



**THE DATASHEET OF  
QVE00033**





# QVE00033 Phototransistor Optical Surface Mount Interrupter Switch

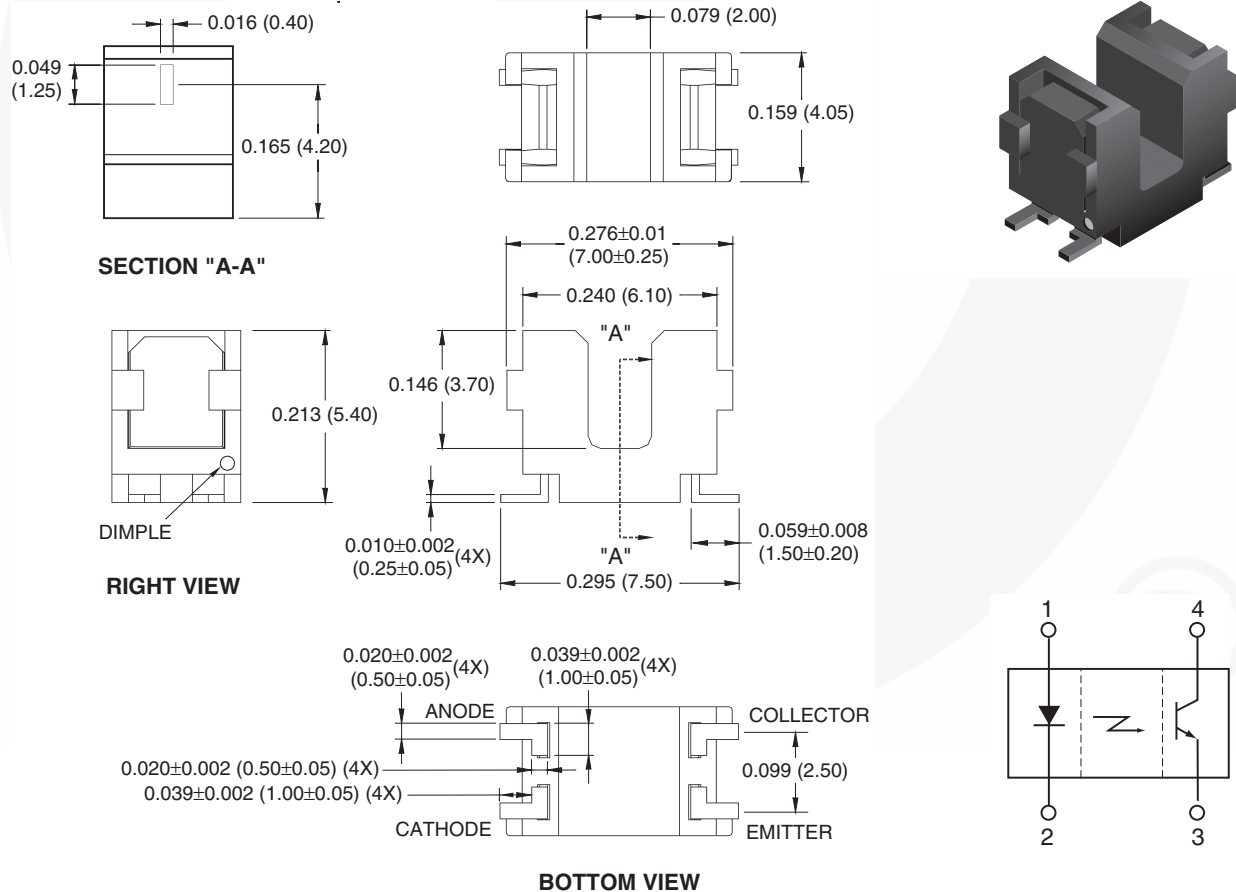
## Features

- 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 otherwise specified.

**Absolute Maximum Ratings** ( $T_A = 25^\circ\text{C}$  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
$T_{\text{OPR}}$	Operating Temperature	-55 to +100	$^\circ\text{C}$
$T_{\text{STG}}$	Storage Temperature	-55 to +100	$^\circ\text{C}$
$T_{\text{SOL-I}}$	Soldering Temperature (Iron) <sup>(2,3,4)</sup>	240 for 5 sec.	$^\circ\text{C}$
$T_{\text{SOL-F}}$	Soldering Temperature (Flow) <sup>(2,3)</sup>	260 for 10 sec.	$^\circ\text{C}$
$P_{\text{TOT}}$	Total Power Dissipation	100	mW
<b>EMITTER</b>			
$I_F$	Continuous Forward Current	50	mA
$V_R$	Reverse Voltage	6	V
$P_D$	Power Dissipation <sup>(1)</sup>	75	mW
<b>SENSOR</b>			
$V_{\text{CEO}}$	Collector-Emitter Voltage	30	V
$V_{\text{ECO}}$	Emitter-Collector Voltage	4.5	V
$I_C$	Collector Current	20	mA
$P_D$	Power Dissipation <sup>(1)</sup>	75	mW

**Notes:**

1. Derate power dissipation linearly 1.00mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$ .
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron tip 1/16" (1.6mm) from housing.

**Electrical/Optical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

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

## Typical Performance Characteristics

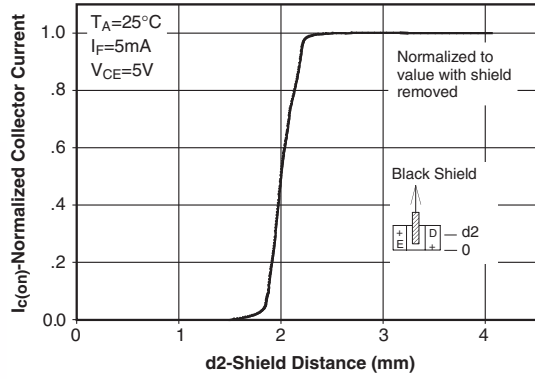


Figure 1. Normalized Collector Current Vs. Shield Distance

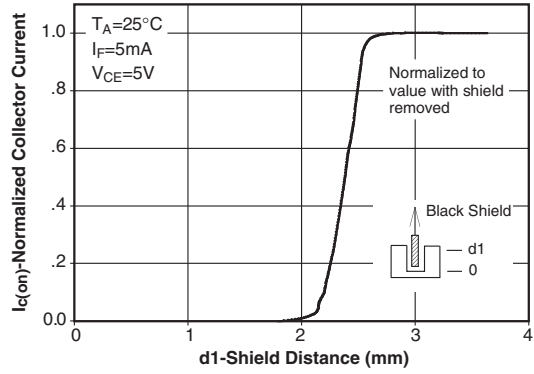


Figure 2. Normalized Collector Current Vs. Shield Distance

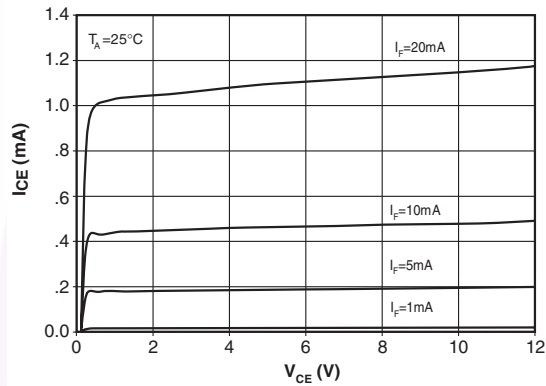


Figure 3. Collector Current Vs. Collector-Emitter Voltage

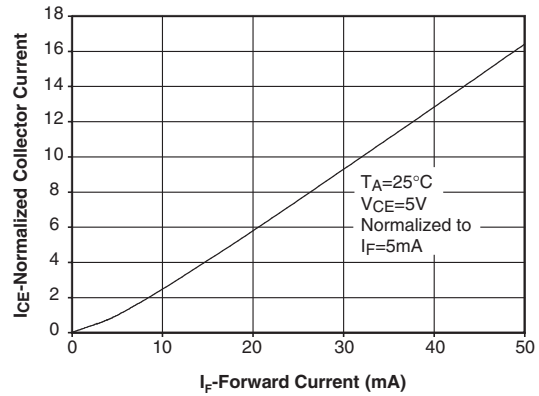


Figure 4. Normalized Collector Current Vs. Forward Current

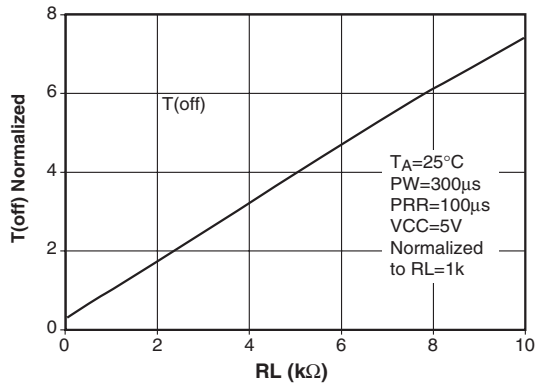


Figure 5. Rise Time vs. Load Resistance

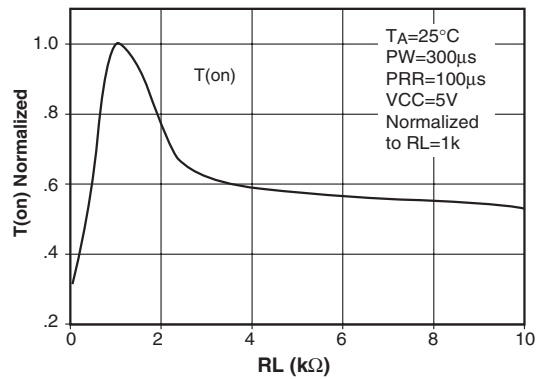
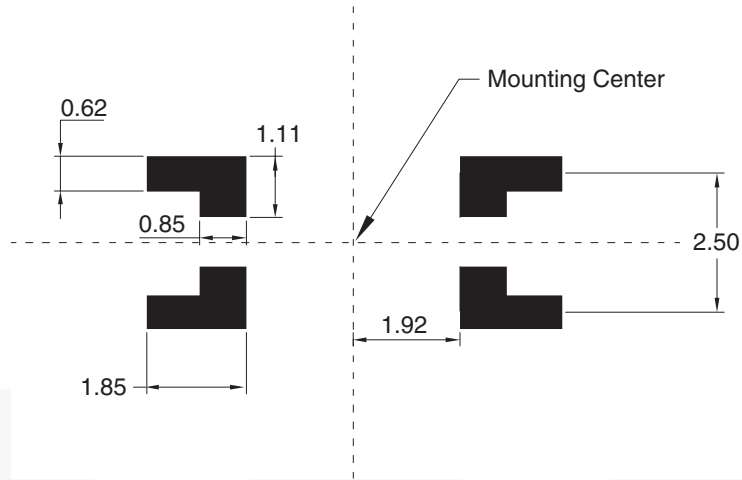
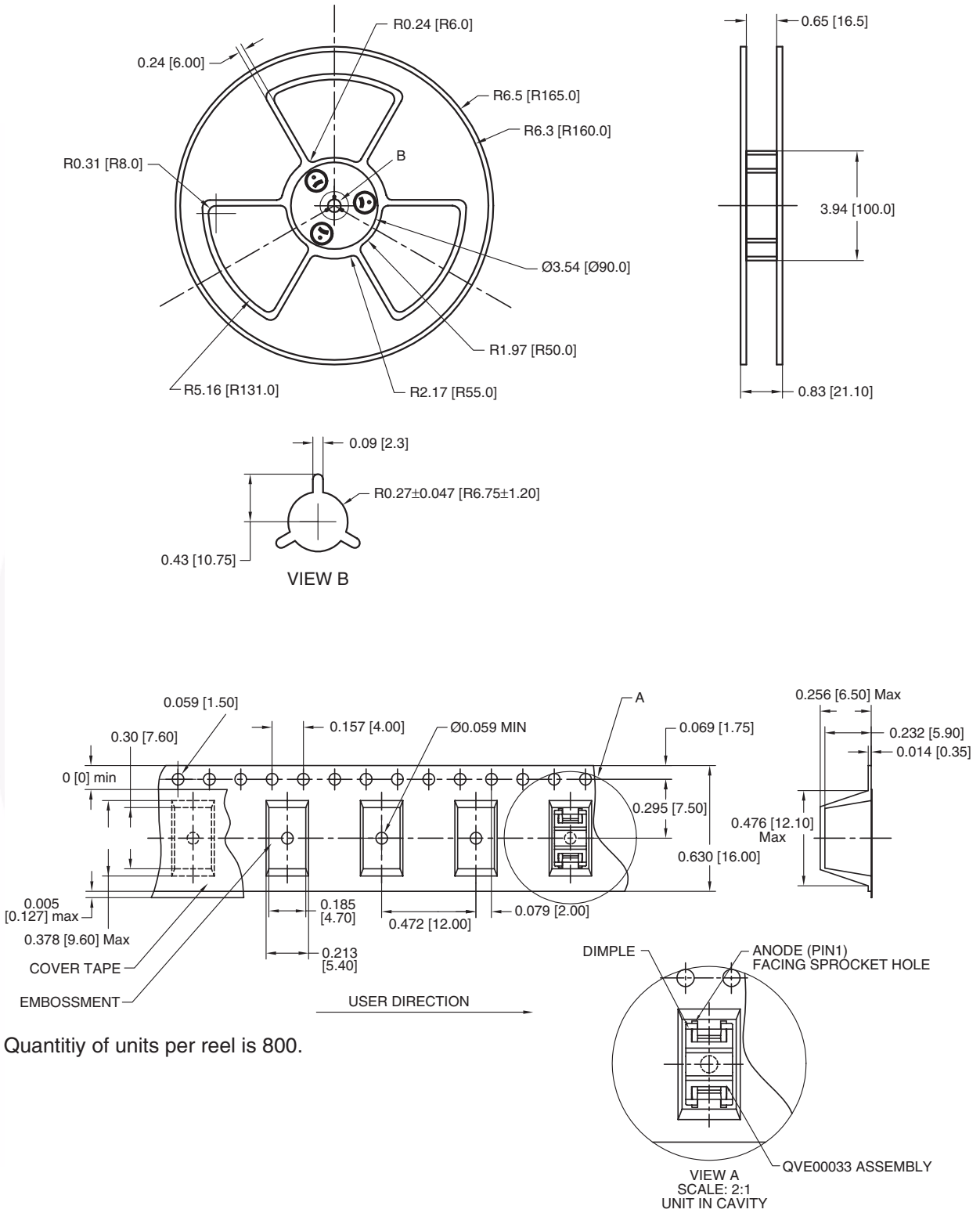


Figure 6. Fall Time vs. Load Resistance

**Recommended Printed Circuit Board Pattern** (For Reference Only)






Tape and Reel Dimensions





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