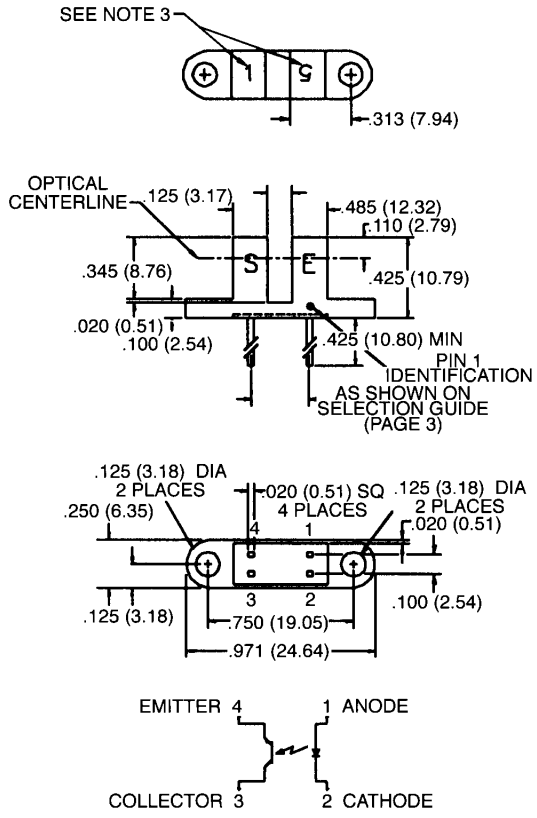
FAIRCHILD
SEMICONDUCTOR™

# SLOTTED OPTICAL SWITCH

## QVB SERIES

## PACKAGE DIMENSIONS




**ST2175**

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

## DESCRIPTION

The QVB series of switches is designed to allow the user maximum flexibility in applications. Each switch consists of an infrared emitting diode facing an NPN photo-transistor 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".
- .050" and .010" aperatures available.

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## ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C Unless Otherwise Specified)

Storage Temperature ..... −40°C to + 85°C
Operating Temperature ..... −40°C to + 85°C
Soldering:
Lead Temperature (Iron) ..... 240°C for 5 sec. [2,3,4]
Lead Temperature (Flow) ..... 260°C for 10 sec. [2,3]

**INPUT DIODE**
Continuous Forward Current ..... 50 mA
Reverse Voltage ..... 5.0 Volts
Power Dissipation ..... 100 mW[1]

**OUTPUT TRANSISTOR**
Collector-Emitter Voltage ..... 30 Volts
Emitter-Collector Voltage ..... 5.0 Volts
Collector Current ..... 40 mA
Power Dissipation ..... 100 mW[1]

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C Unless Otherwise Specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| **INPUT DIODE** | | | | | | |
| Forward voltage | $V_F$ | — | | 1.70 | V | $I_F$ = 20 mA |
| Reverse Leakage Current | $I_R$ | — | | 100 | μA | $V_R$ = 2.0 V |
| **OUTPUT TRANSISTOR** | | | | | | |
| Emitter-Collector Breakdown | $BV_{ECO}$ | 5 | | — | V | $I_E$ = 100 μA, Ee = 0 |
| Collector-Emitter Breakdown | $BV_{CEO}$ | 30 | | — | V | $I_C$ = 1.0 mA, Ee = 0 |
| Collector-Emitter Leakage | $I_{CEO}$ | — | | 100 | nA | $V_{CE}$ = 10.0 V, Ee = 0 |
| **COUPLED** | | | | | | |
| On-State Collector Current | $I_{C(ON)}$ | See selection guide page 3. | | | mA | $I_F$ = 20 mA, $V_{CE}$ = 5 V |
| Saturation Voltage | $V_{CE(SAT)}$ | — | | 0.40 | V | $I_F$ = 20 mA, $I_C$ = 0.1 mA |

## NOTES

1. *Derate power dissipation linearly 1.67 mW/°C above 25°C.*
2. *RMA flux is recommended.*
3. *Methanol or Isopropanol alcohols are recommended as cleaning agents.*
4. *Soldering iron tip 1/16" (1.6 mm) from housing.*

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## QVBXXXX OPTICAL SWITCH SELECTION GUIDE

| PART NUMBER | LEAD SPACING | APERTURES | | $I_{C(ON)}$ | |
|---|---|---|---|---|---|
| | | LED | SENSOR | MIN | MAX |
| QVB11123 | .220″ | 0.050″ | 0.010″ | 0.20 | — |
| QVB11124 | .220″ | 0.050″ | 0.010″ | 0.50 | — |
| QVB11223 | .300″ | 0.050″ | 0.010″ | 0.20 | — |
| QVB11224 | .300″ | 0.050″ | 0.010″ | 0.50 | — |
| QVB11323 | .320″ | 0.050″ | 0.010″ | 0.20 | — |
| QVB11324 | .320″ | 0.050″ | 0.010″ | 0.50 | — |
| QVB11133 | .220″ | 0.050″ | 0.050″ | 0.50 | — |
| QVB11134 | .220″ | 0.050″ | 0.050″ | 1.00 | — |
| QVB11233 | .300″ | 0.050″ | 0.050″ | 0.50 | — |
| QVB11234 | .300″ | 0.050″ | 0.050″ | 1.00 | — |
| QVB11333 | .320″ | 0.050″ | 0.050″ | 0.50 | — |
| QVB11334 | .320″ | 0.050″ | 0.050″ | 1.00 | — |
| QVB21113 | .220″ | 0.010″ | 0.010″ | 0.10 | — |
| QVB21114 | .220″ | 0.010″ | 0.010″ | 0.20 | — |
| QVB21213 | .300″ | 0.010″ | 0.010″ | 0.10 | — |
| QVB21214 | .300″ | 0.010″ | 0.010″ | 0.20 | — |
| QVB21313 | .320″ | 0.010″ | 0.010″ | 0.10 | — |
| QVB21314 | .320″ | 0.010″ | 0.010″ | 0.20 | — |

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