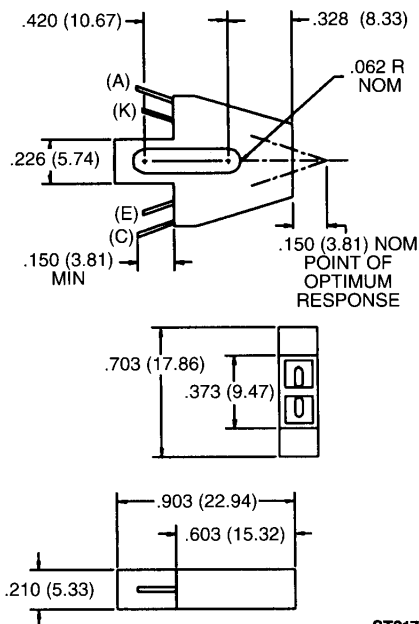


**PACKAGE DIMENSIONS**



ST2178

(C) COLLECTOR  
(E) EMITTER  
(K) CATHODE  
(A) ANODE

NOTES:

1. CATHODE AND EMITTER LEADS ARE .050 NOM SHORTER THAN ANODE AND COLLECTOR LEADS.
2. DIMENSIONS ARE IN INCHES (mm).
3. TOLERANCE IS  $\pm .010"$  [.25] UNLESS OTHERWISE SPECIFIED.

**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



## REFLECTIVE OBJECT SENSORS

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless Otherwise Specified)

Storage Temperature .....	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Operating Temperature .....	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Soldering:	
Lead Temperature (Iron) .....	$240^\circ\text{C}$ for 5 sec. <sup>(2,3,4)</sup>
Lead Temperature (Flow) .....	$260^\circ\text{C}$ for 10 sec. <sup>(2,3)</sup>
<b>INPUT DIODE</b>	
Continuous Forward Current .....	50 mA
Reverse Voltage .....	5.0 Volts
Power Dissipation .....	100 mW <sup>(1)</sup>
<b>OUTPUT TRANSISTOR</b>	
Collector-Emitter Voltage .....	30 Volts
Emitter-Collector Voltage .....	5.0 Volts
Collector Current .....	40 mA
Power Dissipation .....	100 mW <sup>(1)</sup>

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ Unless Otherwise Specified)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>INPUT DIODE</b>						
Forward Voltage	$V_F$	—		1.70	V	$I_F = 40\text{ mA}$
Reverse Leakage Current	$I_R$	—		100	$\mu\text{A}$	$V_R = 2.0\text{ V}$
<b>OUTPUT TRANSISTOR</b>						
Emitter-Collector Breakdown	$BV_{ECO}$	5		—	V	$I_E = 100\mu\text{A}$ , $E_e = 0$
Collector-Emitter Breakdown	$BV_{CEO}$	30		—	V	$I_C = 1.0\text{ mA}$ , $E_e = 0$
Collector-Emitter Leakage	$I_{CEO}$	—		100	nA	$V_{CE} = 10.0\text{ V}$ , $E_e = 0$
<b>COUPLED</b>						
On-State Collector Current	$I_{C(ON)}$	.200		—	mA	$I_F = 40\text{ mA}$ , $V_{CE} = 5\text{ V}$ , $D = .150^{(5,7)}$
Crosstalk	$I_{CX}$	—		1.0	$\mu\text{A}$	$I_F = 40\text{ mA}$ , $V_{CE} = 5\text{ V}^{(6)}$
Saturation Voltage	$V_{CE(SAT)}$	—		0.40	V	$I_F = 40\text{ mA}$ , $I_C = .1\text{ mA}$ , $D = .150^{(5,7)}$

### 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) from housing.
5. D is the distance from the assembly face to the reflective surface.
6. Cross talk is the photocurrent measured with current to the input diode and no reflecting surface.
7. Measured using Eastman Kodak neutral test card with 90% diffused reflecting surface.