

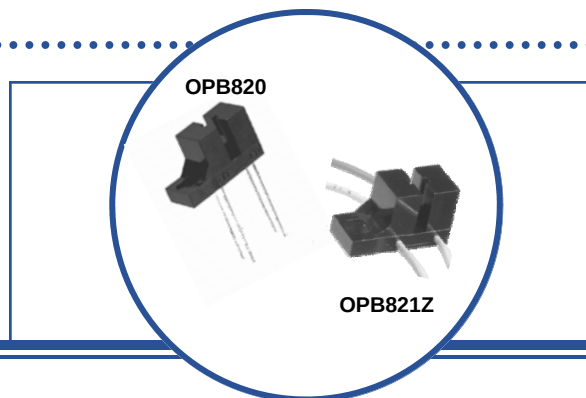
# Slotted Optical Switch

## OPB820, OPB821Z, OPB821S\_\_Z



### Features:

- Non-contact switching
- Four standard aperture sizes for high resolution
- Low profile
- 0.080" (2.03 mm) wide, 0.250" (8.89 mm) deep slot
- Choice of PCBoard or wire mountings



### Description:

Each **OPB820** and **OPB821Z** device consists of an infrared emitting diode (LED, 890 nm center wavelength) and a NPN silicon phototransistor mounted in a low-cost black plastic housing on opposite sides of an 0.080" (2.03 mm) wide slot. Each device in this series has a 0.040" (1.02 mm) wide aperture located in front of the infrared diode. Phototransistor switching occurs when an opaque object passes through the slot.

Devices are offered with 0.275" (6.96 mm) lead spacing for PCBoard mounting (**OPB820**) or 24" (609 mm) 26 AWG wire leads (**OPB821Z**).

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

### Applications:

- Non-contact object sensing
- Assembly line automation
- Machine automation
- Equipment safety
- Machine safety

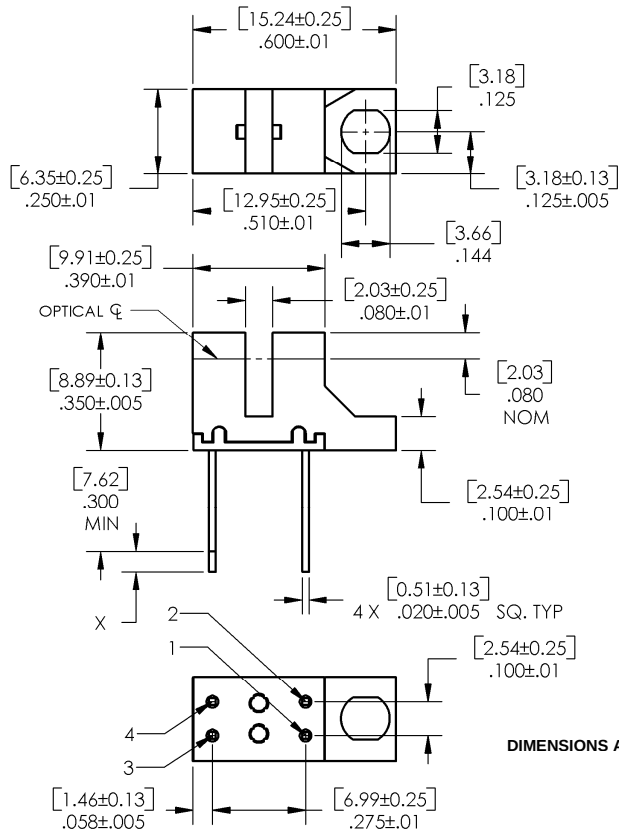
| Ordering Information |                     |            |                    |                         |                       |
|----------------------|---------------------|------------|--------------------|-------------------------|-----------------------|
| Part Number          | LED Peak Wavelength | Sensor     | Slot Width / Depth | Aperture Emitter/Sensor | Lead Length / Spacing |
| OPB820               | 890 nm              | Transistor | 0.080" / 0.255"    | 0.04"/ 0.04"            | 0.425" / 0.275"       |
| OPB820S10            |                     |            |                    | 0.04"/ 0.01"            |                       |
| OPB820S5             |                     |            |                    | 0.04"/ 0.005"           |                       |
| OPB820S3             |                     |            |                    | 0.04"/ 0.003"           |                       |
| OPB821Z              |                     |            |                    | 0.040"/ 0.040"          | 24"/26 AWG Wire       |
| OPB821S10Z           |                     |            |                    | 0.040"/ 0.010"          |                       |
| OPB821S5Z            |                     |            |                    | 0.040"/ 0.005"          |                       |
| OPB821S3Z            |                     |            |                    | 0.040"/ 0.003"          |                       |



RoHS

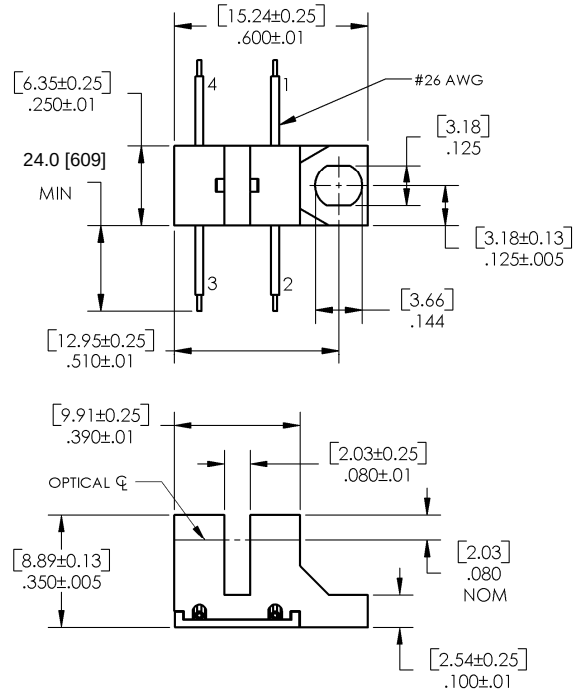
OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Package Drawing  
OPB820



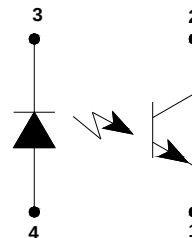
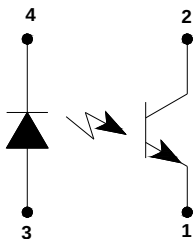
DIMENSIONS ARE IN:  
[ MILLIMETERS]  
INCHES

Package Drawing  
OPB821



| Pin # | Description | Pin # | Description |
|-------|-------------|-------|-------------|
| 4     | Cathode     | 2     | Collector   |
| 3     | Anode       | 1     | Emitter     |

| Color/Pin # | Description | Color/Pin # | Description |
|-------------|-------------|-------------|-------------|
| Green-3     | Cathode     | White-2     | Collector   |
| Orange-4    | Anode       | Blue-1      | Emitter     |



**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.

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

|                                                                                                            |                |
|------------------------------------------------------------------------------------------------------------|----------------|
| Storage and Operating Temperature                                                                          | -40°C to +85°C |
| Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 seconds with soldering iron) <sup>(1)</sup> | 260°C          |
| <b>Input Diode</b>                                                                                         |                |
| Continuous Forward Current                                                                                 | 50 mA          |
| Peak Forward Current (1μs pulse width, 300 pps)                                                            | 1 A            |
| Reverse Voltage                                                                                            | 2 V            |
| Power Dissipation <sup>(2)</sup>                                                                           | 100 mW         |

**Output Phototransistor**

|                                  |        |
|----------------------------------|--------|
| Collector-Emitter Voltage        | 30 V   |
| Emitter-Collector Voltage        | 5 V    |
| Power Dissipation <sup>(2)</sup> | 100 mW |

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) For OPB820, derate linearly 1.67 mW/°C above 25°C. For OPB821Z, derate linearly 1.82 mW/°C above 25°C.
- (3) Methanol or isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
- (4) All parameters were tested using pulse technique.

**Electrical Characteristics** ( $T_A = 25^{\circ}\text{C}$  unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

**Input Diode** (See OP245 for additional information)

|       |                 |   |   |     |    |                       |
|-------|-----------------|---|---|-----|----|-----------------------|
| $V_F$ | Forward Voltage | - | - | 1.7 | V  | $I_F = 20 \text{ mA}$ |
| $I_R$ | Reverse Current | - | - | 100 | μA | $V_R = 2 \text{ V}$   |

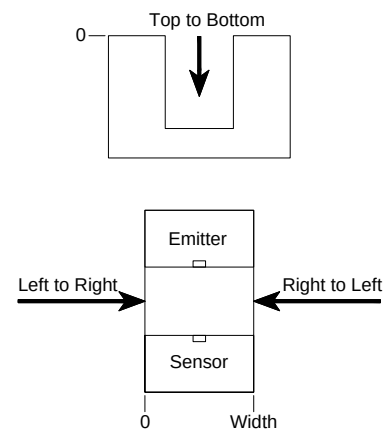
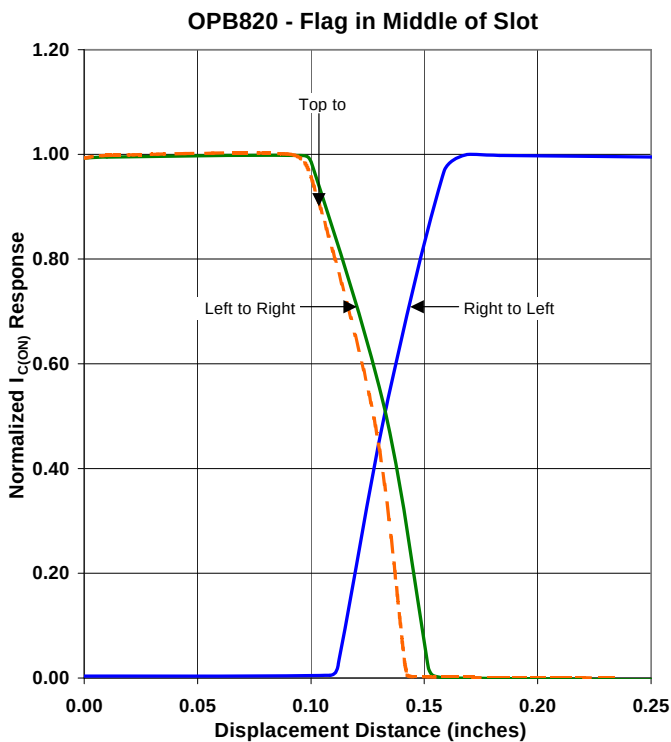
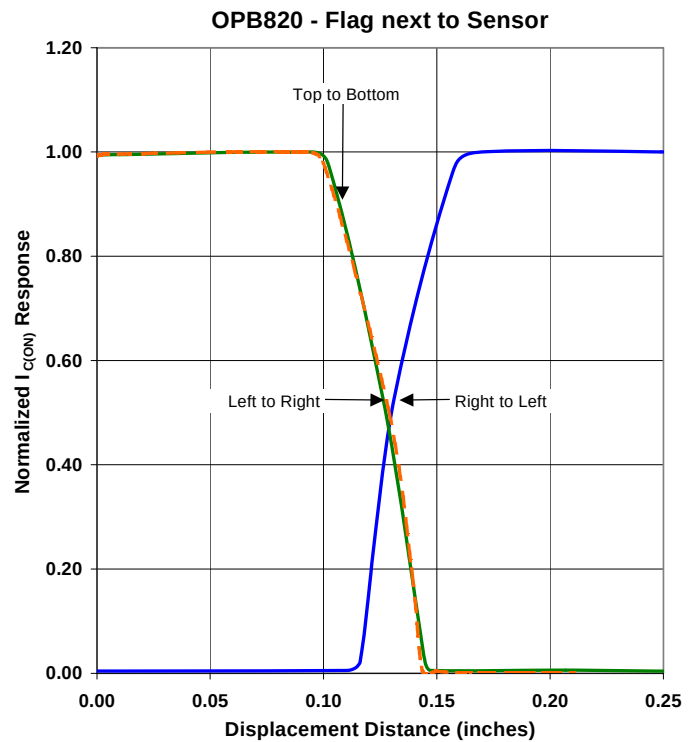
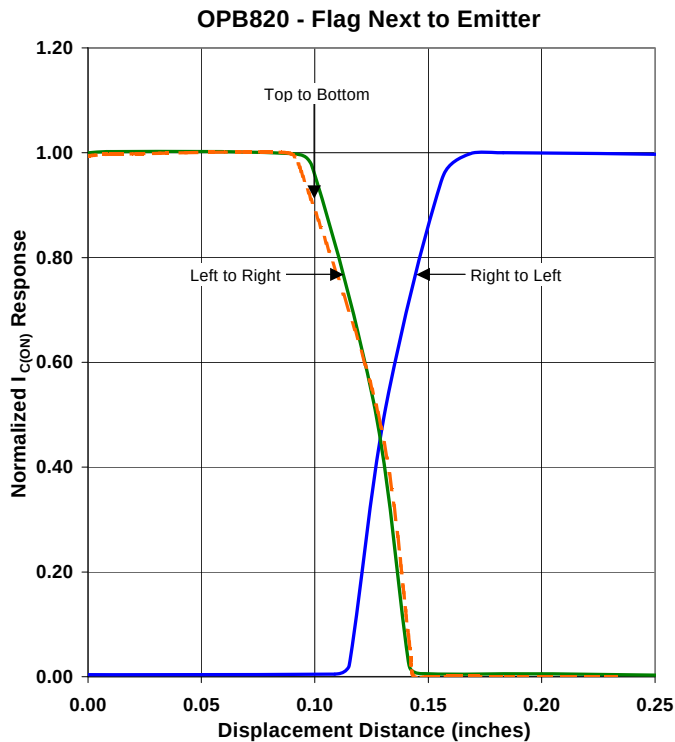
**Output Phototransistor** (See OP555 for additional information)

|               |                                     |    |   |     |    |                                           |
|---------------|-------------------------------------|----|---|-----|----|-------------------------------------------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | 30 | - | -   | V  | $I_C = 100 \text{ mA}$                    |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | 5  | - | -   | V  | $I_E = 100 \text{ μA}$                    |
| $I_{CEO}$     | Collector-Emitter Dark Current      | -  | - | 100 | nA | $V_{CE} = 10 \text{ V}, I_F = 0, I_E = 0$ |

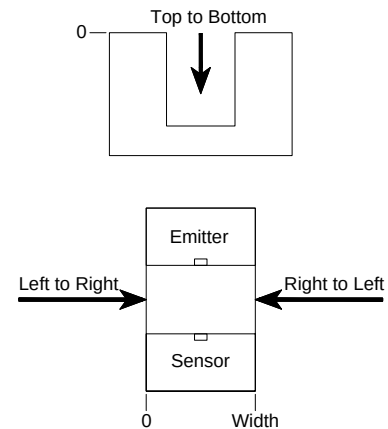
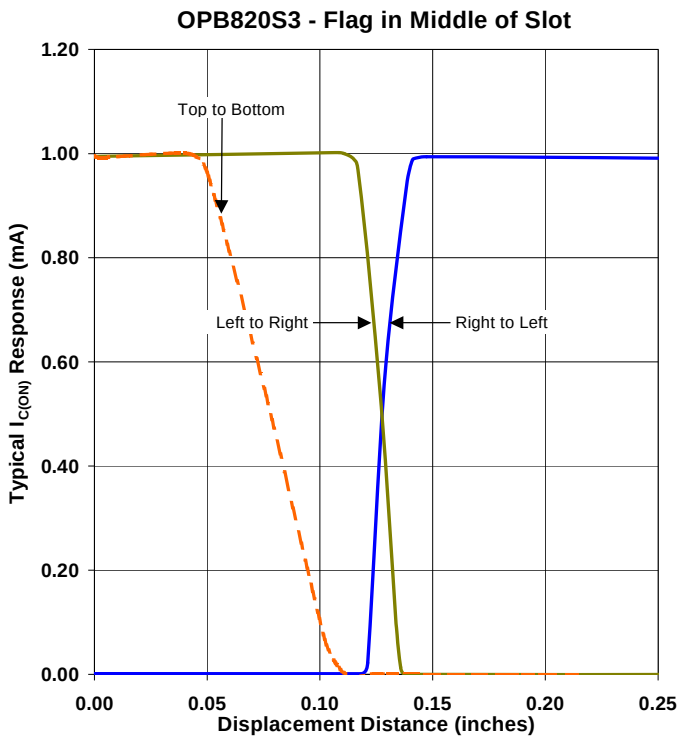
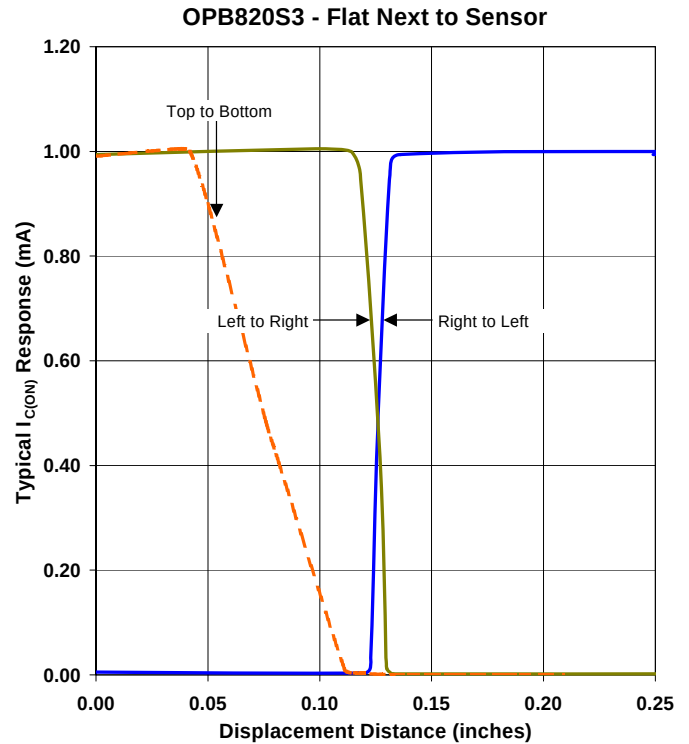
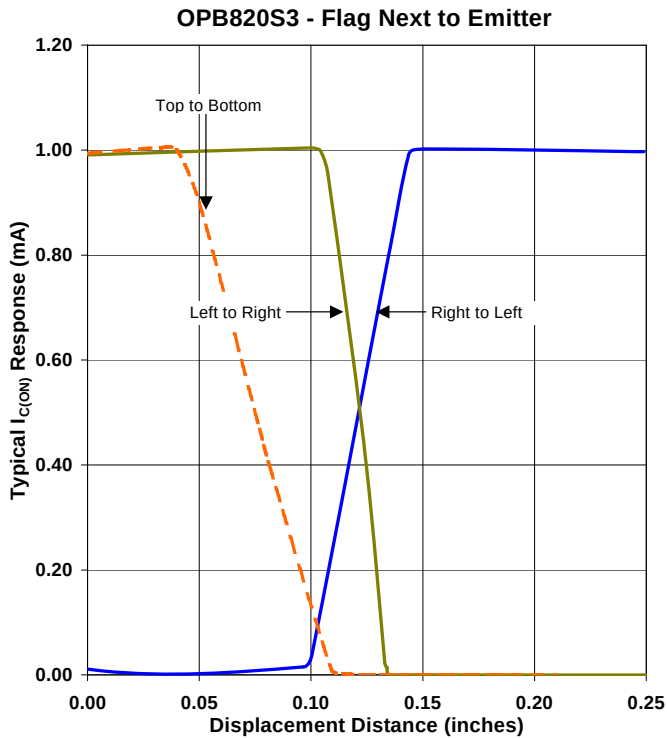
**Coupled**

|               |                                      |     |   |     |    |                                             |
|---------------|--------------------------------------|-----|---|-----|----|---------------------------------------------|
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage |     |   |     |    |                                             |
|               | OPB820, OPB821Z                      | -   | - | 0.4 | V  | $I_C = 250 \text{ μA}, I_F = 20 \text{ mA}$ |
|               | OPB820S3, OPB821S3Z                  | -   | - | 0.4 | V  | $I_C = 40 \text{ μA}, I_F = 20 \text{ mA}$  |
|               | OPB820S5, OPB821S5Z                  | -   | - | 0.4 | V  | $I_C = 150 \text{ μA}, I_F = 20 \text{ mA}$ |
|               | OPB820S10, OPB821S10Z                | -   | - | 0.4 | V  | $I_C = 250 \text{ μA}, I_F = 20 \text{ mA}$ |
| $I_{C(ON)}$   | On-State Collector Current           |     |   |     |    |                                             |
|               | OPB820, OPB821Z                      | 500 | - | -   | μA | $V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$ |
|               | OPB820S3, OPB821S3Z                  | 60  | - | -   | μA | $V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$ |
|               | OPB820S5, OPB821S5Z                  | 300 | - | -   | μA | $V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$ |
|               | OPB820S10, OPB821S10Z                | 400 | - | -   | μA | $V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$ |

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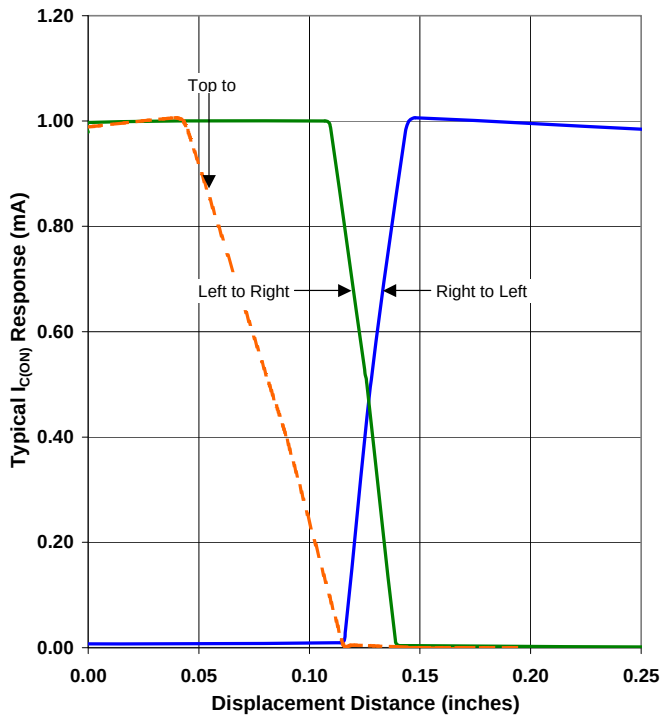


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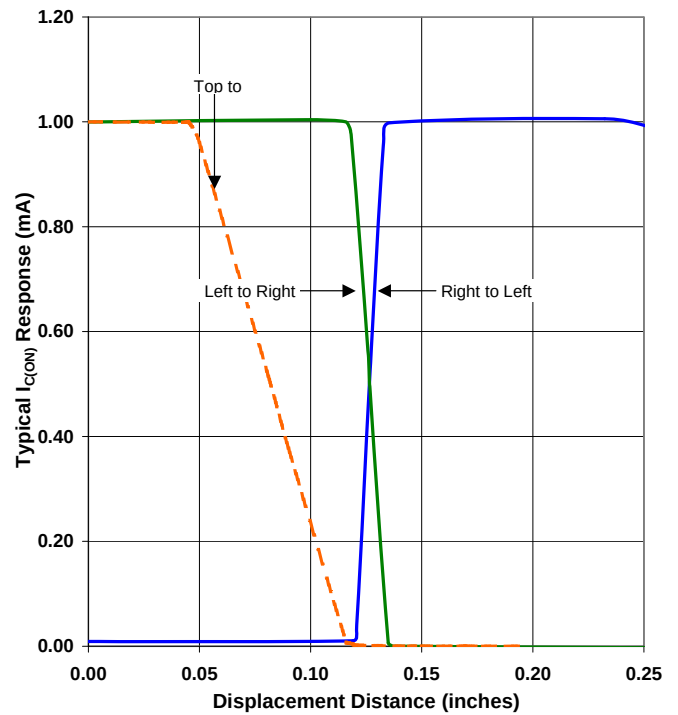


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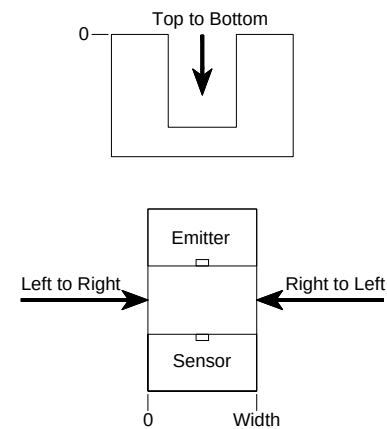
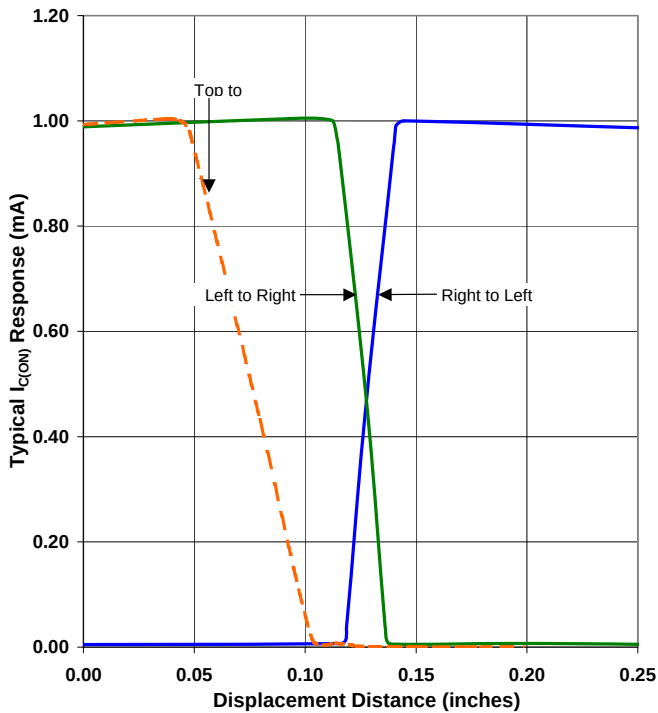
OPB820S5 - Flag Next to Emitter



OPB820S5 - Flag Next to Sensor

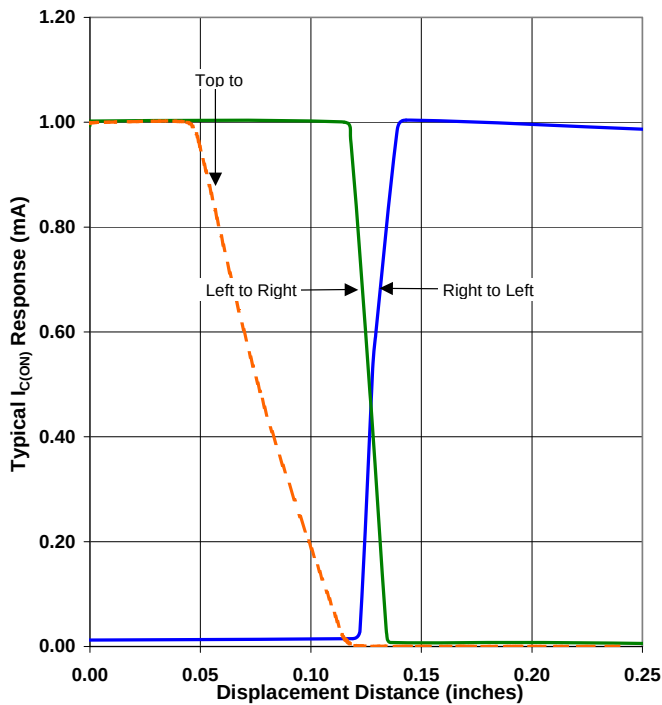


OPB820S5 - Flag in Middle Slot

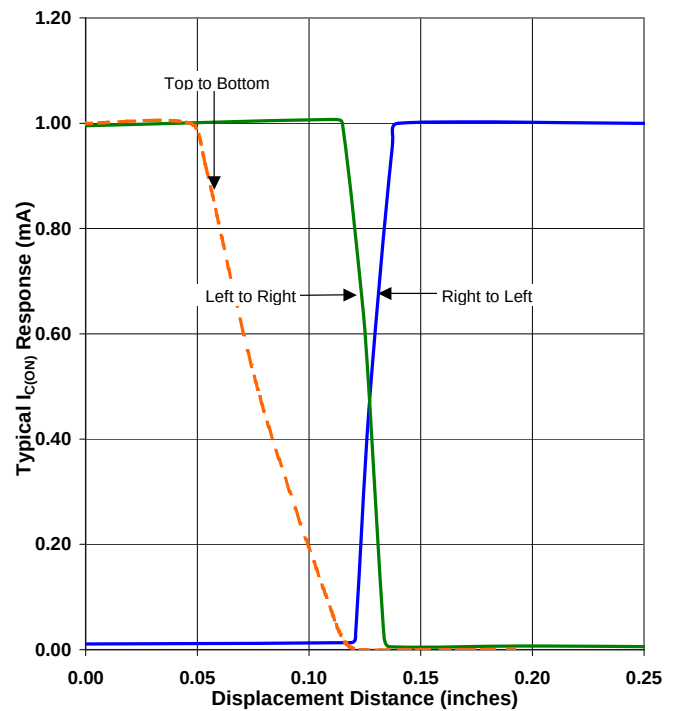


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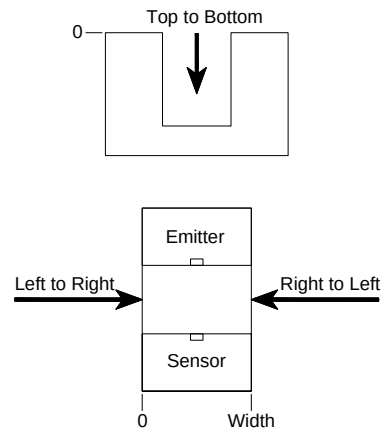
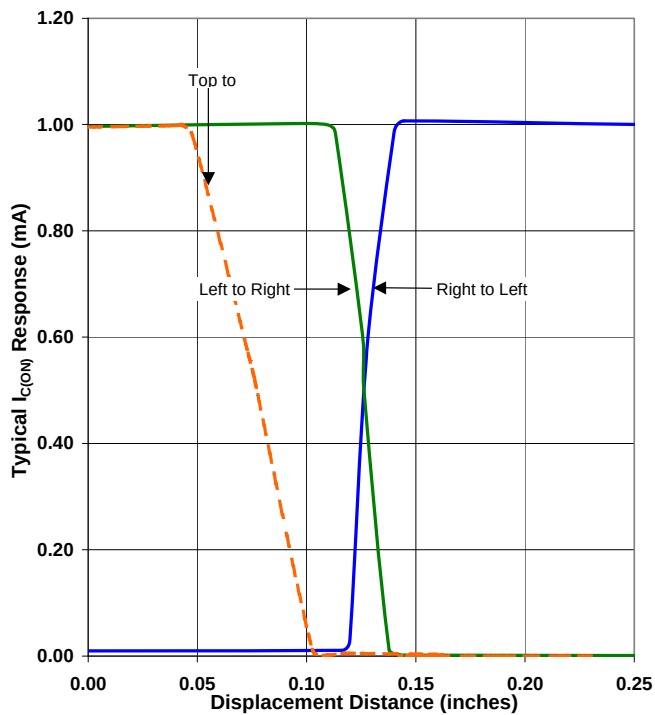
OPB820S10 - Flag Next to Emitter



OPB820S10 - Flag Next to Sensor



OPB820S10 - Flag in Middle of Slot



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