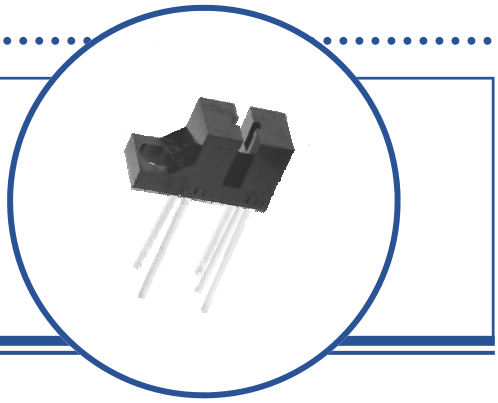
# Photologic® Slotted Optical Switch

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

TT electronics
OPTEK Technology

### 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 seriesseries 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.

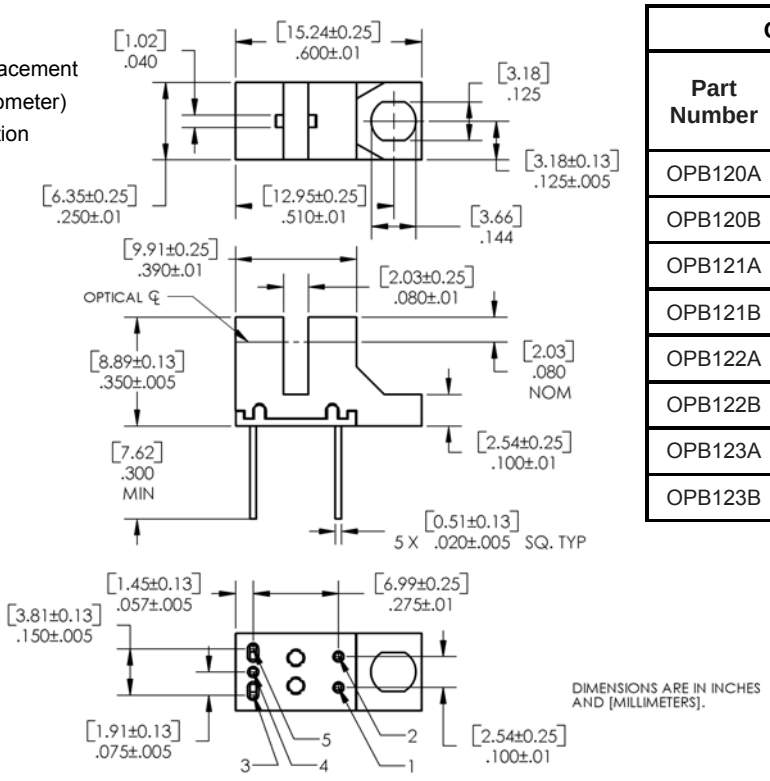
The electrical output can be specified as either buffered Totem-Pole **(OPB 120A, OPB120B)**, buffered Open-Collector **(OPB121A, OPB121B)**, Inverted Totem-Pole **(OPB122A, OPB122B)**, or Inverted Open-Collector **(OPB123A, OPB123B)**.

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 | Anode |
| 2 | Cathode |
| 3 | $V_{CC}$ |
| 4 | Output |
| 5 | Ground |

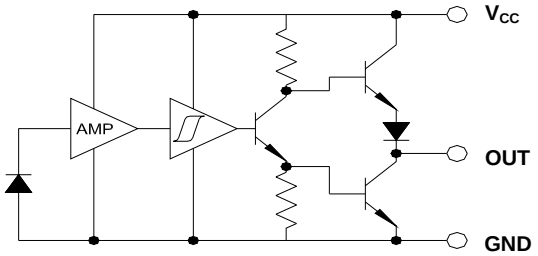



| Ordering Information | | |
|---|---|---|
| **Part Number** | **Sensor Photologic®** | **Aperture Emitter/ Sensor** |
| OPB120A | Totem-Pole | 0.04" / 0.04" |
| OPB120B | | 0.04" / 0.01" |
| OPB121A | Open-Collector | 0.04" / 0.04" |
| OPB121B | | 0.04" / 0.01" |
| OPB122A | Inverted Totem-Pole | 0.04"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

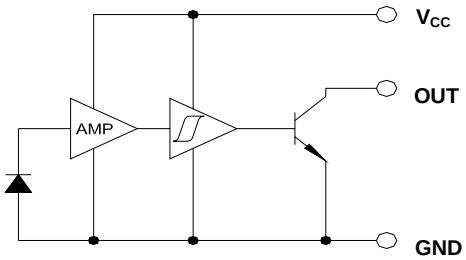
Pb
RoHS

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

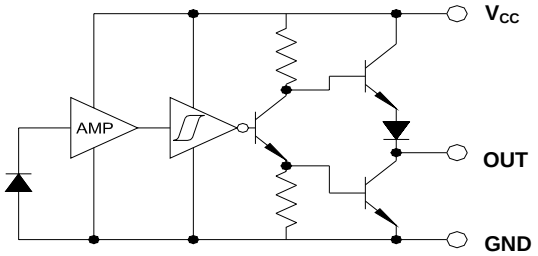
**OPB120 Buffered Totem-Pole**



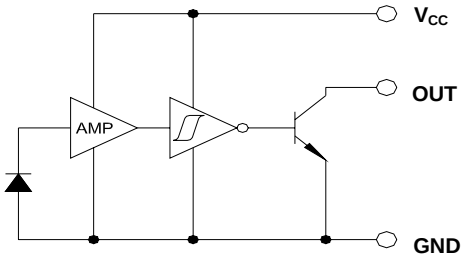

**OPB121 Buffered Open-Collector**




**OPB122 Inverted Totem-Pole**




**OPB123 Inverted Open-Collector**




## Absolute Maximum Ratings ($T_A$ = 25°C unless otherwise noted)

| | |
|---|---|
| Supply Voltage (not to exceed 3 seconds) | 10 V |
| Storage Temperature | -40° C to +85° C |
| Operating Temperature | -40° C to +70° C |
| Lead Soldering Temperature (1/16" (1.6 mm) from case for 5 seconds with soldering iron)(1) | 260° C |

**Input Infrared Diode**

| | |
|---|---|
| Input Diode Power Dissipation(2) | 100 mW |
| Output Photologic® Power Dissipation(4) | 200 mW |
| Total Device Power Dissipation(5) | 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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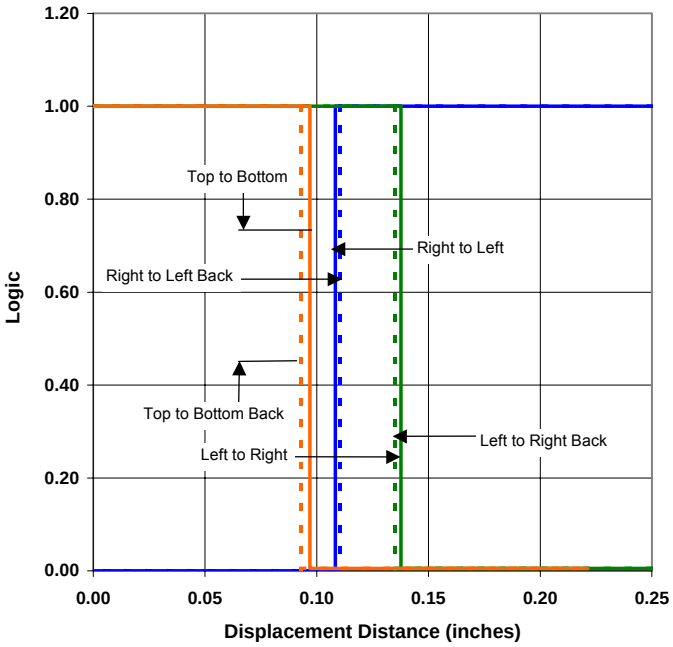
## Electrical Characteristics ($T_A$ = 40°C to + 70° unless otherwise noted)

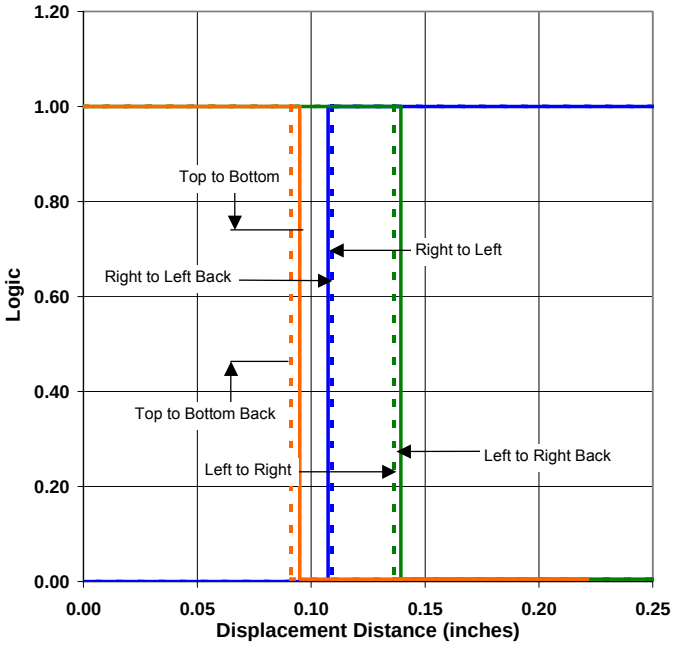
| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| **Input Diode** (see OP240 for additional information) | | | | | | |
| $V_F$ | Forward Voltage | - | - | 1.7 | V | $I_F$ = 20 mA, $T_A$ = 25° C |
| $I_R$ | Reverse Current | - | - | 100 | µA | $V_R$ = 2 V, $T_A$ = 25° C |
| **Output Photologic® Sensor** (see OPL560 for additional information) | | | | | | |
| $V_{CC}$ | Operating D.C. Supply Voltage | 4.75 | - | 5.25 | V | |
| $I_{CCL}$ | Low Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output | - | - | 15 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 0 mA(1) |
| | Inverted Totem-Pole Output<br>Inverted Open-Collector Output | - | - | 15 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 20 mA |
| $I_{CCH}$ | High Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output | - | - | 15 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 20 mA |
| | Inverted Totem-Pole Output<br>Inverted Open-Collector Output | - | - | 15 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 0 mA(1) |
| $V_{OL}$ | Low Level Output Voltage:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output | - | - | 0.4 | V | $V_{CC}$ = 4.75 V, $I_{OL}$ = 12.8 mA, $I_F$ = 0 mA(1) |
| | Inverted Totem-Pole Output<br>Inverted Open-Collector Output | - | - | 0.4 | V | $V_{CC}$ = 4.75 V, $I_{OL}$ = 12.8 mA, $I_F$ = 20 mA |
| $V_{OH}$ | High Level Output Voltage:<br>Buffered Totem-Pole Output | 2.4 | - | - | V | $V_{CC}$ = 4.75 V, $I_{OH}$ = -800 µA, $I_F$ = 20 mA |
| | Inverted Totem-Pole Output | 2.4 | - | - | V | $V_{CC}$ = 4.75 V, $I_{OH}$ = -800 µA, $I_F$ = 0 mA(1) |
| $I_{OH}$ | High Level Output Voltage:<br>Buffered Open-Collector Output | - | - | 100 | µA | $V_{CC}$ = 4.75 V, $V_{OH}$ = 30 V, $I_F$ = 25 mA,<br>$T_A$ = 25° C |
| | Inverted Open-Collector Output | - | - | 100 | µA | $V_{CC}$ = 4.75 V, $V_{OH}$ = 30 V, $I_F$ = 0 mA,<br>$T_A$ = 25° C |
| $I_F(+)$ | LED Positive-Going Threshold Current | - | - | 15 | mA | $V_{CC}$ = 5 V, $T_A$ = 25° C |
| $I_F(+)/I_F(-)$ | Hysteresis | - | 2 | - | - | $V_{CC}$ = 5 V |
| $I_{OS}$ | Short Circuit Output Current:<br>Buffered Totem-Pole Output | -20 | - | -100 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 20 mA(2)<br>Output = GND |
| | Inverted Totem-Pole Output | -20 | - | -100 | mA | $V_{CC}$ = 5.25 V, $I_F$ = 0 mA(2)<br>Output = GND |
| $t_r$, $t_f$ | Output Rise Time, Output Fall Time | - | 70 | - | ns | $V_{CC}$ = 5 V, $T_A$ = 25° C<br>$I_F$ = 0 or 20 mA<br>$R_L$ = 8 TTL Loads (Totem-Pole)<br>$R_L$ = 360 Ω (Open-Collector) |
| $t_{PLH}$, $t_{PHL}$ | Propagation Delay Low-High & High-Low | - | 5 | - | µs | |

Notes:
(1) Normal application would be with light source blocked, simulated by $I_F$ = 00.

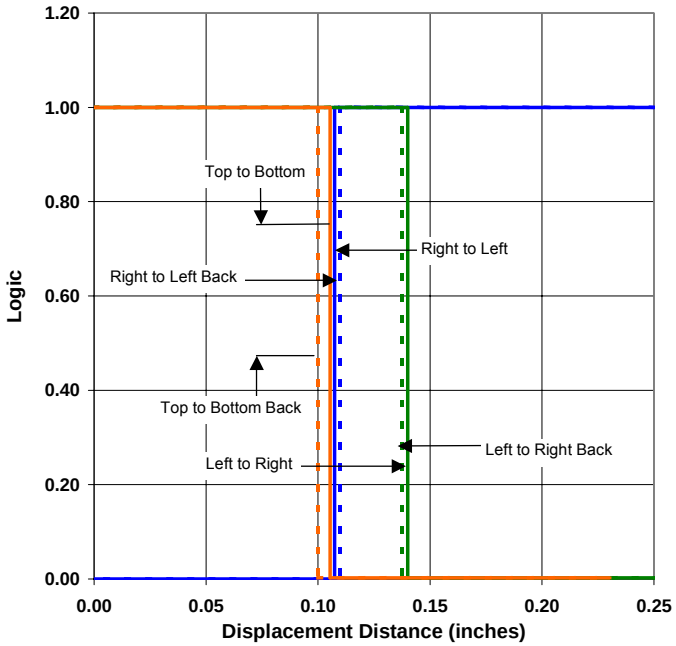
### OPB120A - Flag Next to Emitter




### OPB120A - Flag Next to Sensor




### OPB120A - Flag in Middle of Slot







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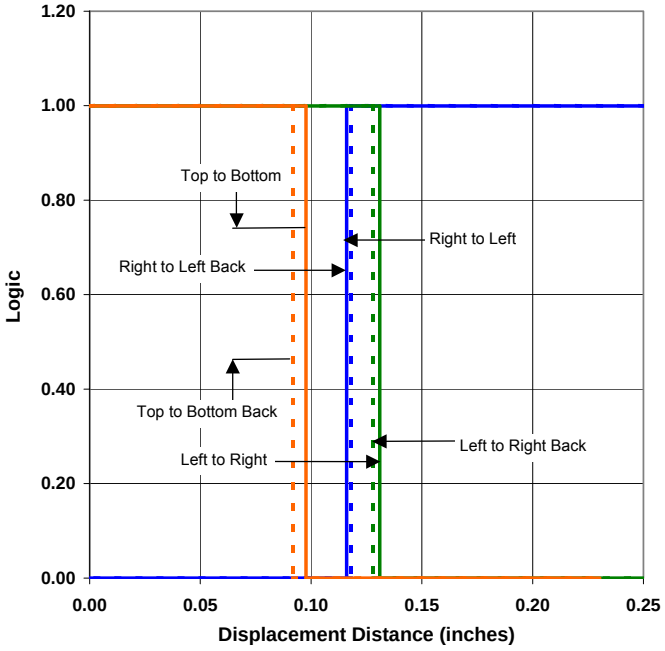
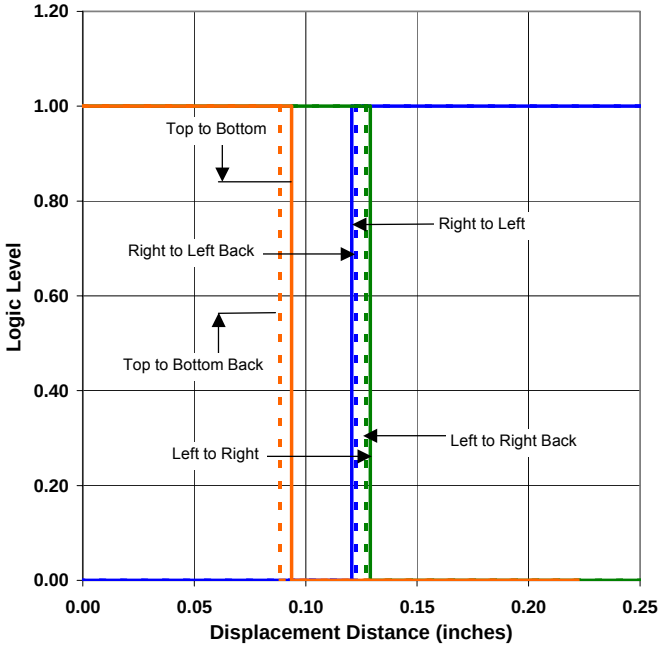
**OPB120B - Flag Next to Emitter**




**OPB120B - Flag Next to Sensor**




**OPB120B - Flag in Middle of Slot**