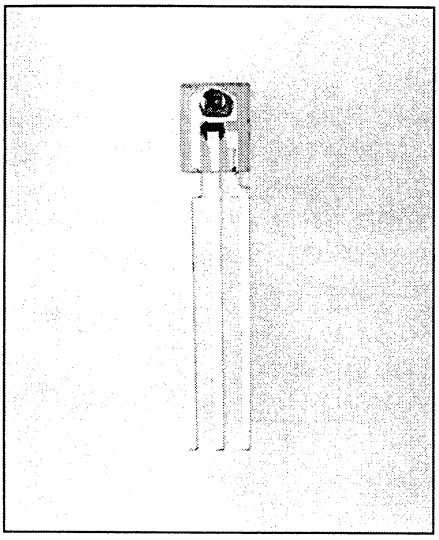
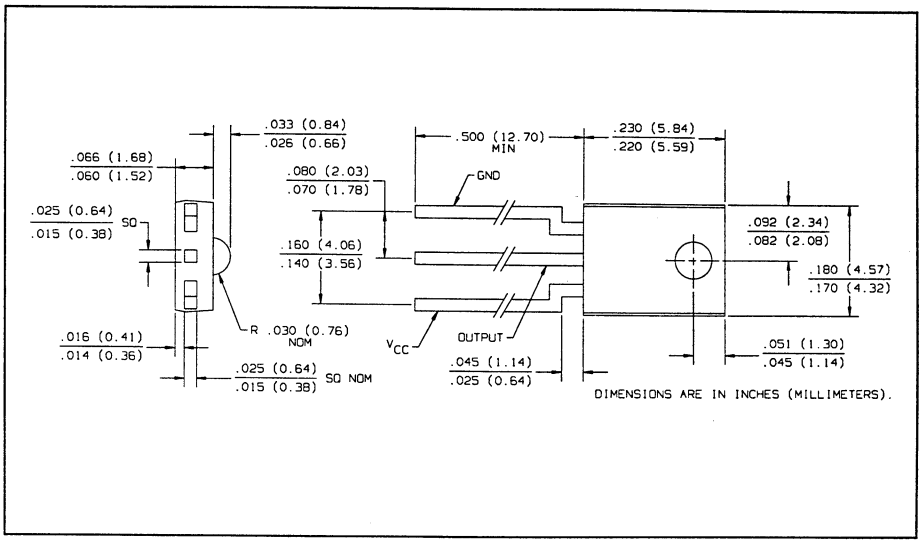
Photologic® Sensors
Types OPL560, OPL561, OPL562, OPL563 Series





Features

- Four output options
- High noise immunity
- Direct TTL/LSTTL interface
- Low cost plastic side-looking package
- Mechanically and spectrally matched to the OP140 and OP240 series LED's
- Data rates to 200 kBaud
- Two sensitivity options

Description

The OPL560, OPL560-OC, OPL561, OPL561-OC, OPL562, OPL562-OC, OPL563, and OPL563-OC contain a monolithic integrated circuit which incorporates a photodiode, a linear amplifier, voltage regulator, and a Schmitt trigger on a single silicon chip. The devices feature TTL/LSTTL compatible logic level output which can drive up to 10 TTL loads over supply voltages ranging from 4.5 V to 16 V. The Photologic® chip is encapsulated in a molded plastic package which has an integral lens for enhanced optical coupling.

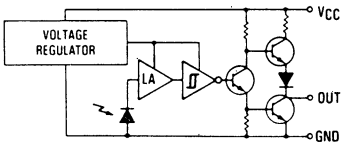
Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Supply Voltage, V_{CC}	18 V
Storage Temperature Range	-40° C to +100° C
Operating Temperature Range	-40° C to +85° C
Lead Soldering Temperature Range [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	240° C
Power Dissipation	200 mW(1)
Duration of Output Short to V_{CC} (OPL560, OPL561, OPL562, OPL563)	1.00 sec.
Duration of Output Short to V_{CC} (OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC)	1.00 sec.
Voltage at Output Lead (OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC)	35 V
Sinking Current	50 mA
Sourcing Current (OPL560, OPL561, OPL562, OPL563)	10 mA
Irradiance (OPL560, OPL560-OC, OPL561, OPL561-OC)	9 mW/cm^2
Irradiance (OPL562, OPL562-OC, OPL563, OPL563-OC)	3 mW/cm^2

Notes:
(1) Derate linearly 2.50 mW/° C above 25° 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 λi = 953 nm.

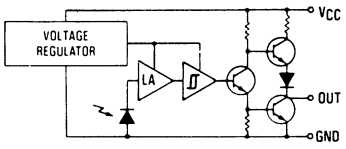
Schematics

OPL560/OPL562
(Totem-Pole Output) Buffer



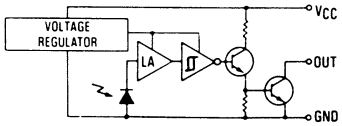
Light On - Output High

OPL561/OPL563
(Totem-Pole Output) Inverter



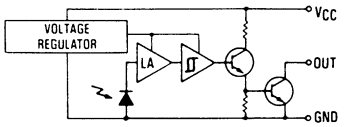
Light On - Output Low

OPL560-OC, OPL562-OC
(Open-Collector Output) Buffer



Light On - Output High

OPL561-OC, OPL563-OC
(Open-Collector Output) Inverter



Light On - Output Low

Types OPL560, OPL561 Series

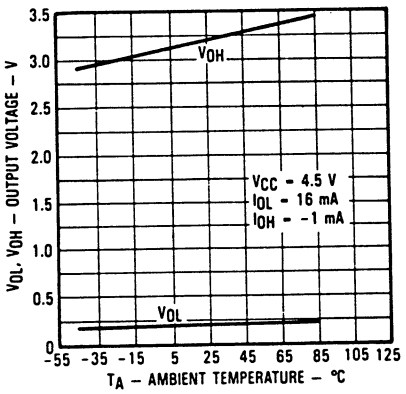
Electrical Characteristics (-40° C to +85° C unless otherwise noted) V_{CC} = 4.5 V to 16 V

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 = DC to 50 MHz
$E_{eT}(+)$	Positive-Going Threshold Irradiance(3) OPL560, OPL560-OC, OPL561, OPL561-OC OPL560A, OPL560-OCA, OPL561A, OPL561-OCA	 0.09 0.09		 0.55 0.36	 mW/cm^2 mW/cm^2	 T_A = 25° C T_A = 25° C
$E_{eT}(+)/E_{eT}(-)$	Hysteresis Ratio	1.20	1.55	2.00		
I_{CC}	Supply Current		8.0	12.0	mA	E_e = 0 or 1 mW/cm^2
OPL560 (Buffer, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1 µA, E_e = 1 mW/cm^2
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 0
OPL560-OC (Buffer, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30 V, E_e = 1 mW/cm^2
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 0
OPL561 (Inverter, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1 mA, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 1 mW/cm^2
OPL561-OC (Inverter, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30 V, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 1 mW/cm^2
OPL560, OPL561						
t_r, t_f	Output Rise Time, Output Fall Time			70	ns	T_A = 25° C, E_e = 0 or 1 mW/cm^2, f = 10 kHz DC = 50%, R_L = 10 TTL Loads
t_{PHL}, t_{PHL}	Propagation Delay, Low-High, High-Low		5.0		µs	
OPL560-OC, OPL561-OC						
t_r, t_f	Output Rise Time, Output Fall Time			100	ns	T_A = 25° C, E_e = 0 or 1 mW/cm^2, f = 10 kHz DC = 50%, R_L = 300 Ω
t_{PLH}, t_{PHL}	Propagation Delay, Low-High, High-Low		5.0		µs	

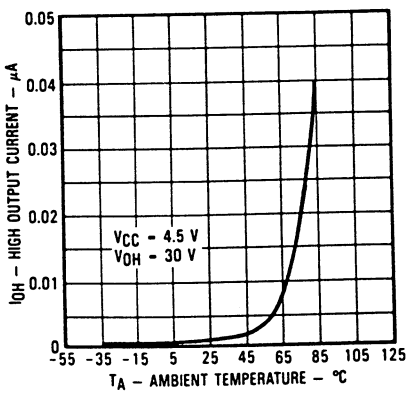
PHOTOLOGIC® SENSORS

Typical Performance Curves

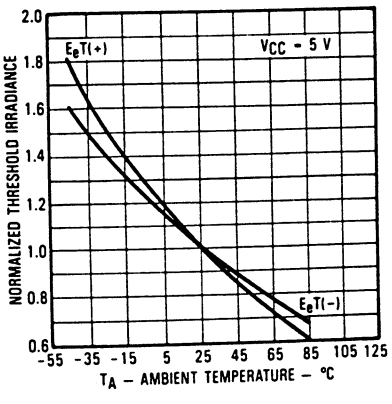
OPL560, OPL561, OPL562, OPL563
Output Voltage vs. Ambient Temp.



OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC
High Output Current vs. Ambient Temp.



OPL560, OPL560-OC, OPL561, OPL561-OC
Normalized Threshold Irradiance vs. T_A

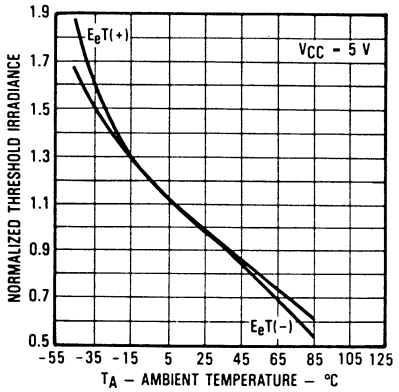


Electrical Characteristics (-40° C to +85° C unless otherwise noted) V_{CC} = 4.5 V to 16 V

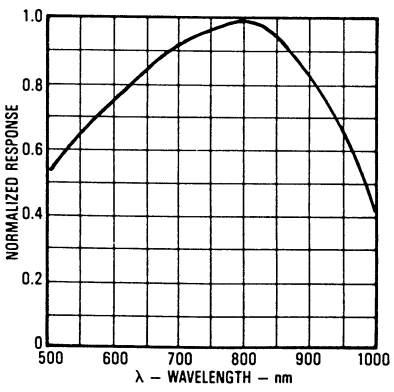
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_{CC}	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak V_{CC} Ripple Necessary to Cause False Triggering of Output			2	V	f = DC to 50 MHz
$E_{eT}(+)$	Positive-Going Threshold Irradiance[3] OPL562, OPL562-OC, OPL563, OPL563-OC OPL562A, OPL562-OCA, OPL563A, OPL563-OCA	 0.025 0.025		 0.230 0.140	 mW/cm² mW/cm²	 T_A = 25° C T_A = 25° C
$E_{eT}(+)/E_{eT}(-)$	Hysteresis Ratio	1.20	1.55	2.00		
I_{CC}	Supply Current		8.0	12.0	mA	E_e = 0 or 0.3 mW/cm²
OPL562 (Buffer, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1 µA, E_e = 0.3 mW/cm²
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E^e = 0
OPL562-OC (Buffer, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30 V, E_e = 0.3 mW/cm²
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 0
OPL563 (Inverter, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1 mA, E_e = 0
V_{OL}	Low Level Output voltage			0.40	V	I_{OL} = 16 mA, E_e = 0.3 mW/cm²
OPL563-OC (Inverter, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30 V, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16 mA, E_e = 0.3 mW/cm²
OPL562, OPL563						
t_r, t_f	Output Rise Time, Output Fall Time			70	ns	T_A = 25° C, E_e = 0 or 0.3 mW/cm², f = 10 kHz, DC = 50%, R_L = 10 TTL Loads
t_{PLH}, t_{PHL}	Propagation Delay, Low-High, High-Low		6.0		µs	
OPL562-OC, OPL563-OC						
t_r, t_f	Output Rise Time, Output Fall Time			100	ns	T_A = 25° C, Ee = 0 or 0.3 mW/cm², f = 10 kHz, DC = 50%, R_L = 300 Ω
t_{PLH}, t_{PHL}	Propagation Delay, Low-High, High-Low		6.0		µs	

Typical Performance Curves

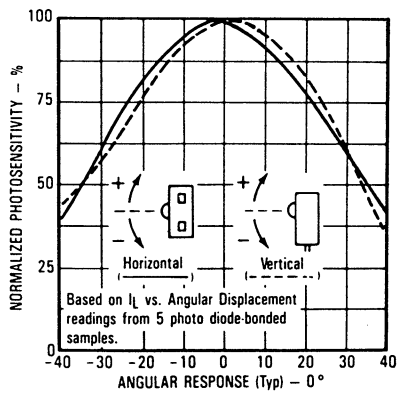
OPL562, OPL562-OC, OPL563, OPL563-OC
Normalized Threshold Irradiance vs. Amb. Temp.



Normalized Spectral Response

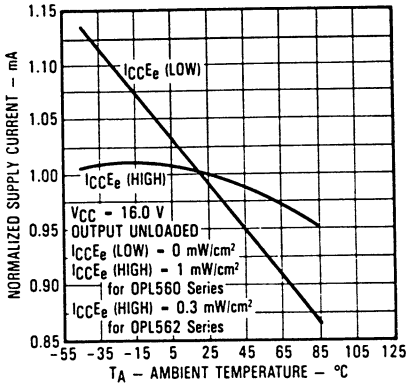


Angular Displacement from Package Mechanical Axis

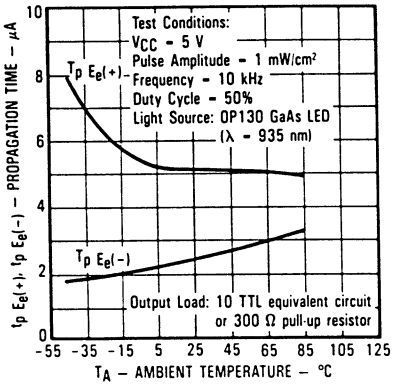


Typical Performance Curves

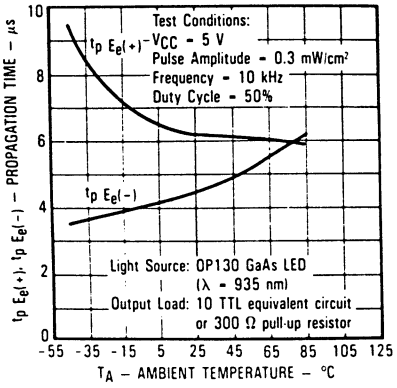
Normalized Supply Current vs. Ambient Temperature



OPL560, OPL560-OC, OPL561, OPL561-OC Propagation Time vs. Amb. Temp.

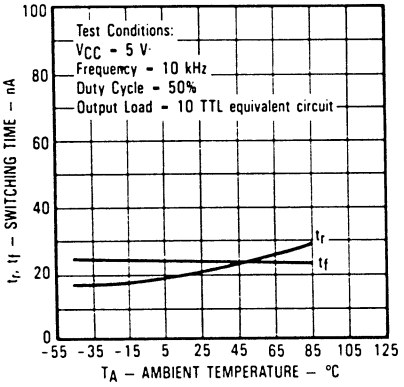


OPL562, OPL562-OC, OPL563, OPL563-OC Propagation Time vs. Amb. Temp.

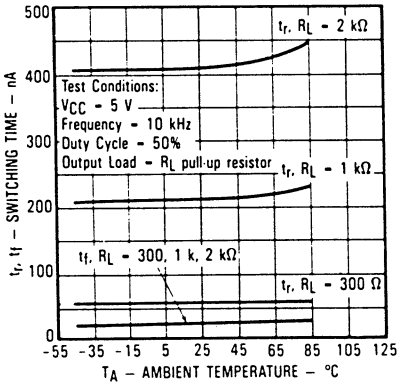


PHOTOLOGIC® SENSORS

OPL560, OPL561, OPL562, OPL563 Rise Time & Fall Time vs. T_A

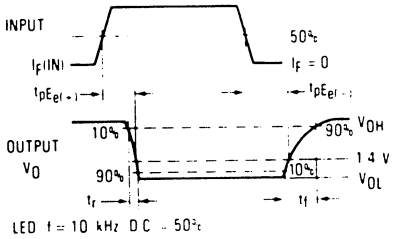


OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC Rise Time & Fall Time vs. T_A vs. Output Load



Switching Test Curves

Switching Test Curve for Inverters



Switching Test Curve for Buffers