

# Photologic® Slotted Optical Switch



OPB615, OPB616, OPB617, OPB618 Series  
 OPB625, OPB626, OPB627, OPB628 Series  
 OPB665, OPB666, OPB667, OPB668 (N and T Series)



## Features:

- Non-contact switching
- PCBoard mounting
- Enhanced signal to noise ratio
- Choice of four Logical output options

## Description:

Each OPB615, OPB625 and OPB665 series slotted optical switch consists of an 890 nm, infrared Light Emitting Diode (LED) and a monolithic integrated circuit that incorporates a photodiode, a linear amplifier and a Schmitt trigger on a single silicon chip. OPB655 offers two mounting options—no tabs (N) or two tabs (T).

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/LST TL 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

| Ordering Information |                    |                    |                           |                    |                       |
|----------------------|--------------------|--------------------|---------------------------|--------------------|-----------------------|
| Part Number          | Package Style      | Sensor Photologic® | Aperture Emitter / Sensor | Slot Width / Depth | Lead Length / Spacing |
| OPB615               | N                  | 10K Pull-up        | None                      | 0.150" / 0.240"    | 0.100" (min) / 0.275" |
| OPB616               |                    | Open Collector     |                           |                    |                       |
| OPB617               |                    | Inv-10K Pull-up    |                           |                    |                       |
| OPB618               |                    | Inv-Open Collector |                           |                    |                       |
| OPB625               |                    | 10K Pull-up        | None                      | 0.190" / 0.285"    | 0.100" (min) / 0.320" |
| OPB626               |                    | Open Collector     |                           |                    |                       |
| OPB627               |                    | Inv-10K Pull-up    |                           |                    |                       |
| OPB628               |                    | Inv-Open Collector |                           |                    |                       |
| OPB665N              | 10K Pull-up        | 0.05"/ 0.01"       | 0.125" / 0.345"           |                    |                       |
| OPB666N              | Open Collector     |                    |                           |                    |                       |
| OPB667N              | Inv-10K Pull-Up    |                    |                           |                    |                       |
| OPB668N              | Inv-Open Collector |                    |                           |                    |                       |
| OPB665T              | 10K Pull-up        |                    |                           | T                  |                       |
| OPB666T              | Open Collector     |                    |                           |                    |                       |
| OPB667T              | Inv-10K Pull-up    |                    |                           |                    |                       |
| OPB668T              | Inv-Open Collector |                    |                           |                    |                       |



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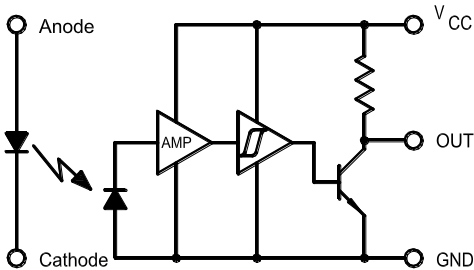


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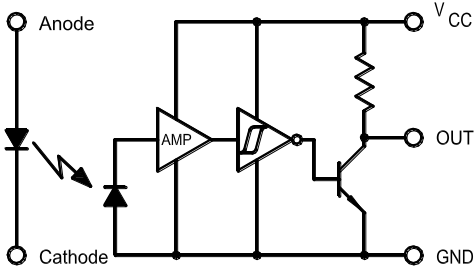
OPB625, OPB626, OPB627, OPB628 Series

OPB665, OPB666, OPB667, OPB668 (N and T Series)

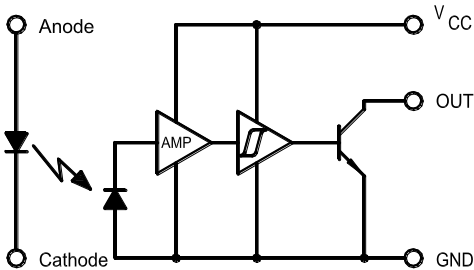
**OPB615/625/665N Buffered 10K Pull-Up**



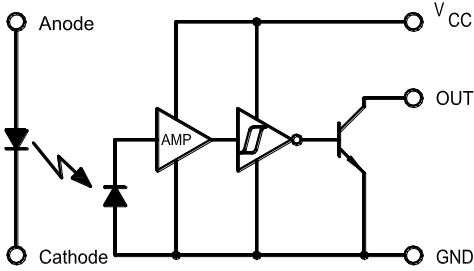
Photologic with Pull-Up-Resistor Inverted Output



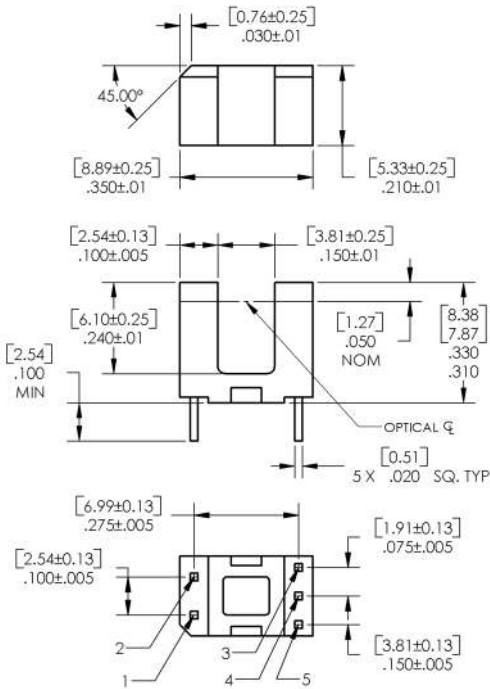
**OPB 616/626/666N Buffered Open-Collector**



Photologic with Open Collector Inverted Output



**OPB615, OPB616, OPB617, OPB618**



| Pin Color/Number | Description |
|------------------|-------------|
| 1                | Anode       |
| 2                | Cathode     |
| 3                | Vcc         |
| 4                | Output      |
| 5                | Ground      |

DIMENSIONS ARE IN: [ MILLIMETERS]  
INCHES

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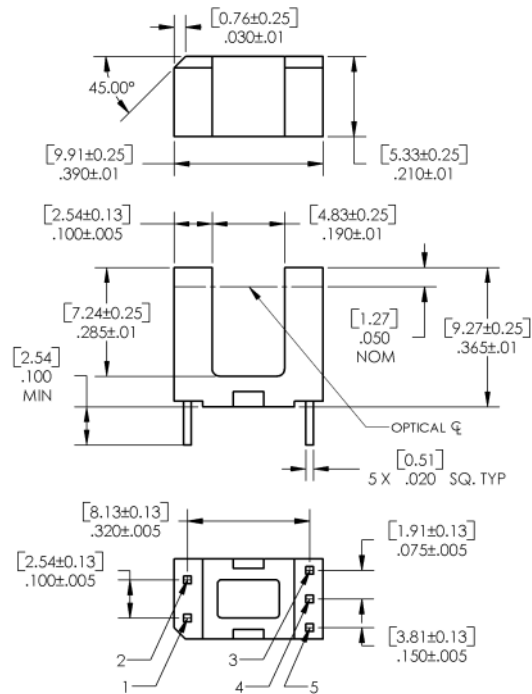
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## OPB625, OPB626, OPB627, OPB628

| Pin Color/ Number | Description |
|-------------------|-------------|
| 1                 | Anode       |
| 2                 | Cathode     |
| 3                 | Vcc         |
| 4                 | Output      |
| 5                 | Ground      |



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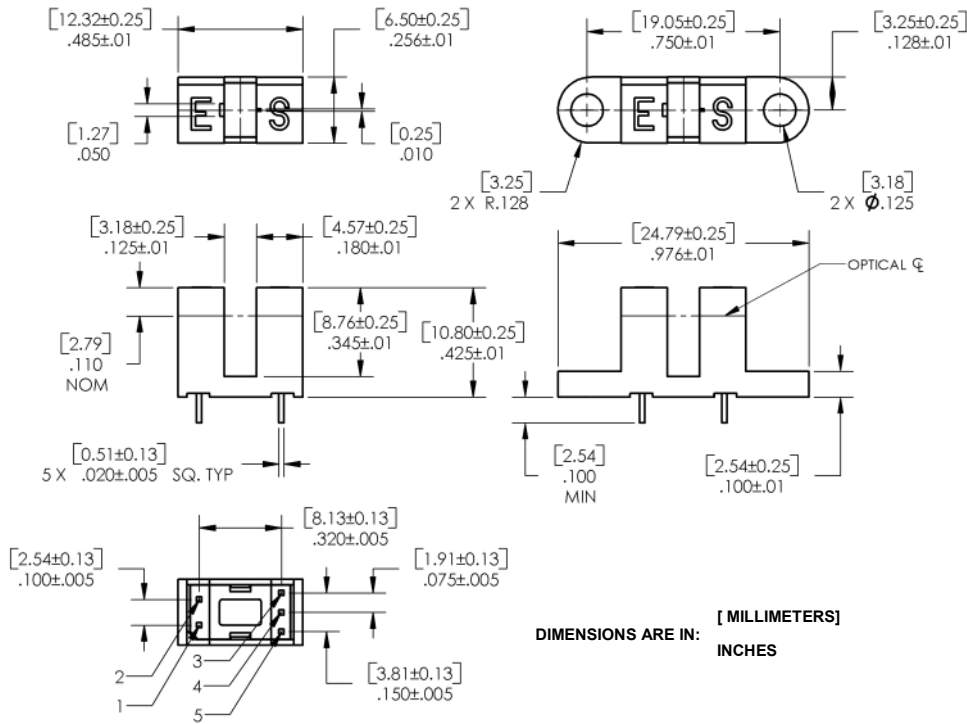


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OPB625, OPB626, OPB627, OPB628 Series

OPB665, OPB666, OPB667, OPB668 (N and T Series)

## OPB665, OPB666, OPB667, OPB668 (N and T)



| Pin Color/ Number | Description |
|-------------------|-------------|
| 1                 | Anode       |
| 2                 | Cathode     |
| 3                 | Vcc         |
| 4                 | Output      |
| 5                 | Ground      |

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| Absolute Maximum Ratings (T <sub>A</sub> = 25° C unless otherwise noted)                                   |                   |
|--|-------------------|
| Storage & Operating Temperature Range  | -40° C to +100° C |
| Lead Soldering Temperature (1/16 inch (1.6mm) from the case for 5 sec. with soldering iron) <sup>(1)</sup> | 260° C            |
| <b>Input Diode</b>   |                   |
| Forward DC Current   | 50 mA             |
| Peak Forward Current (1 μs pulse width, 300 pps)   | 3 A               |
| Reverse DC Voltage   | 3 V               |
| Power Dissipation <sup>(2)</sup>   | 100 mW            |
| <b>Output Photologic®</b>  |                   |
| Supply Voltage, V <sub>CC</sub>  | 18 V              |
| Duration of Output Short to V <sub>CC</sub>  | 1 second          |
| Voltage at Output <sup>(5)</sup>   | V <sub>CC</sub>   |
| Low Level Output Current (sinking)   | 16 mA             |
| Power Dissipation <sup>(3)</sup>   | 240° mW           |

**Notes:**

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.33 mW/° C above 25° C.
- (3) Derate linearly 2.50 mW/° C above 25° C.
- (4) Normal application would be with light source blocked, simulated by I<sub>F</sub> = 0 mA.
- (5) Open Collector devices = 30 volts

| Electrical Characteristics (T <sub>A</sub> = 25° C unless otherwise noted) |                                      |            |      |      |      |       |                        |
|--|--------------------------------------|------------|------|------|------|-------|------------------------|
| SYMBOL   | PARAMETER                            |            | MIN  | TYP  | MAX  | UNITS | TEST CONDITIONS        |
| <b>Input Diode</b>   |                                      |            |      |      |      |       |                        |
| V <sub>F</sub>   | Forward Voltage                      |            | -    | -    | 1.6  | V     | I <sub>F</sub> = 10 mA |
| I <sub>R</sub>   | Reverse Current                      |            | -    | -    | 100  | μA    | V <sub>R</sub> = 3 V   |
| <b>Output Photologic® Sensor</b>   |                                      |            |      |      |      |       |                        |
| V <sub>CC</sub>  | Operating DC Supply Voltage          |            | 4.5  | -    | 16   | V     |                        |
| I <sub>F(+)</sub>  | LED Positive-Going Threshold Current | OPB615-618 | 0.1  | 0.55 | 3    | mA    | V <sub>CC</sub> = 5 V  |
|  |                                      | OPB625-628 | 0.1  | 0.6  | 3    |       |                        |
|  |                                      | OPB665-668 | 0.1  | 1.6  | 10   |       |                        |
| I <sub>F(+)</sub> /I <sub>F(-)</sub>                                       | Hysteresis                           |            | 1.05 | 1.20 | 1.90 |       | V <sub>CC</sub> = 5 V  |

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| Electrical Characteristics (T <sub>A</sub> = 25° C unless otherwise noted) |  |  |                          |     |     |       |  |
|--|--|--|--------------------------|-----|-----|-------|--|
| SYMBOL   | PARAMETER  |  | MIN                      | TYP | MAX | UNITS | TEST CONDITIONS  |
| Output Photologic® Sensor  |  |  |                          |     |     |       |  |
| I <sub>CCH</sub>   | High Level Supply Current:<br>Buffer, 10k Pull-up    |  | -                        | 5   | 12  | mA    | NO LOAD on Output <sup>(3)</sup>                                   |
|  | Buffer, Open-Collector                               |  | -                        | 5   | 12  |       |  |
| I <sub>CCH</sub>   | Inverted, 10k Pull-up                                |  | -                        | 4   | 12  | mA    | NO LOAD on Output<br>I <sub>F</sub> = 0 mA                         |
|  | Inverted, Open-Collector                             |  | -                        | 4   | 12  |       |  |
| I <sub>CCL</sub>   | Low Level Supply Current:<br>Buffer, 10k Pull-up     |  | -                        | 5.5 | 12  | mA    | NO LOAD on Output<br>I <sub>F</sub> = 0 mA                         |
|  | Buffer, Open-Collector                               |  | -                        | 4.0 | 12  |       |  |
| I <sub>CCL</sub>   | Inverted, 10k Pull-up                                |  | -                        | 6.5 | 12  | mA    | NO LOAD on Output <sup>(3)</sup>                                   |
|  | Inverted, Open-Collector                             |  | -                        | 5.0 | 12  |       |  |
| V <sub>OH</sub>  | High Level Output Voltage:<br>Buffer, 10k Pull-up    |  | V <sub>CC</sub> -<br>1.5 | -   | -   | V     | I <sub>OH</sub> = 100 μA <sup>(3)</sup>                            |
|  | Buffer, Open-Collector                               |  | -                        | -   | -   |       |  |
| V <sub>OH</sub>  | Inverter, 10k Pull-up                                |  | V <sub>CC</sub> -<br>1.5 | -   | -   | V     | I <sub>OH</sub> = 100 μA <sup>(1)</sup><br>I <sub>F</sub> = 0 mA   |
|  | Inverter, Open-Collector                             |  | -                        | -   | -   |       |  |
| I <sub>OH</sub>  | High Level Output Voltage:<br>Buffer, Open-Collector |  | -                        | -   | 100 | μA    | V <sub>OH</sub> = 30 V <sup>(3)</sup>                              |
|  | Inverter, Open-Collector                             |  | -                        | -   | 100 |       |  |
| V <sub>OL</sub>  | Low Level Output Voltage:<br>Buffer, 10k Pull-up     |  | -                        | -   | 0.4 | V     | I <sub>OL</sub> = 16 mA, V <sub>CC</sub> = 4.5 V <sup>(3)(1)</sup> |
|  | Buffer, Open-Collector                               |  | -                        | -   | 0.4 |       |  |
| V <sub>OL</sub>  | Inverter, 10k Pull-up                                |  | -                        | -   | 0.4 | V     | I <sub>OL</sub> = 16 mA, I <sub>F</sub> = 0 mA                     |
|  | Inverter, Open-Collector                             |  | -                        | -   | 0.4 |       |  |
| t <sub>r</sub> , t <sub>f</sub>  | Output Rise Time, Output Fall Time                   |  |                          | 30  |     | ns    | f = 10 kHz,<br>R <sub>L</sub> = 300 Ω, DC = 50% <sup>(3)</sup>     |
| t <sub>PLH</sub>   | Propagation Delay, Low-High<br>Buffer, 10k Pull-up   |  |                          | 0.6 |     | μs    |  |
|  | Buffer, Open-collector                               |  |                          |     |     |       |  |
| t <sub>PLH</sub>   | Inverter, 10k Pull-up                                |  |                          | 3.0 |     | μs    |  |
|  | Inverter, Open-Collector                             |  |                          |     |     |       |  |
| t <sub>PHL</sub>   | Propagation Delay, High-Low<br>Buffer, 10k Pull-up   |  |                          | 3.0 |     | μs    |  |
|  | Buffer, Open-collector                               |  |                          |     |     |       |  |
| t <sub>PHL</sub>   | Inverter, 10k Pull-up                                |  |                          | 0.6 |     | μs    |  |
|  | Inverter, Open-Collector                             |  |                          |     |     |       |  |
| Data Rate  |  |  |                          | 100 |     | kHz   | R <sub>L</sub> = 300 Ω, DC = 50% <sup>(4)</sup>                    |

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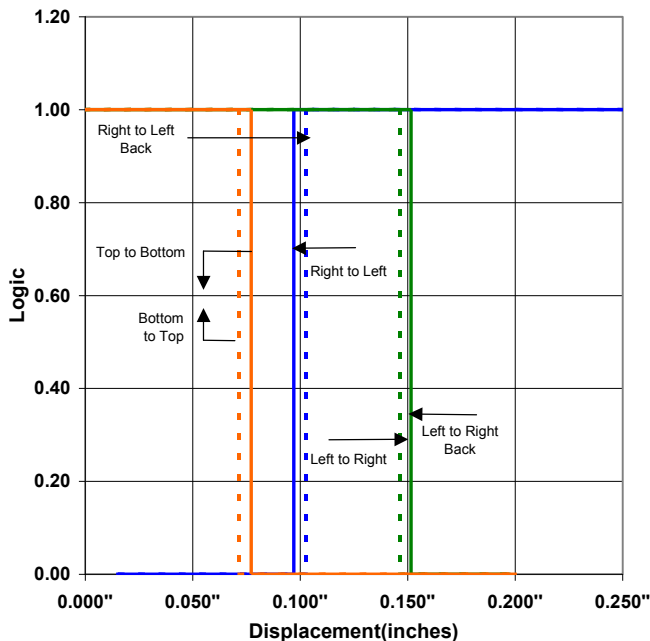


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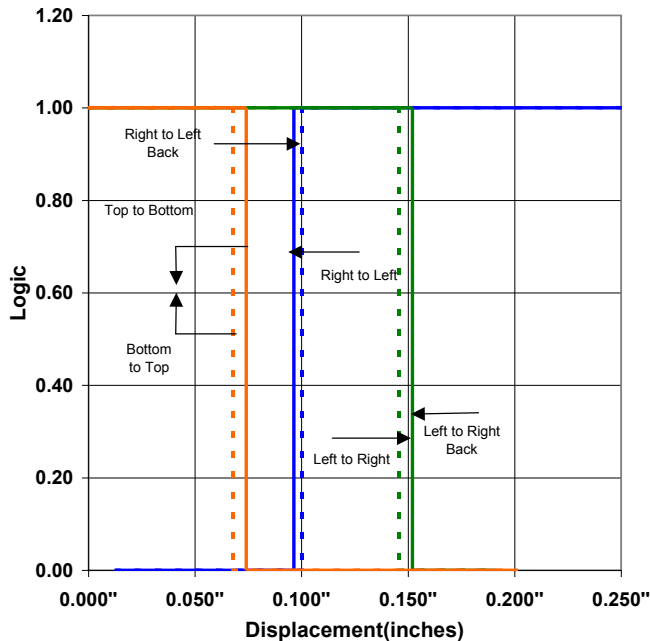
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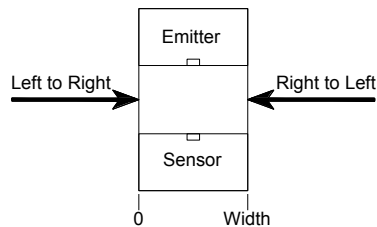
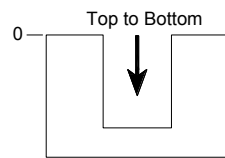
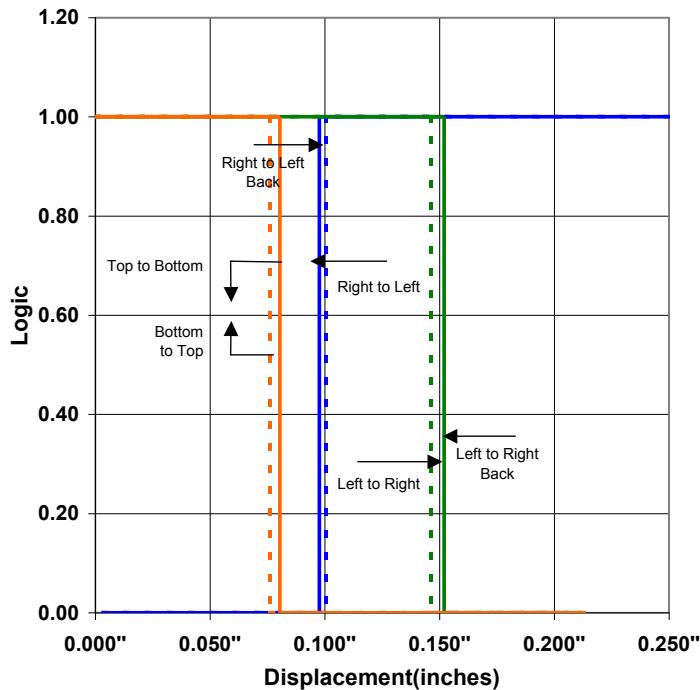
**OPB615 - Flag next to Emitter**



**OPB615 - Flag next to Sensor**



**OPB615 - Flag in Middle of Slot**



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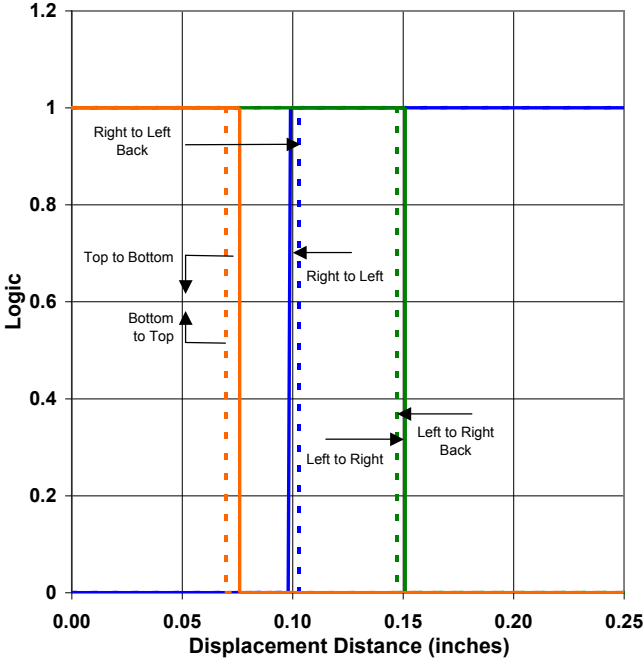


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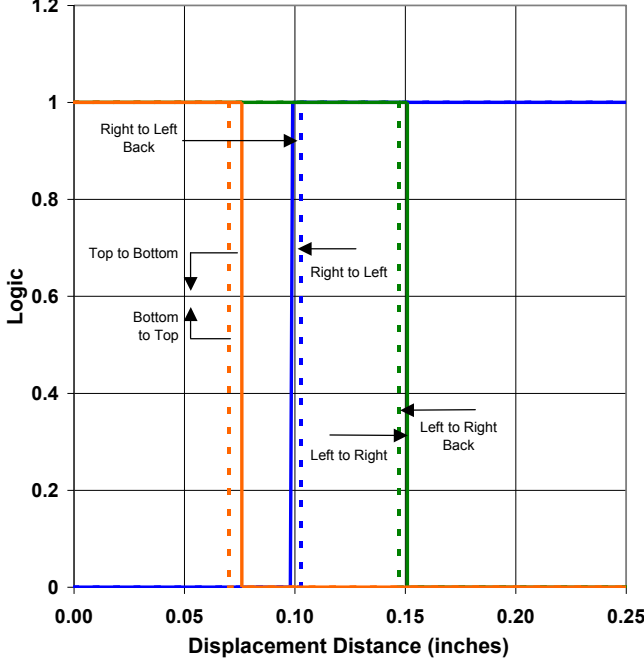
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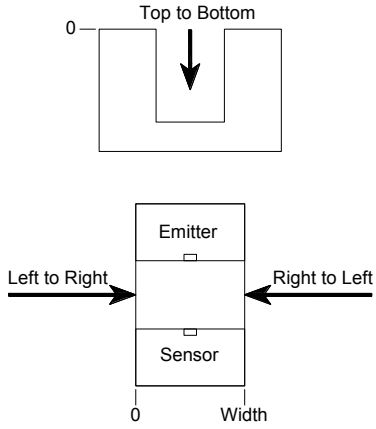
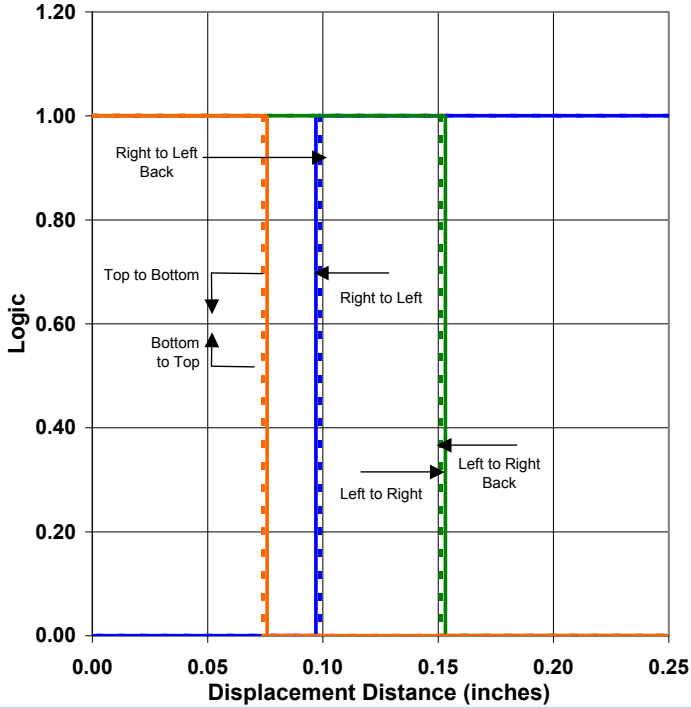
**OPB625 - Flag Next to Emitter**



**OPB625 - Flag Next to Sensor**



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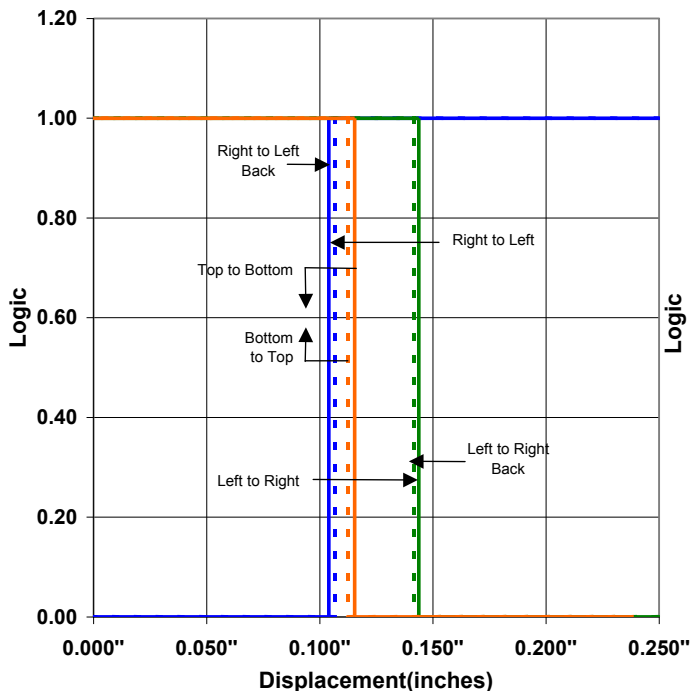


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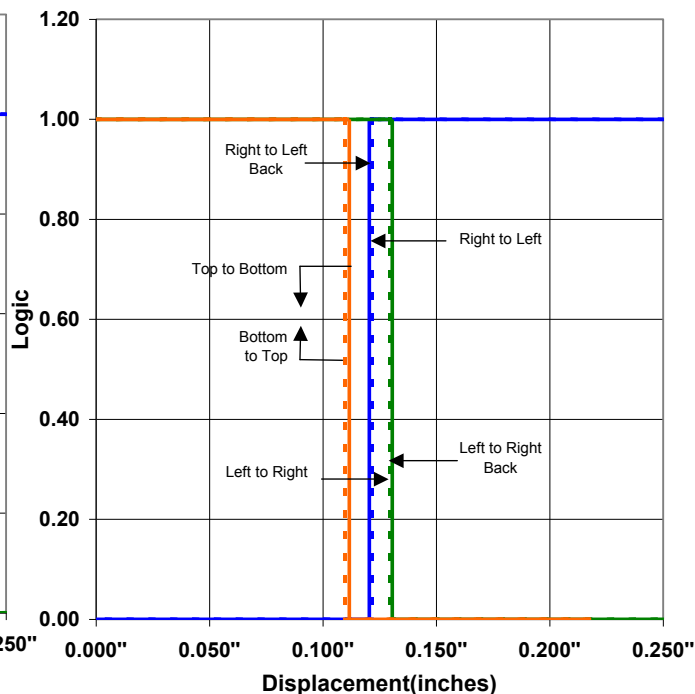
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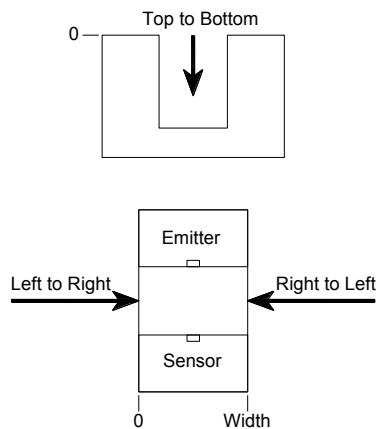
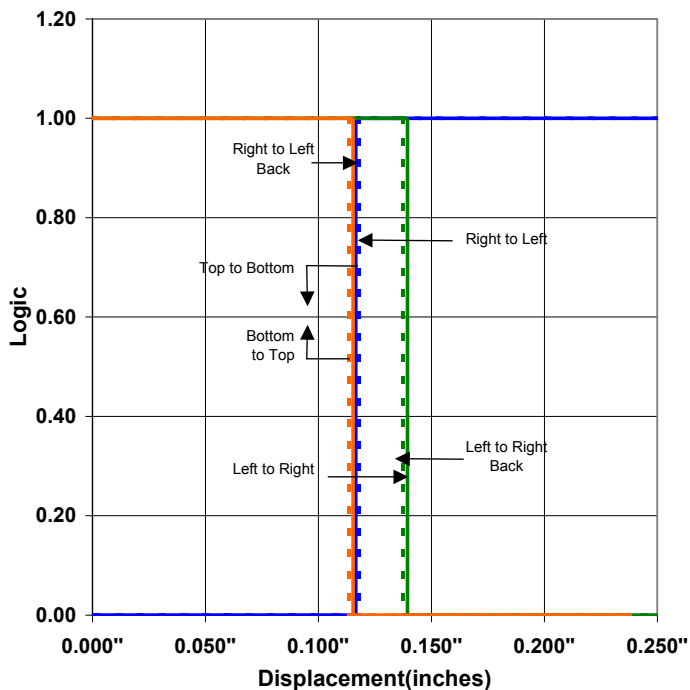
**OPB665 - Flag next to Emitter**



**OPB665 - Flag next to Sensor**



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