

**Electrical Characteristics** ( $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{CC} = 4.5\text{V}$  to  $16\text{V}$ )

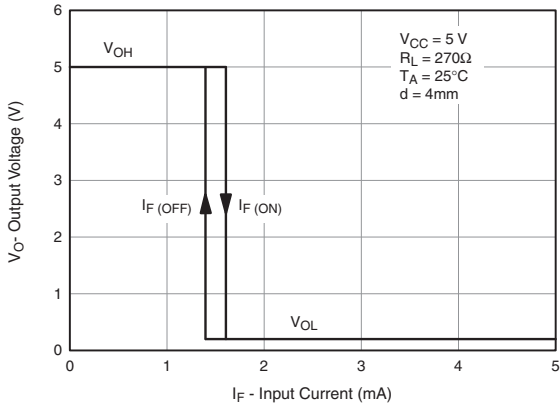
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Ee(+)	Positive Going Threshold Irradiance <sup>(5)</sup>	$T_A = 25^{\circ}\text{C}$	0.025		0.250	$\text{mW}/\text{cm}^2$
Ee(+)/Ee(-)	Hysteresis Ratio		1.10		2.00	
$I_{CC}$	Supply Current <sup>(5)</sup>	Ee = 0 or $0.3\text{mW}/\text{cm}^2$			5.0	mA
	Peak to Peak Ripple which will Cause False Triggering	f = DC to 50MHz			2.00	V
<b>QSE156/C (Buffer Totem Pole)</b>						
$V_{OH}$	High Level Output Voltage <sup>(5)</sup>	Ee = $0.3\text{mW}/\text{cm}^2$ , $I_{OH} = -10\text{mA}$	$V_{CC} - 2.1$			V
$V_{OL}$	Low Level Output Voltage	Ee = 0, $I_{OL} = 16\text{mA}$			0.40	V
<b>QSE157/C (Inverter Totem Pole)</b>						
$V_{OH}$	High Level Output Voltage	Ee = 0, $I_{OH} = -10\text{mA}$	$V_{CC} - 2.1$			V
$V_{OL}$	Low Level Output Voltage <sup>(5)</sup>	Ee = $0.3\text{mW}/\text{cm}^2$ , $I_{OL} = 16\text{mA}$			0.40	V
<b>QSE158/C (Buffer Open Collector)</b>						
$I_{OH}$	High Level Output Current <sup>(5)</sup>	Ee = $0.3\text{mW}/\text{cm}^2$ , $V_{OH} = 30\text{V}$			100	$\mu\text{A}$
$V_{OL}$	Low Level Output Voltage	Ee = 0, $I_{OL} = 16\text{mA}$			0.40	V
<b>QSE159/C (Inverter Open Collector)</b>						
$I_{OH}$	High Level Output Current	Ee = 0, $V_{OH} = 30\text{V}$			100	$\mu\text{A}$
$V_{OL}$	Low Level Output Voltage <sup>(5)</sup>	Ee = $0.3\text{mW}/\text{cm}^2$ , $I_{OL} = 16\text{mA}$			0.40	V
<b>QSE156/C, QSE157/C</b>						
$t_R, t_F$	Output Rise, Fall Times	Ee = 0 or $0.3\text{mW}/\text{cm}^2$ , f = 10kHz, DC = 50%, $R_L = 360\Omega$ <sup>(5)</sup>			70	nS
$t_{PHL}, t_{PLH}$	Propagation Delay			6.0		$\mu\text{S}$
<b>QSE158/C, QSE159/C</b>						
$t_R, t_F$	Output Rise, Fall Times	Ee = 0 or $0.3\text{mW}/\text{cm}^2$ , f = 10kHz, DC = 50%, $R_L = 360\Omega$ <sup>(5)</sup>			100	nS
$t_{PHL}, t_{PLH}$	Propagation Delay			6.0		$\mu\text{S}$

**Note:**

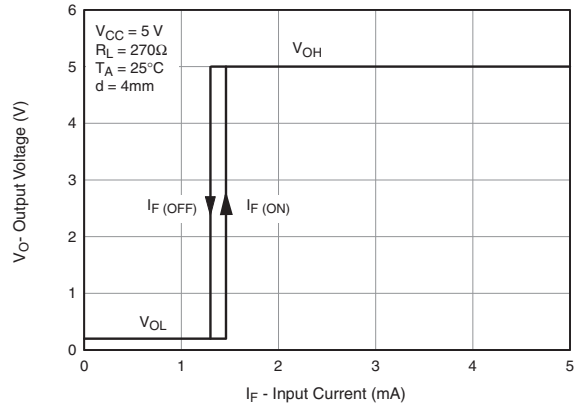
5.  $\lambda = 880\text{nm}$  (AlGaAs).

**Typical Performance Curves** (Sensor Coupled to QEE113 Emitter)

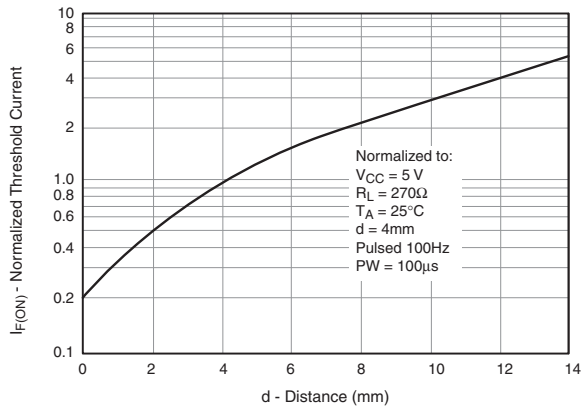
**Fig. 1 Output Voltage vs. Input Current (Inverters)**



**Fig. 2 Output Voltage vs. Input Current (Buffers)**



**Fig. 3 Threshold Current vs. Distance**



**Fig. 4 Normalized Threshold Current vs. Supply Voltage**

