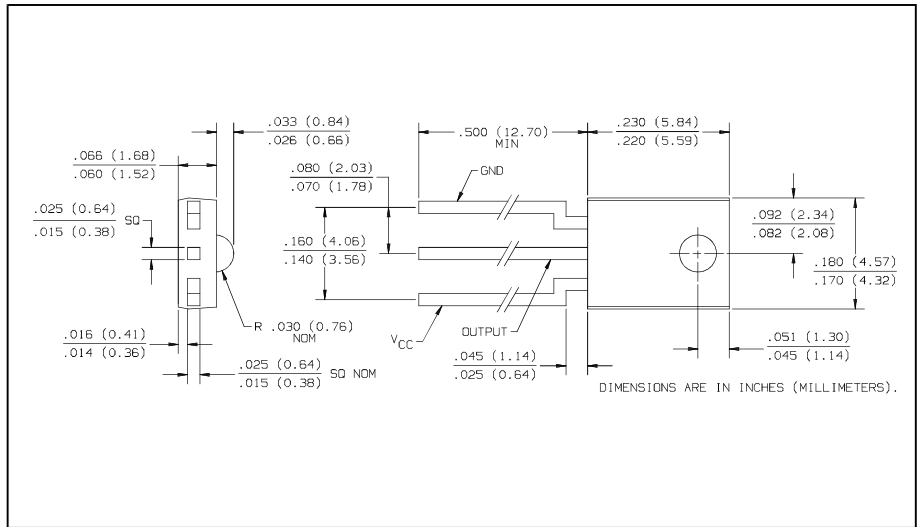


# Photologic<sup>®</sup> Sensors

## Types OPL530, OPL530-OC, OPL531, OPL531-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 OP140 and OP240 series LED's
- Data rates to 250 kBaud
- Low power consumption

### Description

The OPL530, OPL530-OC, OPL531, OPL531-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 OPL530 and OPL531 includes a 10 K $\Omega$  pull-up resistor ( $R_L$ ) from output to  $V_{CC}$ . The OPL530-OC and OPL531-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 an integral lens for enhanced optical coupling and minimal optical spacing.

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

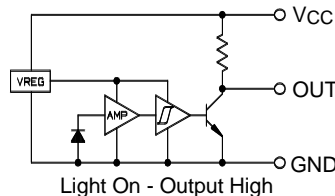
Supply Voltage, $V_{CC}$ .....	18 V
Storage Temperature Range .....	$-40^\circ\text{C}$ to $+100^\circ\text{C}$
Operating Temperature Range .....	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Lead Soldering Temperature Range [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] .....	$240^\circ\text{C}$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

### Notes:

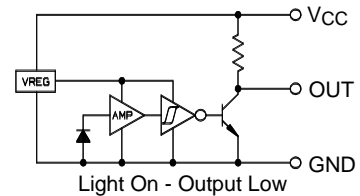
- (1) Derate linearly 2.67 mW/ $^\circ\text{C}$  above  $70^\circ\text{C}$ .
- (2) RMA flux is recommended. Duration can be extended to 10 sec. maximum when flow soldering. Max 20 grams force may be applied to the leads when soldering.
- (3) Irradiance measurements are made with  $\lambda_i = 935\text{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

### Schematics

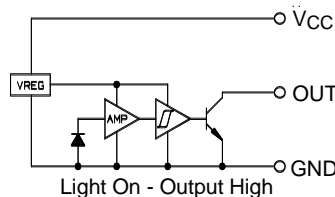
OPL530 Buffer/Pull-up Resistor



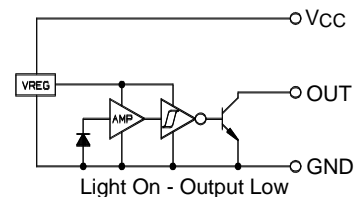
OPL531 Inverter/Pull-up Resistor



OPL530-OC Buffer/OC



OPL531-OC Inverter/OC



# Types OPL530, OPL530-OC, OPL531, OPL531-OC

Electrical Characteristics (-40° C to +85° C unless otherwise noted) V<sub>CC</sub> = 4.5 V to 16 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>					
	OPL530, OPL530-OC, OPL531, OPL531-OC	0.12		0.38	mW/cm <sup>2</sup>	T <sub>A</sub> = 25° C
	OPL530A, OPL530-OCA, OPL531A, OPL531-OCA OPL530B, OPL530-OCB, OPL531B, OPL531-OCB	0.12 0.23		0.28 0.38	mW/cm <sup>2</sup> mW/cm <sup>2</sup>	T <sub>A</sub> = 25° C 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	
<b>OPL530, OPL530-OC (Buffers)</b>						
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
<b>OPL531, OPL531-OC (Inverters)</b>						
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>
<b>OPL530, OPL531</b>						
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	
<b>OPL530-OC, OPL531-OC</b>						
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	
<b>OPL530, OPL530-OC, OPL531, OPL531-OC</b>						
t <sub>pE<sub>eT</sub>(+)</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
t <sub>pE<sub>eT</sub>(-)</sub>	Propagation Delay		3.0		μs	