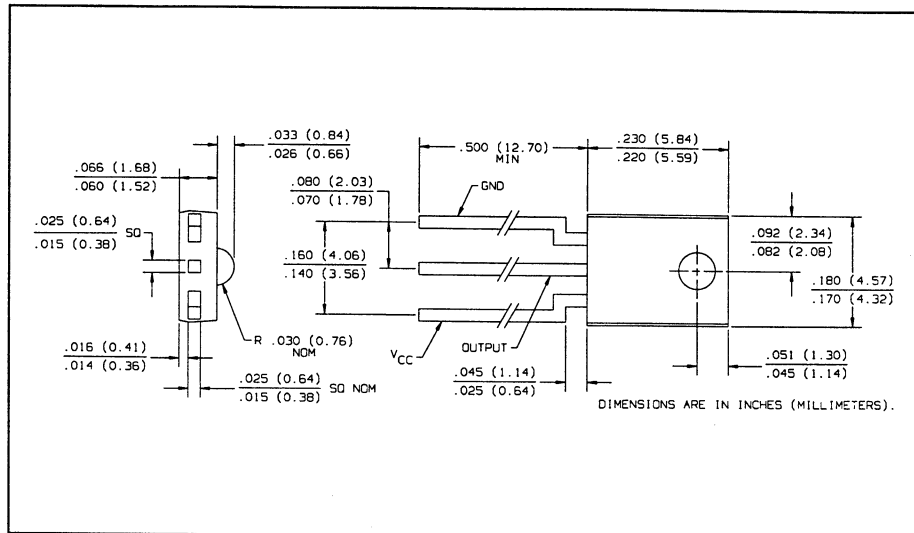
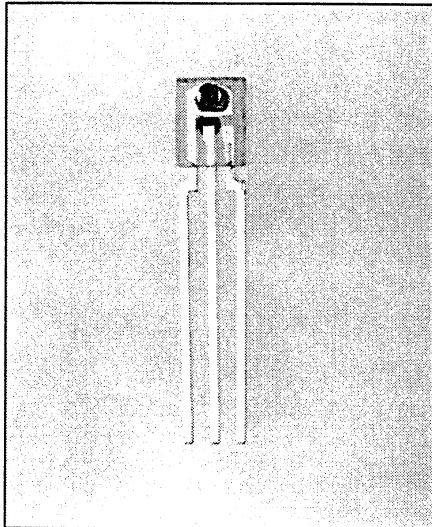


Photologic[®] Plastic Sensors Types OPL550, OPL551 Series



Features

- Four output options
- High noise immunity
- Direct TTL/LSTTL interface
- Low cost plastic side-looking package
- Mechanically and spectrally matched to OP140 and OP240 series LEDs
- Data rates to 250 kBaud

Description

The OPL550, OPL550-OC, OPL551, and OPL551-OC contain a monolithic integrated circuit which incorporates a photodiode, a linear amplifier and a Schmitt trigger on a single silicon chip. The devices feature TTL/LSTTL compatible logic level output which can drive up to 8 TTL loads without additional circuitry. Also featured are medium speed data rates to 250 kBaud with typical rise and fall times of 25 nsec. The Schmitt trigger's hysteresis characteristics provide high immunity to noise on input and V_{CC} . The Photologic[®] chip is encapsulated in a molded plastic package which has an integral lens for enhanced optical coupling. These devices are mechanically and spectrally matched to OP140 and OP240 infrared emitting diodes.

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

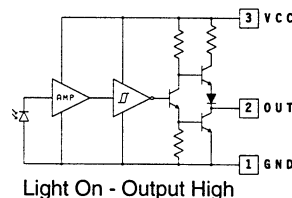
Supply Voltage, V_{CC} (not to exceed 3 seconds)	+10 V
Storage Temperature Range	-40°C to $+100^\circ\text{C}$
Operating Temperature Range	-40°C to $+85^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	$260^\circ\text{C}^{(1)}$
Power Dissipation	200 mW ⁽²⁾
Duration of Output Short to V_{CC} or Ground (OPL550, OPL551)	1.00 sec.
Duration of Output Short to V_{CC} (OPL550-OC, OPL551-OC)	1.00 sec.
Voltage at Output Lead (OPL550-OC, OPL551-OC)	35 V
Low Level Output Current	16 mA
High Level Output Current (OPL550, OPL551)	1 mA
Irradiance	10 mW/cm ²

Notes:

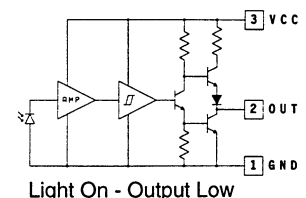
- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. Max. 20 grams force may be applied to leads when soldering.
- (2) Derate linearly 2.5 mW/ $^\circ\text{C}$ above 25°C .
- (3) Irradiance measurements are made with $\lambda_i = 935\text{ nm}$.

Schematics

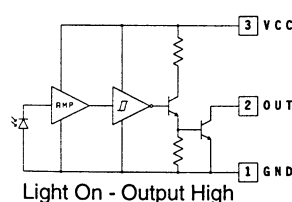
OPL550 (Totem-Pole Output) Buffer



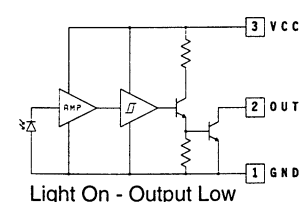
OPL551 (Totem-Pole Output) Inverter



OPL550-OC (Open-Collector Output) Buffer



OPL551-OC (Open-Collector Output) Inverter



Types OPL550, OPL551 Series

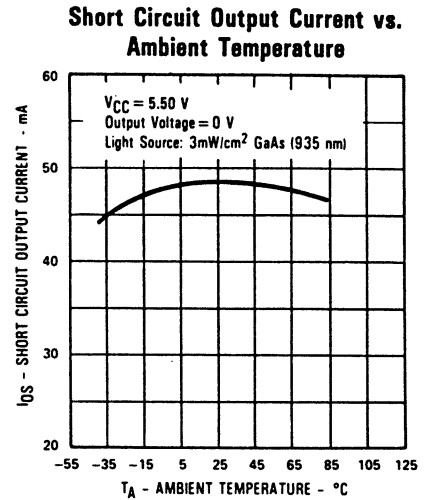
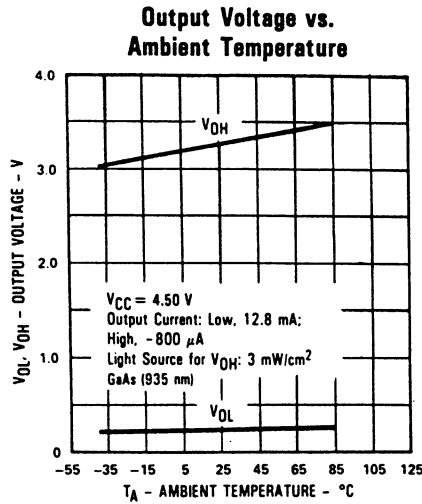
Electrical Characteristics (-40° C to +85° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V _{CC}	Operating Supply Voltage	4.5		5.5	V	
	Peak-to-Peak V _{CC} Ripple Necessary to Cause False Triggering of Output		2.0		V	V _{CC} = 5 VDC f = DC to 50 MHz
E _{eT} (+)	Positive-Going Threshold Irradiance OPL550, OPL550-OC, OPL551, OPL551-OC OPL550A, OPL550-OCA, OPL551A, OPL551-OCA	0.25 0.25		2.4 1.4	mW/cm ² mW/cm ²	V _{CC} = 5 V, T _A = 25° C V _{CC} = 5 V, T _A = 25° C
E _{eT} (+)/E _{eT} (-)	Hysteresis Ratio	1.50	2.0	2.5		
I _{CC}	Supply Current		8.0	15.0	mA	V _{CC} = 5.5 V, E _e = 0 or 3 mW/cm ²
OPL550 (Buffer, Totem-Pole)						
V _{OH}	High Level Output Voltage	2.4	3.3		V	V _{CC} = 4.5 V, I _{OH} = -800 μA, E _e = 3 mW/cm ²
V _{OL}	Low Level Output Voltage		0.25	0.40	V	V _{CC} = 4.5 V, I _{OL} = 12.8 mA, E _e = 0
I _{OS}	Short Circuit Output Current	-20	-55	-100	mA	V _{CC} = 5.5 V, E _e = 3 mW/cm ² , Output = GND
OPL550-OC (Buffer, Open-Collector)						
I _{OH}	High Level Output Current		1.0	100	μA	V _{CC} = 4.5 V, V _{OH} = 30 V, E _e = 3 mW/cm ²
V _{OL}	Low Level Output Voltage		0.25	0.40	V	V _{CC} = 4.5 V, I _{OL} = 12.8 mA, E _e = 0
OPL551 (Inverter, Totem-Pole)						
V _{OH}	High Level Output Voltage	2.4	3.3		V	V _{CC} = 4.5 V, I _{OH} = -800 μA, E _e = 0
V _{OL}	Low Level Output Voltage		0.25	0.40	V	V _{CC} = 4.5 V, I _{OL} = 12.8 mA, E _e = 3 mW/cm ²
I _{OS}	Short Circuit Output Current	-20	-55	-100	mA	V _{CC} = 5.5V, E _e = 0, Output = GND
OPL551-OC (Inverter, Open-Collector)						
I _{OH}	High Level Output Current		1.0	100	μA	V _{CC} = 4.5 V, V _{OH} = 30 V, E _e = 0
V _{OL}	Low Level Output Current		0.25	0.40	V	V _{CC} = 4.5 V, I _{OL} = 12.8 mA, E _e = 3 mW/cm ²
OPL550, OPL551						
t _r , t _f	Output Rise Time, Output Fall Time		25	70	ns	V _{CC} = 5 V, T _A = 25° C, E _e = 0 or 3 mW/cm ²
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		2.5	5.0	μs	f = 10 kHz, D.C. = 50%, R _L = 8 TTL Loads
OPL550-OC, OPL551-OC						
t _r , t _f	Output Rise Time, Output Fall Time		25	70	ns	V _{CC} = 5 V, T _A = 25° C, E _e = 0 or 3 mW/cm ²
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		2.5	5.0	μs	f = 10 kHz, D.C. = 50%, R _L = 360 Ω

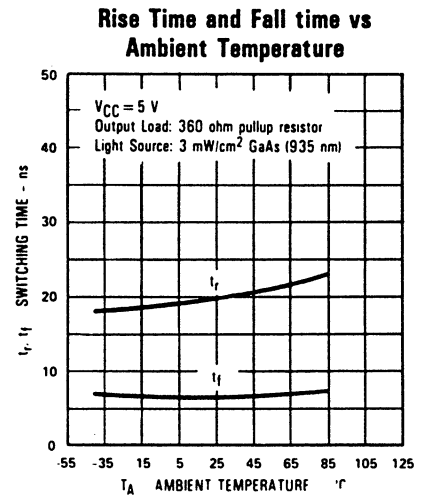
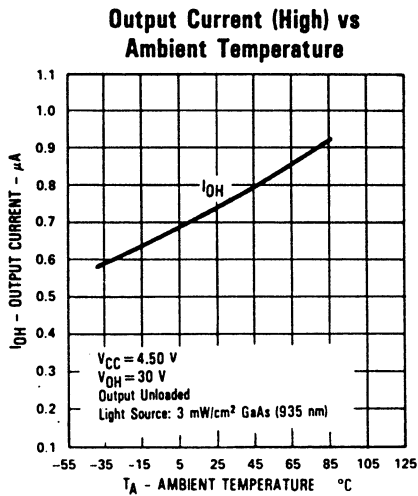
PHOTLOGIC®
SENSORS

Typical Performance Curves

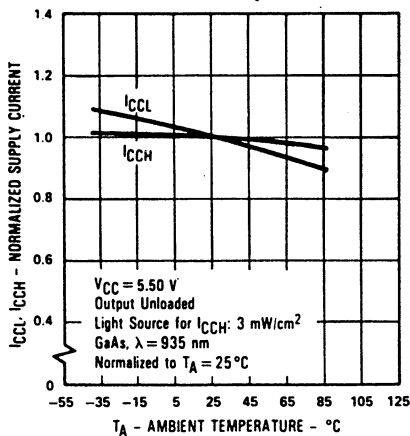
OPL550, OPL551



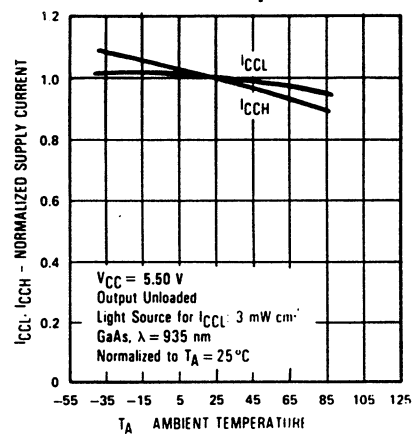
OPL550-OC, OPL551-OC



OPL550, OPL550-OC Normalized Supply Current vs. Ambient Temperature

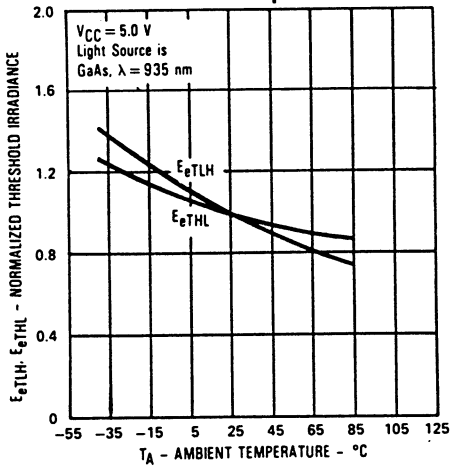


OPL551, OPL551-OC Normalized Supply Current vs. Ambient Temperature

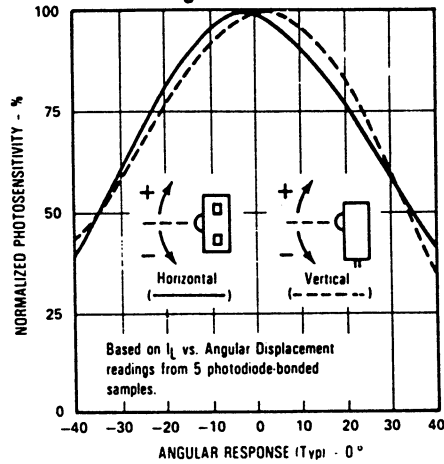


Types OPL550, OPL551 Series

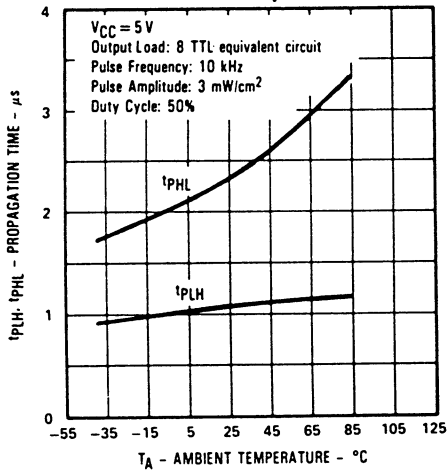
Normalized Threshold Irradiance vs Ambient Temperature



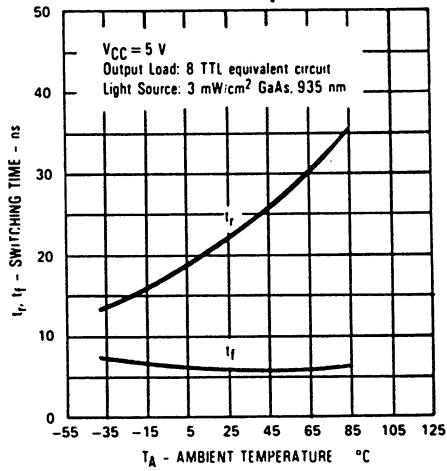
Angular Displacement from Package Mechanical Axis



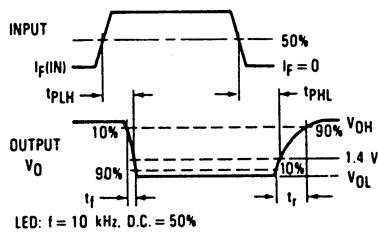
Propagation Time vs Ambient Temperature



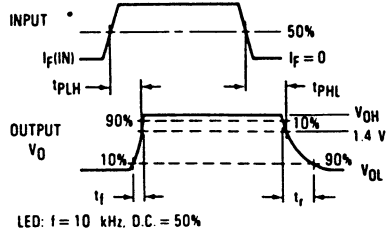
Rise Time and Fall time vs Ambient Temperature



Switching Test Curve for Inverters



Switching Test Curve for Buffers



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