

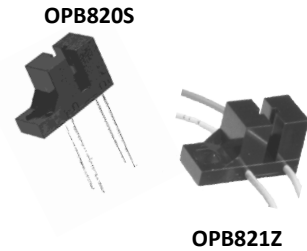
# Slotted Optical Switch

OPB820S, 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 OPB820S 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 (OPB820S) or 24" (609 mm) 26 AWG wire leads (OPB821Z).

## 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 |
| <b>OPB820</b><br><b>Obsolete</b> | 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"         |                       |

### General Note

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## Electrical Specifications

**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           |

### Input Diode

|   |        |
|---|--------|
| Continuous Forward Current                                  | 50 mA  |
| Peak Forward Current (1 $\mu\text{s}$ 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 OPB820S, 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 | $\mu\text{A}$ | $V_R = 2\text{ V}$   |

**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  | $I_E = 100\text{ }\mu\text{A}$           |
| $I_{CEO}$     | 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 | -   | - | -   | -             | -  |
|               | OPB821Z                              | -   | - | 0.4 | V             | $I_C = 250\text{ }\mu\text{A}, I_F = 20\text{ mA}$ |
|               | OPB820S3, OPB821S3Z                  | -   | - | 0.4 | V             | $I_C = 40\text{ }\mu\text{A}, I_F = 20\text{ mA}$  |
|               | OPB820S5, OPB821S5Z                  | -   | - | 0.4 | V             | $I_C = 150\text{ }\mu\text{A}, I_F = 20\text{ mA}$ |
| $I_{C(ON)}$   | On-State Collector Current           | -   | - | -   | -             | -  |
|               | OPB821Z                              | 500 | - | -   | $\mu\text{A}$ | $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$          |
|               | OPB820S3, OPB821S3Z                  | 60  | - | -   | $\mu\text{A}$ | $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$          |
|               | OPB820S5, OPB821S5Z                  | 300 | - | -   | $\mu\text{A}$ | $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$          |
|               | OPB820S10, OPB821S10Z                | 400 | - | -   | $\mu\text{A}$ | $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$          |

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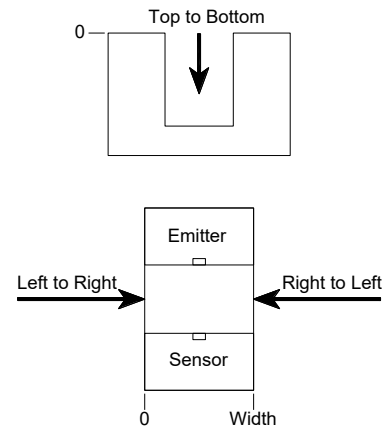
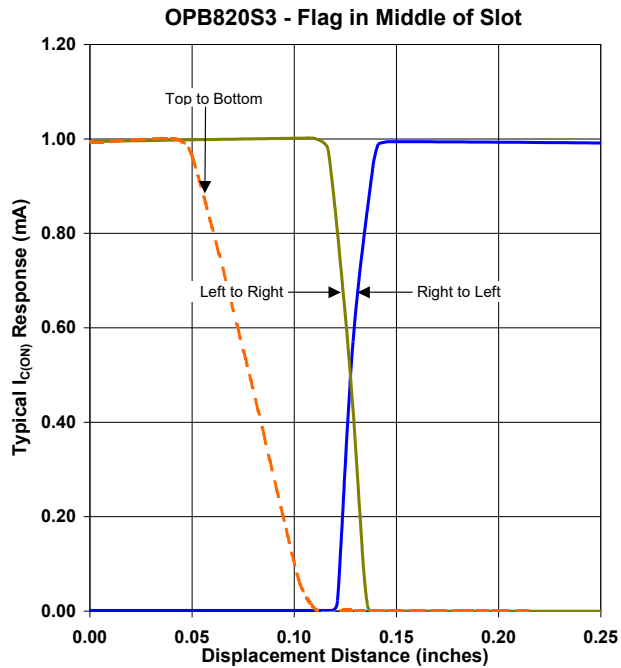
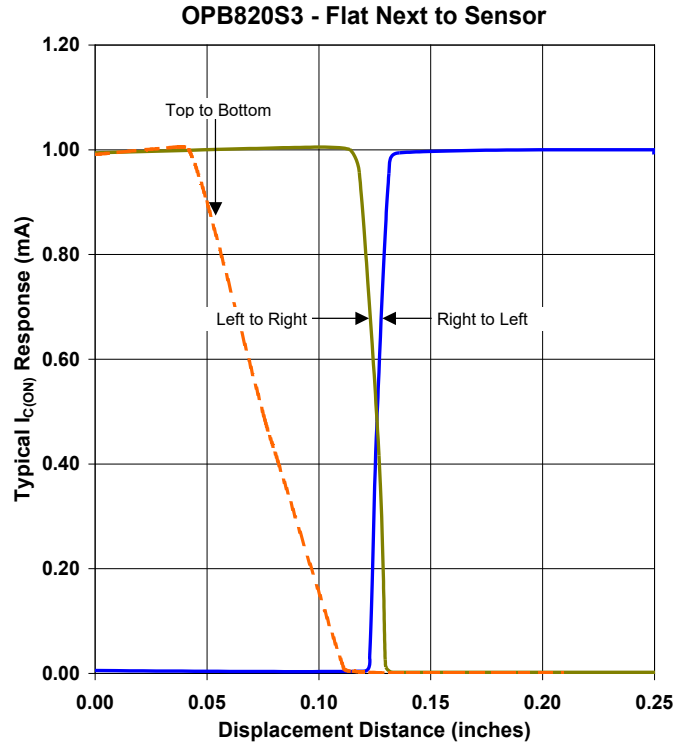
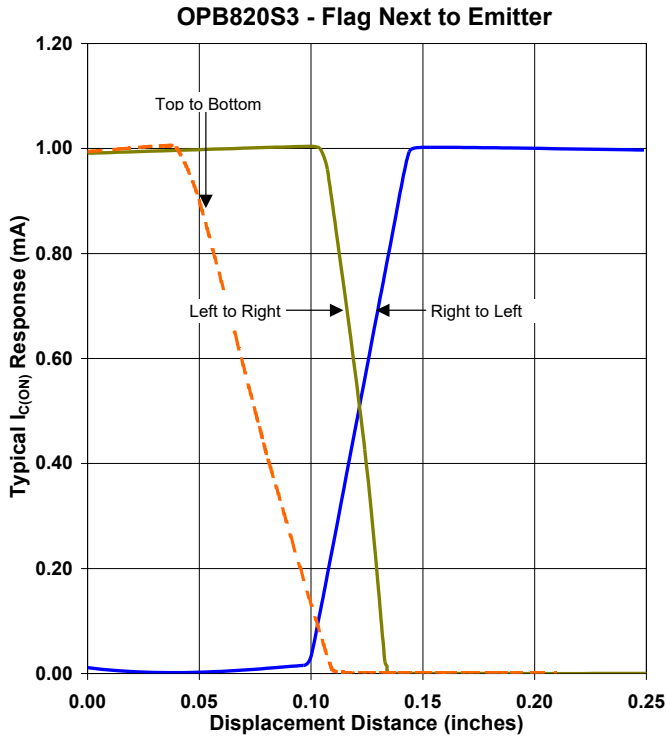
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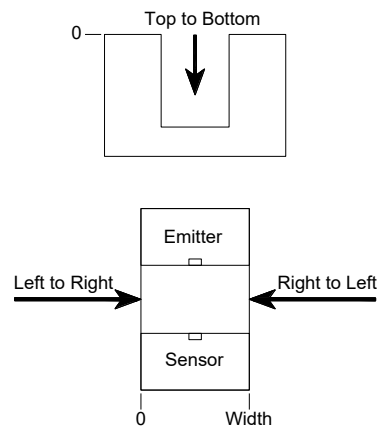
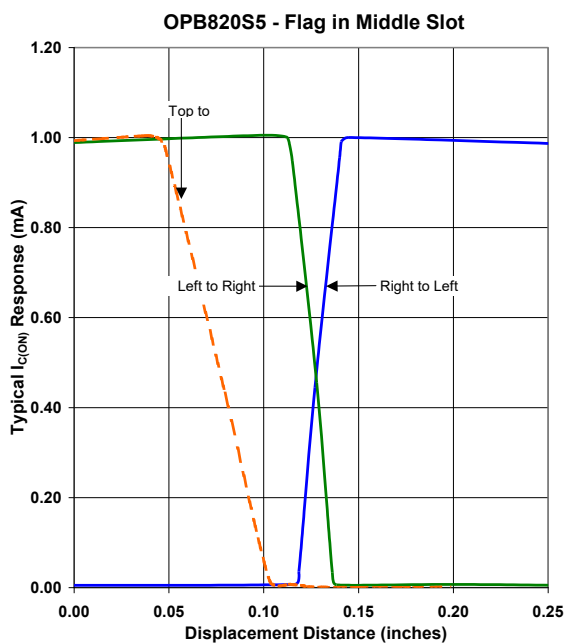
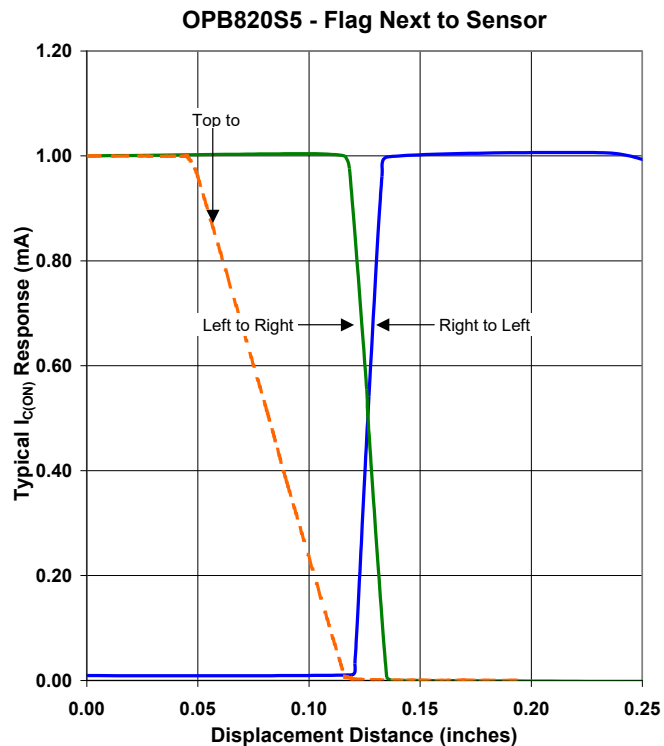
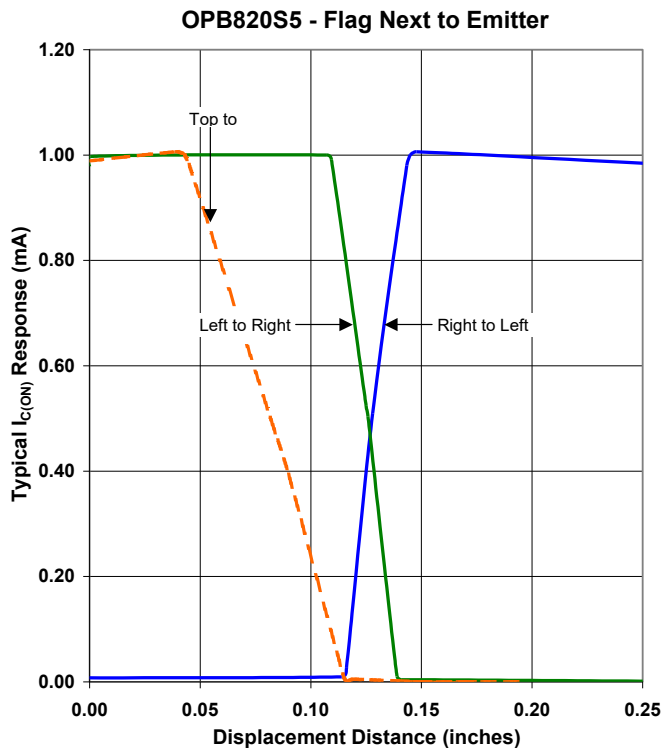
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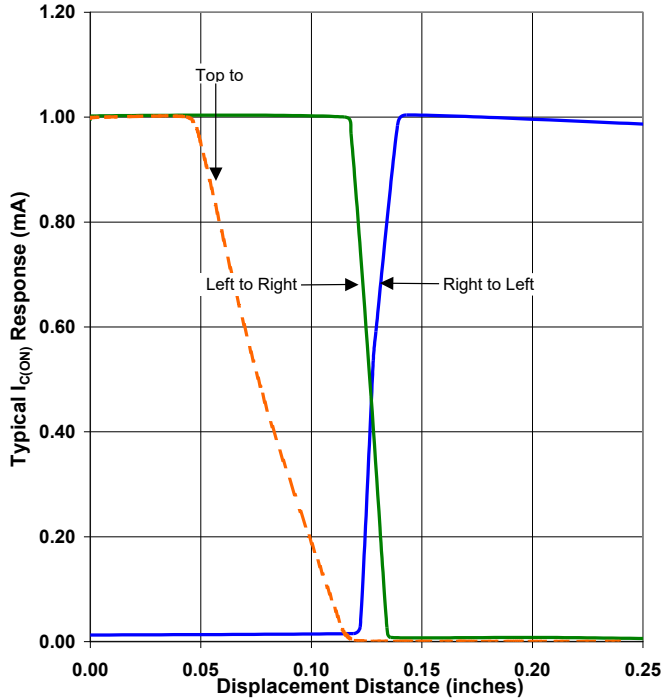
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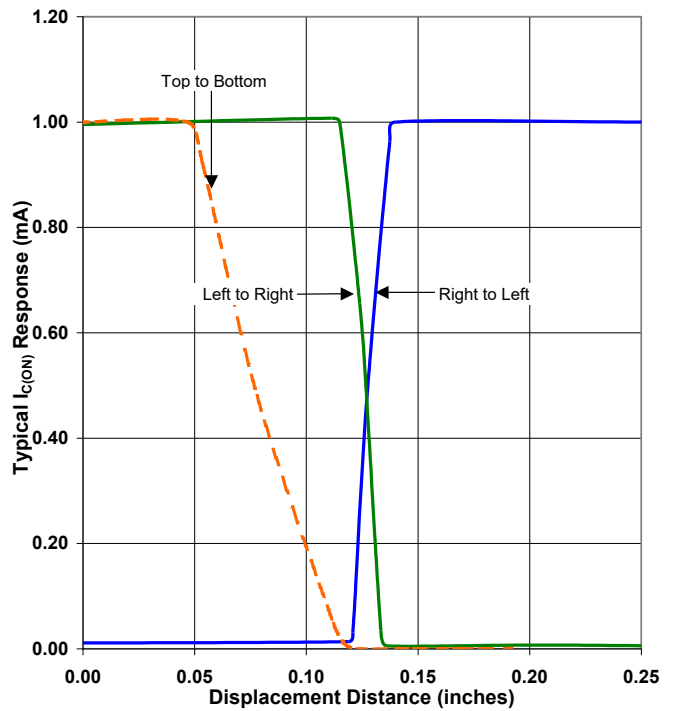


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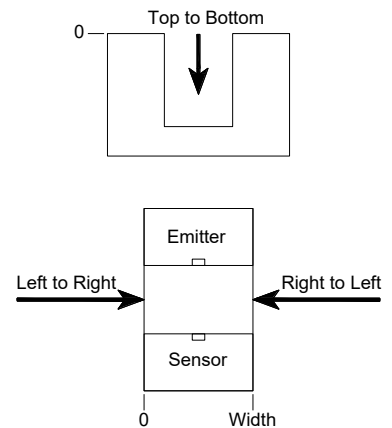
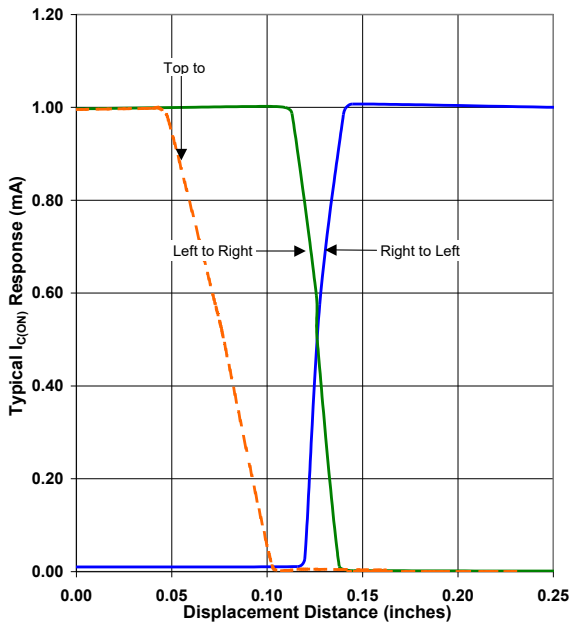
OPB820S10 - Flag Next to Emitter



OPB820S10 - Flag Next to Sensor



OPB820S10 - Flag in Middle of Slot



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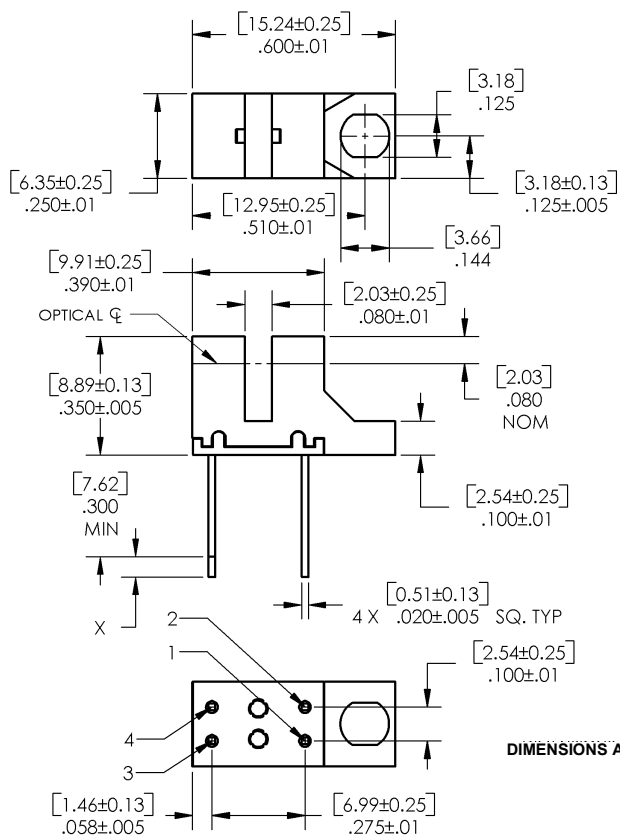
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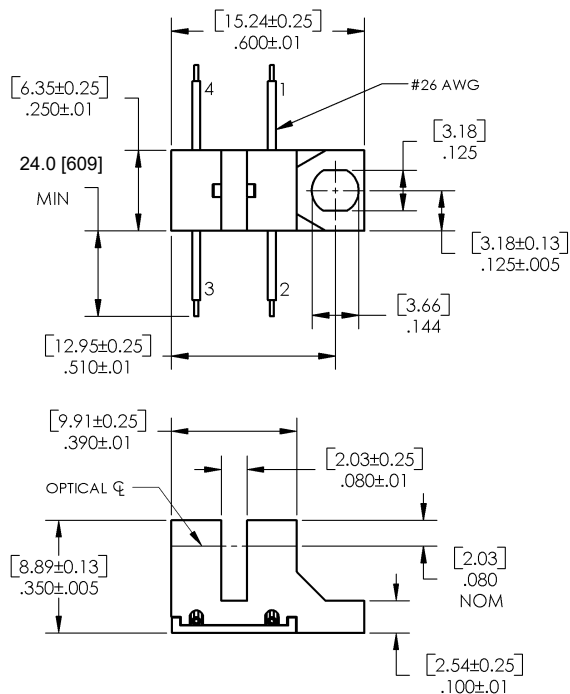


## Packaging

Package Drawing  
OPB820S Series



Package Drawing  
OPB821Z Series

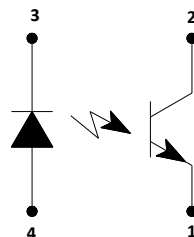
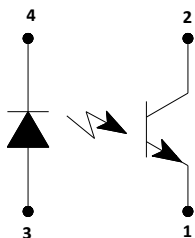


DIMENSIONS ARE IN: [ MILLIMETERS] INCHES

**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.

| 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     |



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