

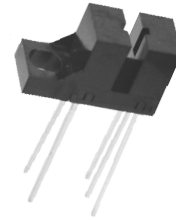
# Photologic® Slotted Optical Switch



OPB120A, OPB120B, OPB121A, OPB121B,  
OPB122A, OPB122B, OPB123A, OPB123B

## Features:

- Choice of output configuration
- Printed circuit board mounting
- Opaque plastic housing
- Low profile
- 0.080" (2.03 mm) wide slot
- 0.275" (6.99 mm) lead spacing



## Description:

The **OPB120** through **OPB123** devices consist of an infrared emitting diode and a Photologic® sensor (which is a monolithic integrated circuit that incorporates a linear amplifier and a Schmitt Trigger). The **OPB120** series have an LED and Photologic® sensor mounted on opposite sides of a 0.080" (2.03 mm) wide gap of an opaque housing. The OPB12\_A series have a molded 0.040" (1.02 mm) wide apertures located over both the emitter and the Photologic® sensor. The OPB12\_B series have a molded 0.040" (1.016 mm) wide apertures located over the emitter and 0.010" (0.254 mm) over the Photologic® sensor. All devices in this series have the added stability utilizing hysteresis built into the amplification circuitry.

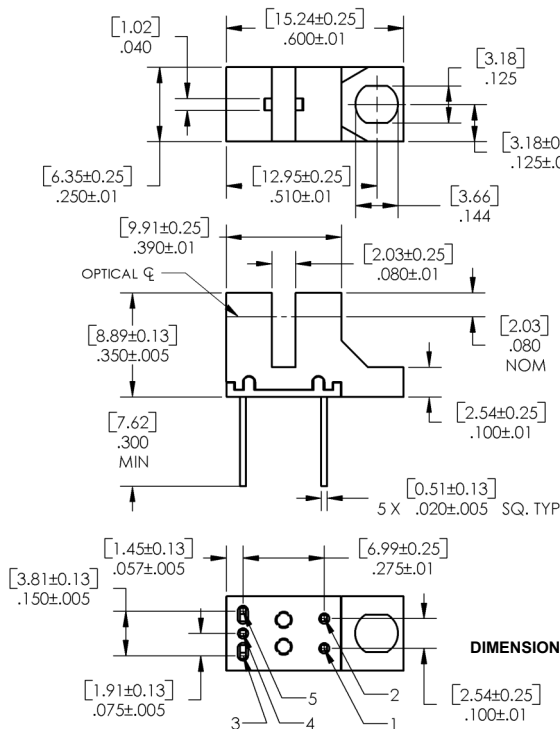
The electrical output can be specified as either buffered Totem-Pole (**OPB 120A, OPB120B**), buffered Open-Collector (**OPB121A, OPB121B**), Inverted Totem-Pole (**OPB122A, OPB122B**), or Inverted Open-Collector (**OPB123A, OPB123B**).

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
- Object sensing

| Pin # | Description     |
|-------|-----------------|
| 1     | Cathode         |
| 2     | Anode           |
| 3     | V <sub>CC</sub> |
| 4     | Output          |
| 5     | Ground          |



| Ordering Information |                         |                         |
|----------------------|-------------------------|-------------------------|
| Part Number          | Sensor Photologic®      | Aperture Emitter/Sensor |
| OPB120A              | Totem-Pole              | 0.04" / 0.04"           |
| OPB120B              |                         | 0.04" / 0.01"           |
| OPB121A              | Open-Collector          | 0.04" / 0.04"           |
| OPB121B              |                         | 0.04" / 0.01"           |
| OPB122A              | Inverted Totem-Pole     | 0.04" / 0.04"           |
| OPB122B              |                         | 0.04" / 0.01"           |
| OPB123A              | Inverted Open-Collector | 0.04" / 0.04"           |
| OPB123B              |                         | 0.04" / 0.01"           |



General Note  
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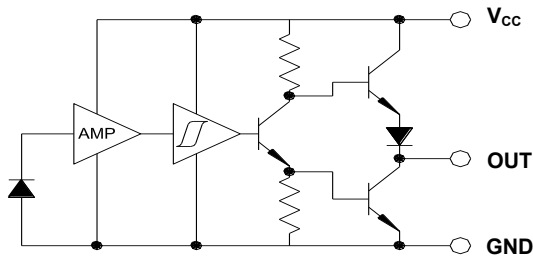
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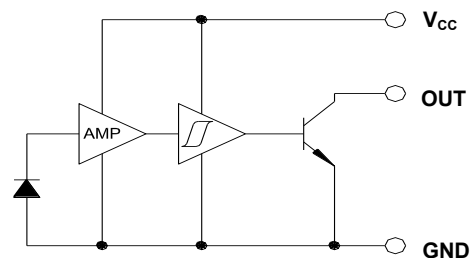


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OPB122A, OPB122B, OPB123A, OPB123B

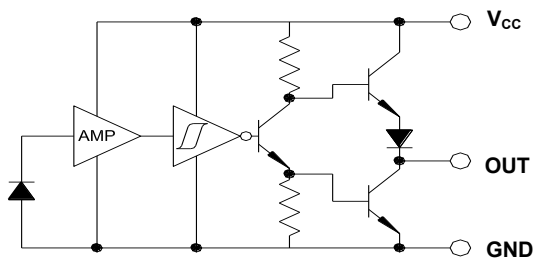
**OPB120 Buffered Totem-Pole**



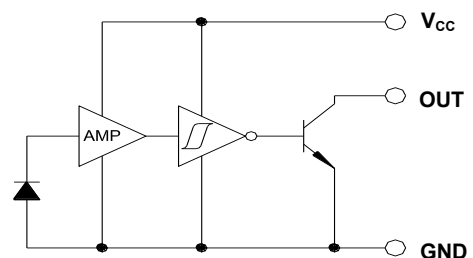
**OPB121 Buffered Open-Collector**



**OPB122 Inverted Totem-Pole**



**OPB123 Inverted Open-Collector**



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## Electrical Specifications

| Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)                            |  |
|--|--|
| Supply Voltage (not to exceed 3 seconds)   | 10 V                                       |
| Storage Temperature  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| Operating Temperature  | $-40^\circ\text{C}$ to $+70^\circ\text{C}$ |
| Lead Soldering Temperature (1/16" (1.6 mm) from case for 5 seconds with soldering iron) <sup>(1)</sup> | 260° C                                     |
| Input Infrared Diode   |  |
| Input Diode Power Dissipation <sup>(2)</sup>   | 100 mW                                     |
| Output Photologic® Power Dissipation <sup>(4)</sup>  | 200 mW                                     |
| Total Device Power Dissipation <sup>(5)</sup>  | 300 mW                                     |
| Output Photologic®   |  |
| Voltage at Output Lead (Open Collector Output - OPB121, OPB122, OPB123)                                | 35 V                                       |
| Forward D.C. Current   | 40 mA                                      |
| Reverse D.C. Current   | 2 V  |

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 2.22 mW/°C above 25°C
- (3) Normal application would be with light source blocked, simulated by  $I_F = 0$ .
- (4) Derate linearly 4.44 mW/°C above 25°C
- (5) Derate linearly 6.66 mW/°C above 25°C
- (6) Applies to Totem Pole configurations (OPB120A, OPB120B) only.
- (7) All parameters tested using pulse technique.

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| Electrical Characteristics (T <sub>A</sub> = 25° C unless otherwise noted) |  |      |     |      |       |   |
|--|--|------|-----|------|-------|---|
| SYMBOL   | PARAMETER  | MIN  | TYP | MAX  | UNITS | TEST CONDITIONS   |
| <b>Input Diode</b> (see OP240 for additional information)                  |  |      |     |      |       |   |
| V <sub>F</sub>   | Forward Voltage  | -    | -   | 1.7  | V     | I <sub>F</sub> = 20 mA, T <sub>A</sub> = 25° C  |
| I <sub>R</sub>   | Reverse Current  | -    | -   | 100  | μA    | V <sub>R</sub> = 2 V, T <sub>A</sub> = 25° C  |
| <b>Output Photologic® Sensor</b> (see OPL560 for additional information)   |  |      |     |      |       |   |
| V <sub>CC</sub>  | Operating D.C. Supply Voltage  | 4.75 | -   | 5.25 | V     |   |
| I <sub>CCL</sub>   | Low Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output  | -    | -   | 15   | mA    | V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 0 mA <sup>(1)</sup>                                      |
|  | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -   | 15   | mA    | V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 20 mA  |
| I <sub>CCH</sub>   | High Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output | -    | -   | 15   | mA    | V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 20 mA  |
|  | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -   | 15   | mA    | V <sub>CC</sub> = 5.25 V, I <sub>F</sub> = 0 mA <sup>(1)</sup>                                      |
| V <sub>OL</sub>  | Low Level Output Voltage:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output  | -    | -   | 0.4  | V     | V <sub>CC</sub> = 4.75 V, I <sub>OL</sub> = 12.8 mA, I <sub>F</sub> = 0 mA <sup>(1)</sup>           |
|  | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               | -    | -   | 0.4  | V     | V <sub>CC</sub> = 4.75 V, I <sub>OL</sub> = 12.8 mA, I <sub>F</sub> = 20 mA                         |
| V <sub>OH</sub>  | High Level Output Voltage:<br>Buffered Totem-Pole Output                                   | 2.4  | -   | -    | V     | V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = -800 μA, I <sub>F</sub> = 20 mA                         |
|  | Inverted Totem-Pole Output   | 2.4  | -   | -    | V     | V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = -800 μA, I <sub>F</sub> = 0 mA <sup>(1)</sup>           |
| I <sub>OH</sub>  | High Level Output Voltage:<br>Buffered Open-Collector Output                               | -    | -   | 100  | μA    | V <sub>CC</sub> = 4.75 V, V <sub>OH</sub> = 30 V, I <sub>F</sub> = 25 mA,<br>T <sub>A</sub> = 25° C |
|  | Inverted Open-Collector Output   | -    | -   | 100  | μA    | V <sub>CC</sub> = 4.75 V, V <sub>OH</sub> = 30 V, I <sub>F</sub> = 0 mA,<br>T <sub>A</sub> = 25° C  |
| I <sub>F</sub> (+)   | LED Positive-Going Threshold Current   | -    | -   | 15   | mA    | V <sub>CC</sub> = 5 V, T <sub>A</sub> = 25° C   |
| I <sub>F</sub> (+)/I <sub>F</sub> (-)                                      | Hysteresis   | -    | 2   | -    | -     | V <sub>CC</sub> = 5 V   |

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OPB122A, OPB122B, OPB123A, OPB123B

| Electrical Characteristics ( $T_A = 25^\circ \text{C}$ unless otherwise noted) |   |     |     |      |               |  |
|--|---|-----|-----|------|---------------|--|
| SYMBOL   | PARAMETER   | MIN | TYP | MAX  | UNITS         | TEST CONDITIONS  |
| $I_{OS}$   | Short Circuit Output Current:<br>Buffered Totem-Pole Output | -20 | -   | -100 | mA            | $V_{CC} = 5.25 \text{ V}$ , $I_F = 20 \text{ mA}^{(2)}$<br>Output = GND            |
|  | Inverted Totem-Pole Output                                  | -20 | -   | -100 | mA            | $V_{CC} = 5.25 \text{ V}$ , $I_F = 0 \text{ mA}^{(2)}$<br>Output = GND             |
| $t_r, t_f$   | Output Rise Time, Output Fall Time                          | -   | 70  | -    | ns            | $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ \text{C}$<br>$I_F = 0$ or $20 \text{ mA}$ |
| $t_{PLH}, t_{PHL}$   | Propagation Delay Low-High & High-Low                       | -   | 5   | -    | $\mu\text{s}$ | $R_L = 8 \text{ TTL Loads (Totem-Pole)}$<br>$R_L = 360 \Omega$ (Open-Collector)    |

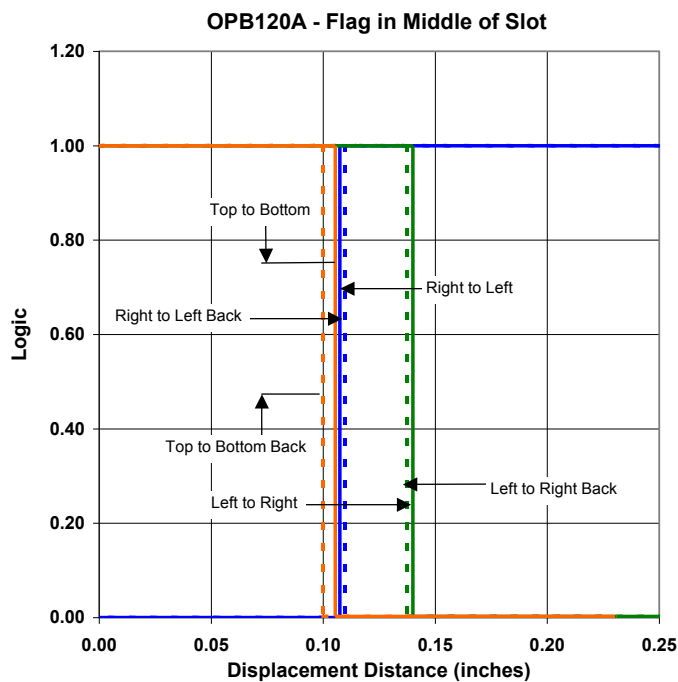
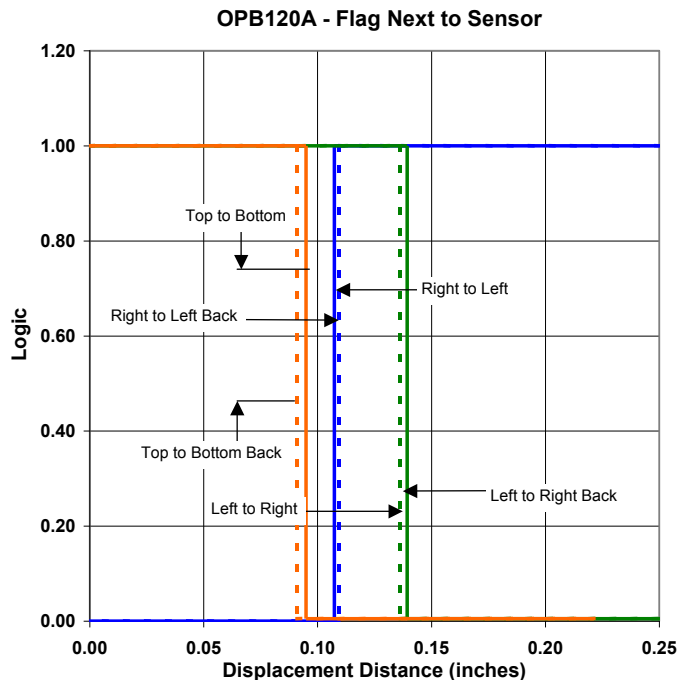
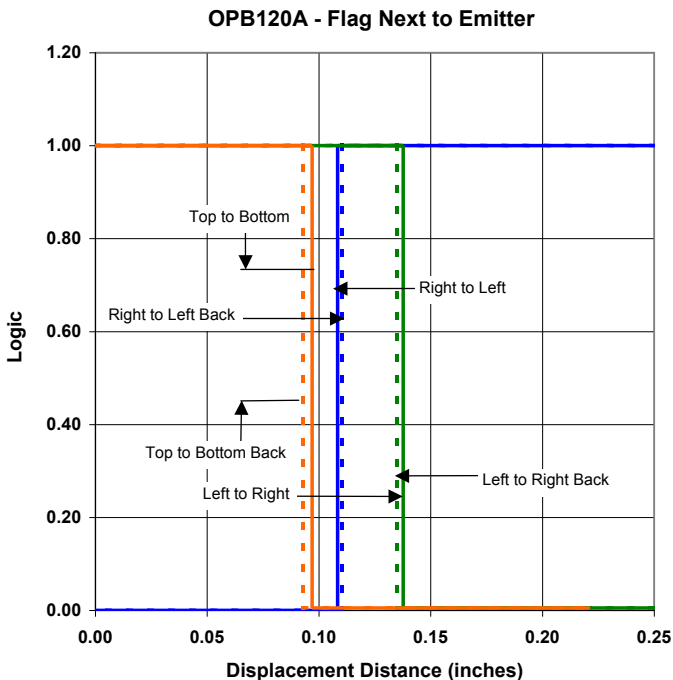
Notes:

- (1) Normal application would be with light source blocked, simulated by  $I_F = 00$ .
- (2) Applies to Totem Pole configurations (OPB120A, OPB120B) only.

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OPB122A, OPB122B, OPB123A, OPB123B



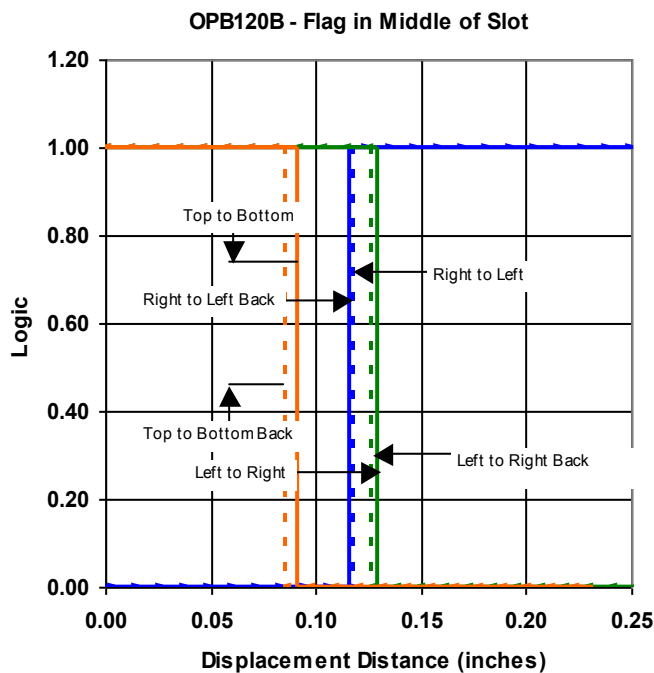
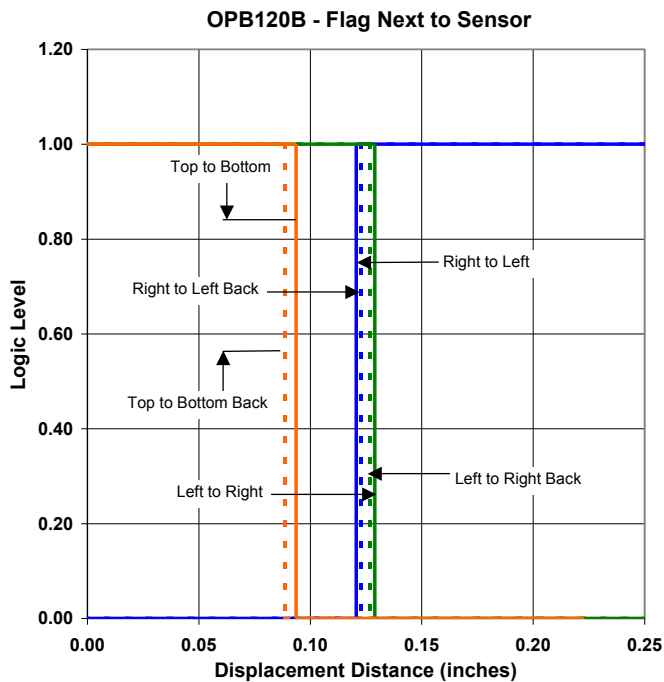
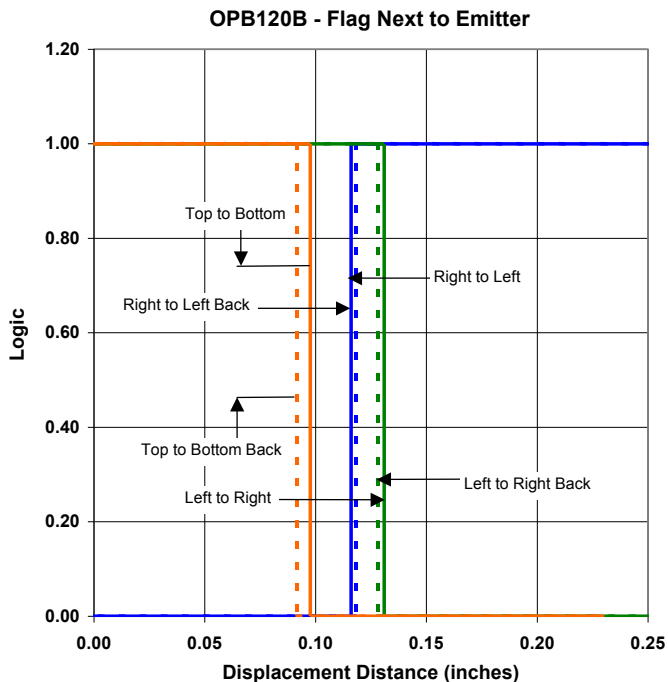
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