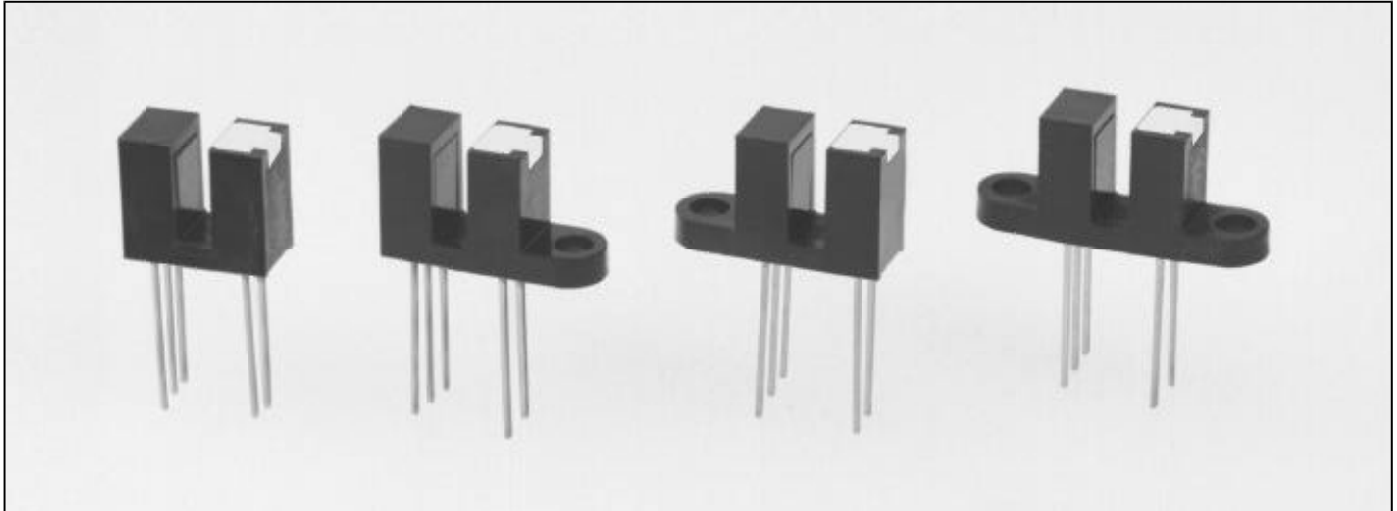


# Photologic™ Slotted Optical Switches

## Types OPB960, OPB970 Series



### Features

- Choice of mounting configuration
- Choice of aperture
- Choice of output configuration
- Choice of opaque or IR transmissive shell material
- Data rates to 250 kBaud
- 0.320" lead spacing for PC board mount

### Description

The OPB960 and OPB970 series of Photologic™ Photo Integrated Circuit Switches provide optimum flexibility for the design engineer. Building from a standard housing with a .125" wide slot, the user can specify (1) type and polarity of TTL output, (2) discrete shell material, (3) aperture width, and (4) type of mounting configuration. Available with 24", 26AWG wire leads as OPB980/OPB990 series.

The electrical output can be specified as either TTL totem pole or TTL open collector. Either may be supplied with inverter or buffer output polarity. All have added stability of a built-in hysteresis amplifier.



RoHS

### Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

|                                                                                         |                      |
|-----------------------------------------------------------------------------------------|----------------------|
| Supply Voltage, V <sub>CC</sub> (Not to exceed 3 sec.)                                  | 10V                  |
| Storage Temperature Range                                                               | -40°C to +85°C       |
| Operating Temperature Range                                                             | -40°C to +70°C       |
| Lead Soldering Temperature [1/16 inch (1.6mm) from case for 5 sec. with soldering iron] | 240°C <sup>(1)</sup> |
| Input Diode Power Dissipation                                                           | 100mW <sup>(2)</sup> |
| Output Photologic™ Power Dissipation                                                    | 200mW <sup>(3)</sup> |
| Total Device Power Dissipation                                                          | 300mW <sup>(4)</sup> |
| Voltage at Output Lead (Open Collector Output)                                          | 35V                  |
| Diode Forward D.C. Current                                                              | 40mA                 |
| Diode Reverse D.C. Voltage                                                              | 2V                   |

### Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate linearly 2.22mW/°C above 25° C.
- (3) Derate linearly 4.44mW/°C above 25° C.
- (4) Derate linearly 6.66mW/°C above 25° C.
- (5) The OPB960/OPB970 series are terminated with .020" square leads designed for printed circuit board mounting.
- (6) Normal application would be with light source blocked, simulated by I<sub>F</sub> = 0mA.
- (7) All parameters tested using pulse technique.

### Housing

All housings are an opaque grade of injection-molded plastic to minimize the assembly's sensitivity to ambient radiation, both visible and near-infrared. Discrete shells (exposed on the parallel faces inside the device throat) are either IR transmissive plastic for applications where aperture contamination may occur or opaque plastic for maximum protection against ambient light.

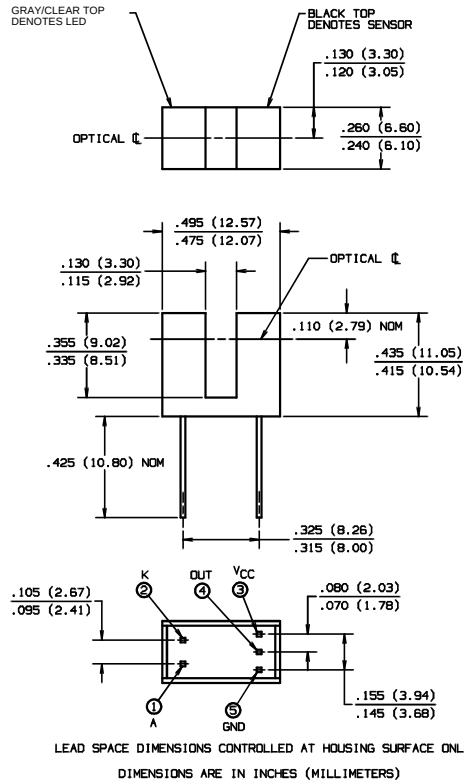
# Types OPB960, OPB970 Series

Electrical Characteristics ( $T_A = -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  unless otherwise noted).

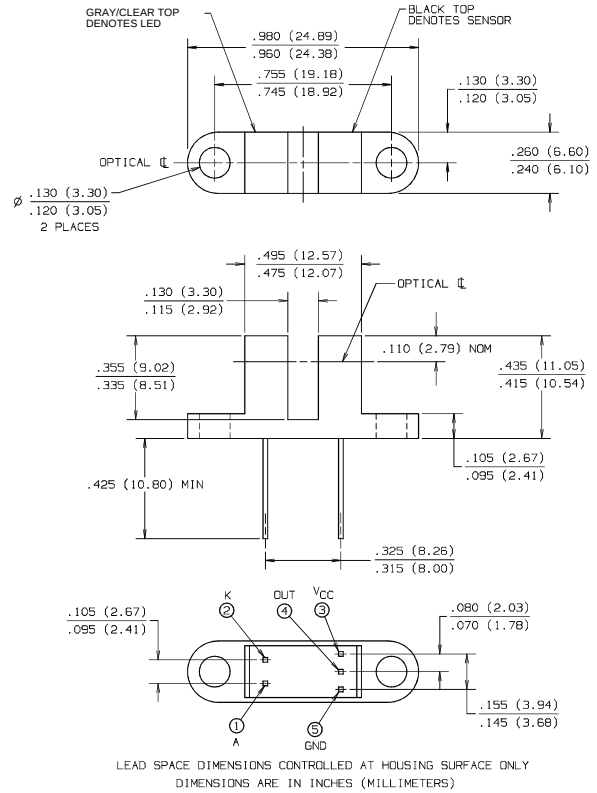
| SYMBOL                                      | PARAMETER                                                                                  | MIN  | TYP | MAX  | UNITS         | TEST CONDITIONS                                                                                          |
|---------------------------------------------|--------------------------------------------------------------------------------------------|------|-----|------|---------------|----------------------------------------------------------------------------------------------------------|
| <b>Input Diode</b>                          |                                                                                            |      |     |      |               |                                                                                                          |
| $V_F$                                       | Forward Voltage                                                                            |      |     | 1.7  | V             | $I_F = 20\text{ mA}$ , $T_A = 25^{\circ}\text{C}$                                                        |
| $I_R$                                       | Reverse Current                                                                            |      |     | 100  | $\mu\text{A}$ | $V_R = 2.0\text{ V}$ , $T_A = 25^{\circ}\text{C}$                                                        |
| <b>Output Photologic<sup>®</sup> Sensor</b> |                                                                                            |      |     |      |               |                                                                                                          |
| $V_{CC}$                                    | 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            | $V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(6)}$                                                     |
|                                             | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               |      |     | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$                                                          |
| $I_{CCH}$                                   | High Level Supply Current:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output |      |     | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$                                                          |
|                                             | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               |      |     | 15   | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(6)}$                                                     |
| $V_{OL}$                                    | Low Level Output Voltage:<br>Buffered Totem-Pole Output<br>Buffered Open-Collector Output  |      |     | 0.4  | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$<br>$I_F = 0\text{ mA}^{(6)}$                        |
|                                             | Inverted Totem-Pole Output<br>Inverted Open-Collector Output                               |      |     | 0.4  | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$<br>$I_F = 15\text{ mA}^{(6)}$                       |
| $V_{OH}$                                    | High Level Output Voltage:<br>Buffered Totem-Pole Output                                   | 2.4  |     |      | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ }\mu\text{A}$<br>$I_F = 15\text{ mA}$                    |
|                                             | Inverted Totem-Pole Output                                                                 | 2.4  |     |      | V             | $V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ }\mu\text{A}$<br>$I_F = 0\text{ mA}^{(6)}$               |
| $I_{OH}$                                    | High Level Output Current:<br>Buffered Open-Collector Output                               |      |     | 100  | $\mu\text{A}$ | $V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ ,<br>$I_F = 15\text{ mA}$ , $T_A = 25^{\circ}\text{C}$ |
|                                             | Inverted Open-Collector Output                                                             |      |     | 100  | $\mu\text{A}$ | $V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ ,<br>$I_F = 0\text{ mA}$ , $T_A = 25^{\circ}\text{C}$  |
| $I_F(+)$                                    | LED Positive-Going Threshold Current                                                       |      |     | 15   | mA            | $V_{CC} = 5.0\text{ V}$ , $T_A = 25^{\circ}\text{C}$                                                     |
| $I_F(+)/I_F(-)$                             | Hysteresis                                                                                 |      | 2.0 |      |               | $V_{CC} = 5.0\text{ V}$                                                                                  |
| $I_{OS}$                                    | Short Circuit Output Current:<br>Buffered Totem-Pole Output<br>"11" Series                 | -15  |     | -60  | mA            | $V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$<br>Output = GND                                          |
|                                             | Inverted Totem-Pole Output<br>"11" Series                                                  | -15  |     | -60  |               | $V_{CC} = 5.25$ , $I_F = 0\text{ mA}$<br>Output = GND                                                    |
| $t_r, t_f$                                  | Output Rise Time, Output Fall Time                                                         |      | 70  |      | ns            | $V_{CC} = 5.0\text{ V}$ , $T_A = 25^{\circ}\text{C}$<br>$I_F = 0$ or $15\text{ mA}$                      |
| $t_{PLH}, t_{PHL}$                          | Propagation Delay Low-High & High-Low                                                      |      | 5.0 |      | $\mu\text{s}$ | $R_L = 8\text{ TTL (Totem Pole)}$<br>$R_L = 360\Omega$ (Open Collector)                                  |

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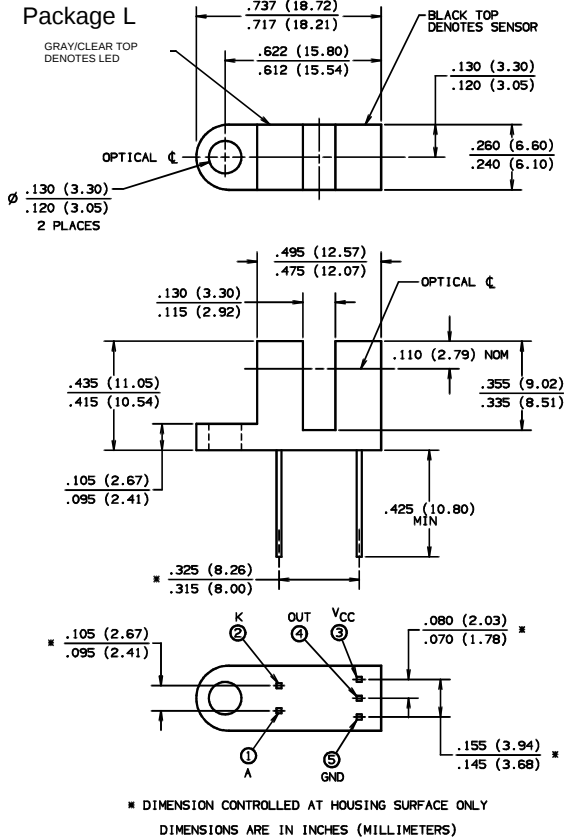
Package N



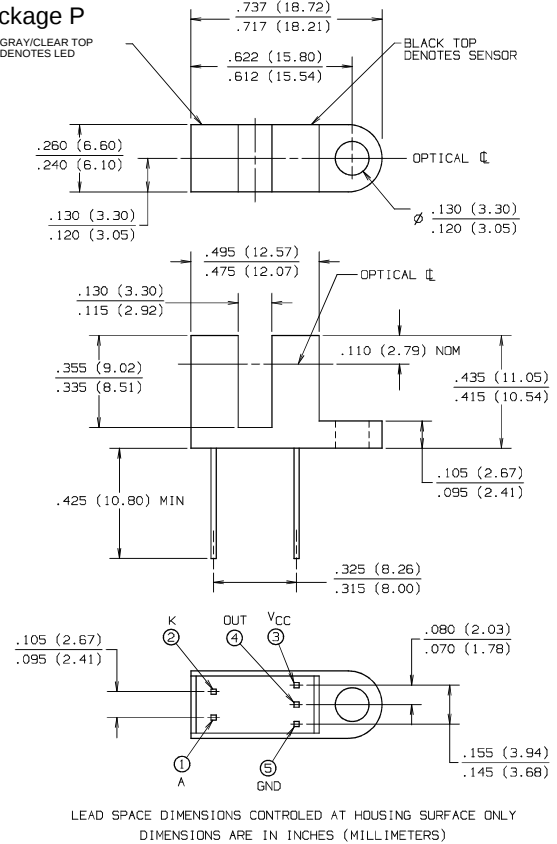
Package T



Package L



Package P



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

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3-OPTWO

## PART NUMBER GUIDE

OPB 9 X X X X X

Optek Assembly

Aperture Width In Front  
of Sensor

5 = 0.050" 1 = 0.010"

Photologic®  
Photo Integrated Circuit  
Sensor FamilyAperture Width In Front  
of Emitter

5 = 0.050" 1 = 0.010"

Discrete Shell Material  
Designation

Mounting Configurations

6 - Base Mount IR Transmissive  
Plastic Discrete Shell  
PC Mountable LeadsT - Both Mounting Tabs  
N - No Mounting Tabs  
L - Single Mounting Tab  
Emitter Side7 - Base Mount Opaque  
Plastic Discrete Shell  
PC Mountable LeadsP - Single Mounting Tab  
Photologic® Side

Electrical Specification Variations

0 - Buffered Totem-Pole Output

1 - Buffered Open-Collector Output

2 - Inverted Totem-Pole Output

3 - Inverted Open-Collector Output