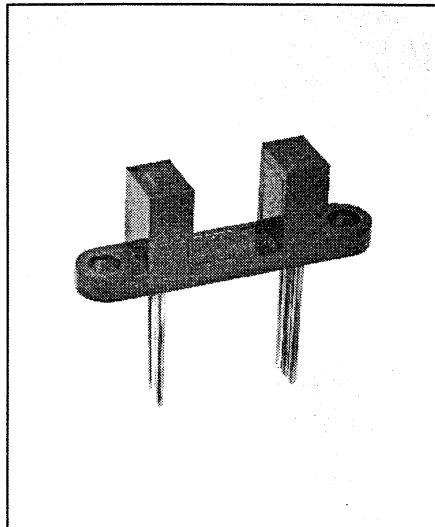


Photologic® Slotted Optical Switches Types OPB900L, OPB910L "Wide Gap" Series



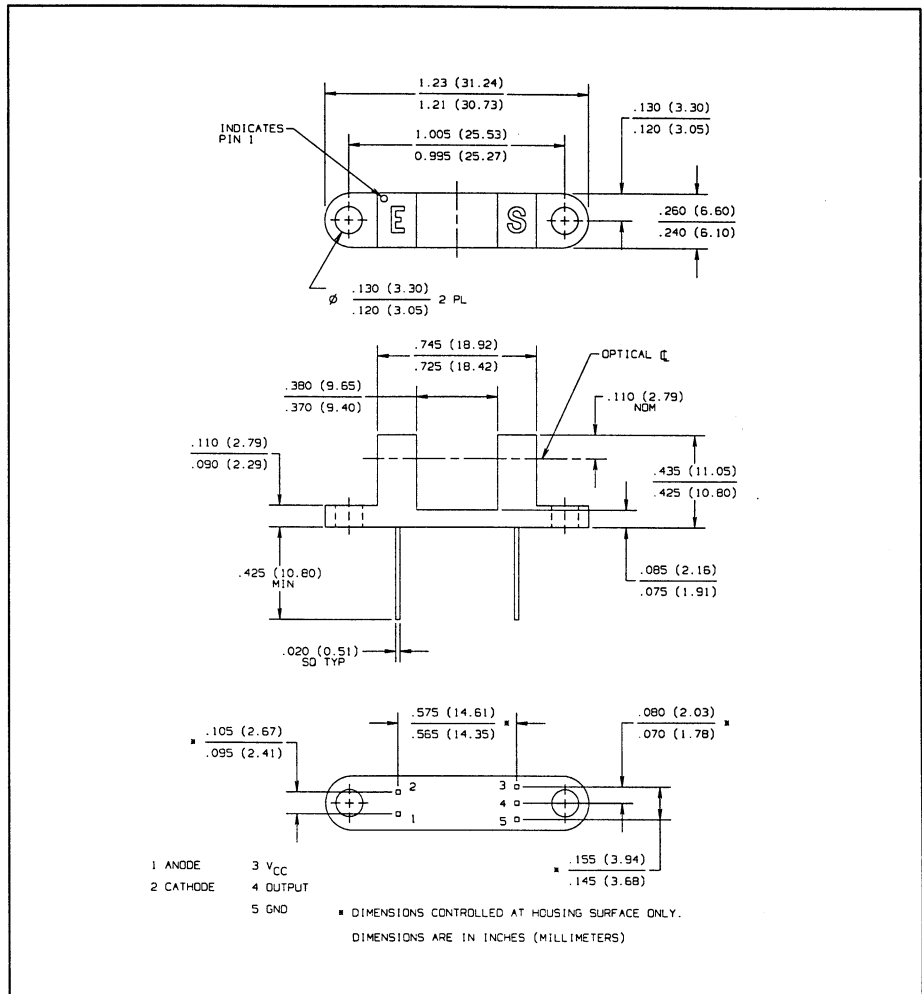
Features

- 0.375" (9.53 mm) wide gap
- Choice of output configuration
- Choice of opaque or IR transmissive shell material
- Data rates to 250 kBaud
- 0.570" (14.48 mm) lead spacing

Description

The OPB900L and OPB910L series of Photologic® Photo Integrated Circuit Switches provide optimum flexibility for the design engineer. Building from a standard housing with a 0.375" (9.53 mm) wide slot, the user can specify (1) type and polarity of TTL output and (2) discrete shell material. Available with wire leads as OPB900W/OPB910W series.

The electrical output can be specified as either TTL totem pole or TTL open collector. Either may be supplied with inverter or buffer output polarity. All have added stability of a built-in hysteresis amplifier.



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

| | |
|--|-----------------------|
| Supply Voltage, V _{CC} (Not to exceed 3 sec.) | 10 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 ⁽¹⁾ |
| Input Diode Power Dissipation | 100 mW ⁽²⁾ |
| Output Photologic® Power Dissipation | 200 mW ⁽³⁾ |
| Total Device Power Dissipation | 300 mW ⁽⁴⁾ |
| Voltage at Output Lead (Open Collector Output) | 35 V |
| Diode Forward D.C. Current | 40 mA |
| Diode Reverse D.C. Voltage | 2 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) Derate linearly 4.44 mW/° C above 25° C.
- (4) Derate linearly 6.66 mW/° C above 25° C.
- (5) The OPB900L/OPB910L series are terminated with 0.020" square leads designed for printed circuit board mounting.
- (6) Normal application would be with light source blocked, simulated by I_F = 0 mA.
- (7) All parameters tested using pulse technique.
- (8) Methanol or isopropanol are recommended as cleaning agents. Plastic housings are soluble in chlorinated hydrocarbons and ketones.

Types OPB900L, OPB910L Series

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 | $V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| | 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 | $V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| V_{OL} | Low Level Output Voltage: Buffered Totem-Pole Output Buffered Open-Collector Output | | | 0.4 | V | $V_{CC} = 4.75\text{ V}$, $I_{OL} = 12.8\text{ mA}$ $I_F = 0\text{ mA}^{(6)}$ |
| | 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 | $V_{CC} = 4.75\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 0\text{ mA}^{(6)}$ |
| I_{OH} | High Level Output Current: Buffered Open-Collector Output | | | 100 | μA | $V_{CC} = 4.75\text{ V}$, $V_{OH} = 30\text{ V}$ $I_F = 20\text{ mA}$, $T_A = 25^\circ\text{C}$ |
| | 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 | | | 20 | 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 | -30 | | -100 | mA | $V_{CC} = 5.25\text{ V}$, $I_F = 20\text{ mA}$ Output = GND |
| | Inverted Totem-Pole Output | -30 | | -100 | mA | $V_{CC} = 5.25\text{ V}$, $I_F = 0\text{ mA}$ 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) |

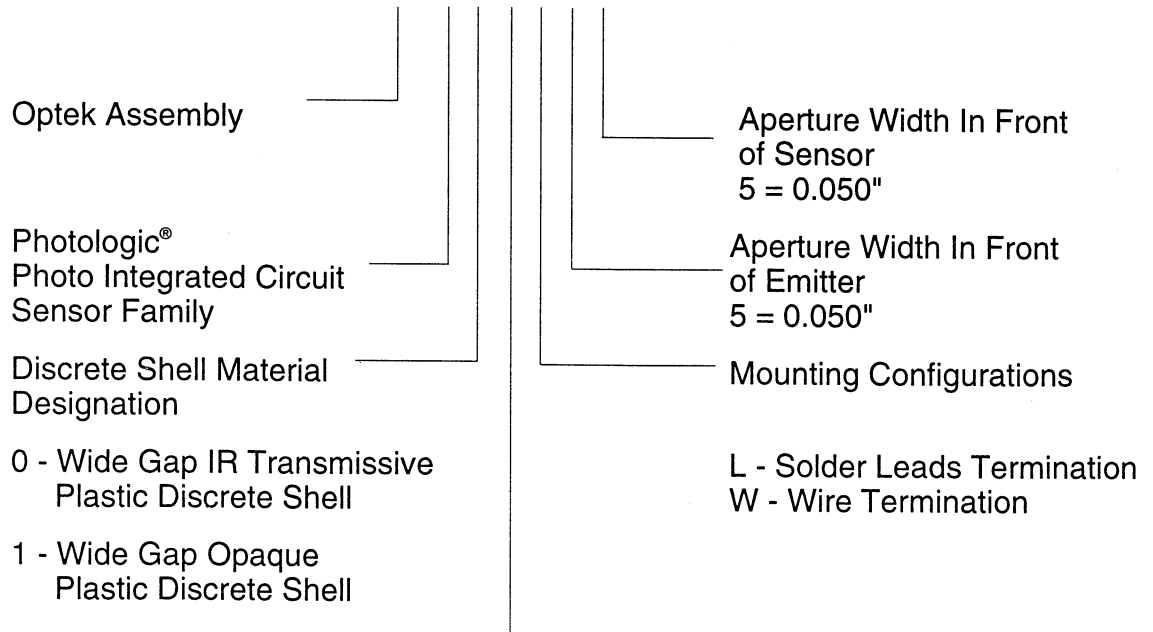
SLOTTED
OPTICAL
SWITCHES

Housing

All housings are an opaque grade of injection-molded plastic to minimize the assembly's sensitivity to ambient radiation, both visible and near-infrared. Discrete shells (exposed on the parallel faces inside the device throat) are either IR transmissive plastic for applications where aperture contamination may occur or opaque plastic for maximum protection against ambient light.

PART NUMBER GUIDE

OPB 9 X X X X X

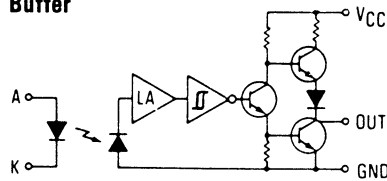


Electrical Specification Variations

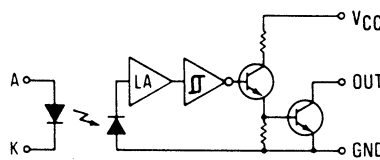
- 0 - Buffered Totem-Pole Output
- 1 - Buffered Open-Collector Output
- 2 - Inverted Totem-Pole Output
- 3 - Inverted Open-Collector Output

Schematics

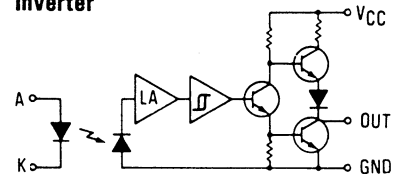
**OPB900/OPB910
(Totem-Pole Output)
Buffer**



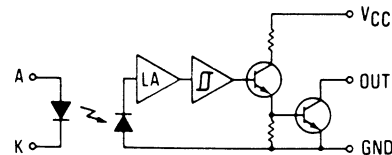
**OPB901/OPB911
(Open-Collector Output)
Buffer**



**OPB902/OPB912
(Totem-Pole Output)
Inverter**



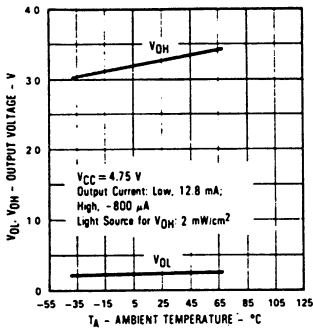
**OPB903/OPB913
(Open-Collector Output)
Inverter**



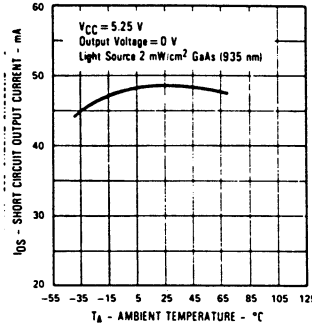
Types OPB900L, OPB910L Series

Typical Performance Curves

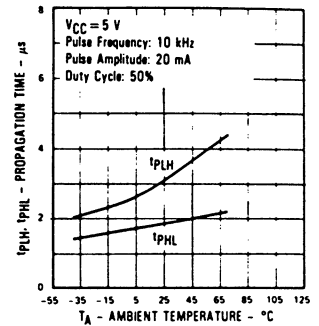
Output Voltage vs Ambient Temperature



OPB900L, OPB902L, OPB910L, OPB912L
Short Circuit Output Current vs Ambient Temperature



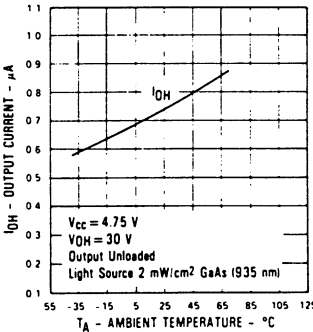
All Assemblies
Propagation Time vs Ambient Temperature



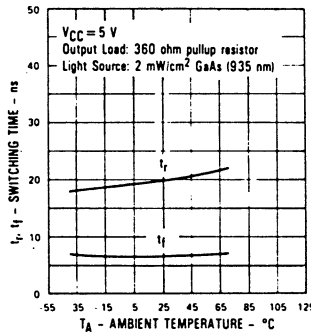
SLOTTED OPTICAL SWITCHES

OPB901L, OPB903L, OPB911L, OPB913L

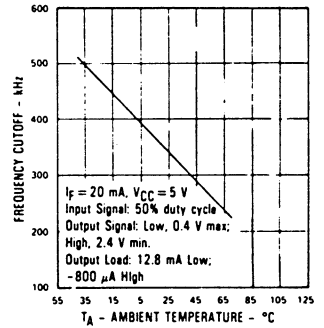
Output Current (High) vs Ambient Temperature



Rise Time and Fall Time vs Ambient Temperature

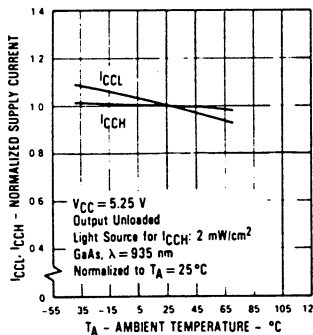


All Assemblies
Data Rate vs Ambient Temperature



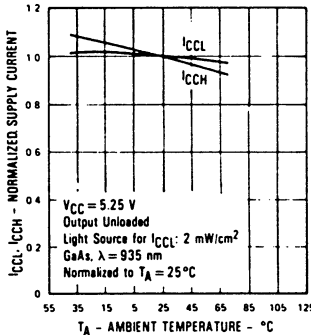
OPB902L, OPB903L, OPB912L, OPB913L

Normalized Supply Current vs Ambient Temperature



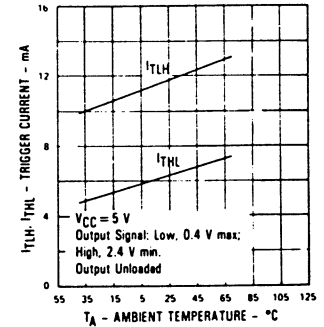
OPB900L, OPB901L, OPB910L, OPB911L

Normalized Supply Current vs Ambient Temperature

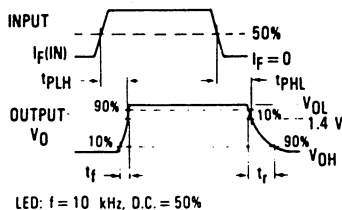


All Assemblies

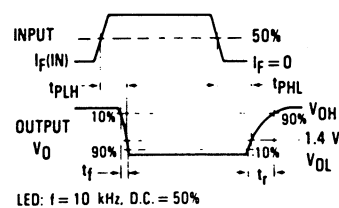
Trigger Current vs Ambient Temperature



Switching Test Curve for Buffers



Switching Test Curve for Inverters



Optek 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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