

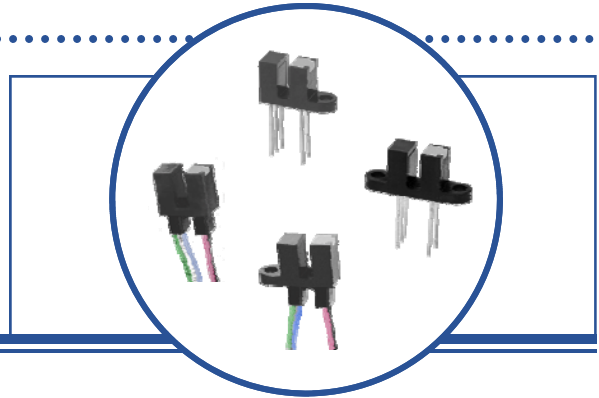
# Photologic® Slotted Optical Switch

## OPB460, OPB470, OPB480, OPB490 Series



### Features:

- Choice of pins or wires mounting configuration
- Choice of aperture
- Choice of output configuration
- Choice of opaque or IR transmissive shell material
- Data rates to 250 kBaud
- Low power consumption



### Description:

The **OPB460**, **OPB470**, **OPB480** and **OPB490** series of Photologic® photo integrated circuit switches provide optimum flexibility for the design engineer. Building from a standard housing with a 0.125" (3.180 mm) wide slot, a user can specify the type and polarity of TTL output, discrete shell material, aperture width and choice of mounting configurations. **OPB460** through **OPB473** have 0.425" (10.795 mm) PCBoard leads with 0.320" (8.1 mm) spacing. **OPB480** through **OPB493** have 24" (609 mm) 26 AWG wires (UL approved wires).

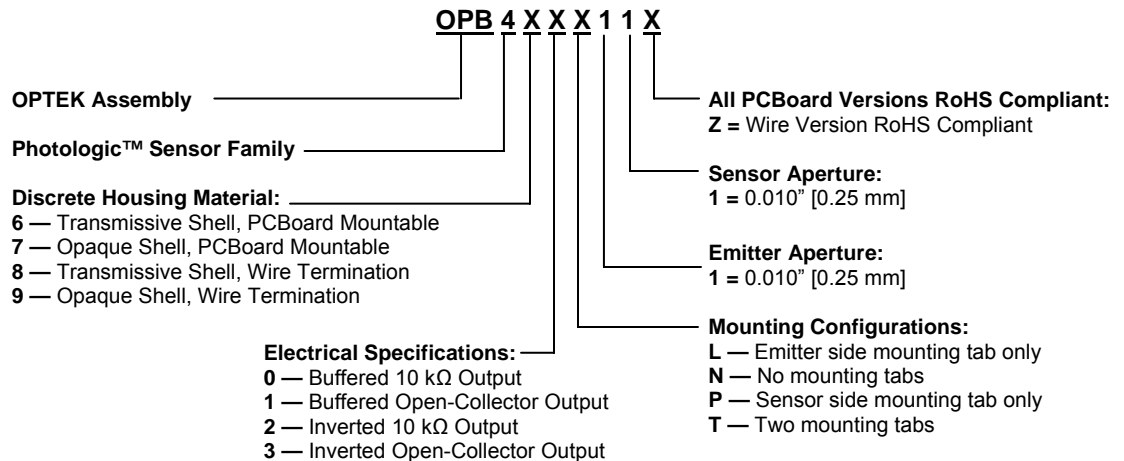
All devices in this series exhibit performance over supply voltages ranging from 4.5 V to 16.0 V, and may be specified as buffered or inverted with 10 kW Pull-up or Open Collector output. Devices are also TTI/LSTTL compatible and can drive up to 10 TTL loads.

Custom electrical, wire and cabling and connectors are available. Contact your local representative or OPTEK for more information.

### Applications:

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

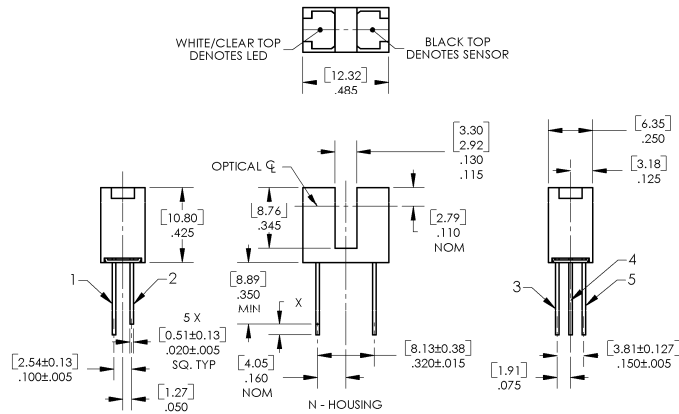
### Part Number Guide — OPB460, OPB470, OPB480, OPB490 Series



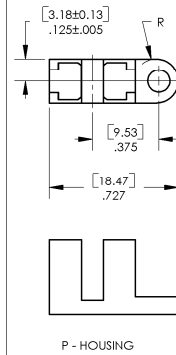
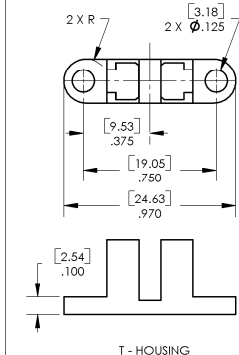
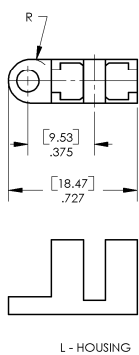
**RoHS**

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

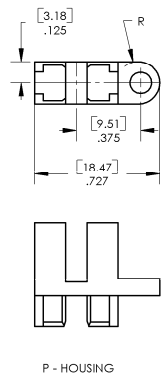
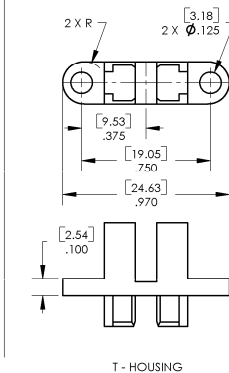
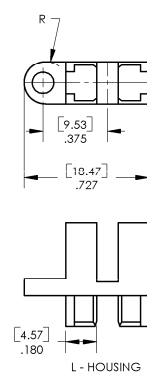
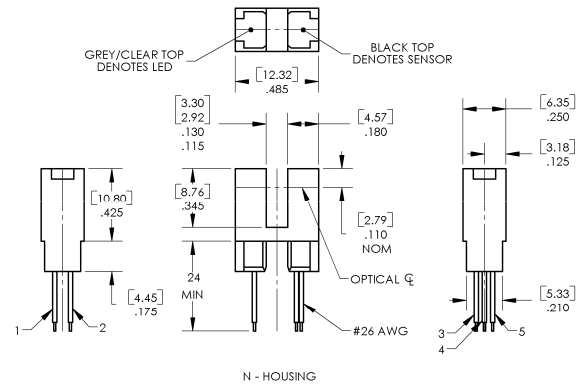
# Photologic® Slotted Optical Switch OPB460, OPB470, OPB480, OPB490 Series



| Color—Pin # | Description |
|-------------|-------------|
| Red—1       | Anode       |
| Black—2     | Cathode     |
| Green—3     | Ground      |
| Blue—4      | Output      |
| White—5     | Vcc         |



DIMENSIONS ARE IN: [ MILLIMETERS]  
INCHES



**CONTAINS POLYSULFONE**  
To avoid stress cracking, we suggest using ND Industries' **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK's molded plastics.  
**Applies to: OPB460, OPB470, OPB480, OPB490.**

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

|  |                  |
|--|------------------|
| Storage & Operating Temperature Range  | -40° C to +85° C |
| Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] <sup>(1)</sup> | 260°C            |

**Input Infrared LED**

|  |       |
|--|-------|
| Supply Voltage, $V_{CC}$ (not to exceed 3 seconds) | 18 V  |
| Diode Forward DC Current                           | 40 mA |
| Diode Reverse DC Voltage                           | 2 V   |
| Input Diode Power Dissipation <sup>(2)</sup>       | 75 mW |

**Output Photologic®**

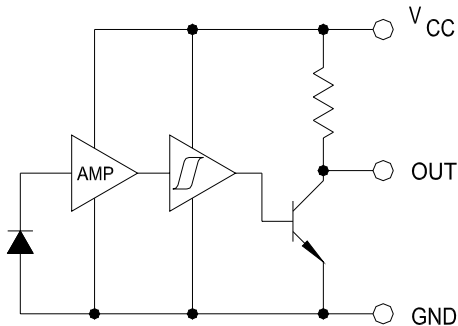
|   |        |
|---|--------|
| Voltage at Output Lead (Open Collector Output)      | 25 V   |
| Output Photologic® Power Dissipation <sup>(3)</sup> | 200 mW |

|   |        |
|---|--------|
| Total Device Power Dissipation <sup>(4)</sup> | 275 mW |
|---|--------|

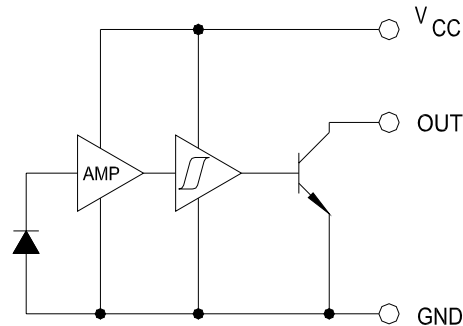
Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.67 mW/°C above 25° C (OPB460, OPB470) or derate linearly 1.82 mW/°C above 25° C (OPB480, OPB490).
- (3) Derate linearly 1.50 mW/°C above 25° C (OPB460, OPB470) or derate linearly 1.64 mW/°C above 25° C (OPB480, OPB490).
- (4) Derate linearly 3.17 mW/°C above 25° C (OPB460, OPB470) or derate linearly 3.45 mW/°C above 25° C (OPB480, OPB490).
- (5) The OPB460/OPB470 series are terminated with 0.020" square leads designed for printed circuit board mounting.
- (6) The OPB480/OPB490 series of switches are terminated with 24" (609.600 mm) of 7-strand 26 AWG, UL rated insulated wire on each terminal. Insulation colors and functions are: red (anode), black (cathode), white ( $V_{CC}$ ), blue (output) and green (ground). Other wire lengths and/or colors in addition to customer selected connectors are available. Contact your local representative or call the factory.

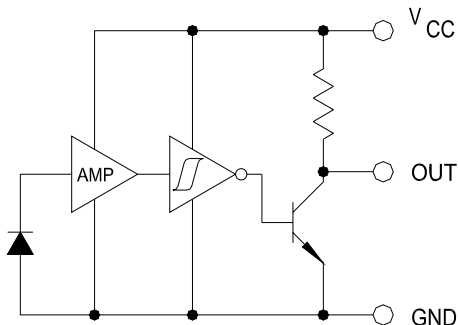
**OPB460/470/480/490 Buffered 10K Pull-Up**



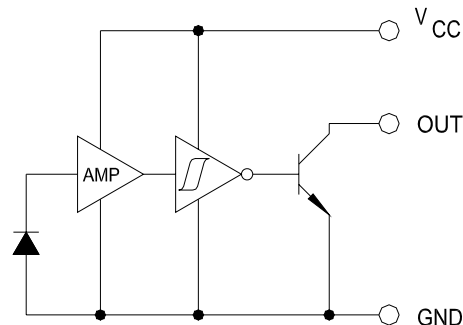
**OPB461/471/481/491 Buffered Open-Collector**



**OPB462/472/482/492 Inverted 10K Pull-Up**



**OPB463/473/483/493 Inverted Open-Collector**



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**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  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 | $\mu\text{A}$ | $V_R = 2\text{ V}, T_A = 25^\circ\text{C}$   |

**Output Photologic® Sensor**

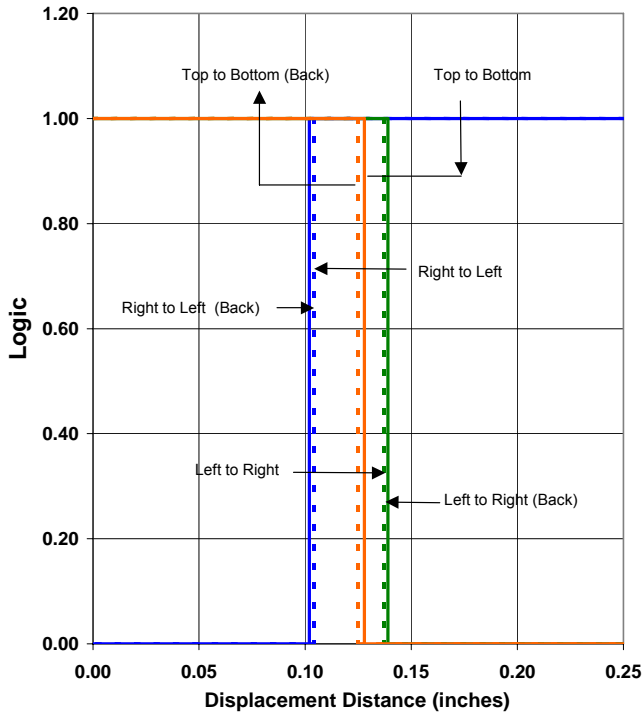
|                     |   |                  |     |     |               |  |
|---------------------|---|------------------|-----|-----|---------------|--|
| $V_{CC}$            | Operating DC Supply Voltage   | 4.5              | -   | 16  | V             |  |
| $I_{CCL}$           | Low Level Supply Current:<br>Buffered with 10k pull-up <sup>(1)</sup><br>Buffered Open-Collector Output | -                | -   | 7.5 | mA            | $V_{CC} = 16\text{ V}, I_F = 0\text{ mA}^{(1)}$  |
|                     | Inverted with 10k pull-up:<br>Inverted Open-Collector Output  | -                | -   | 7.5 | mA            | $V_{CC} = 16\text{ V}, I_F = 12\text{ mA}$   |
| $I_{CCH}$           | High Level Supply Current:<br>Buffered with 10k pull-up<br>Buffered Open-Collector Output               | -                | -   | 7.5 | mA            | $V_{CC} = 16\text{ V}, I_F = 12\text{ mA}$   |
|                     | Inverted with 10k pull-up:<br>Inverted Open-Collector Output  | -                | -   | 7.5 | mA            | $V_{CC} = 16\text{ V}, I_F = 0\text{ mA}^{(1)}$  |
| $V_{OL}$            | Low Level Output Voltage:<br>Buffered with 10k pull-up<br>Buffered Open-Collector Output                | -                | -   | 0.4 | V             | $V_{CC} = 4.5\text{ V}, I_{OL} = 16\text{ mA}, I_F = 0\text{ mA}$                        |
|                     | Inverted with 10k pull-up:<br>Inverted Open-Collector Output  | -                | -   | 0.4 | V             | $V_{CC} = 4.5\text{ V}, I_F = 12\text{ mA}^{(1)}$  |
| $V_{OH}$            | High Level Output Voltage:<br>Buffered with 10k pull-up   | $V_{CC}$<br>-1.5 | -   | -   | V             | $V_{CC} = 4.5\text{ V to }16\text{ V}, \text{No Load}, I_F = 12\text{ mA}$               |
|                     | Inverted with 10k pull-up:<br>Inverted Open-Collector Output <sup>(1)</sup>                             | $V_{CC}$<br>-1.5 | -   | -   | V             | $V_{CC} = 4.5\text{ V to }16\text{ V}, \text{No Load}, I_F = 0\text{ mA}$                |
| $I_{OH}$            | High Level Output Current:<br>Buffered Open-Collector Output  | -                | -   | 14  | $\mu\text{A}$ | $V_{CC} = 16\text{ V}, I_F = 12\text{ mA}, V_{OH} = 25\text{ V}, T_A = 25^\circ\text{C}$ |
|                     | Inverted with 10k pull-up:<br>Inverted Open-Collector Output <sup>(1)</sup>                             | -                | -   | 14  | $\mu\text{A}$ | $V_{CC} = 16\text{ V}, I_F = 0\text{ mA}, V_{OH} = 25\text{ V}, T_A = 25^\circ\text{C}$  |
| $I_{F(+)}$          | LED Positive-Going Threshold Current  | -                | -   | 10  | mA            | $V_{CC} = 5\text{ V}, T_A = 25^\circ\text{C}$  |
| $I_{F(+)} I_{F(-)}$ | Hysteresis  | -                | 1.4 | -   | -             | $V_{CC} = 5\text{ V}$  |
| $t_r, t_f$          | Rise Time, Fall Time  | -                | 50  | -   | ns            | $V_{CC} = 5\text{ V}, T_A = 25^\circ\text{C}, I_F = 0\text{ or }12\text{ mA}$            |
| $t_{PLH}, t_{PHL}$  | Propagation Delay   | -                | 3   | -   | $\mu\text{s}$ | $R_L = 300\ \Omega \text{ to } 5\text{ V}, C_L = 50\text{ pF}$                           |

Notes:

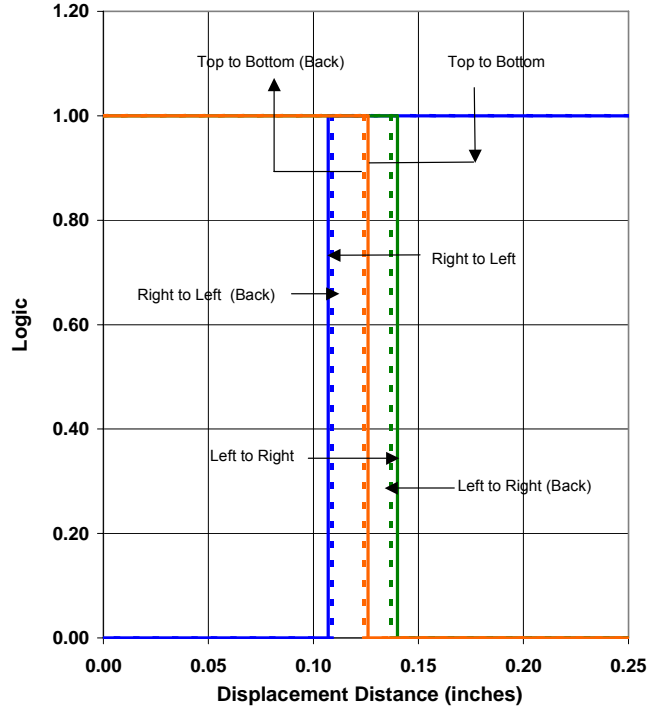
- (1) Normal application would be with light source blocked, simulated by  $I_F = 0\text{ mA}$ .
- (2) All parameters tested using pulse technique.

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

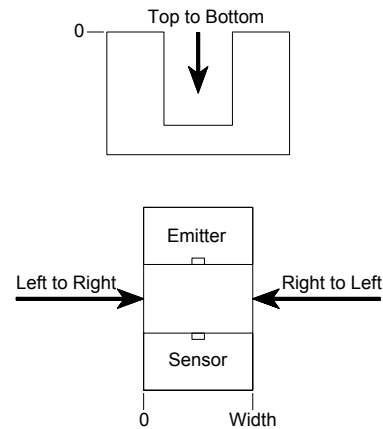
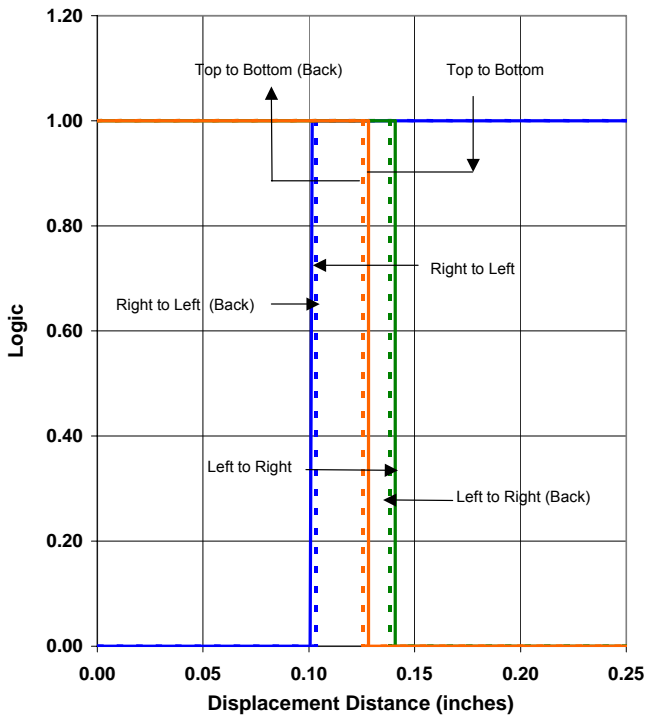
**OPB480T55 - Flag Next to Emitter**



**OPB480T55 - Flag Next to Sensor**

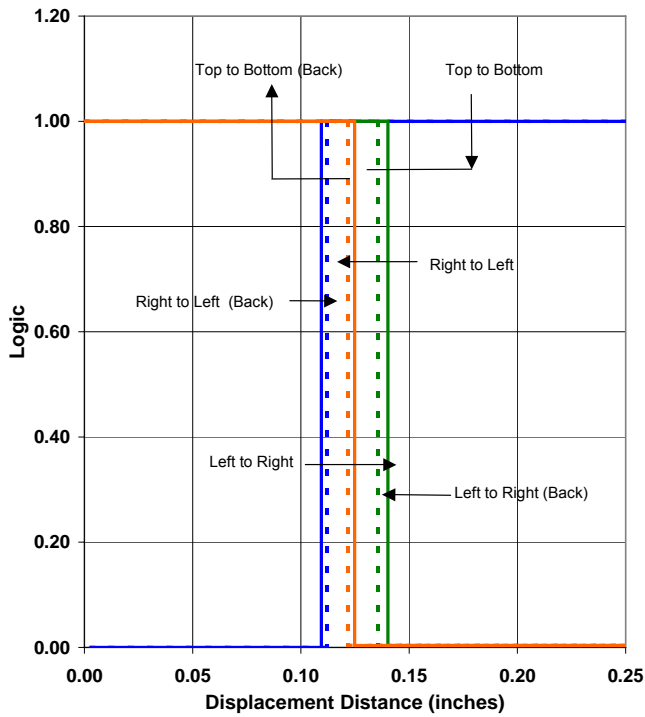


**OPB480T55 - Flag in Middle of Slot**

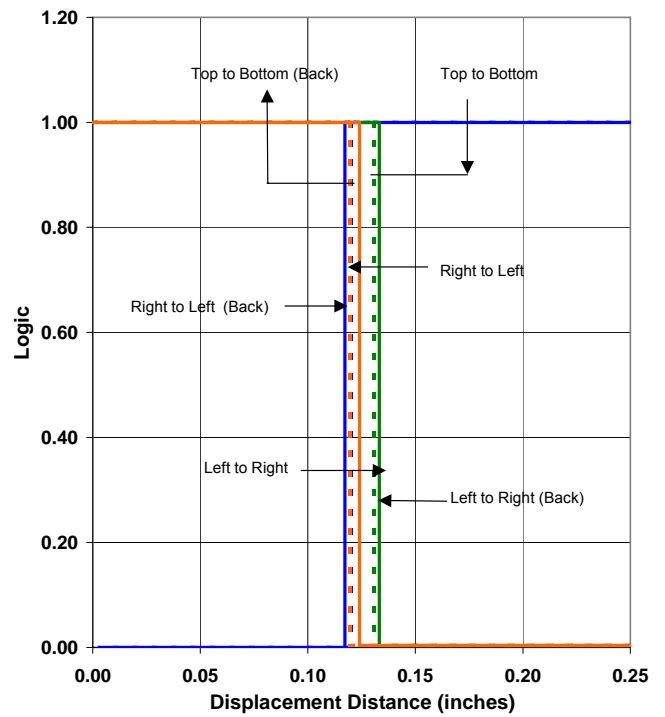


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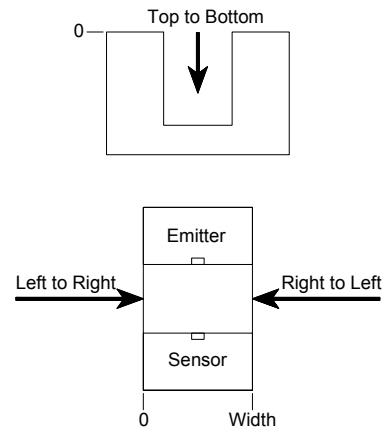
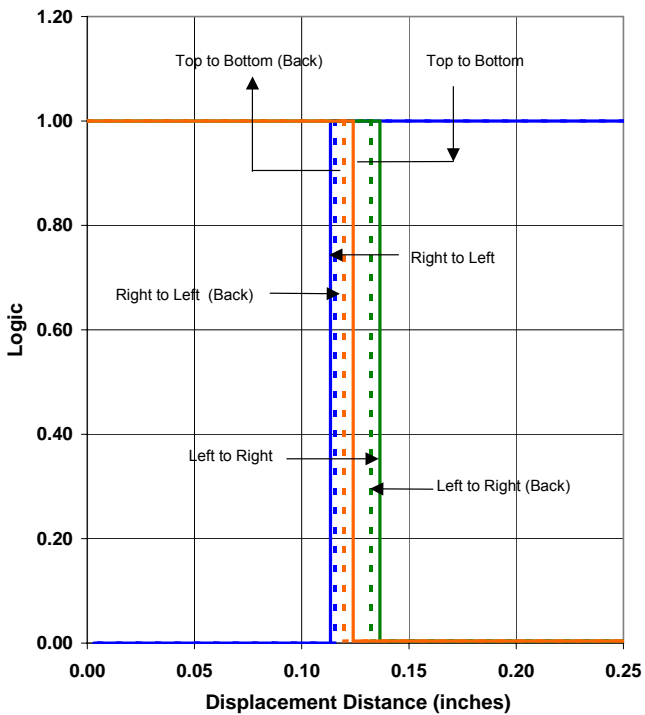
**OPB481N51 - Flag Next to Emitter**



**OPB481N51 - Flag Next to Sensor**

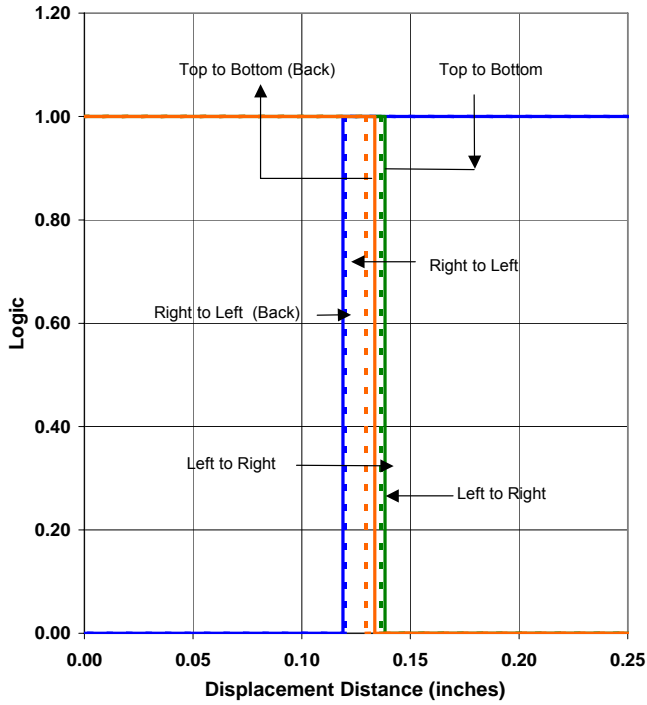


**OPB481N51 - Flag in Middle of Slot**

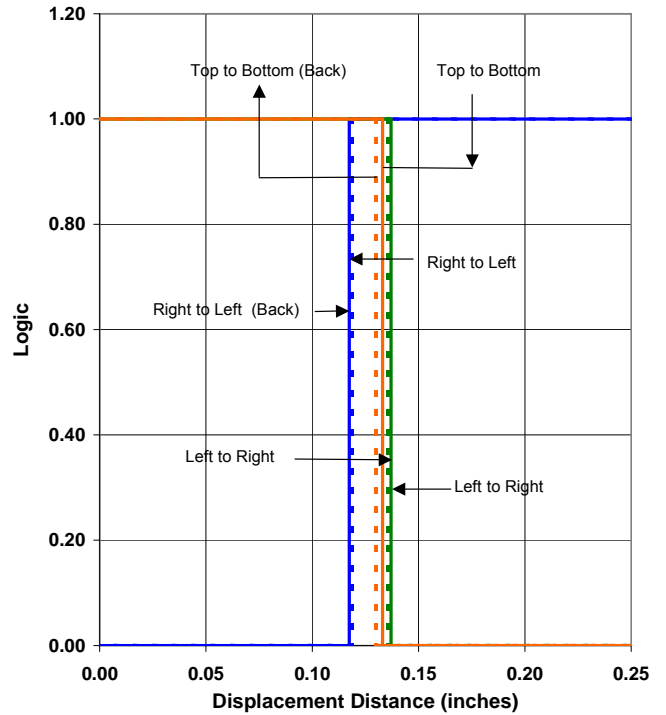


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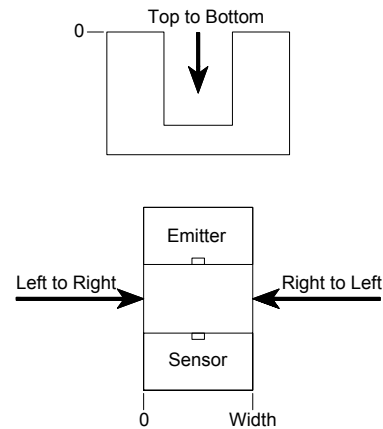
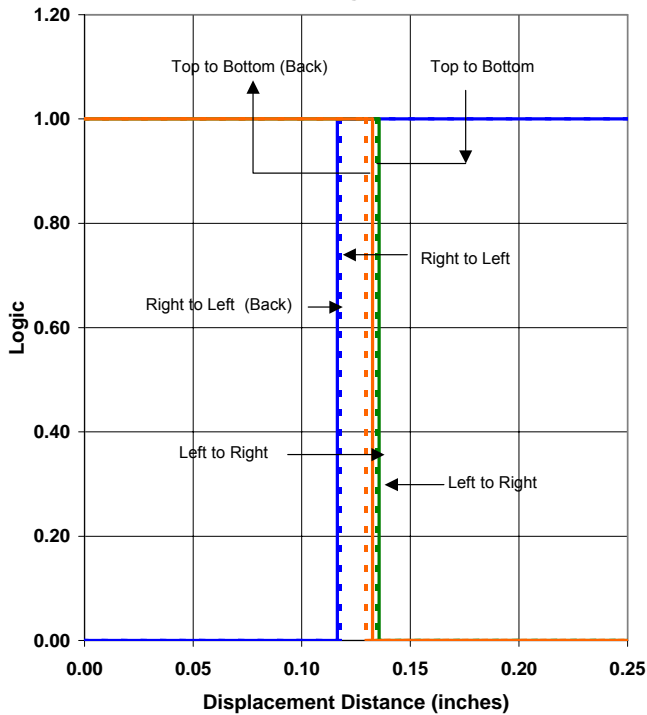
**OPB460N11 - Flag Next to Emitter**



**OPB460N11 - Flag Next to Sensor**



**OPB460N11 - Flag in Middle of Slot**



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