

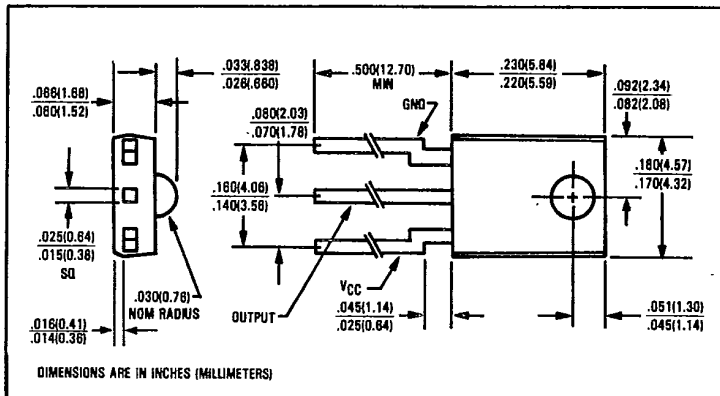
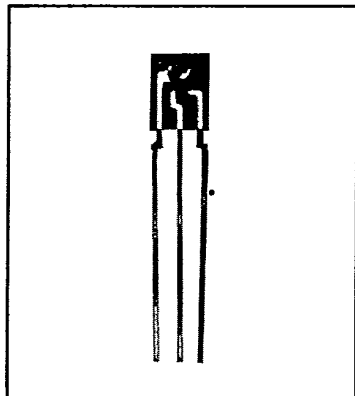
Optoelectronics Division
TRW Electronic Components Group

TRW

Product Bulletin 5154
January 1985

Photologic™ Plastic Sensors

Types OPL550, OPL550-OC, OPL551, OPL551-OC, SLB, SLA



Features

- Four output options
- High noise immunity
- Direct TTL/STTL interface
- Low cost plastic side looking package
- Mechanically and spectrally matched to OP140SL and OP240SL series LEDs
- Data rates to 250 K-baud

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/STTL compatible logic level output which can drive up to 8 TTL loads without additional circuitry. Also featured are medium speed data rates to 250 K-baud 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 the OP140SL and OP240SL infrared emitting diodes.

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

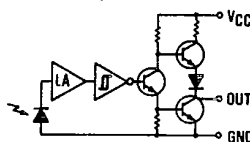
Supply Voltage, V _{CC} (not to exceed 3 seconds)	+10.0 V
Storage Temperature Range	-40°C to +100°C
Operating Temperature Range	-40°C to +85°C
Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 sec. with soldering iron)	240°C ⁽¹⁾
Power Dissipation	.85 mW ⁽²⁾
Duration of Output Short to V _{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	16.0 mA
High Level Output Current (OPL550, OPL551)	1.00 mA
Irradiance	25 mW/cm ²

Notes:

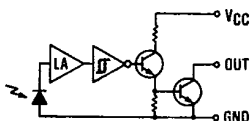
(1) RMA flux is recommended. Duration can be extended to 10 seconds max. when flow soldering.
(2) Derate linearly 4.25 mW/°C above 80°C.

Schematics

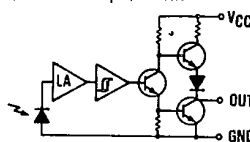
OPL550 (Totem-Pole Output) Buffer



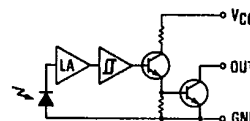
OPL550-OC (Open-Collector Output) Buffer



OPL551 (Totem-Pole Output) Inverter



OPL551-OC (Open-Collector Output) Inverter



Types OPL550, OPL550-OC, OPL551, OPL551-OC, SLB, SLA

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
VCC	Operating Supply Voltage	4.5		5.5	V	
	Peak-to-Peak VCC Ripple Necessary to Cause False Triggering of Output		2.0		V	VCC = 5.0 VDC f = DC to 50 MHz
E _o (+)	Positive-Going Threshold Irradiance OPL550, OPL550-OC, OPL551, OPL551-OC OPL550SLA, OPL550-OCSLA, OPL551SLA, OPL551-OCSLA OPL550SLB, OPL550-OCSLB, OPL551SLB, OPL551-OCSLB	.25 .25 .65		2.4 1.40 1.90	mW/cm ² mW/cm ² mW/cm ²	VCC = 5.0 V VCC = 5.0 V VCC = 5.0 V
E _o (+)/E _o (–)	Hysteresis Ratio	1.50	2.0	3.0		
ICC	Supply Current		8.0	15.0	mA	VCC = 5.5 V, E _o = 0 or 3.0 mW/cm ²

OPL550 (Buffer, Totem-Pole)

VOH	High Level Output Voltage	2.4	3.3		V	VCC = 4.5 V, I _{OH} = –800 μ A, E _o = 3.0 mW/cm ²
VOL	Low Level Output Voltage		.25	0.40	V	VCC = 4.5 V, I _{OL} = 12.8 mA, E _o = 0
I _{OS}	Short Circuit Output Current	–20	–55	–100	mA	VCC = 5.5 V, E _o = 3.0 mW/cm ² , Output = GND

OPL550-OC (Buffer, Open-Collector)

I _{OH}	High Level Output Current		1.00	100	μ A	VCC = 4.5 V, VOH = 30 V, E _o = 3.0 mW/cm ²
VOL	Low Level Output Voltage		.25	0.40	V	VCC = 4.5 V, I _{OL} = 12.8 mA, E _o = 0

OPL551 (Inverter, Totem-Pole)

VOH	High Level Output Voltage	2.4	3.3		V	VCC = 4.5 V, I _{OH} = –800 μ A, E _o = 0
VOL	Low Level Output Voltage		.25	0.40	V	VCC = 4.5 V, I _{OL} = 12.8 mA, E _o = 3.0 mW/cm ²
I _{OS}	Short Circuit Output Current	–20	–55	–100	mA	VCC = 5.5 V, E _o = 0, Output = GND

OPL551-OC (Inverter, Open-Collector)

I _{OH}	High Level Output Current		1.00	100	μ A	VCC = 4.5 V, VOH = 30 V, E _o = 0
VOL	Low Level Output Voltage		.25	0.40	V	VCC = 4.5 V, I _{OL} = 12.8 mA, E _o = 3.0 mW/cm ²

OPL550, OPL551

t _r , t _f	Output Rise Time, Output Fall Time		25	70	ns	VCC = 5.0 V, T _A = 25°C, E _o = 0 or 3.0 mW/cm ² f = 10.0 kHz, D.C. = 50%, R _L = 8 TTL Loads
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		2.5	5.0	μ s	

OPL550-OC, OPL551-OC

t _r , t _f	Output Rise Time, Output Fall Time		25	70	ns	VCC = 5.0 V, T _A = 25°C, E _o = 0 or 3.0 mW/cm ² f = 10.0 kHz, D.C. = 50%, R _L = 360 Ω
t _{PLH} , t _{PHL}	Propagation Delay, Low-High, High-Low		2.5	5.0	μ s	

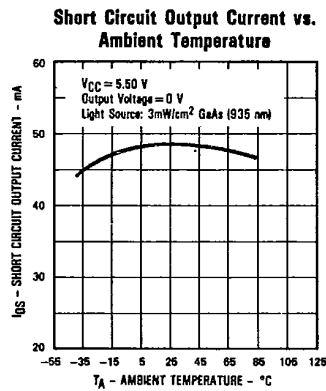
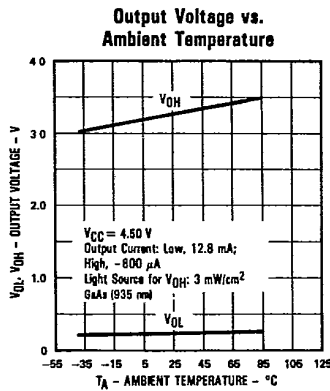
Note: (1) Irradiance measurements are made with λ_i = 935 nm, through an aperture .020 $\times$.060, centered on the lens, parallel to the leads, and flush +.005 to the lens surface.

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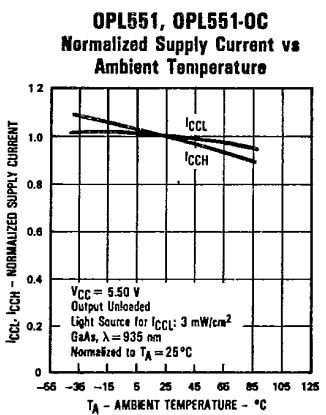
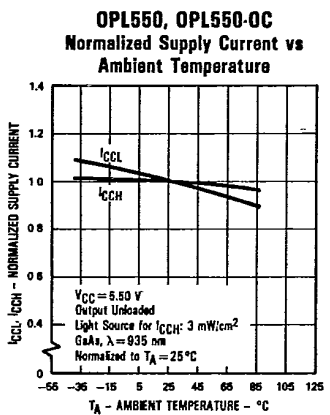
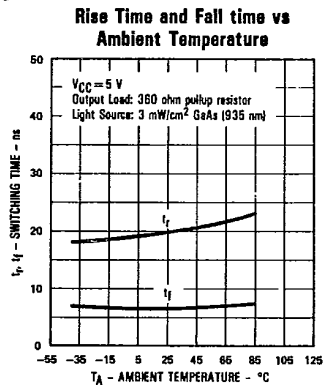
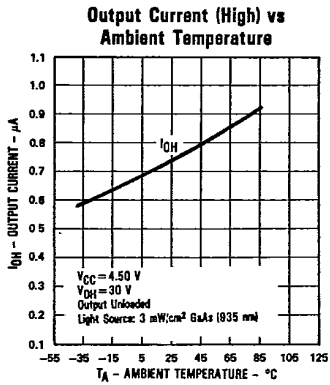
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Typical Performance Curves

OPL550, OPL551

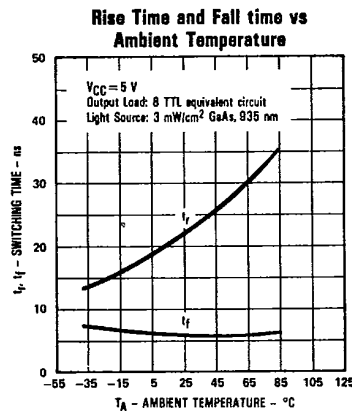
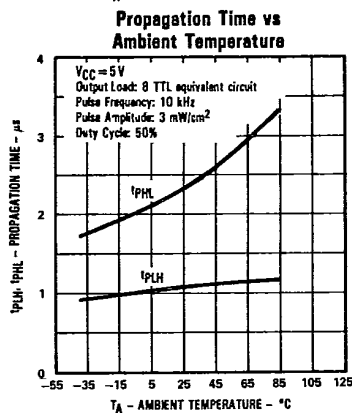
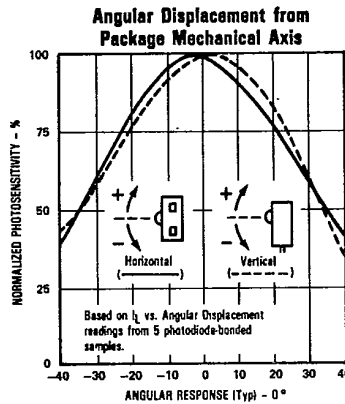
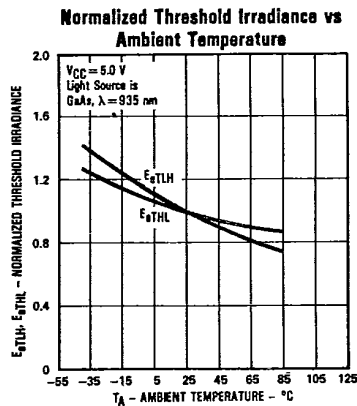


OPL550-OC, OPL551-OC

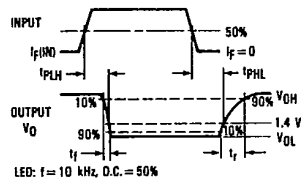


Types OPL550, OPL550-OC, OPL551, OPL551-OC, SLB, SLA

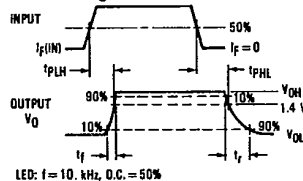
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Switching Test Curve for Inverters



Switching Test Curve for Buffers



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

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