Temperature

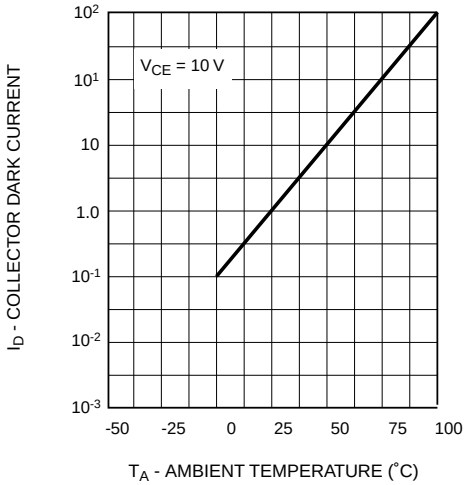
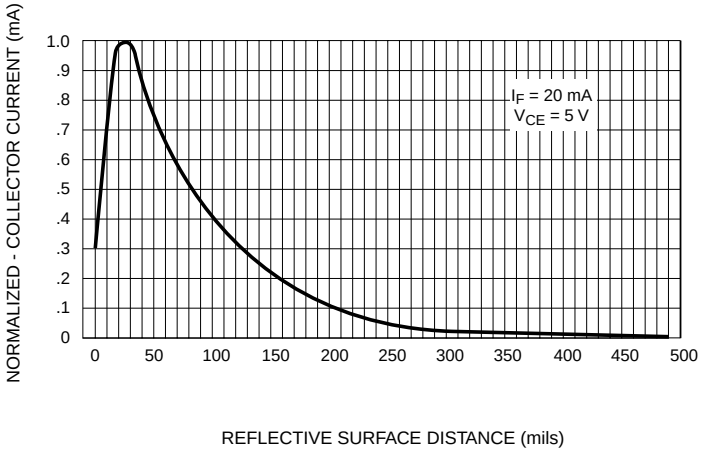


Fig. 5 Normalized Collector Current vs. Distance



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