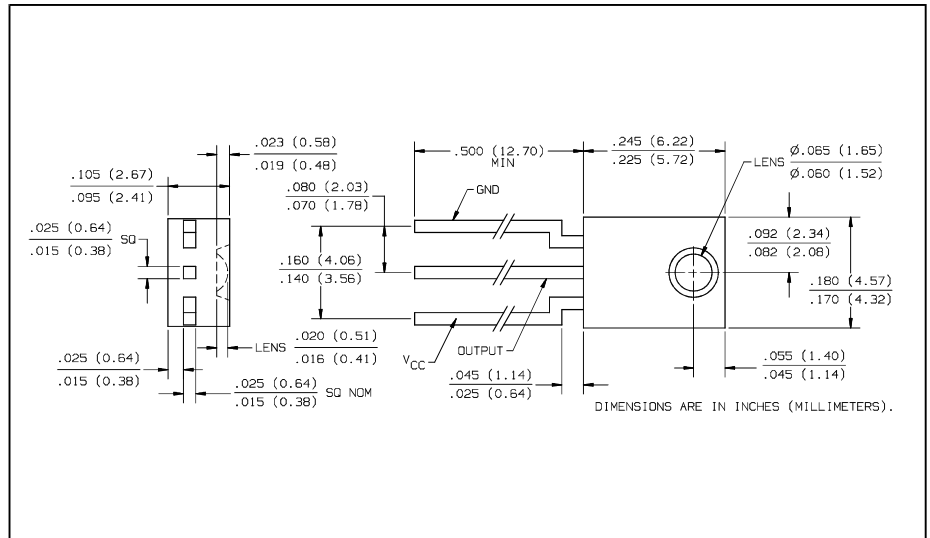


# Photologic<sup>®</sup> Sensors

## Types OPL535, OPL535-OC, OPL536, OPL536-OC



### Features

- Four output options
- High noise immunity
- Direct TTL/LSTTL CMOS interface
- Low cost plastic side-looking package
- Mechanically and spectrally matched to the OP145 and OP245 series LED's
- Data rates to 250 kBaud
- Low power consumption

### Description

The OPL535, OPL535-OC, OPL536, OPL536-OC contain a monolithic integrated circuit which incorporates a photodiode, amplifier, voltage regulator, Schmitt trigger and an NPN output transistor on a single silicon chip. The OPL535 and OPL536 include a 10 K $\Omega$  pull-up resistor ( $R_L$ ) from output to  $V_{CC}$ . The OPL535-OC and OPL536-OC have an open-collector output. These devices exhibit very stable performance over supply voltages ranging from 4.5 V to 16 V and a wide range of irradiance levels. The Photologic<sup>®</sup> chip is encapsulated in a molded plastic package which has a recessed integral lens for enhanced optical coupling combined with mechanical protection.

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

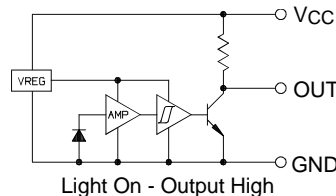
Supply Voltage, $V_{CC}$ .....	18 V
Storage Temperature Range .....	$-40^\circ\text{C}$ to $+100^\circ\text{C}$
Operating Temperature Range .....	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Lead Soldering Temperature Range [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] .....	$240^\circ\text{C}$
Power Dissipation .....	90 mW
Voltage at Output Lead <sup>(4)</sup> .....	35 V
Sinking Current .....	50 mA

### Notes:

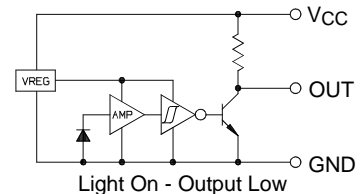
- (1) Derate linearly 2.67 mW/ $^\circ\text{C}$  above  $70^\circ\text{C}$ .
- (2) RMA flux is recommended. Duration can be extended to 10 sec. maximum when flow soldering. Max 20 grams force may be applied to the leads when soldering.
- (3) Irradiance measurements are made with  $\lambda_i = 935\text{ nm}$ .
- (4) OC versions only. For  $I_{CC}$  on pull-up versions add  $V_{CC}/10\text{ k}\Omega$ .

### Schematics

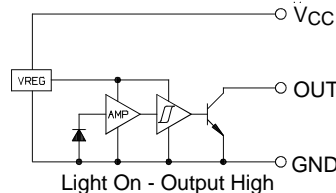
OPL535 Buffer/Pull-up Resistor



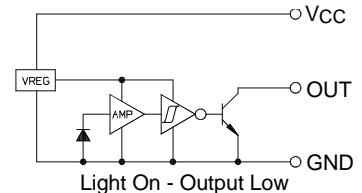
OPL536 Inverter/Pull-up Resistor



OPL535-OC Buffer/OC



OPL536-OC Inverter/OC



# Types OPL535, OPL535-OC, OPL536, OPL536-OC

Electrical Characteristics (-40° C to +85° C unless otherwise noted)  $V_{CC} = 4.5\text{ V to }16\text{ V}$

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$V_{CC}$	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak $V_{CC}$ Ripple Necessary to Cause False Triggering of Output			2	V	$f = \text{DC to } 50\text{ MHz}$
$I_{CC}$	Supply Current <sup>(4)</sup>		2.7	5.0	mA	$E_e = 0\text{ or }1\text{ mW/cm}^2$
$E_{eT(+)}$	Positive-Going Threshold Irradiance <sup>(3)</sup>					$T_A = 25^\circ\text{ C}$
	OPL535, OPL535-OC, OPL536, OPL536-OC	0.12		0.38	$\text{mW/cm}^2$	$T_A = 25^\circ\text{ C}$
	OPL535A, OPL535-OCA, OPL536A, OPL536-OCA OPL535B, OPL535-OCB, OPL536B, OPL536-OCB	0.12 0.23		0.28 0.38	$\text{mW/cm}^2$ $\text{mW/cm}^2$	$T_A = 25^\circ\text{ C}$ $T_A = 25^\circ\text{ C}$
$E_{eT(+)} / E_{eT(-)}$	Hysteresis Ratio	1.20		1.80		
$\Delta E_{eT(+)}(\Delta T)$	Temperature Coefficient	$>0^\circ\text{ C}$		-0.6	$\% / ^\circ\text{ C}$	
		$<0^\circ\text{ C}$		-1.6	$\% / ^\circ\text{ C}$	
<b>OPL535, OPL535-OC (Buffers)</b>						
$I_{OH}$	High Level Output Current <sup>(4)</sup>		0.1	10	$\mu\text{A}$	$V_{OH} = 30\text{ V}$ , $E_e = 1\text{ mW/cm}^2$
$V_{OL}$	Low Level Output Voltage		0.2	0.40	V	$I_{OL} = 16\text{ mA}$ , $E_e = 0$
<b>OPL536, OPL536-OC (Inverters)</b>						
$I_{OH}$	High Level Output Current <sup>(4)</sup>		0.1	10	$\mu\text{A}$	$V_{OH} = 30\text{ V}$ , $E_e = 0$
$V_{OL}$	Low Level Output Voltage		0.2	0.40	V	$I_{OL} = 16\text{ mA}$ , $E_e = 1\text{ mW/cm}^2$
<b>OPL535, OPL536</b>						
$t_r$	Output Rise Time		1.5		$\mu\text{s}$	$E_e = 0\text{ or }1\text{ mW/cm}^2$ , $C_L = 50\text{ pF}$
$t_f$	Output Fall Time		20		ns	
<b>OPL535-OC, OPL536-OC</b>						
$t_r$	Output Rise Time		50		ns	$E_e = 0\text{ or }1\text{ mW/cm}^2$ , $R_L = 300\ \Omega\text{ to }5\text{ V}$ , $C_L = 50\text{ pF}$
$t_f$	Output Fall Time		20		ns	
<b>OPL535, OPL535-OC, OPL536, OPL536-OC</b>						
$t_{pE_{eT}(+)}$	Propagation Delay		1.0		$\mu\text{s}$	$E_e = 0\text{ or }1\text{ mW/cm}^2$
$t_{pE_{eT}(-)}$	Propagation Delay		3.0		$\mu\text{s}$	$R_L = 300\ \Omega\text{ to }5\text{ V}$ , $C_L = 50\text{ pF}$