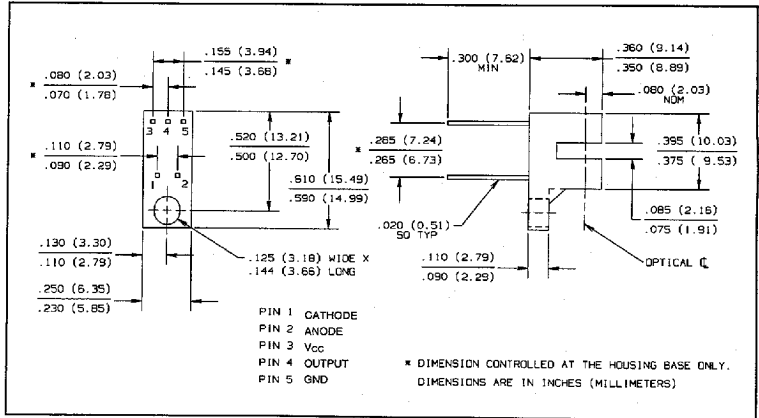
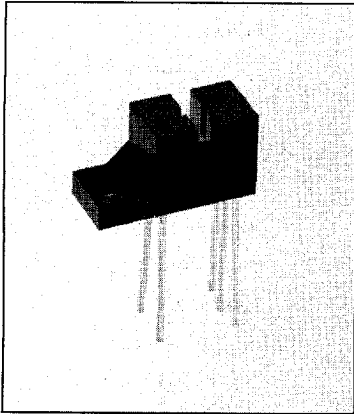


# Photologic<sup>®</sup> Slotted Optical Switches

## Types OPB120A, OPB121A, OPB122A, OPB123A



### Features

- Choice of output configuration
- Printed circuit board mounting
- 0.080" (2.03 mm) wide slot
- 0.275" (6.99 mm) lead spacing
- Opaque plastic housing
- Low profile

### Description

The OPB120A through OPB123A each consist of an infrared emitting diode and a Photologic<sup>®</sup> sensor (a monolithic integrated circuit which incorporates a linear amplifier and a Schmitt Trigger) mounted on opposite sides of a .080" (2.03 mm) wide gap opaque housing, with molded .040" (1.02 mm) wide apertures located over both emitter and Photologic<sup>®</sup> sensor.

### Absolute Maximum Ratings (T<sub>A</sub> = 25° C unless otherwise noted)

Supply Voltage, V <sub>CC</sub> (not to exceed 3 sec.)	+10.0 V
Storage Temperature Range	-40° C to +85° C
Operating Temperature Range	-40° C to +70° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	240° C <sup>(1)</sup>
Input Diode Power Dissipation	100 mW <sup>(2)</sup>
Output Photologic <sup>®</sup> Power Dissipation	200 mW <sup>(4)</sup>
Total Device Power Dissipation	300 mW <sup>(5)</sup>
Voltage at Output Lead (Open Collector Output)	35 V
Forward D.C. Current	40 mA
Reverse D.C. Voltage	2.0 V

#### Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate Linearly 2.22 mW/° C above 25° C.
- (3) Normal application would be with light source blocked, simulated by I<sub>F</sub> = 0.
- (4) Derate Linearly 4.44 mW/° C above 25° C.
- (5) Derate Linearly 6.66 mW/° C above 25° C.
- (6) Applies to Totem Pole configurations only.
- (7) All parameters tested using pulse technique.

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# Types OPB120A, OPB121A, OPB122A, OPB123A

Electrical Characteristics (T<sub>A</sub> = -40° C to +70° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>						
V <sub>F</sub>	Forward Voltage			1.7	V	I <sub>F</sub> = 20 mA, T <sub>A</sub> = 25° C
I <sub>R</sub>	Reverse Current			100	μA	V <sub>R</sub> = 2 V, T <sub>A</sub> = 25° C
<b>Output Photologic<sup>®</sup> Sensor</b>						
V <sub>CC</sub>	Operating D.C. Supply Voltage	4.75		5.25	V	
I <sub>CC</sub> L	Low Level Supply Current: Buffered Totem-Pole Output			15	mA	V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 0 mA <sup>(3)</sup>
	Buffered Open-Collector Output					
I <sub>CC</sub> H	High Level Supply Current: Buffered Totem-Pole Output			15	mA	V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 20 mA
	Buffered Open-Collector Output					
V <sub>OL</sub>	Low Level Output Voltage: Buffered Totem-Pole Output			0.4	V	V <sub>CC</sub> = 4.75 V, I <sub>OL</sub> = 12.8 mA I <sub>F</sub> = 0 mA <sup>(3)</sup>
	Buffered Open-Collector Output					
V <sub>OH</sub>	High Level Output Voltage: Buffered Totem-Pole Output	2.4			V	V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = -800 μA I <sub>F</sub> = 20 mA
	Inverted Totem-Pole Output	2.4			V	V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = -800 μA I <sub>F</sub> = 0 mA <sup>(3)</sup>
I <sub>OH</sub>	High Level Output Current: Buffered Open-Collector Output			100	μA	V <sub>CC</sub> = 4.75 V, V <sub>OH</sub> = 30 V I <sub>F</sub> = 25 mA, T <sub>A</sub> = 25° C
	Inverted Open-Collector Output			100	μA	V <sub>CC</sub> = 4.75 V, V <sub>OH</sub> = 30 V, I <sub>F</sub> = 0 mA, T <sub>A</sub> = 25° C
I <sub>F</sub> (+)	LED Positive-Going Threshold Current			15	mA	V <sub>CC</sub> = 5 V, T <sub>A</sub> = 25° C
I <sub>F</sub> (+)/I <sub>F</sub> (-)	Hysteresis		2.0			V <sub>CC</sub> = 5 V
I <sub>OS</sub>	Short Circuit Output Current: Buffered Totem-Pole Output	-20		-100	mA	V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 20 mA <sup>(6)</sup> Output = GND
	Inverted Totem-Pole	-20		-100	mA	V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 0 mA <sup>(6)</sup> Output = GND
t <sub>r</sub> , t <sub>f</sub>	Output Rise Time, Output Fall Time		70		ns	V <sub>CC</sub> = 5 V, T <sub>A</sub> = 25° C I <sub>F</sub> = 0 or 20 mA
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay Low-High & High-Low		5.0		μs	R <sub>L</sub> = 8 TTL Loads (Totem-Pole) R <sub>L</sub> = 360 Ω (Open-Collector)

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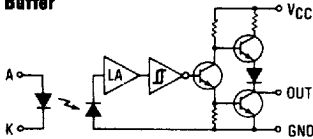
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## Part Number Guide

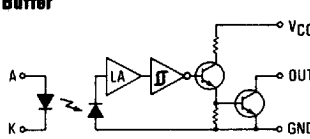
	Output	Aperture	
		Emitter	Sens or
OPB120A	Buffer Totem-pole	0.040"	0.040"
OPB121A	Buffer Open-Collector	0.040"	0.040"
OPB122A	Inverter Totem-Pole	0.040"	0.040"
OPB123A	Inverter Open-Collector	0.040"	0.040"
OPB120B	Buffer Totem-pole	0.040"	0.010"
OPB121B	Buffer Open-Collector	0.040"	0.010"
OPB122B	Inverter Totem-Pole	0.040"	0.010"
OPB123B	Inverter Open-Collector	0.040"	0.010"

### Schematics

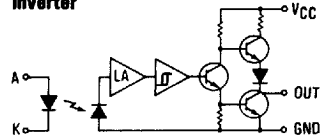
**OPB120  
(Totem-Pole Output)  
Buffer**



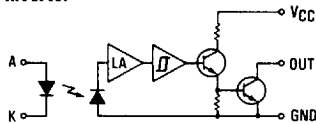
**OPB121  
(Open-Collector Output)  
Buffer**



**OPB122  
(Totem-Pole Output)  
Inverter**



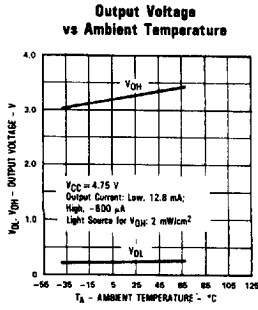
**OPB123  
(Open-Collector Output)  
Inverter**



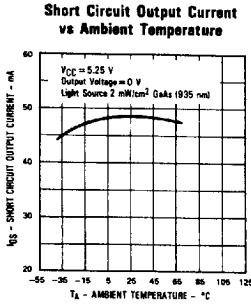
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# Types OPB120A, OPB121A, OPB122A, OPB123A

## Typical Performance Curves

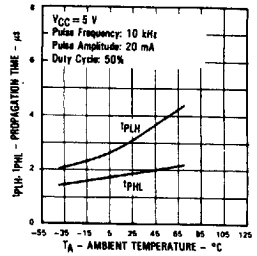


## OPB120, OPB122

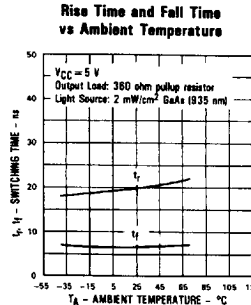
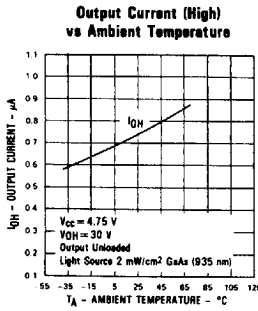


## All Assemblies

**Propagation Time vs Ambient Temperature**

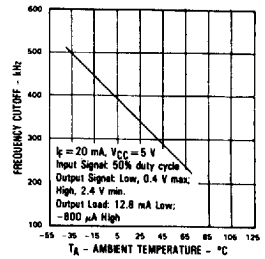


## OPB121, OPB123



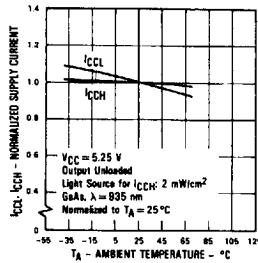
## All Assemblies

**Data Rate vs Ambient Temperature**



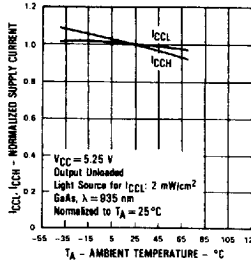
## OPB120, OPB121

### Normalized Supply Current vs Ambient Temperature



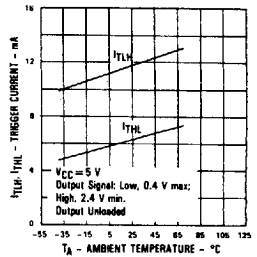
## OPB122, OPB123

### Normalized Supply Current vs Ambient Temperature

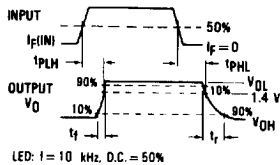


## All Assemblies

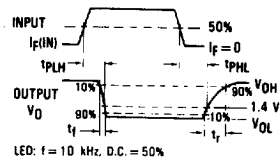
**Trigger Current vs Ambient Temperature**



## Switching Test Curve for Buffers



## Switching Test Curve for Inverters



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