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FAIRCHILD SEMICONDUCTOR®

January 2008

QVE00033
Phototransistor Optical Surface Mount Interrupter Switch

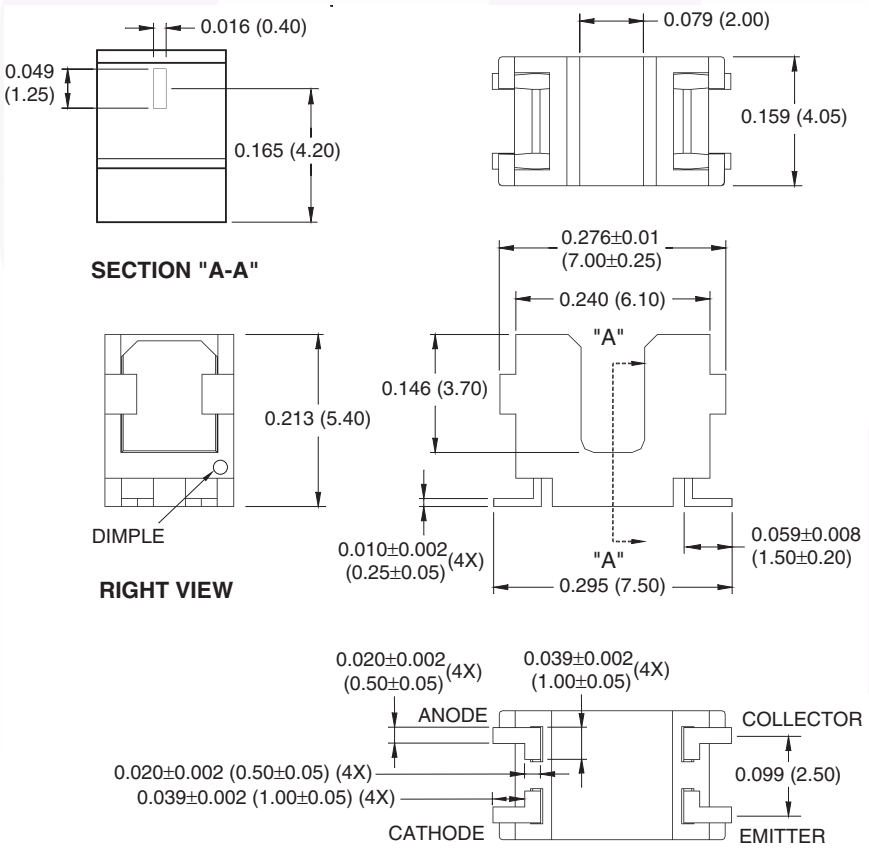
Features

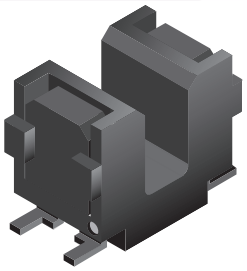
- No contact switching
- Transistor Output
- Compact surface mount package
- Opaque black plastic housing
- 2mm wide slot
- 0.4 mm aperture width
- Tape and reel
- Reflow conditions:
  Preheat = 160°C for 120 seconds
  Reflow = 200°C for 60 seconds (peak = 240°C)
- HL-94V-0 housing

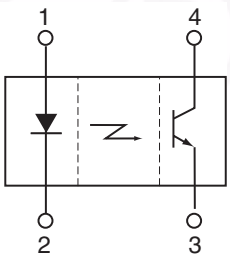
Description

The QVE00033 is a miniature slotted optical switch designed for surface mount applications. It consists of a GaAs LED and a silicon phototransistor facing each other across a 2mm gap, and packaged in a temperature resistant black plastic housing.

Package Dimension







Note:

1. Dimensions for all drawings are in inches (millimeters). Tolerance ±0.005" (0.127mm) unless othewise specified.

Absolute Maximum Ratings (T_A = 25°C unless otherwise specified)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating	Units
T_{OPR}	Operating Temperature	-55 to +100	°C
T_{STG}	Storage Temperature	-55 to +100	°C
T_{SOL-I}	Soldering Temperature (Iron)[2,3,4]	240 for 5 sec.	°C
T_{SOL-F}	Soldering Temperature (Flow)[2,3]	260 for 10 sec.	°C
P_{TOT}	Total Power Dissipation	100	mW
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	6	V
P_D	Power Dissipation[1]	75	mW
SENSOR			
V_{CEO}	Collector-Emitter Voltage	30	V
V_{ECO}	Emitter-Collector Voltage	4.5	V
I_C	Collector Current	20	mA
P_D	Power Dissipation[1]	75	mW

Notes:

1. Derate power dissipation linearly 1.00mW/°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" (1.6mm) from housing.

Electrical/Optical Characteristics (T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
EMITTER						
V_F	Forward Voltage	I_F = 20mA		1.2	1.4	V
I_R	Reverse Current	V_R = 4V			10	µA
I_{PE}	Peak Emission Wavelength	I_F = 20mA		940		nm
SENSOR						
I_{CEO}	Dark Current	V_{CE} = 20V, I_F = 0mA			100	nA
COUPLED						
$I_{C(ON)}$	Collector Current	I_F = 5mA, V_{CE} = 5V	100		600	µA
$V_{CE\ (SAT)}$	Collector Emitter	I_F = 10mA, I_C = 40µA			0.4	V
t_r	Rise Time	V_{CC} = 5V, R_L = 1000Ω, I_C = 100µA		7	150	µs
t_f	Fall Time			7	150	µs

Typical Performance Characteristics

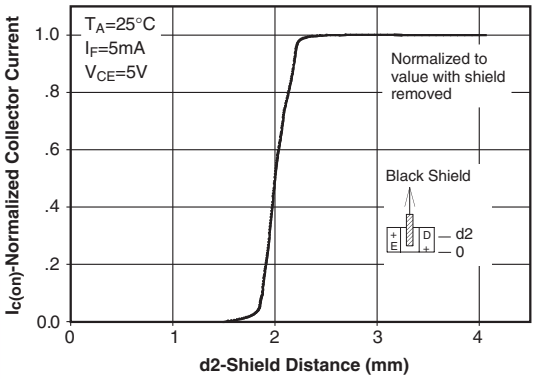


Figure 1. Normalized Collector Current Vs. Shield Distance

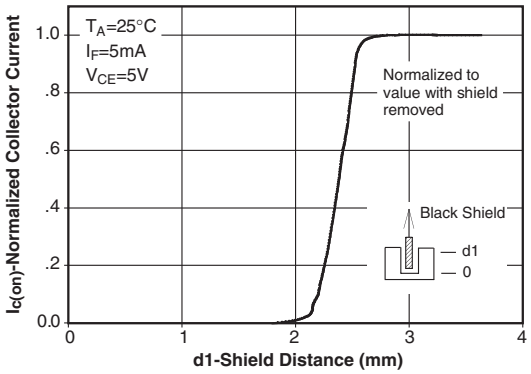


Figure 2. Normalized Collector Current Vs. Shield Distance

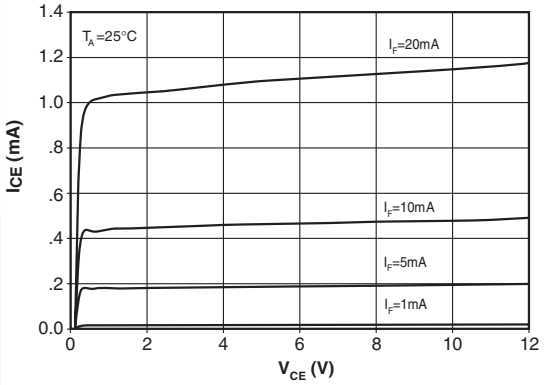


Figure 3. Collector Current Vs. Collector-Emitter Voltage

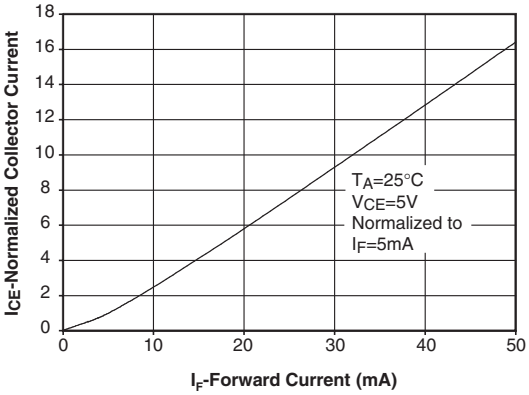


Figure 4. Normalized Collector Current Vs. Forward Current

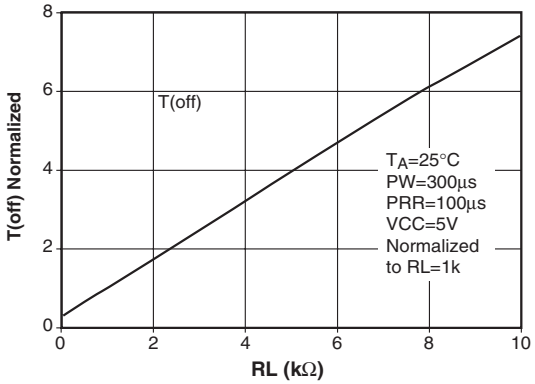


Figure 5. Rise Time vs. Load Resistance

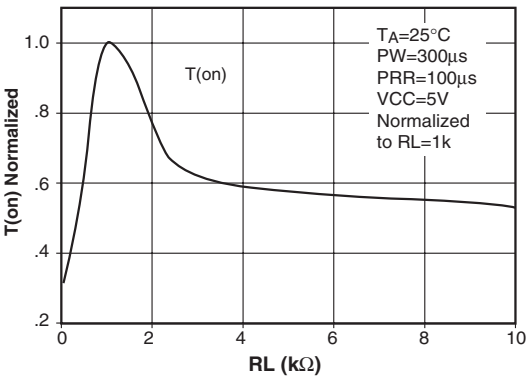
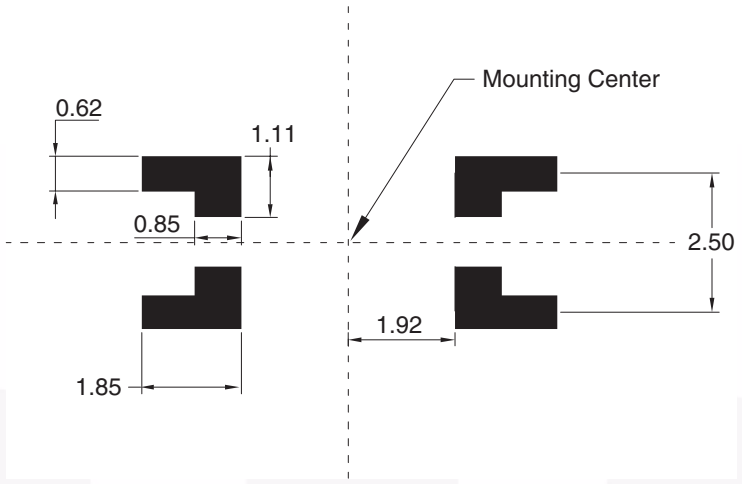
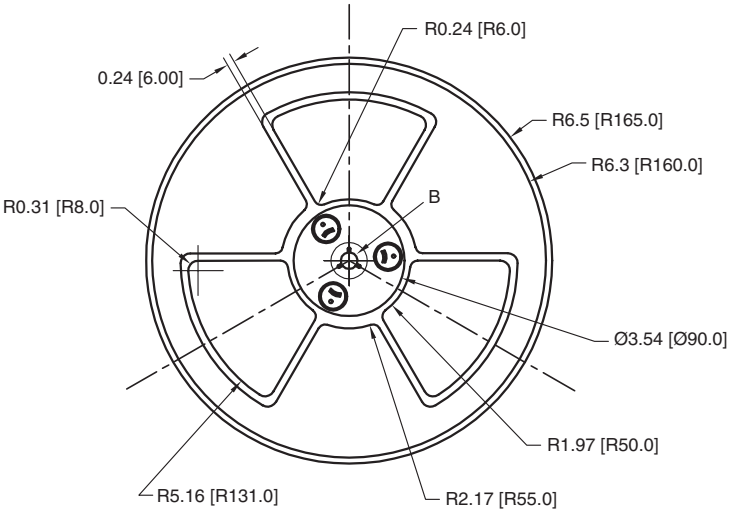


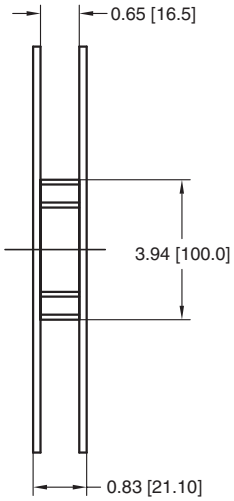
Figure 6. Fall Time vs. Load Resistance

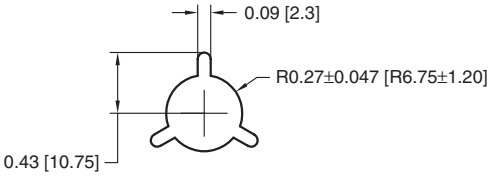
Recommended Printed Circuit Board Pattern (For Reference Only)



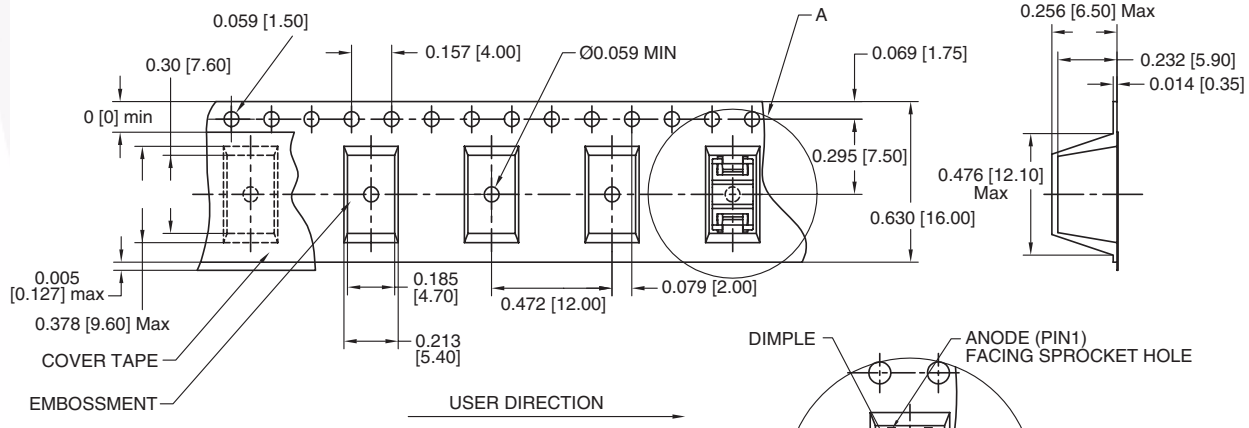
Tape and Reel Dimensions



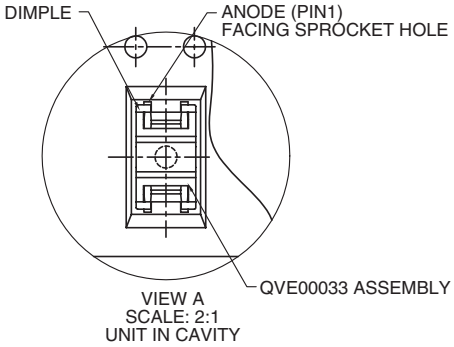




VIEW B



Quantitiy of units per reel is 800.



VIEW A
SCALE: 2:1
UNIT IN CAVITY

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