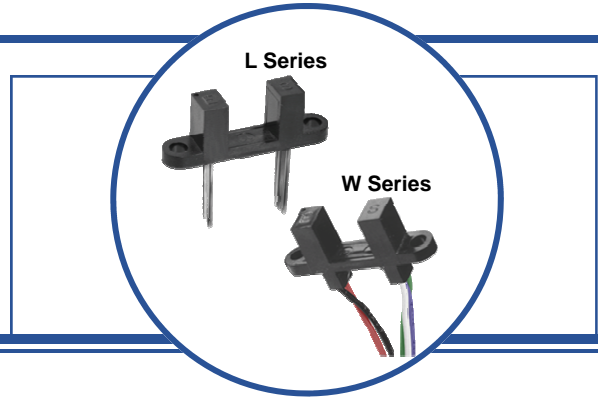


# Photologic® Slotted Optical Switch “Wide Gap” Series OPB900 through OPB913 Series (L, W\_\_Z)



## Features:

- 0.375" (9.5 mm) wide gap
- Choice of logical output configurations
- Choice of opaque or IR transmissive housing material
- Choice of PCBoard or 26 AWG, UL rated wire
- Data rates to 250 kBaud



## Description:

The **OPB900 - OPB913** series of Photologic® Integrated Circuit Switches provide optimum flexibility for the design engineer. Building from a standard housing with a 0.375" (9.5mm) wide slot, a user can specify the type and polarity of the TTL output and the type of shell material.

Electrical output can be specified as either TTL Totem Pole (buffered) or TTL Open Collector, either of which can be supplied with an inverted output polarity.

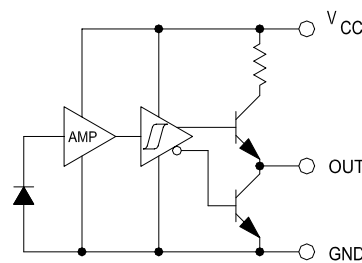
All versions have the added stability of hysteresis built into the amplification circuitry.

## Applications:

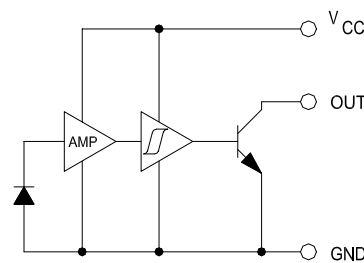
- Mechanical switch replacement
- Speed indication (tachometer)
- Mechanical limit indication
- Edge sensing
- Object sensing

| Part Number Guide — OPB900 Series (L, W)   |   |
|--|---|
| <b>OPB9</b> _____  |   |
| 0 = Dust protection with apertures<br>1 = Open apertured                                       | _____ L55 = Solder lead termination (PCBoard mount)             |
| 0 = Totem Pole<br>1 = Open Collector<br>2 = Inverted Totem Pole<br>3 = Inverted Open Collector | _____ W5_Z= 26 AWG wire termination (24" [61cm] long)           |
|  | Aperture sizes:<br>1 = 0.010" (0.25 mm)<br>5 = 0.050" (1.52 mm) |

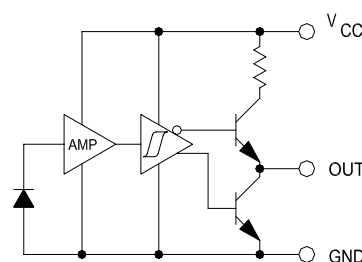
### Totem-Pole-Output



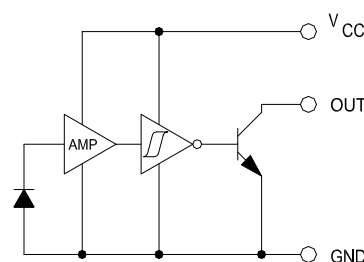
### Open-Collector-Output



### Inverted Totem-Pole



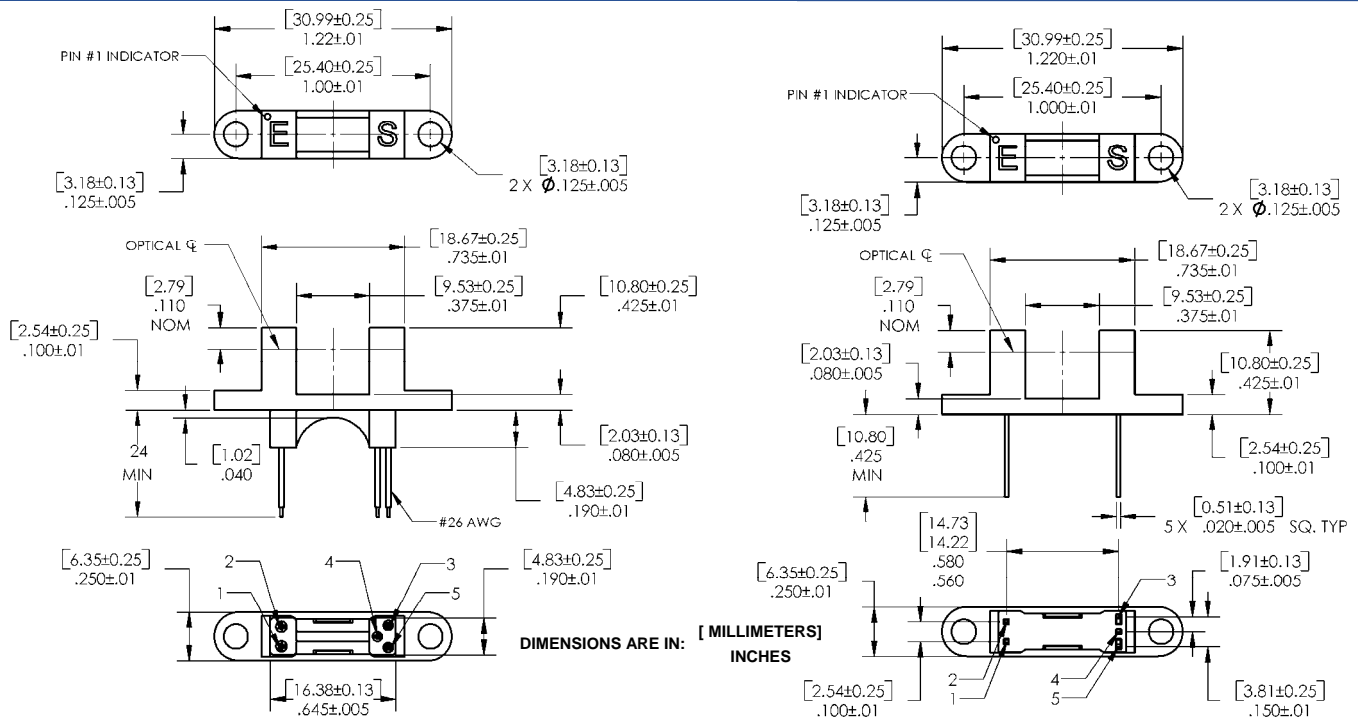
### Inverted Open Collector



RoHS

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| Color-Pin # | Description | Color-Pin # | Description | Color-Pin # | Description     | Color-Pin # | Description | Color-Pin # | Description |
|-------------|-------------|-------------|-------------|-------------|-----------------|-------------|-------------|-------------|-------------|
| Red-1       | Anode       | Black-2     | Cathode     | White-3     | V <sub>CC</sub> | Blue-4      | Output      | Green-5     | Ground      |

**Absolute Maximum Ratings** (T<sub>A</sub> = -40°C to +70° Unless otherwise noted)

|  |                  |
|--|------------------|
| Storage Temperature  | -40° C to +85° C |
| Operating Temperature  | -40° C to +70° C |
| Lead Soldering Temperature (1/16" (1.6 mm) from case for 5 seconds with soldering iron) <sup>(1)</sup> | 260° C           |

**Input Infrared LED**

|  |        |
|--|--------|
| DC Forward Diode (LED) Current               | 40 mA  |
| DC Reverse Diode (LED) Voltage               | 2 V    |
| Input Diode Power Dissipation <sup>(1)</sup> | 100 mW |

**Output Photologic®**

|   |        |
|---|--------|
| Supply Voltage, V <sub>CC</sub> (not to exceed 3 seconds) | 10V    |
| Voltage at Output Lead (Open Collector Output version)    | 35 V   |
| Output Photologic® Power Dissipation <sup>(2)</sup>       | 200 mW |
| Total Device Power Dissipation <sup>(3)</sup>             | 300 mW |

**Notes:**

- (1) Derate linearly 2.22 mW/°C above 25°C
- (2) Derate linearly 4.44 mW/°C above 25°C
- (3) Derate linearly 6.66 mW/°C above 25°C
- (4) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (5) Methanol or isopropanol are recommended as cleaning agents. The plastic housing is soluble in chlorinated hydrocarbons and ketones.

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**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** (See OPB240 for more information — for reference only)

|       |                 |   |   |     |               |   |
|-------|-----------------|---|---|-----|---------------|---|
| $V_F$ | Forward Voltage | - | - | 1.7 | V             | $I_F = 20\text{ mA}$ , $T_A = 25^\circ\text{C}$ |
| $I_R$ | Reverse Current | - | - | 100 | $\mu\text{A}$ | $V_R = 2\text{ V}$ , $T_A = 25^\circ\text{C}$   |

**Output Photologic® Sensor** (See OPB560 for more information — for reference only)

|                    |  |      |    |      |               |  |
|--------------------|--|------|----|------|---------------|--|
| $V_{CC}$           | Operating D.C. Supply Voltage  | 4.75 | -  | 5.25 | V             |  |
| $I_{CCL}$          | Low Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output  | -    | -  | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(1)}$                                       |
|                    | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -  | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 20\text{ mA}^{(1)}$                                      |
| $I_{CCH}$          | High Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output | -    | -  | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 20\text{ mA}^{(1)}$                                      |
|                    | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -  | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(1)}$                                       |
| $V_{OL}$           | Low Level Output Voltage:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output  | -    | -  | 0.4  | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$ , $I_F = 0\text{ mA}^{(1)}$           |
|                    | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -  | 0.4  | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$ , $I_F = 20\text{ mA}^{(1)}$          |
| $V_{OH}$           | High Level Output Voltage:<br>Buffered Totem-Pole Output                                   | 2.4  | -  | -    | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ }\mu\text{A}$ , $I_F = 20\text{ mA}^{(1)}$ |
|                    | Inverted Totem-Pole Output   | 2.4  | -  | -    | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ }\mu\text{A}$ , $I_F = 0\text{ mA}^{(1)}$  |
| $I_{OH}$           | High Level Output Current:<br>Buffered Open-Collector Output                               | -    | -  | 100  | $\mu\text{A}$ | $V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $T_A = 25^\circ\text{C}$               |
|                    | Inverted Open-Collector Output   | -    | -  | 100  | $\mu\text{A}$ | $V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $T_A = 25^\circ\text{C}$               |
| $I_F(+)$           | LED Positive-Going Threshold Current   | -    | -  | 20   | mA            | $V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$   |
| $I_F(+)/I_F(-)$    | Hysteresis   | -    | 2  | -    | -             | $V_{CC} = 5\text{ V}$  |
| $I_{OS}$           | Short Circuit Output Current:<br>Buffered Totem-Pole Output                                | -30  | -  | -100 | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 20\text{ mA}$<br>Output = GND                            |
|                    | Inverted Totem-Pole Output   | -30  | -  | -100 | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}$<br>Output = GND                             |
| $t_r, t_f$         | Output Rise Time, Output Fall Time   | -    | 70 | -    | ns            | $V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$<br>$I_F = 0$ or $20\text{ mA}$            |
| $t_{PLH}, t_{PHL}$ | Propagation Delay Low-High and High-Low  | -    | 5  | -    | $\mu\text{s}$ | $R_L = 8\text{ TTL Loads (Totem-Pole)}$<br>$R_L = 360\text{ }\Omega$ (Open-Collector)      |

Notes:

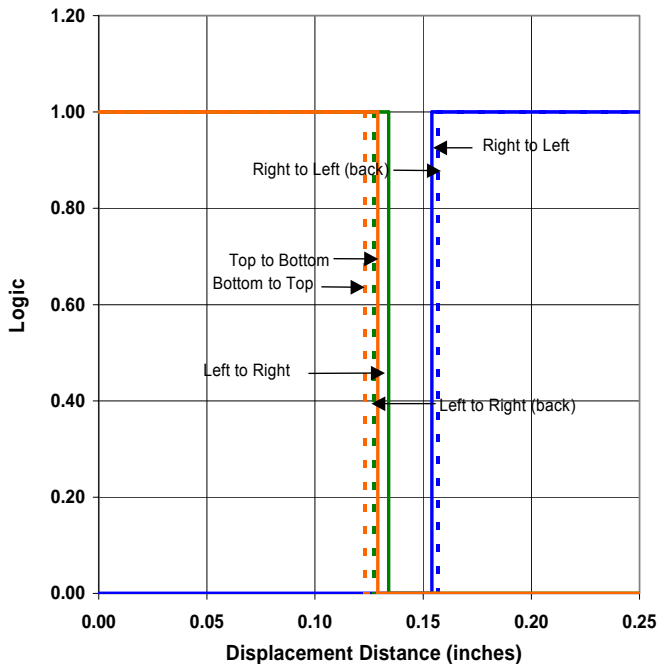
(1) Normal application would be with light source blocked, simulated by  $I_F = 0\text{ mA}$ .

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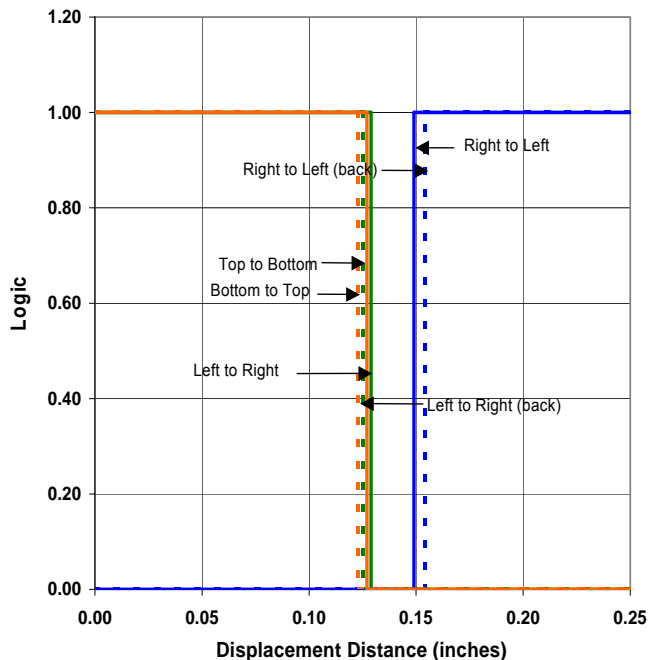
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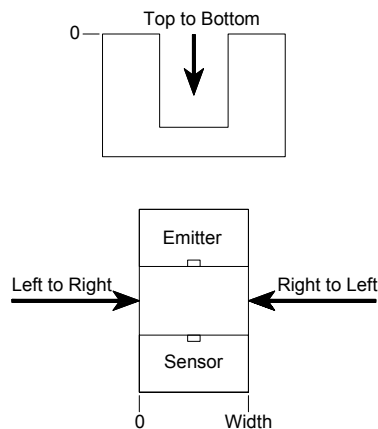
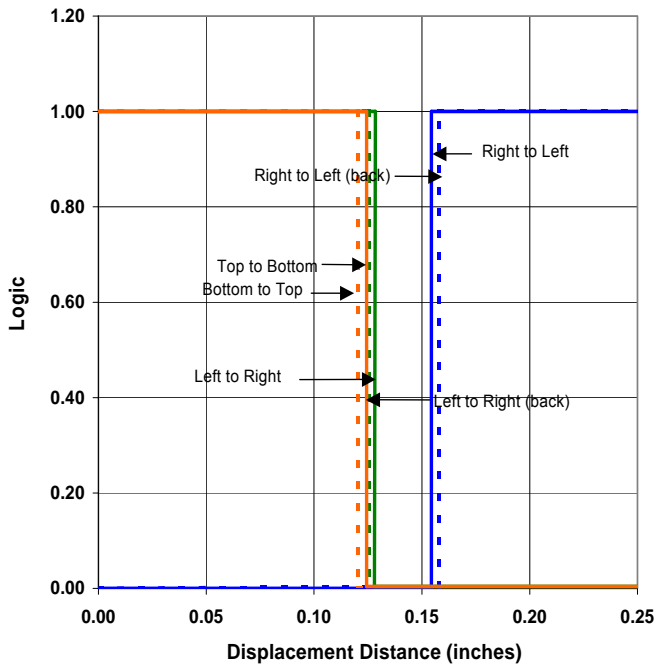
**OPB900 - Flag Next to Emitter**



**OPB900 - Flag Next to Sensor**



**OPB900 - Flag in Middle of Slot**



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