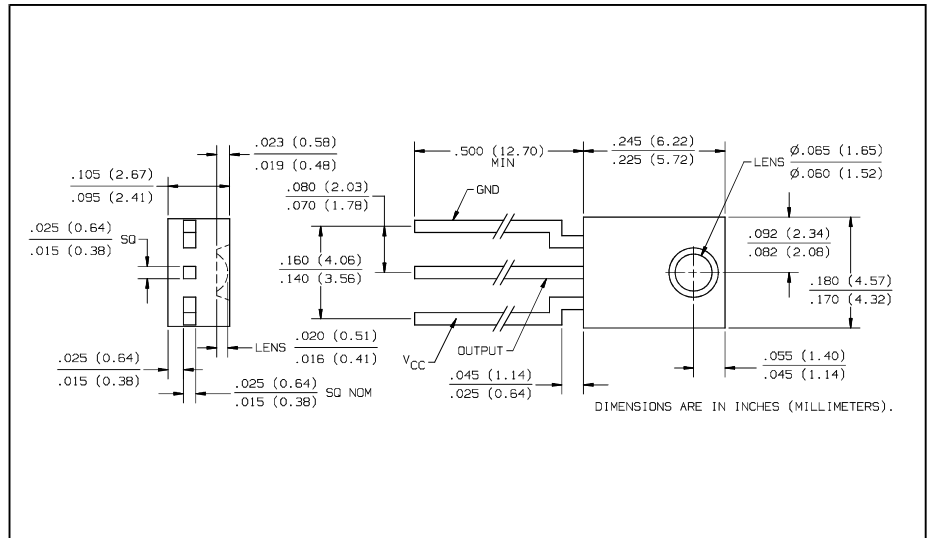


# Photologic® Sensors

## 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® 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)

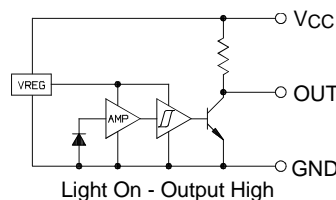
Supply Voltage, $V_{CC}$	18 V
Storage Temperature Range	$-40^\circ\text{C}$ to $+100^\circ\text{C}$
Operating Temperature Range	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Lead Soldering Temperature Range [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	$240^\circ\text{C}$
Power Dissipation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

#### Notes:

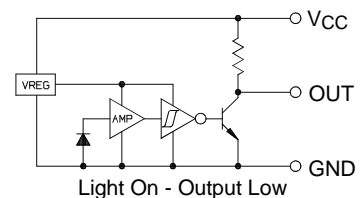
- (1) Derate linearly 2.67 mW/ $^\circ\text{C}$  above  $70^\circ\text{C}$ .
- (2) RMA flux is recommended. Duration can be extended to 10 sec. maximum when flow soldering. Max 20 grams force may be applied to the leads when soldering.
- (3) Irradiance measurements are made with  $\lambda_i = 935\text{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

### Schematics

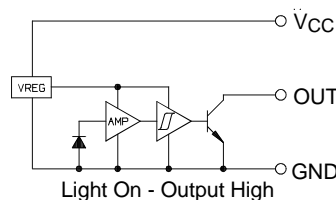
OPL535 Buffer/Pull-up Resistor



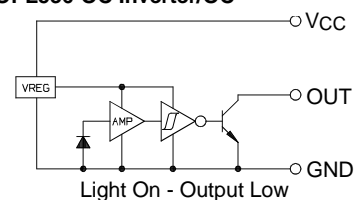
OPL536 Inverter/Pull-up Resistor



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 <sub>CC</sub>	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak V <sub>CC</sub> Ripple Necessary to Cause False Triggering of Output			2	V	f = DC to 50 MHz
I <sub>CC</sub>	Supply Current <sup>(4)</sup>		2.7	5.0	mA	E <sub>e</sub> = 0 or 1 mW/cm <sup>2</sup>
E <sub>eT</sub> (+)	Positive-Going Threshold Irradiance <sup>(3)</sup>					
	OPL535, OPL535-OC, OPL536, OPL536-OC	0.12		0.38	mW/cm <sup>2</sup>	T <sub>A</sub> = 25° C
	OPL535A, OPL535-OCA, OPL536A, OPL536-OCA	0.12		0.28	mW/cm <sup>2</sup>	T <sub>A</sub> = 25° C
	OPL535B, OPL535-OCB, OPL536B, OPL536-OCB	0.23		0.38	mW/cm <sup>2</sup>	T <sub>A</sub> = 25° C
E <sub>eT</sub> (+)/E <sub>eT</sub> (-)	Hysteresis Ratio	1.20		1.80		
ΔE <sub>eT</sub> (+)(ΔT)	Temperature Coefficient	>0° C	-0.6		%/° C	
		<0° C	-1.6		%/° C	
OPL535, OPL535-OC (Buffers)						
I <sub>OH</sub>	High Level Output Current <sup>(4)</sup>		0.1	10	μA	V <sub>OH</sub> = 30 V, E <sub>e</sub> = 1 mW/cm <sup>2</sup>
V <sub>OL</sub>	Low Level Output Voltage		0.2	0.40	V	I <sub>OL</sub> = 16 mA, E <sub>e</sub> = 0
OPL536, OPL536-OC (Inverters)						
I <sub>OH</sub>	High Level Output Current <sup>(4)</sup>		0.1	10	μA	V <sub>OH</sub> = 30 V, E <sub>e</sub> = 0
V <sub>OL</sub>	Low Level Output Voltage		0.2	0.40	V	I <sub>OL</sub> = 16 mA, E <sub>e</sub> = 1 mW/cm <sup>2</sup>
OPL535, OPL536						
t <sub>r</sub>	Output Rise Time		1.5		μs	E <sub>e</sub> = 0 or 1 mW/cm <sup>2</sup> , C <sub>L</sub> = 50 pF
t <sub>f</sub>	Output Fall Time		20		ns	
OPL535-OC, OPL536-OC						
t <sub>r</sub>	Output Rise Time		50		ns	E <sub>e</sub> = 0 or 1 mW/cm <sup>2</sup> , R <sub>L</sub> = 300 Ω to 5 V, C <sub>L</sub> = 50 pF
t <sub>f</sub>	Output Fall Time		20		ns	
OPL535, OPL535-OC, OPL536, OPL536-OC						
tpE <sub>eT</sub> (+)	Propagation Delay		1.0		μs	E <sub>e</sub> = 0 or 1 mW/cm <sup>2</sup> , R <sub>L</sub> = 300 Ω to 5 V, C <sub>L</sub> = 50 pF
tpE <sub>eT</sub> (-)	Propagation Delay		3.0		μs	