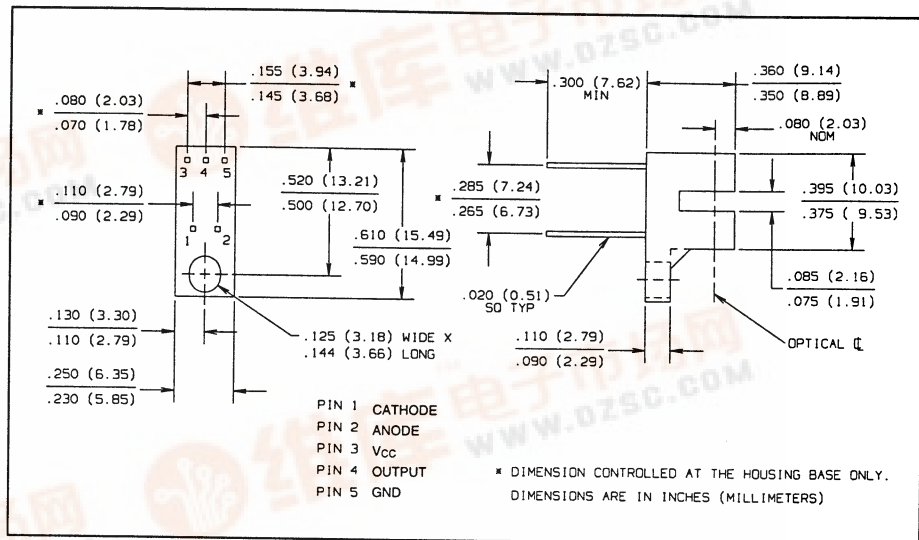
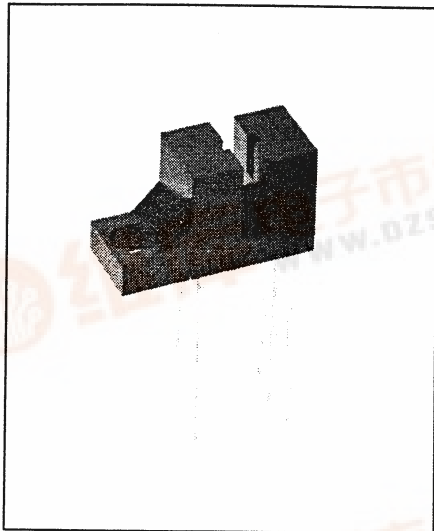


Product Bulletin OPB120A
June 1996

Photologic® 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® 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® sensor.

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

Supply Voltage, V_{CC} (not to exceed 3 sec.)	+10.0 V
Storage Temperature Range	-40°C to $+85^\circ\text{C}$
Operating Temperature Range	-40°C to $+70^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	$240^\circ\text{C}^{(1)}$
Input Diode Power Dissipation	100 mW ⁽²⁾
Output Photologic® Power Dissipation	200 mW ⁽⁴⁾
Total Device Power Dissipation	300 mW ⁽⁵⁾
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 $2.22\text{ mW}/^\circ\text{C}$ above 25°C .
- (3) Normal application would be with light source blocked, simulated by $I_F = 0$.
- (4) Derate Linearly $4.44\text{ mW}/^\circ\text{C}$ above 25°C .
- (5) Derate Linearly $6.66\text{ mW}/^\circ\text{C}$ above 25°C .
- (6) Applies to Totem Pole configurations only.
- (7) All parameters tested using pulse technique.

Types OPB120A, OPB121A, OPB122A, OPB123A

Electrical Characteristics ($T_A = -40^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage			1.7	V	$I_F = 20\text{ mA}$, $T_A = 25^{\circ}\text{C}$
I_R	Reverse Current			100	μA	$V_R = 2\text{ V}$, $T_A = 25^{\circ}\text{C}$
Output Photologic[®] Sensor						
V_{CC}	Operating D.C. Supply Voltage	4.75		5.25	V	
I_{CCL}	Low Level Supply Current: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}^{(3)}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 20\text{ mA}$
I_{CCH}	High Level Supply Current: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 20\text{ mA}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}^{(3)}$
V_{OL}	Low Level Output Voltage: Buffered Totem-Pole Output Buffered Open-Collector Output			0.4	V	$V_{CC} = 4.75\text{ V}$, $I_{OL} = 12.8\text{ mA}$ $I_F = 0\text{ mA}^{(3)}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			0.4	V	$V_{CC} = 4.75\text{ V}$, $I_{OL} = 12.8\text{ mA}$ $I_F = 20\text{ mA}$
V_{OH}	High Level Output Voltage: Buffered Totem-Pole Output	2.4			V	$V_{CC} = 4.75\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 20\text{ mA}$
	Inverted Totem-Pole Output	2.4			V	$V_{CC} = 4.75\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 0\text{ mA}^{(3)}$
I_{OH}	High Level Output Voltage: Buffered Open-Collector Output			100	μA	$V_{CC} = 4.75\text{ V}$, $V_{OH} = 30\text{ V}$ $I_F = 25\text{ mA}$, $T_A = 25^{\circ}\text{C}$
	Inverted Open-Collector Output			100	μA	$V_{CC} = 4.75\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 0\text{ mA}$, $T_A = 25^{\circ}\text{C}$
$I_F(+)$	LED Positive-Going Threshold Current			15	mA	$V_{CC} = 5\text{ V}$, $T_A = 25^{\circ}\text{C}$
$I_F(+)/I_F(-)$	Hysteresis		2.0			$V_{CC} = 5\text{ V}$
I_{OS}	Short Circuit Output Current: Buffered Totem-Pole Output	-20		-100	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 20\text{ mA}^{(6)}$ Output = GND
	Inverted Totem-Pole	-20		-100	mA	$V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ Output = GND
t_r, t_f	Output Rise Time, Output Fall Time		70		ns	$V_{CC} = 5\text{ V}$, $T_A = 25^{\circ}\text{C}$ $I_F = 0$ or 20 mA
t_{PLH}, t_{PHL}	Propagation Delay Low-High & High-Low		5.0		μs	$R_L = 8\text{ TTL Loads (Totem-Pole)}$ $R_L = 360\text{ }\Omega$ (Open-Collector)

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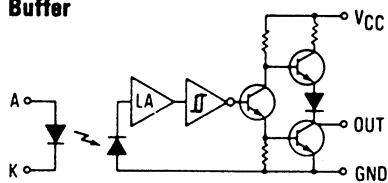
Types OPB120A, OPB121A, OPB122A, OPB123A

Part Number Guide

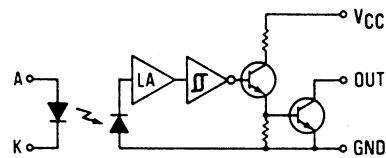
	Output	Aperture	
		Emitter	Sens or
OPB120A	Buffer Totem-pole	0.040"	0.040"
OPB121A	Buffer Open-Collector	0.040"	0.040"
OPB122A	Inverter Totem-Pole	0.040"	0.040"
OPB123A	Inverter Open-Collector	0.040"	0.040"
OPB120B	Buffer Totem-pole	0.040"	0.010"
OPB121B	Buffer Open-Collector	0.040"	0.010"
OPB122B	Inverter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

Schematics

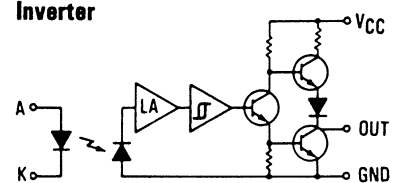
**OPB120
(Totem-Pole Output)
Buffer**



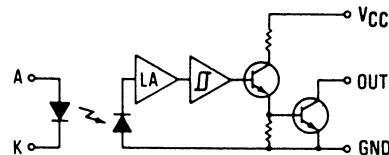
**OPB121
(Open-Collector Output)
Buffer**



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



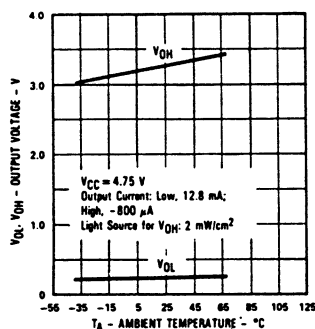
**OPB123
(Open-Collector Output)
Inverter**



Types OPB120A, OPB121A, OPB122A, OPB123A

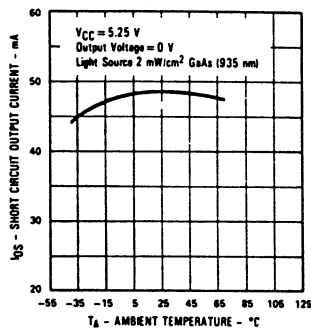
Typical Performance Curves

Output Voltage vs Ambient Temperature



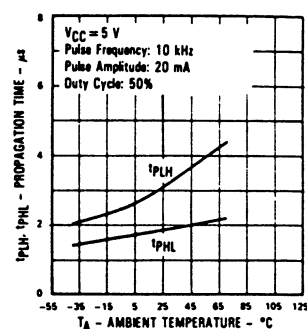
OPB120, OPB122

Short Circuit Output Current vs Ambient Temperature



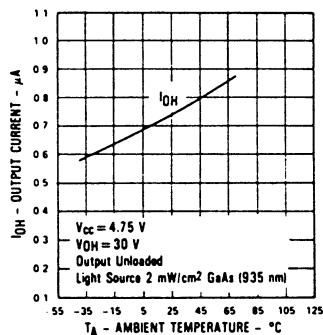
All Assemblies

Propagation Time vs Ambient Temperature

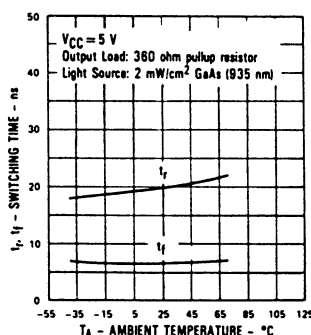


OPB121, OPB123

Output Current (High) vs Ambient Temperature

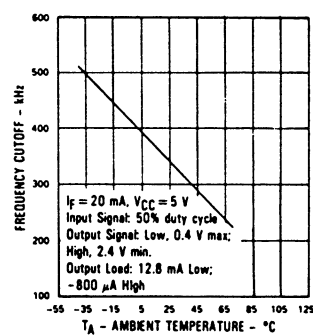


Rise Time and Fall Time vs Ambient Temperature



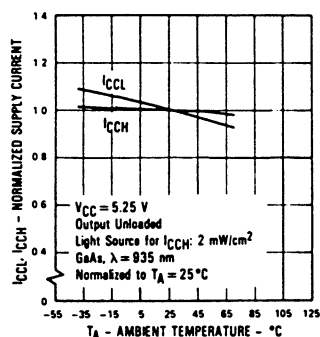
All Assemblies

Data Rate vs Ambient Temperature



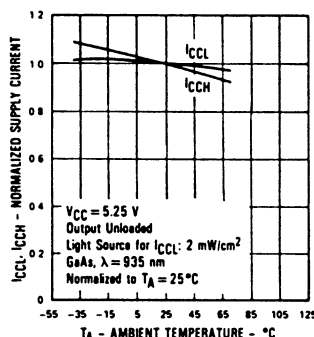
OPB120, OPB121

Normalized Supply Current vs Ambient Temperature



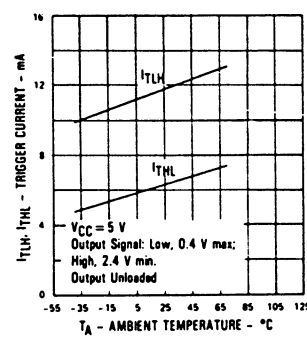
OPB122, OPB123

Normalized Supply Current vs Ambient Temperature

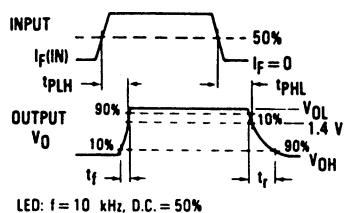


All Assemblies

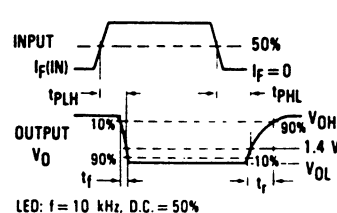
Trigger Current vs Ambient Temperature



Switching Test Curve for Buffers



Switching Test Curve for Inverters



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