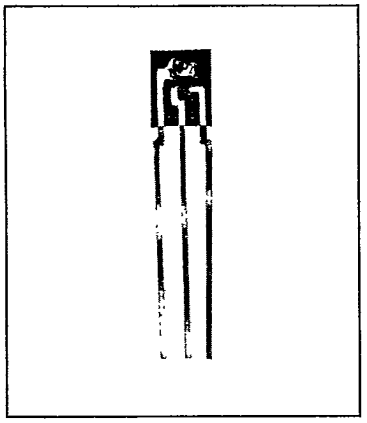
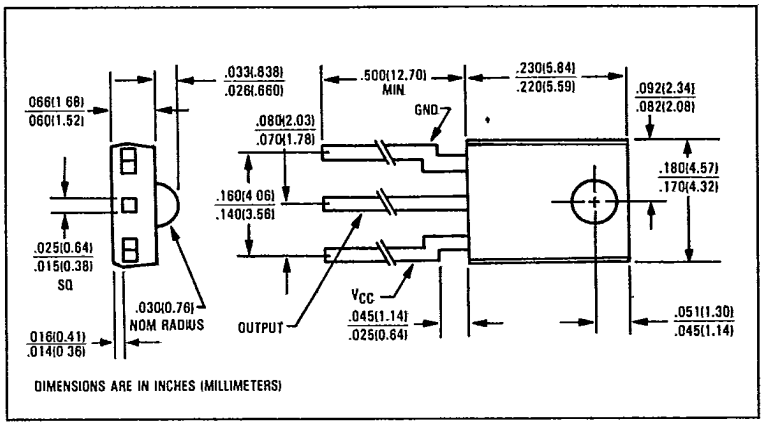
Product Bulletin OPL560
July 1989 Replaces August 1988

T-41-69

OPTEK

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 devices
- Data rates to 200 K-baud
- 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.

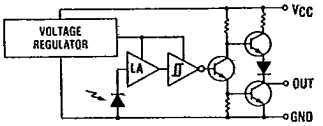
Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Supply Voltage, V_{CC}	18V
Storage Temperature Range	-40°C to +100°C
Operating Temperature Range	-40°C to +85°C
Lead Soldering Temperature Range [1/16 inch (1.6mm) from case for 5 sec. with soldering iron]	240°C
Power Dissipation	240mW(1)
Duration of Output Short to V_{CC} (OPL560, OPL561, OPL562, OPL563)	1.00sec.
Duration of Output Short to V_{CC} (OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC)	1.00sec.
Voltage at Output Lead (OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC)	35V
Sinking Current	50.0mA
Sourcing Current (OPL560, OPL561, OPL562, OPL563)	10.0mA
Irradiance (OPL560, OPL560-OC, OPL561, OPL561-OC)	9mW/cm²
Irradiance (OPL562, OPL562-OC, OPL563, OPL563-OC)	3mW/cm²

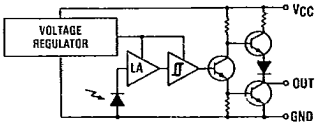
Notes:
(1) Derate linearly 4.86mW/°C above 25°C.
(2) RMA flux is recommended. Duration can be extended to 10 sec. maximum when flow soldering. Max 20 grams force may be applied to the leads when soldering.
(3) Irradiance measurements are made with λi = 953nm.

Schematics

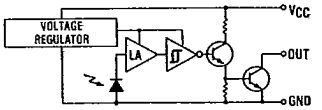
OPL560/OPL562
(Totem-Pole Output) Buffer



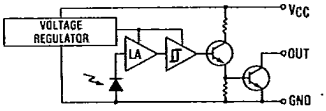
OPL561/OPL563
(Totem-Pole Output) Inverter



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



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



Optek Technology, Inc., 1215 West Crosby Road, Carrollton, Texas 75006 (214) 323-2200 TLX 215849 Fax (214) 323-2396

Types OPL560, OPL561 Series

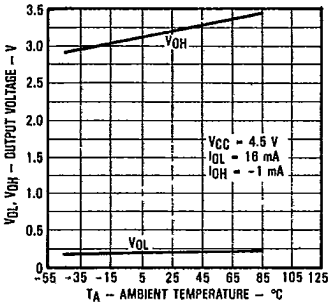
T-41-69

Electrical Characteristics (-40°C to +85°C unless otherwise noted) V_{CC} = 4.5 TO 16.0 V

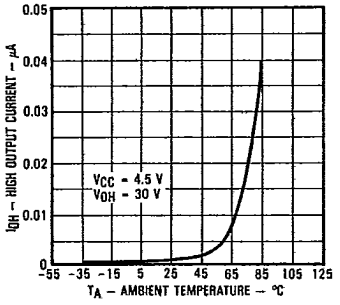
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_{CC}	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak V_{CC} Ripple Necessary to Cause False Triggering of Output			2	V	f = DC to 50 MHz
$E_{eT}(+)$	Positive-Going Threshold Irradiance[3]					
	OPL560, OPL560-OC, OPL561, OPL561-OC	.09		.55	mW/cm^2	T_A = 25°C
	OPL560A, OPL560-OCA, OPL561A, OPL561-OCA	.09		.36	mW/cm^2	T_A = 25°C
	OPL560B, OPL560-OCB, OPL561B, OPL561-OCB	.18		.55	mW/cm^2	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} = -1.0µA, E_e = 1 mW/cm^2
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 0
OPL560-OC (Buffer, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30V, E_e = 1.0mW/cm^2
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 0
OPL561 (Inverter, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1mA, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 1.0mW/cm^2
OPL561-OC (Inverter, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30V, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 1.0mW/cm^2
OPL560, OPL561						
t_r, t_f	Output Rise Time, Output Fall Time			70	ns	T_A = 25°C, E_e = 0 or 1.0mW/cm^2, f = 10.0kHz DC = 50%, R_L = 10TTL Loads
t_{PLH}, 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 1.0mW/cm^2, f = 10.0kHz, DC = 50%, R_L = 300Ω
t_{PLH}, t_{PHL}	Propagation Delay, Low-High, High-Low		5.0		µs	

Typical Performance Curves

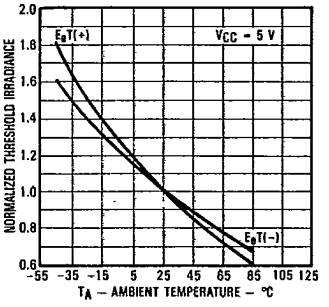
OPL560, OPL561, OPL562, OPL563
Output Voltage vs. Ambient Temp.



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



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Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Optek Technology, Inc., 1215 West Crosby Road, Carrollton, Texas 75006 (214) 323-2200 TLX 215849 Fax (214) 323-2396

Printed in USA

Types OPL562, OPL563 Series

OPTEK

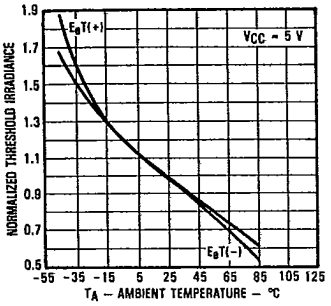
T-41-09

Electrical Characteristics (-40°C to +85°C unless otherwise noted) V_{CC} = 4.5 TO 16.0 V

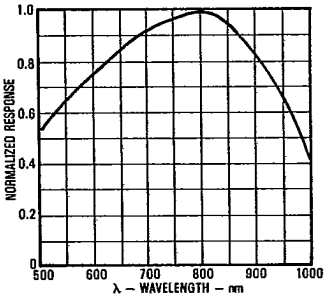
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_{CC}	Operating Supply Voltage	4.5		16.0	V	
	Peak-to-Peak V_{CC} Ripple Necessary to Cause False Triggering of Output			2	V	f = DC to 50 MHz
$E_{eT}(+)$	Positive-Going Threshold Irradiance[3]					
	OPL562, OPL562-OC, OPL563, OPL563-OC	.025		.230	mW/cm²	T_A = 25°C
	OPL562A, OPL562-OCA, OPL563A, OPL563-OCA	.025		.140	mW/cm²	T_A = 25°C
	OPL562B, OPL562-OCB, OPL563B, OPL563-OCB	.070		.230	mW/cm²	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 .3mW/cm²
OPL562 (Buffer, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1.0µA, E_e = .3mW/cm²
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 0
OPL562-OC (Buffer, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30V, E_e = .3mW/cm²
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = 0
OPL563 (Inverter, Totem-Pole)						
V_{OH}	High Level Output Voltage	V_{CC}-2.1			V	I_{OH} = -1mA, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = .3mW/cm²
OPL563-OC (Inverter, Open-Collector)						
I_{OH}	High Level Output Current			100	µA	V_{OH} = 30V, E_e = 0
V_{OL}	Low Level Output Voltage			0.40	V	I_{OL} = 16mA, E_e = .3mW/cm²
OPL562, OPL563						
t_r, t_f	Output Rise Time, Output Fall Time			70	ns	T_A = 25°C, E_e = 0 or .3mW/cm², f = 10.0kHz DC = 50%, R_L = 10TTL 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, E_e = 0 or .3mW/cm², f = 10.0kHz, DC = 50%, R_L = 300Ω
t_{PLH}, t_{PHL}	Propagation Delay, Low-High, High-Low		6.0		µs	

Typical Performance Curves

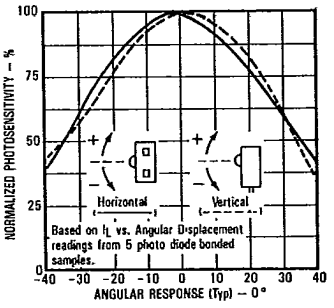
OPL562, OPL562-OC, OPL563, OPL563-OC Normalized Threshold Irradiance vs. Amb. Temp.



Normalized Spectral Response



Angular Displacement from Package Mechanical Axis

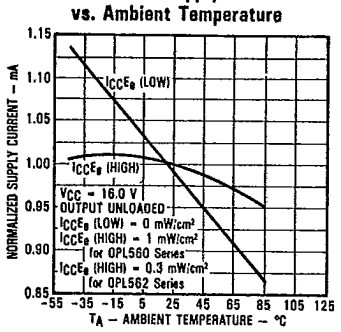


Types OPL562, OPL563 Series

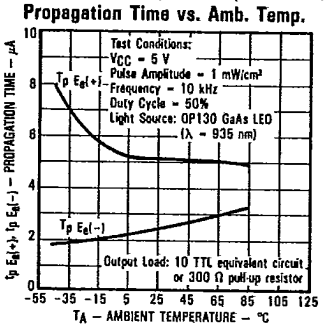
T-41-09

Typical Performance Curves

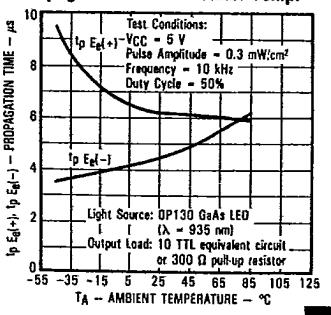
Normalized Supply Current vs. Ambient Temperature



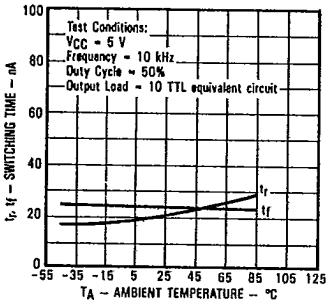
OPL560, OPL560-OC, OPL561, OPL561-OC Propagation Time vs. Amb. Temp.



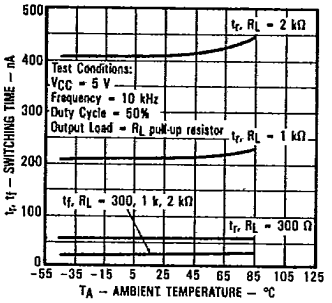
OPL562, OPL562-OC, OPL563, OPL563-OC Propagation Time vs. Amb. Temp.



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

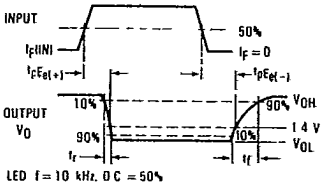


OPL560-OC, OPL561-OC, OPL562-OC, OPL563-OC Rise Time & Fall Time vs. T_A vs. Output Load

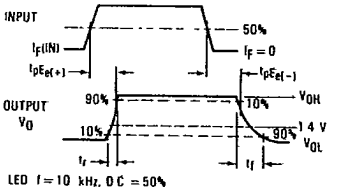


Switching Test Curves

Switching Test Curve for Inverters



Switching Test Curve for Buffers



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