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October 2009

QVE00118
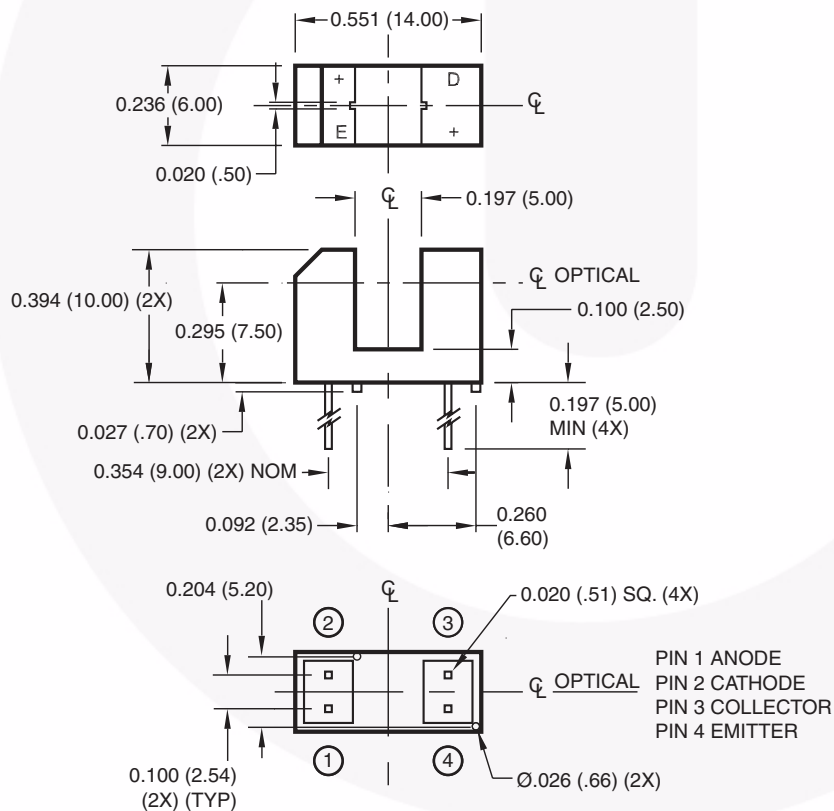# Phototransistor Optical Interrupter Switch

Features

■ No contact sensing
■ 5mm gap
■ 0.5mm aperture width
■ Low profile
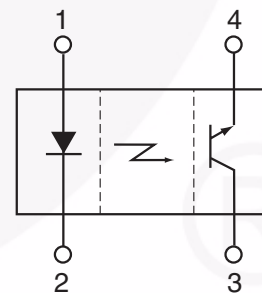■ PCB mount
■ Transistor output

Description

The QVE00118 consists of an infrared light emitting diode coupled to an NPN silicon phototransistor packaged into an injection molded housing. The housing is designed for wide-gap, non-contact sensing.

Package Dimensions

0.551 (14.00)

0.236 (6.00)

+   D

E   +

0.020 (.50)

0.197 (5.00)

0.394 (10.00) (2X)

0.295 (7.50)

CL OPTICAL

0.100 (2.50)

0.027 (.70) (2X)

0.354 (9.00) (2X) NOM

0.197 (5.00) MIN (4X)

0.092 (2.35)

0.260 (6.60)

0.204 (5.20)

2   3

0.020 (.51) SQ. (4X)

CL OPTICAL

1   4

0.100 (2.54) (2X) (TYP)

Ø.026 (.66) (2X)

PIN 1 ANODE
PIN 2 CATHODE
PIN 3 COLLECTOR
PIN 4 EMITTER

Schematic

1   4

2   3

Notes:

1. Dimensions for all drawings are in inches (millimeters).
2. Tolerance of ± .010 (.25) on all non-nominal dimensions unless otherwise 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]	240 for 5 sec	°C
T$_{SOL-F}$	Soldering Temperature (Flow)[2][3]	260 for 10 sec	°C
EMITTER			
I$_F$	Continuous Forward Current	50	mA
V$_R$	Reverse Voltage	5	V
P$_D$	Power Dissipation[1]	100	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]	100	mW

Notes:

1. Derate power dissipation linearly, on each component, 1.33mW/°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)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
EMITTER						
V$_F$	Forward Voltage	I$_F$ = 20mA		1.2	1.5	V
I$_R$	Reverse Current	V$_R$ = 4V			10	µA
I$_{PE}$	Peak Emission Wavelength	I$_F$ = 20mA		940		nm
SENSOR						
I$_D$	Dark Current	V$_{CE}$ = 10V, I$_F$ = 0mA			200	nA
COUPLED						
I$_{C(ON)}$	Collector Current	I$_F$ = 20mA, V$_{CE}$ = 10V	0.5		14	mA
V$_{CE\,(SAT)}$	Collector Emitter Saturation Voltage	I$_F$ = 20mA, I$_C$ = 0.1mA			0.4	V
t$_r$	Rise Time	V$_{CC}$ = 5V, R$_L$ = 100Ω,		4		µs
t$_f$	Fall Time	I$_C$ = 5mA		4		µs

Typical Performance Characteristics

$T_A = 25°C$
$I_F = 20$ mA
$V_{CE} = 10$ V
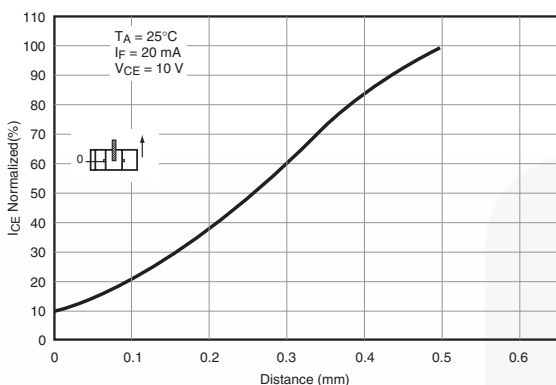
Fig. 1 Collector Current vs. Shield distance

$T_A = 25°C$
$I_F = 20$ mA
$V_{CE} = 10$ V

Fig. 2 Collector Current vs. Shield distance

$T_A = 25°C$

$I_F = 40$ mA
$I_F = 30$ mA
$I_F = 20$ mA
$I_F = 10$ mA
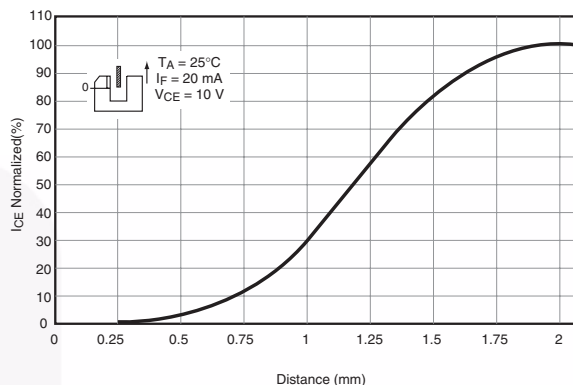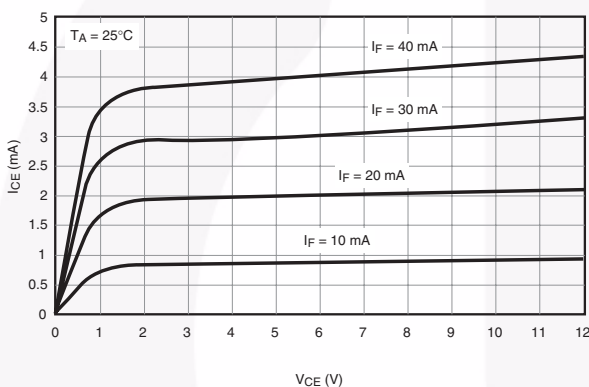
Fig. 3 Collector-Emitter Voltage vs. Collector Current

$I_F = 20$ mA, $I_C = 0.1$ mA
$I_F = 10$ mA, $I_C = 0.05$ mA
$I_F = 30$ mA, $I_C = 0.15$ mA

Normalized to
$I_F = 20$ mA, $I_C = 0.1$ mA, $T_A = 25°C$
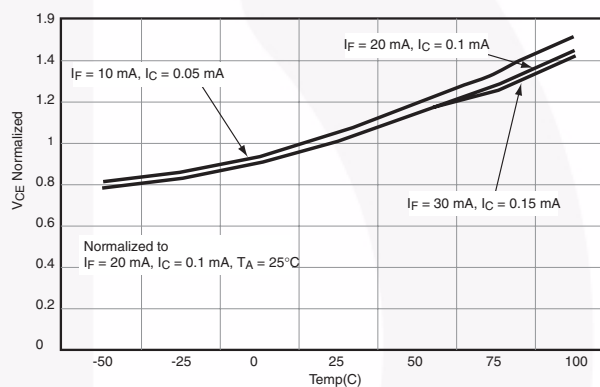
Fig. 4 Collector-Emitter Voltage vs. Temperature

Normalized to
$I_F = 20$ mA, $V_{CE} = 5$ V, $T_A = 25°C$

$I_F = 100$ mA
$I_F = 60$ mA
$I_F = 30$ mA
$I_F = 20$ mA
$I_F = 10$ mA
$I_F = 5$ mA
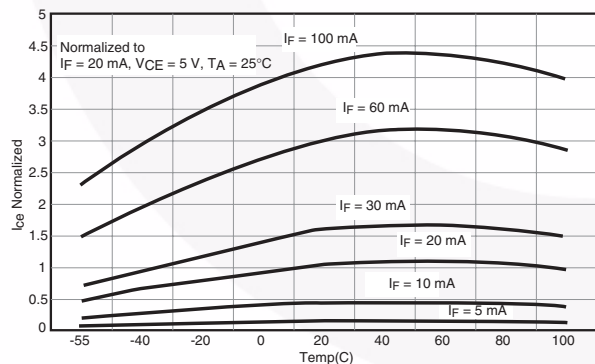
Fig. 5 Collector Current vs. Temperature

$T_A = 25°C$
$V_{CE} = 10$ V
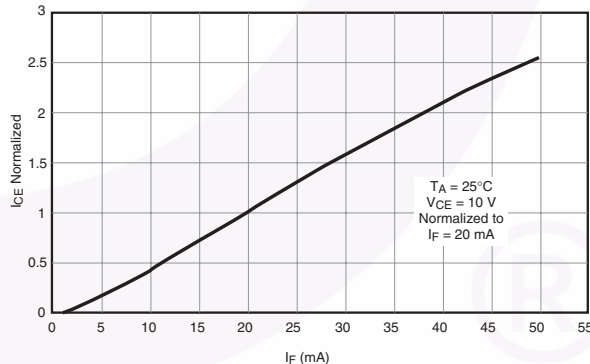Normalized to
$I_F = 20$ mA

Fig. 6 Collector Current vs. Forward Current

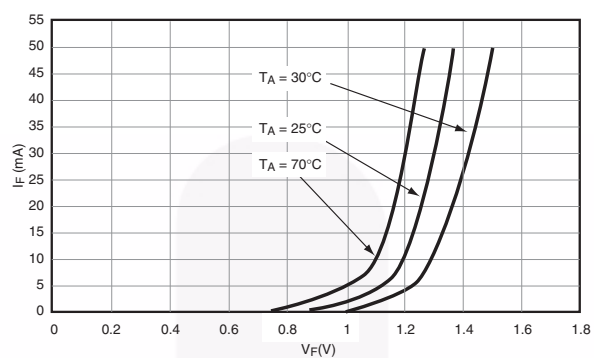## Typical Performance Characteristics (Continued)

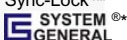**Fig. 7 Forward Voltage vs. Forward Current**

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Rev. I40