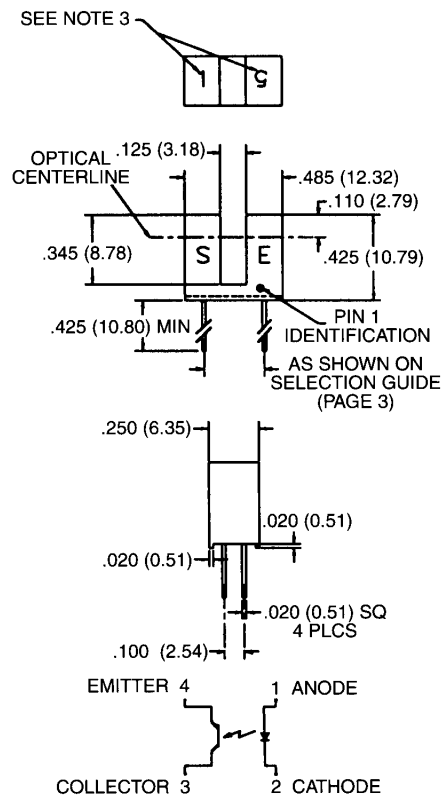


**PACKAGE DIMENSIONS**



ST2174

**DESCRIPTION**

The QVA series of switches is designed to allow the user maximum flexibility in applications. Each switch consists of an infrared emitting diode facing an NPN phototransistor across a .125" (3.18 mm) gap. A unique housing design provides a smooth external surface to prevent dust and dirt buildup while molded internal apertures give precise positioning and also provide protection from ambient light interference.

**FEATURES**

- Ambient light and dust protection.
- Lead spacing available at .220", .300", or .320".
- .010" and .050" apertures.

NOTES:

1. DIMENSIONS ARE IN INCHES (mm).
2. TOLERANCE IS  $\pm .010$  (.25) UNLESS OTHERWISE SPECIFIED.
3. NUMBER INDICATES APERTURE SIZE. (5 = .050", 1 = .010")

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ 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 .....	30.0 Volts
Emitter-Collector Voltage .....	5.0 Volts
Power Dissipation .....	100 mW <sup>(1)</sup>

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ Unless Otherwise Specified)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
<b>INPUT DIODE</b>						
Forward Voltage	$V_F$	—		1.70	V	$I_F = 20\text{ mA}$
Reverse Leakage Current	$I_R$	—		100	$\mu\text{A}$	$V_R = 2.0\text{ V}$
<b>OUTPUT TRANSISTOR</b>						
Emitter-Collector Breakdown	$BV_{ECC}$	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	$I_{C(ON)}$	See selection guide page 3.			mA	$I_F = 20\text{ mA}$ , $V_{CE} = 5\text{ V}$
Saturation Voltage	$V_{CE(SAT)}$	—		0.40	V	$I_F = 20\text{ mA}$ , $I_C = 0.25\text{ mA}$

<b>NOTES</b>	
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 tip 1/16" (1.6 mm) from housing.	



**SLOTTED OPTICAL SWITCH**

<b>QVAXXXX OPTICAL SWITCH SELECTION GUIDE</b>						
PART NUMBER	LEAD SPACING	APERTURES		$I_{CLOW}$		
		LED	SENSOR	MIN	MAX	
QVA11123	.220"	0.050"	0.010"	0.20	—	
QVA11124	.220"	0.050"	0.010"	0.50	—	
QVA11223	.300"	0.050"	0.010"	0.20	—	
QVA11224	.300"	0.050"	0.010"	0.50	—	
QVA11323	.320"	0.050"	0.010"	0.20	—	
QVA11324	.320"	0.050"	0.010"	0.50	—	
QVA11133	.220"	0.050"	0.050"	0.50	—	
QVA11134	.220"	0.050"	0.050"	1.00	—	
QVA11233	.300"	0.050"	0.050"	0.50	—	
QVA11234	.300"	0.050"	0.050"	1.00	—	
QVA11333	.320"	0.050"	0.050"	0.50	—	
QVA11334	.320"	0.050"	0.050"	1.00	—	
QVA21113	.220"	0.010"	0.010"	0.10	—	
QVA21114	.220"	0.010"	0.010"	0.20	—	
QVA21213	.300"	0.010"	0.010"	0.10	—	
QVA21214	.300"	0.010"	0.010"	0.20	—	
QVA21313	.320"	0.010"	0.010"	0.10	—	
QVA21314	.320"	0.010"	0.010"	0.20	—	



## SLOTTED OPTICAL SWITCH

---

### **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.