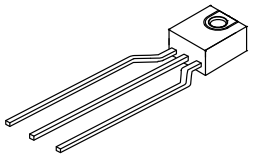
Plastic Silicon OPTOLOGIC Photosensor

QSE159



SIDELOOKER OPTOLOGIC
CASE 100CM

Description

The QSE159 is OPTOLOGIC IC which feature a Schmitt trigger at output which provides hysteresis for noise immunity and pulse shaping. The basic building block of this IC consists of a photodiode, a linear amplifier, voltage regulator, Schmitt trigger and four output options. The TTL/LSTTL compatible output can drive up to ten TTL loads over supply currents from 4.5 to 16.0 Volts. The devices are marked with a color stripe for easy identification.

Features

- Bipolar Silicon IC
- Package Type: Sidelooker
- Medium Wide Reception Angle, 50°
- Package Material and Color: Black Epoxy
- Matched emitter: QEE113/QEE123
- Daylight Filter
- High Sensitivity
- Direct TTL/LSTTL Interface
- This is a Pb−Free Device

Block Diagram

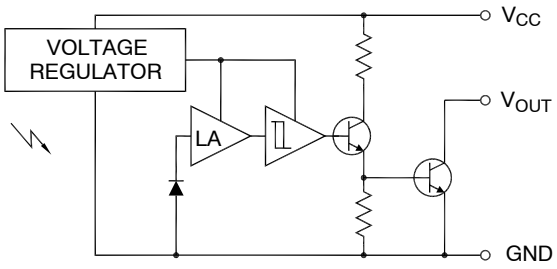


Figure 1. QSE159 Open−Collector Output Inverter

INPUT/OUTPUT TABLE

Part Number	Light	Output
QSE159	On	LOW
	Off	HIGH

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

Symbol	Parameter	Rating	Unit
T_{OPR}	Operating Temperature	−40 to +85	°C
T_{STG}	Storage Temperature	−40 to +100	°C
T_{SOL-I}	Soldering Temperature (Iron) (Notes 2, 3, 4)	240 for 5 s	°C
T_{SOL-F}	Soldering Temperature (Flow) (Notes 2, 3)	260 for 10 s	°C
I_O	Output Current	50	mA
V_{CC}	Supply Voltage	4.0 to 16	V
V_O	Output Voltage	35	V
P_D	Power Dissipation (Note 1)	100	mW

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Derate power dissipation linearly 2.50 mW/°C above 25°C.
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16” (1.6 mm) minimum from housing.

ELECTRICAL CHARACTERISTICS (T_A = −40°C to +85°C, V_{CC} = 4.5 V to 5.5 V)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Ee(+)	Positive Going Threshold Irradiance (Note 5)	T_A = 25°C	0.025	–	0.250	mW/cm^2
Ee(+) / Ee(−)	Hysteresis Ratio		1.10	–	2.00	
I_{CC}	Supply Current (Note 5)	Ee = 0 or 0.3 mW/cm^2	–	–	5.0	mA
	Peak to Peak Ripple which will Cause False Triggering	f = DC to 50 MHz	–	–	2.00	V
QSE159 (INVERTER OPEN COLLECTOR)						
I_{OH}	High Level Output Voltage	Ee = 0, V_{OH} = 30 V	–	–	100	μA
V_{OL}	Low Level Output Voltage (Note 5)	Ee = 0.3 mW/cm^2, I_{OL} = 16 mA	–	–	0.40	V
QSE159						
t_R, t_F	Output Rise, Fall Times	Ee = 0 or 0.3 mW/cm^2, f = 10 kHz, DC = 50%, R_L = 360 Ω (Note 5)	–	–	100	ns
t_{PHL}, t_{PLH}	Propagation Delay		–	6.0	–	μs

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. λ = 880 nm (AlGaAs).

TYPICAL PERFORMANCE CURVES

(Sensor Coupled to QEE113 Emitter)

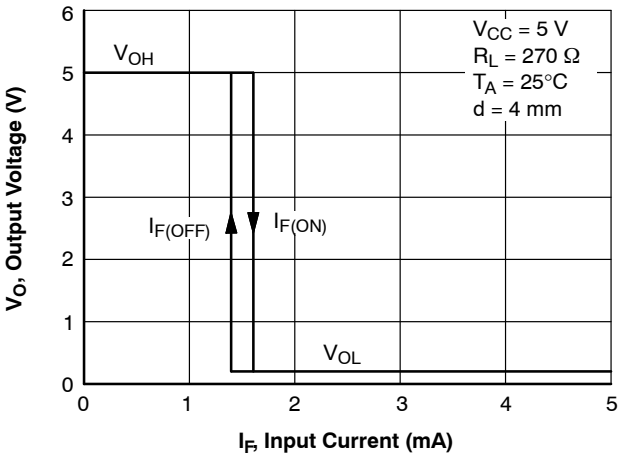


Figure 2. Output Voltage vs. Input Current

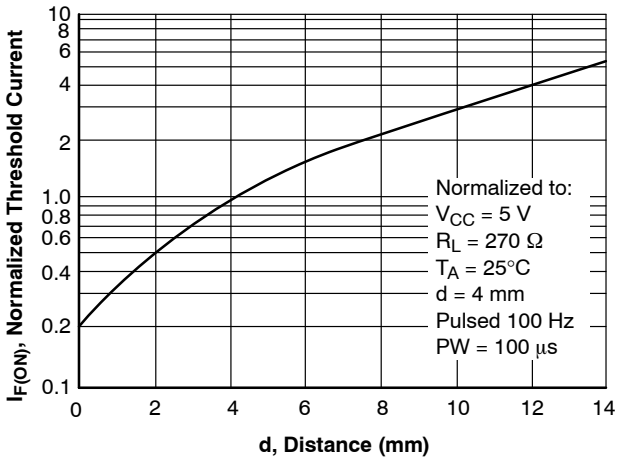


Figure 3. Threshold Current vs. Distance

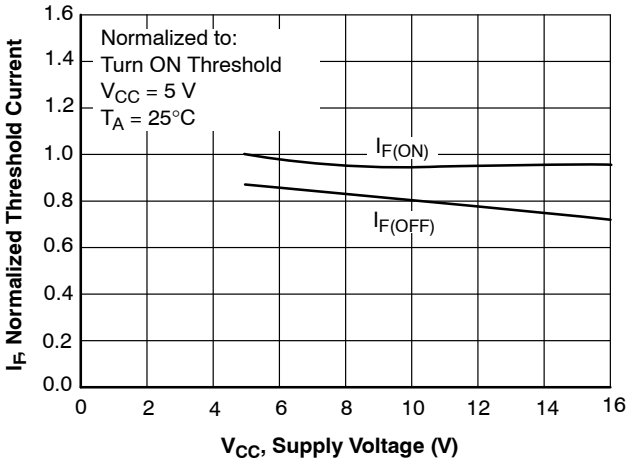


Figure 4. Normalized Threshold Current vs. Supply Voltage

TYPICAL PERFORMANCE CURVES (continued)

(Sensor Coupled to QEE113 Emitter)

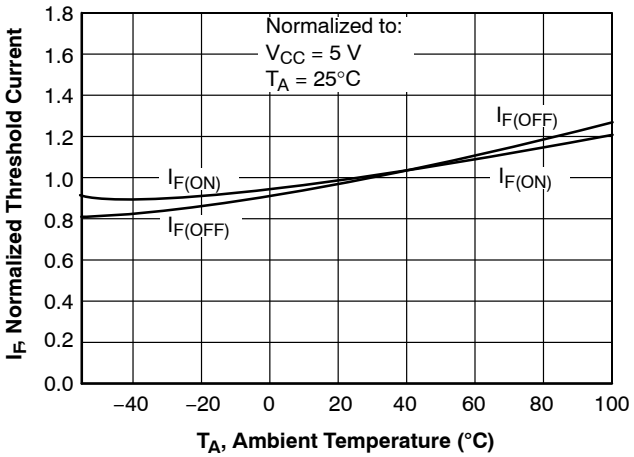


Figure 5. Normalized Threshold Current vs. Ambient Temperature

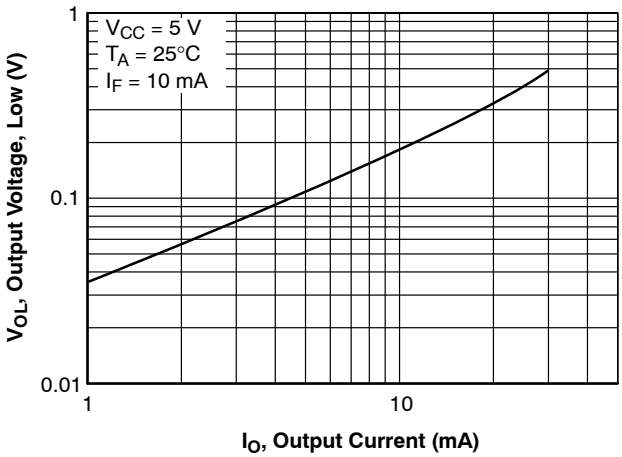


Figure 6. Low Output Voltage vs. Output Current

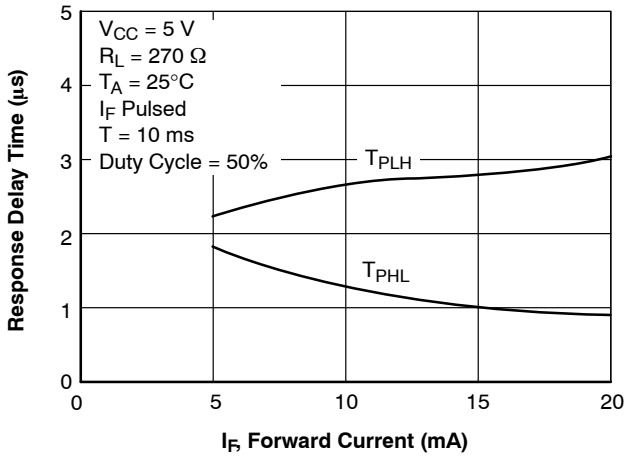
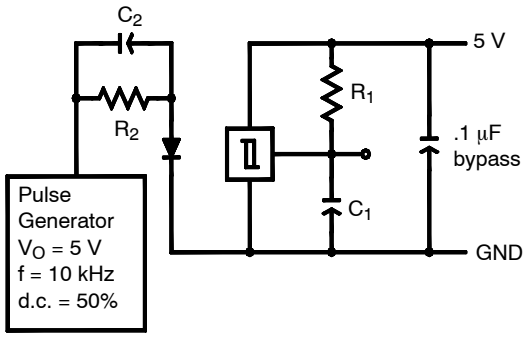


Figure 7. Response Time vs. Forward Current



R_1 = 360 Ω
R_2 = 180 Ω
C_1 = 15 pF
C_2 = 20 pF
C_1 and C_2 include probe and stray wire capacitance

Figure 8. Switching Speed Test Circuit

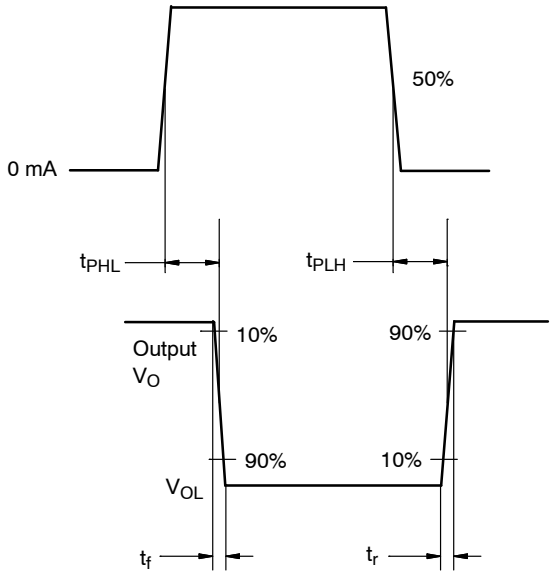
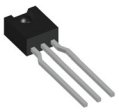


Figure 9. Switching Times Definitions

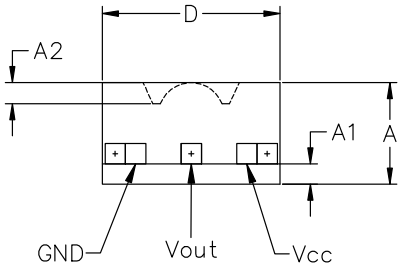
ORDERING INFORMATION

Part Number	Package	Part Number Definitions	Color Code	Shipping
QSE159	SIDELOOKER OPTOLOGIC (Pb−Free)	Open−collector, inverter output	Blue	500 Units / Bulk

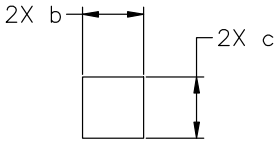


SIDELOOKER OPTOLOGIC 4.44x5.08x2.54, 1.90P
CASE 100CM
ISSUE A

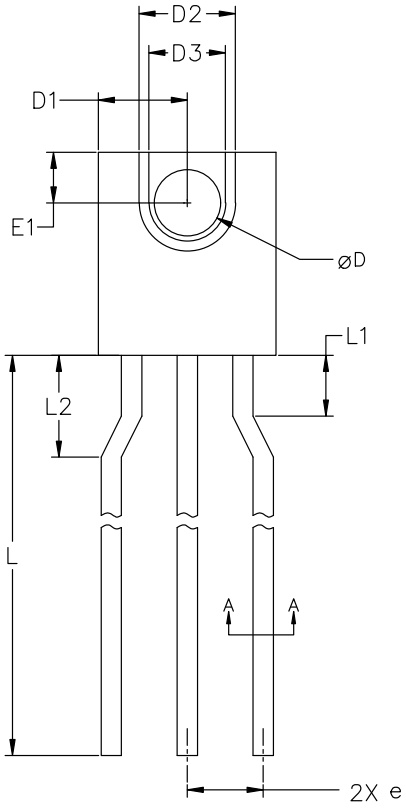
DATE 05 MAR 2024



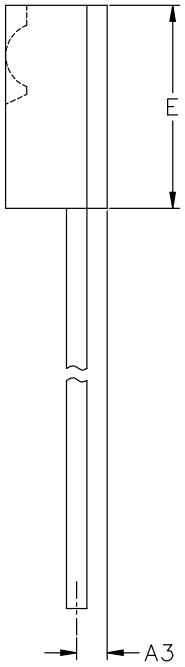
END VIEW



Section "A–A"
Scale 3:1



TOP VIEW



SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING AS PER ASMEY14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.

DIMENSION (MILLIMETERS)			
	MIN	NOM	MAX
A	2.41	2.54	2.67
A1	0.38	0.51	0.64
A2	0.48	0.53	0.58
A3	0.64	0.76	0.89
b	0.51	0.57	0.61
c	0.51	0.57	0.61
D	4.32	4.44	4.57
D1	2.16	2.21	2.29
D2	2.29	2.41	2.54
D3	1.78	1.91	2.03
E	4.83	5.08	5.33
E1	1.14	1.27	1.40
e	1.65	1.90	2.15
øD	1.52	1.65	1.78
L	12.70	13.46	–––
L1	1.27	1.52	1.78
L2	2.29	2.54	2.79

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales