# Photologic® Slotted Optical Switch

## OPB615, OPB616, OPB617, OPB618 Series

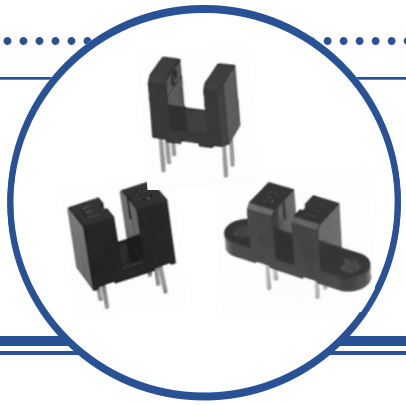
## OPB625, OPB626, OPB627, OPB628 Series

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

TT electronics
OPTEK Technology

### 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. **OPB665** 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/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

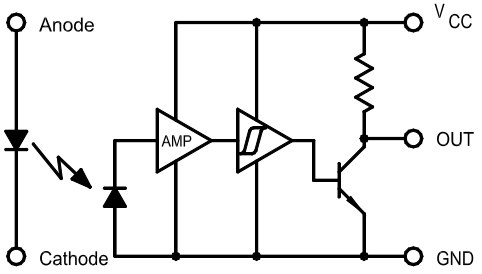
**Ordering Information**

| 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 | T | 10K Pull-up | | | |
| OPB666T | | Open Collector | | | |
| OPB667T | | Inv-10K Pull-up | | | |
| OPB668T | | Inv-Open Collector | | | |

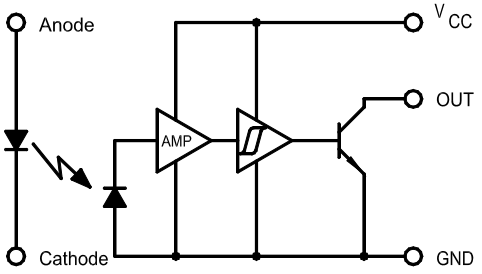
Pb
RoHS

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

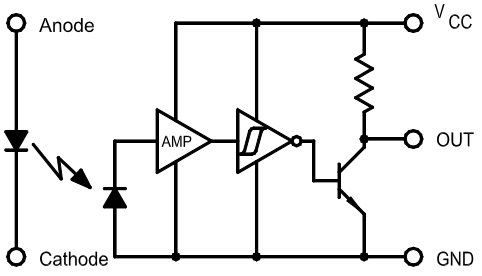
**OPB615/625/665N Buffered 10K Pull-Up**



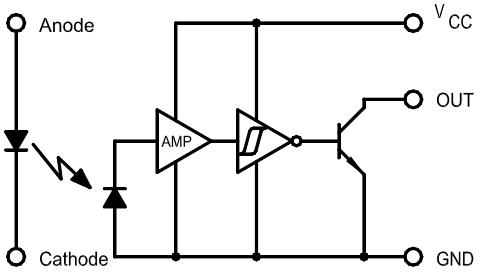

**OPB 616/626/666N Buffered Open-Collector**



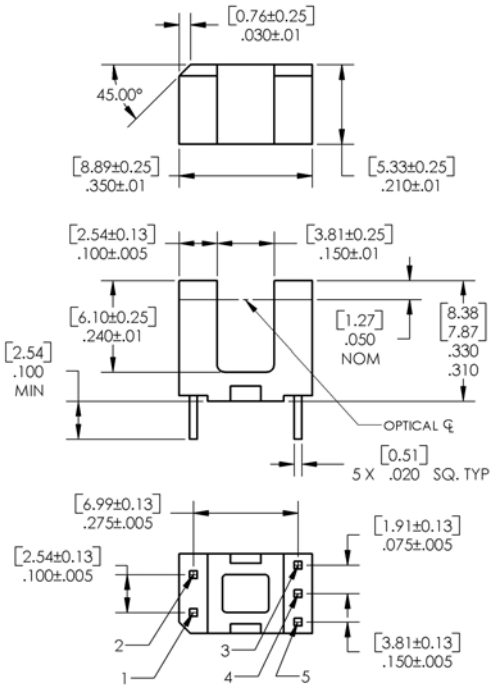

**OPB617/627/667N Inverted 10K Pull-Up**




**OPB618/628/668N Inverted Open-Collector**




### 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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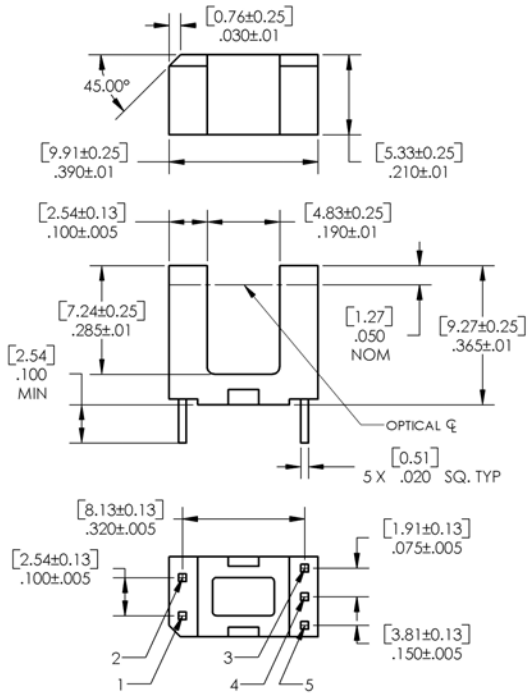
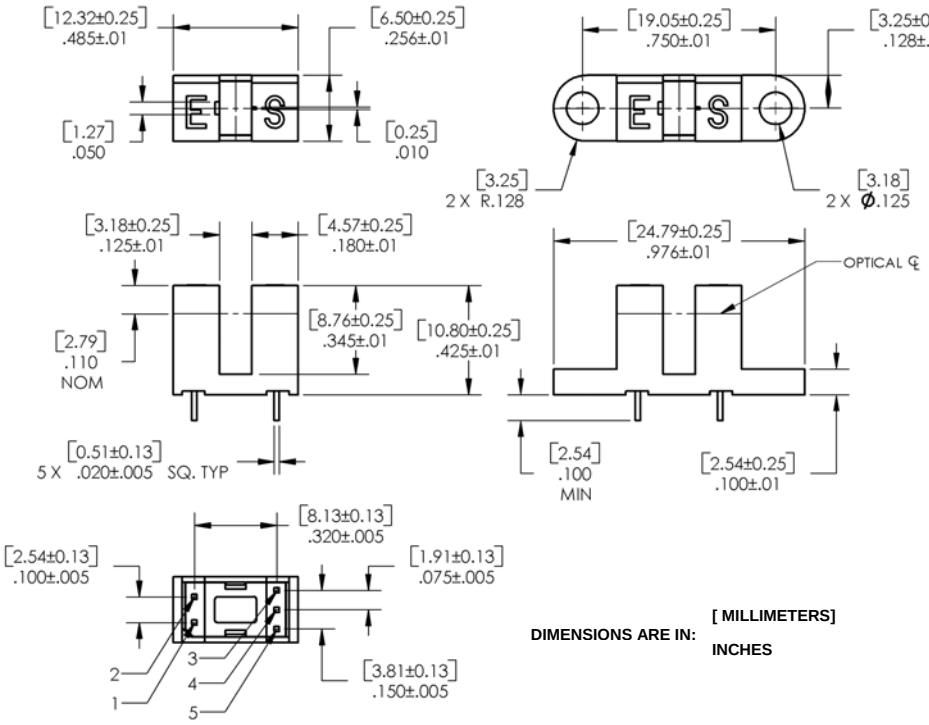
### OPB625, OPB626, OPB627, OPB628

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




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




**DIMENSIONS ARE IN:** **[ MILLIMETERS]**
**INCHES**

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

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### Absolute Maximum Ratings ($T_A$=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)(1) | 260° C |

**Input Diode**

| | |
|---|---|
| Forward DC Current | 50 mA |
| Peak Forward Current (1 µs pulse width, 300 pps) | 3 A |
| Reverse DC Voltage | 3 V |
| Power Dissipation(2) | 100 mW |

**Output Photologic®**

| | |
|---|---|
| Supply Voltage, $V_{CC}$ | 18 V |
| Duration of Output Short to $V_{CC}$ | 1 second |
| Voltage at Output(5) | Vcc |
| Low Level Output Current (sinking) | 16 mA |
| Power Dissipation(3) | 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 $I_F$ = 0 mA.
(5) Open Collector devices = 30 volts

### Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

| SYMBOL | PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|---|
| **Input Diode** | | | | | | | |
| $V_F$ | Forward Voltage | | - | - | 1.6 | V | $I_F$ = 10 mA |
| $I_R$ | Reverse Current | | - | - | 100 | µA | $V_R$ = 3 V |
| **Output Photologic® Sensor** | | | | | | | |
| $V_{CC}$ | Operating DC Supply Voltage | | 4.5 | - | 16 | V | |
| $I_{F(+)}$ | LED Positive-Going Threshold Current | OPB615-618<br>OPB625-628<br>OPB665-668 | 0.1<br>0.1<br>0.1 | 0.55<br>0.6<br>1.6 | 3<br>3<br>10 | mA | $V_{CC}$ = 5 V |
| $I_{F(+)}/I_{F(-)}$ | Hysteresis | | 1.05 | 1.20 | 1.90 | | $V_{CC}$ = 5 V |




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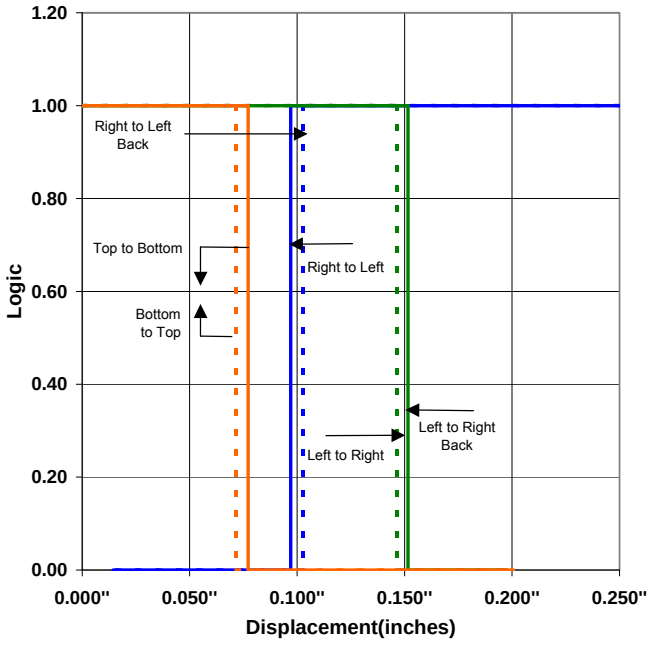
### Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

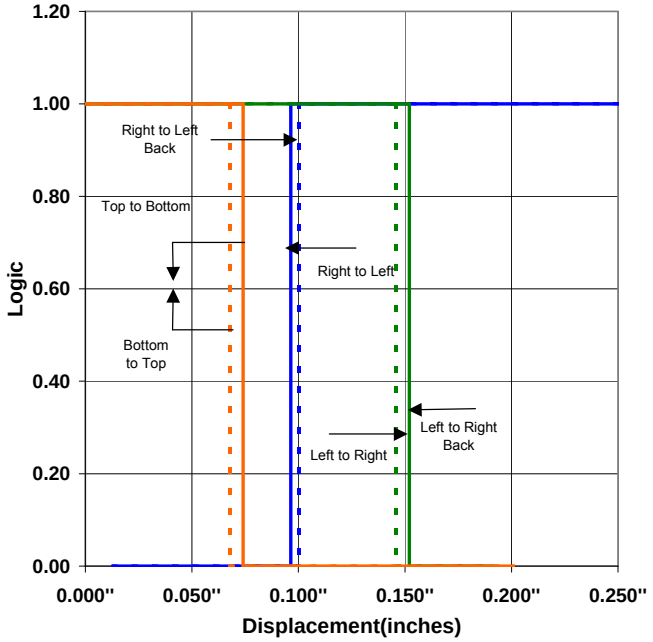
| SYMBOL | PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|---|
| **Output Photologic® Sensor** | | | | | | | |
| $I_{CCH}$ | High Level Supply Current:<br>Buffer, 10k Pull-up<br>Buffer, Open-Collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | <br>-<br>- | <br>5<br>5 | <br>12<br>12 | mA | NO LOAD on Output(3) |
| | Inverted, 10k Pull-up<br>Inverted, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | -<br>- | 4<br>4 | 12<br>12 | mA | NO LOAD on Output<br>$I_F$ = 0 mA |
| $I_{CCL}$ | Low Level Supply Current:<br>Buffer, 10k Pull-up<br>Buffer, Open-Collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | <br>-<br>- | <br>5.5<br>4.0 | <br>12<br>12 | mA | NO LOAD on Output<br>$I_F$ = 0 mA |
| | Inverted, 10k Pull-up<br>Inverted, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | -<br>- | 6.5<br>5.0 | 12<br>12 | mA | NO LOAD on Output(3) |
| $V_{OH}$ | High Level Output Voltage:<br>Buffer, 10k Pull-up<br>Buffer, Open-Collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | <br>$V_{CC}$-1.5 | <br>-<br>- | <br>-<br>- | V | $I_{OH}$ = 100 µA(3) |
| | Inverter, 10k Pull-up<br>Inverter, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | $V_{CC}$-1.5 | -<br>- | -<br>- | V | $I_{OH}$ = 100 µA(1)<br>$I_F$ = 0 mA |
| $I_{OH}$ | High Level Output Voltage:<br>Buffer, Open-Collector | <br>OPB616, 626, 666 | - | - | 100 | µA | $V_{OH}$ = 30 V(3) |
| | Inverter, Open-Collector | OPB618, 628, 668 | - | - | 100 | µA | $I_F$ = 0 mA, $V_{OH}$ = 30 V(1) |
| $V_{OL}$ | Low Level Output Voltage:<br>Buffer, 10k Pull-up<br>Buffer, Open-Collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | - | - | 0.4 | V | $I_{OL}$ = 16 mA, Vcc = 4.5 V(3)(1) |
| | Inverter, 10k Pull-up<br>Inverter, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | - | - | 0.4 | V | $I_{OL}$ = 16 mA, $I_F$ = 0 mA |
| $t_r$, $t_f$ | Output Rise Time, Output Fall Time | | | 30 | | ns | f = 10 kHz,<br>$R_L$ = 300 Ω, DC = 50%(3) |
| $t_{PLH}$ | Propagation Delay, Low-High<br>Buffer, 10k Pull-up<br>Buffer, Open-collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | | 0.6 | | µs | |
| | Inverter, 10k Pull-up<br>Inverter, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | | 3.0 | | µs | |
| $t_{PHL}$ | Propagation Delay, High-Low<br>Buffer, 10k Pull-up<br>Buffer, Open-collector | <br>OPB615, 625, 665<br>OPB616, 626, 666 | | 3.0 | | µs | |
| | Inverter, 10k Pull-up<br>Inverter, Open-Collector | OPB617, 627, 667<br>OPB618, 628, 668 | | 0.6 | | µs | |
| Data Rate | | | - | 100 | - | kHz | $R_L$ = 300 Ω, DC = 50%(4) |

Notes:
(1) Normal application would be with light source blocked, simulated by $I_F$ = 0 mA.
(2) $V_{OH}$ = $V_{CC}$-1.5V for $V_{CC}$ = 4.5 to 16 Volts.
(3) $I_F$ = 5 mA OPB615 to OPB628; $I_F$ = 10 mA OPB665 to OPB668
(4) $I_F$ = 0 to 5 mA OPB615 to OPB628; $I_F$ = 0 to 10 mA OPB665 to OPB668

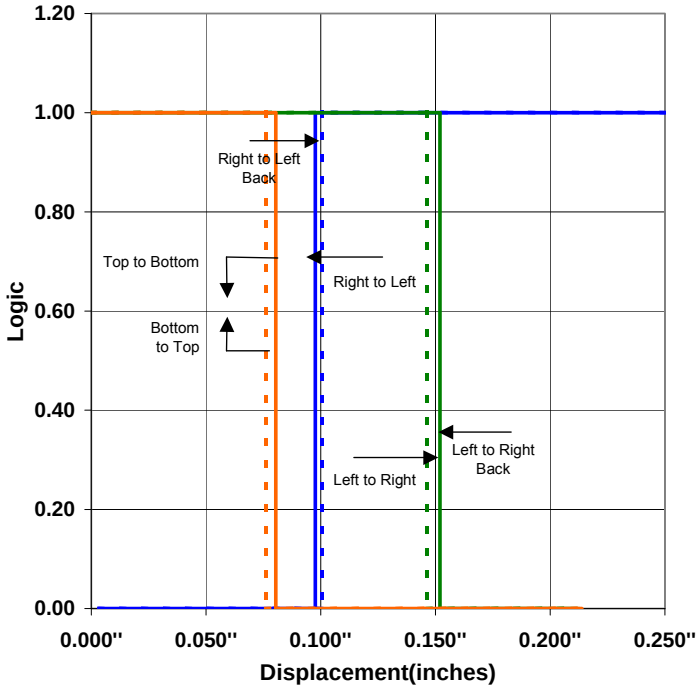
### OPB615 - Flag next to Emitter

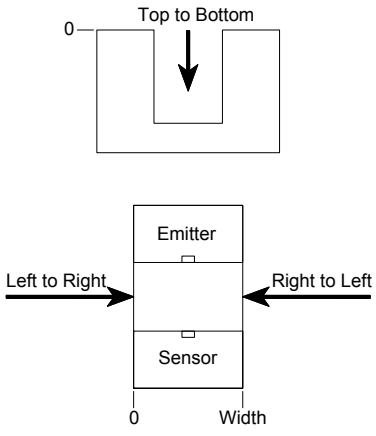



### OPB615 - Flag next to Sensor




### OPB615 - Flag in Middle of Slot







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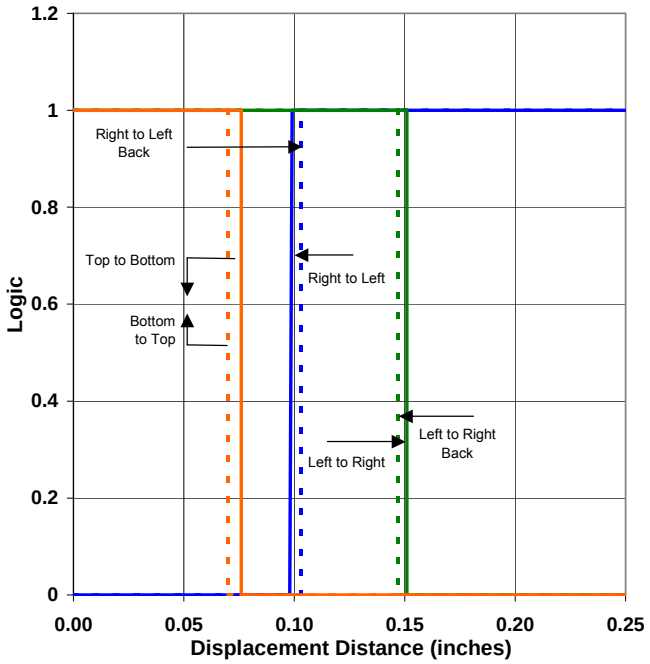
### OPB625 - Flag Next to Emitter

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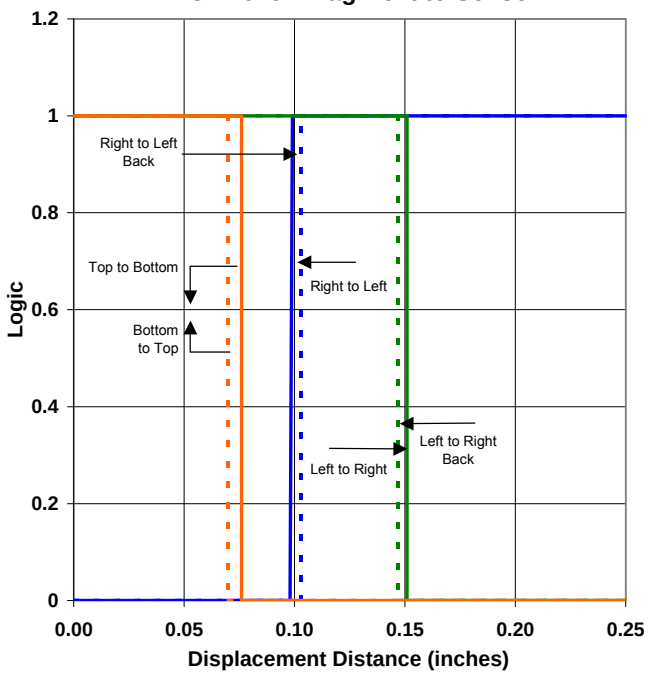
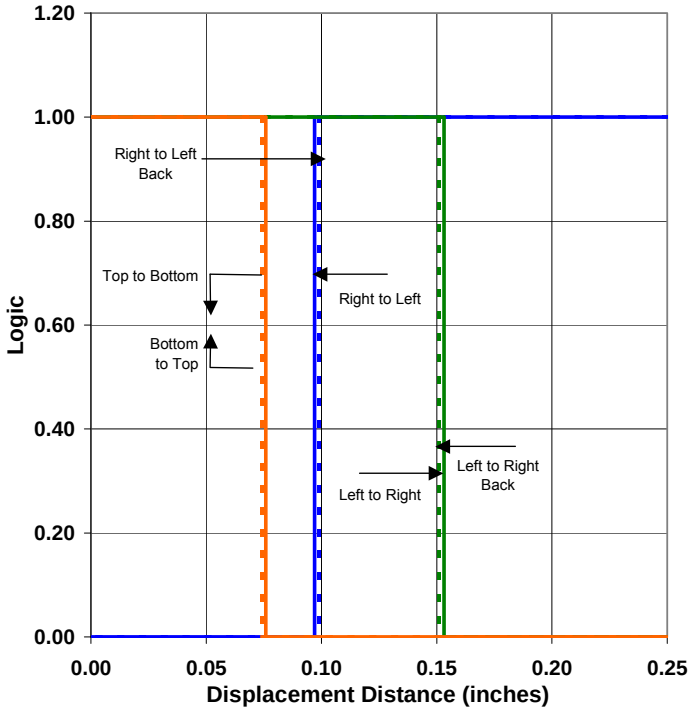
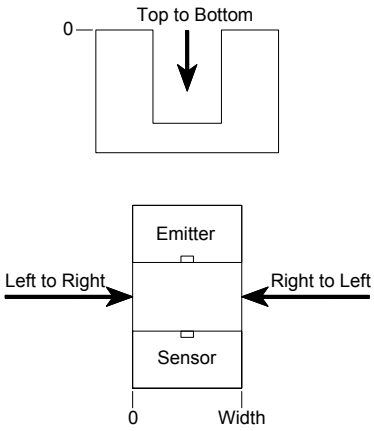



### OPB625 - Flag in Middle of Slot

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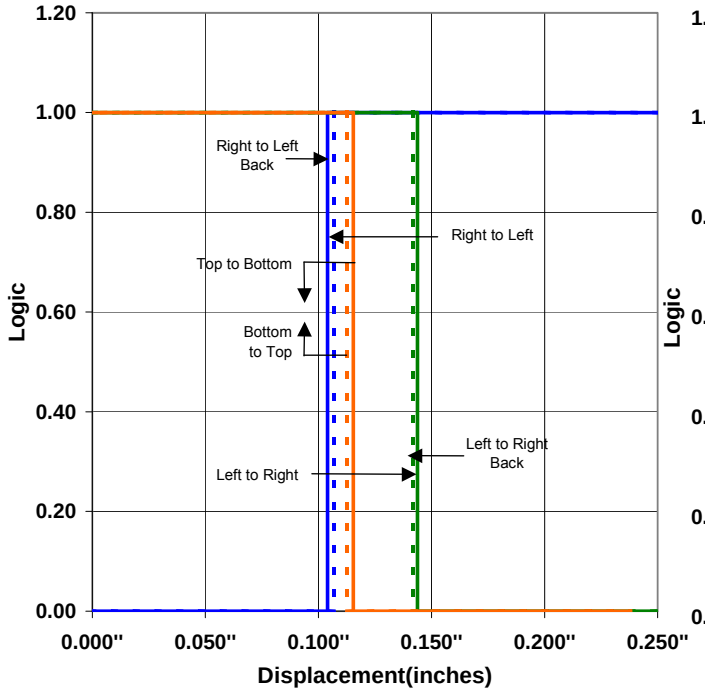
### OPB665 - Flag next to Emitter

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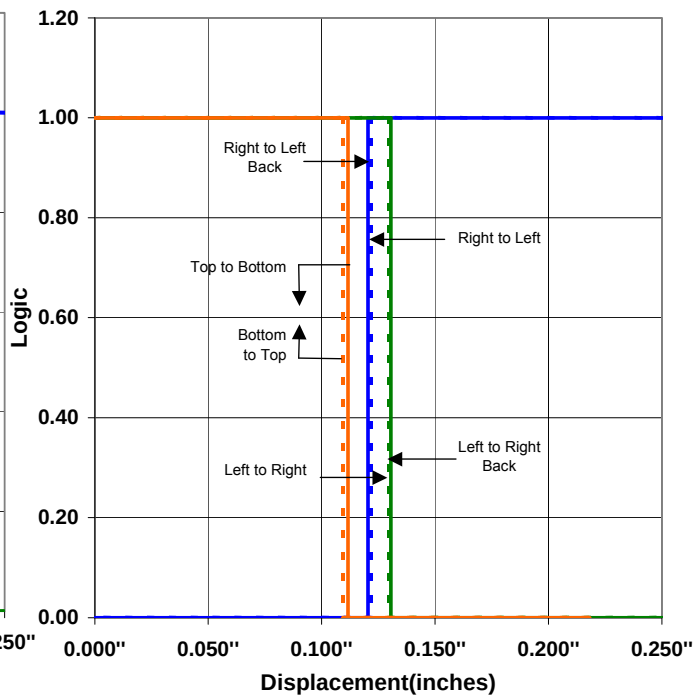


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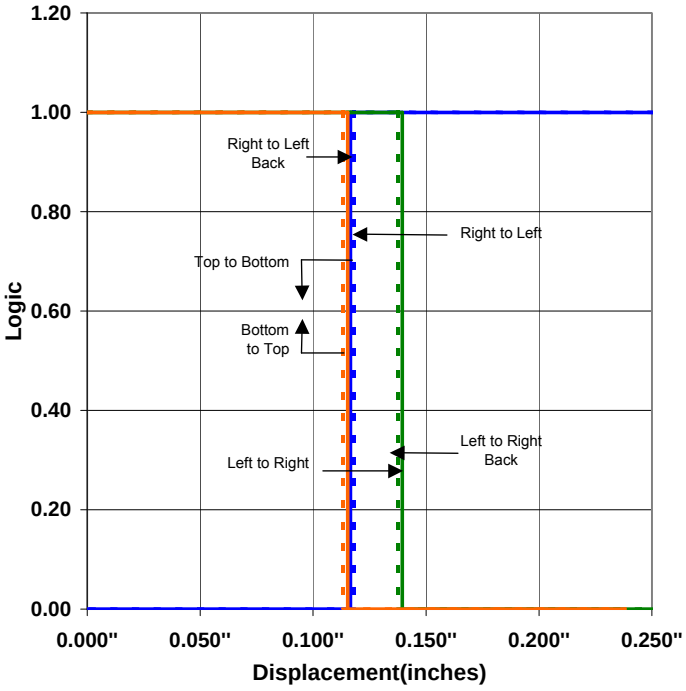


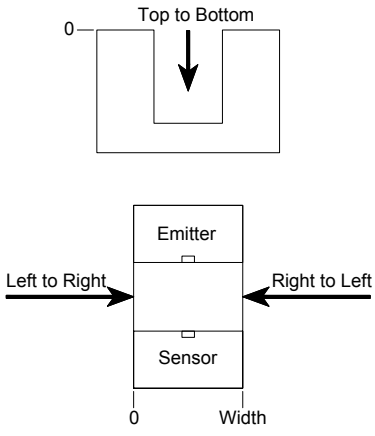





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