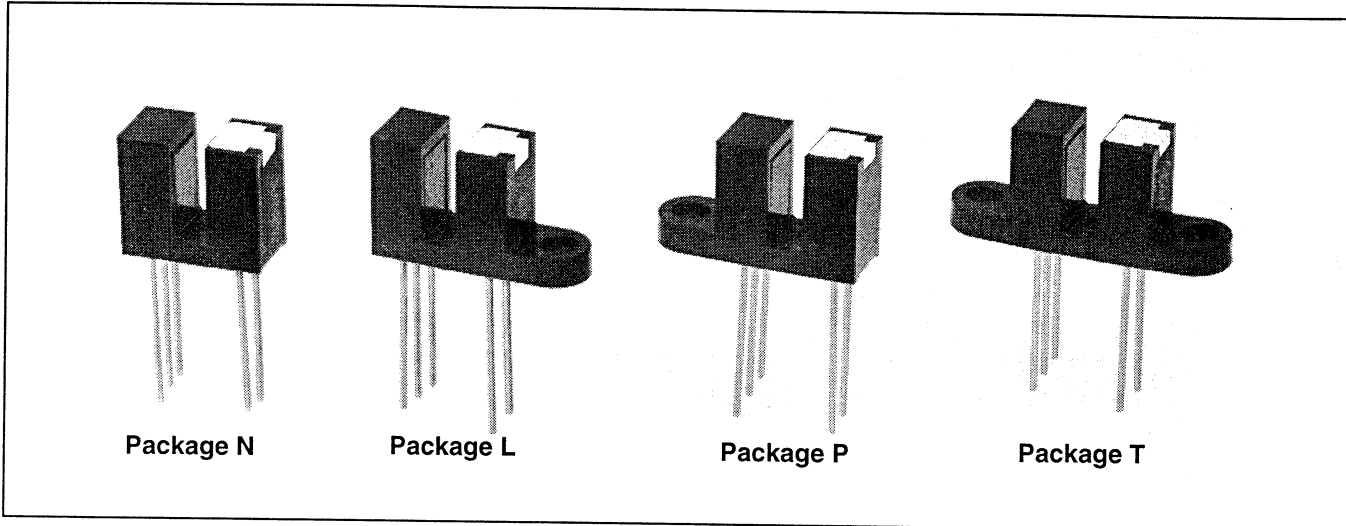


Photologic® Slotted Optical Switches

Types OPB460, OPB470 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" (8.13 mm) lead spacing for PC board mount
- Low power consumption

Description

The OPB460 and OPB470 series of Photologic® Photo Integrated Circuit Switches provide optimum flexibility for the design engineer. Building from a standard housing with a 0.125" (3.18 mm) 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.

These devices exhibit stable performance over supply voltages ranging from 4.5 V to 16.0 V and may be specified as buffered or inverted with 10 kΩ pull-up or open collector output. All are TTL/LSTTL compatible and can drive up to 10 TTL loads.

Replaces/Upgrades

OPB960, OPB970 Series.

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

| | |
|--|-----------------------|
| Supply Voltage, V _{CC} (Not to exceed 3 sec.) | 18 V |
| Storage Temperature Range | -40° C to +85° C |
| Operating Temperature Range | -40° C to +85° C |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] | 240° C ⁽¹⁾ |
| Input Diode Power Dissipation | 100 mW ⁽²⁾ |
| Output Photologic® Power Dissipation | 90 mW ⁽³⁾ |
| Total Device Power Dissipation | 190 mW ⁽⁴⁾ |
| Voltage at Output Lead (Open Collector Output) | 35 V |
| Diode Forward D.C. Current | 40 mA |
| Diode Reverse D.C. Voltage | 2 V |

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate linearly 1.67 mW/° C above 25° C.
- (3) Derate linearly 1.50 mW/° C above 25° C.
- (4) Derate linearly 3.17 mW/° C above 25° C.
- (5) The OPB460/OPB470 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_F = 0 mA.
- (7) All parameters tested using pulse technique.

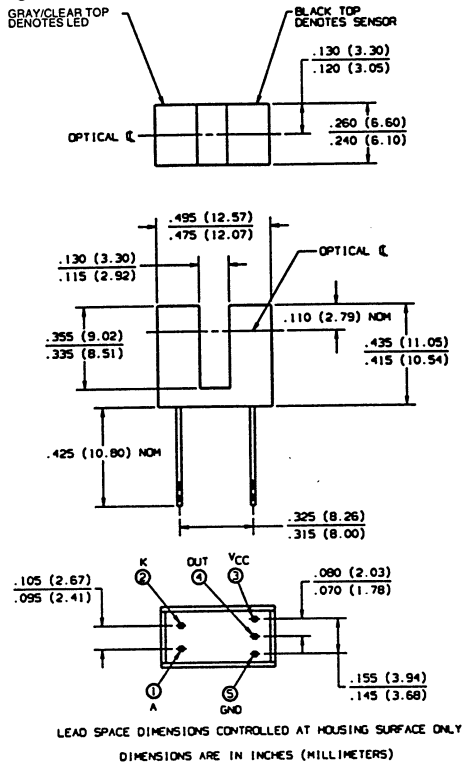
Housing

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.

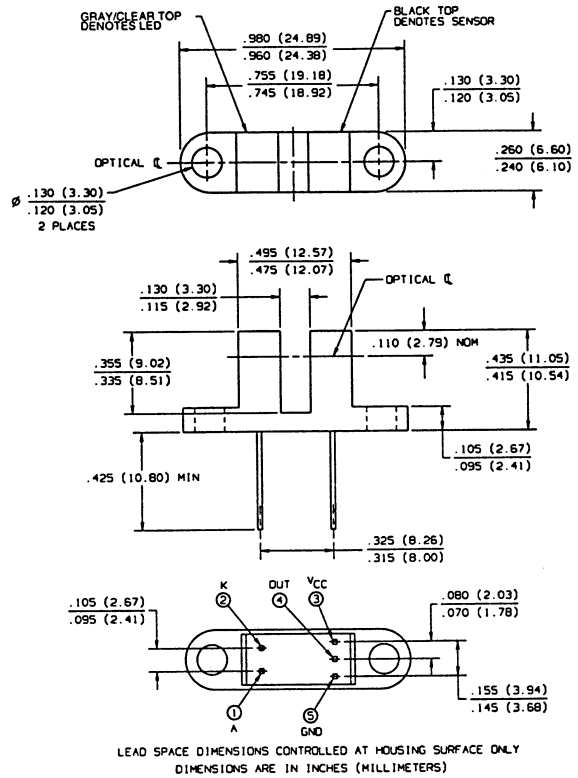
Types OPB460, OPB470 Series

SLOTTED OPTICAL SWITCHES

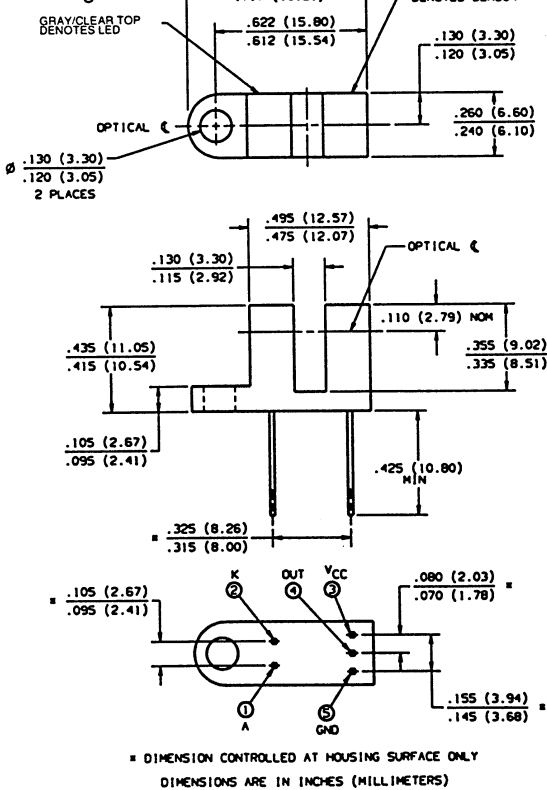
Package N



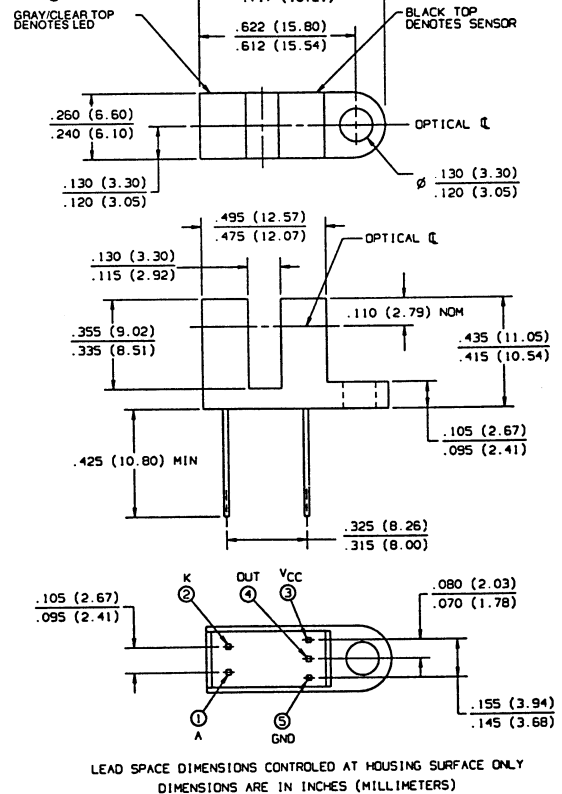
Package T



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.
 Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (972)323-2200 Fax (972)323-2396

Types OPB460, OPB470 "55" Series



Electrical Characteristics ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|--|--------------|-----|------|---------------|---|
| Input Diode | | | | | | |
| V_F | Forward Voltage | | | 1.7 | V | $I_F = 20\text{ mA}$, $T_A = 25^\circ\text{C}$ |
| I_R | Reverse Current | | | 100 | μA | $V_R = 2\text{ V}$, $T_A = 25^\circ\text{C}$ |
| Output Photologic[®] Sensor | | | | | | |
| V_{CC} | Operating D.C. Supply Voltage | 4.5 | | 16.0 | V | |
| I_{CCL} | Low Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 4\text{ mA}$ |
| I_{CCH} | High Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 4\text{ mA}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| V_{OL} | Low Level Output Voltage: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 0.4 | V | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$ $I_F = 0\text{ mA}^{(6)}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 0.4 | V | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$ $I_F = 4\text{ mA}$ |
| V_{OH} | High Level Output Voltage: Buffered with 10 k pull-up | $V_{CC}-1.5$ | | | V | $V_{CC} = 4.5\text{ V to }16\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 4\text{ mA}$ |
| | Inverted with 10 k pull-up | $V_{CC}-1.5$ | | | V | $V_{CC} = 4.5\text{ V to }16\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 0\text{ mA}^{(6)}$ |
| I_{OH} | High Level Output Current: Buffered Open-Collector Output | | | 10 | μA | $V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 4\text{ mA}$, $T_A = 25^\circ\text{C}$ |
| | Inverted Open-Collector Output | | | 10 | μA | $V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 0\text{ mA}^{(6)}$, $T_A = 25^\circ\text{C}$ |
| $I_F(+)$ | LED Positive-Going Threshold Current | | | 4 | mA | $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$ |
| $I_F(+)/I_F(-)$ | Hysteresis | | 1.2 | | | $V_{CC} = 5\text{ V}$ |
| t_r, t_f | Output Rise Time, Output Fall Time | | 50 | | ns | $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$ $I_F = 0$ or 4 mA |
| t_{PLH}, t_{PHL} | Propagation Delay Low-High & High-Low | | 3.0 | | μs | $R_L = 300\text{ }\Omega$ to 5 V $C_L = 50\text{ pF}$ |

Types OPB460, OPB470 “51” Series

Electrical Characteristics ($T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|--|--------------|-----|------|---------------|---|
| Input Diode | | | | | | |
| V_F | Forward Voltage | | | 1.7 | V | $I_F = 20\text{ mA}$, $T_A = 25^{\circ}\text{C}$ |
| I_R | Reverse Current | | | 100 | μA | $V_R = 2\text{ V}$, $T_A = 25^{\circ}\text{C}$ |
| Output Photologic[®] Sensor | | | | | | |
| V_{CC} | Operating D.C. Supply Voltage | 4.5 | | 16.0 | V | |
| I_{CCL} | Low Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 8\text{ mA}$ |
| I_{CCH} | High Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 8\text{ mA}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | $V_{CC} = 16\text{ V}$, $I_F = 0\text{ mA}^{(6)}$ |
| V_{OL} | Low Level Output Voltage: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 0.4 | V | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$ $I_F = 0\text{ mA}^{(6)}$ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 0.4 | V | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 16\text{ mA}$ $I_F = 8\text{ mA}$ |
| V_{OH} | High Level Output Voltage: Buffered with 10 k pull-up | $V_{CC}-1.5$ | | | V | $V_{CC} = 4.5\text{ V}$ to 16 V , $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 8\text{ mA}$ |
| | Inverted with 10 k pull-up | $V_{CC}-1.5$ | | | V | $V_{CC} = 4.5\text{ V}$ to 16 V , $I_{OH} = -800\text{ }\mu\text{A}$ $I_F = 0\text{ mA}^{(6)}$ |
| I_{OH} | High Level Output Current: Buffered Open-Collector Output | | | 10 | μA | $V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 8\text{ mA}$, $T_A = 25^{\circ}\text{C}$ |
| | Inverted Open-Collector Output | | | 10 | μA | $V_{CC} = 16\text{ V}$, $V_{OH} = 30\text{ V}$, $I_F = 0\text{ mA}^{(6)}$, $T_A = 25^{\circ}\text{C}$ |
| $I_F(+)$ | LED Positive-Going Threshold Current | | | 8 | mA | $V_{CC} = 5\text{ V}$, $T_A = 25^{\circ}\text{C}$ |
| $I_F(+)/I_F(-)$ | Hysteresis | | 1.2 | | | $V_{CC} = 5\text{ V}$ |
| t_r, t_f | Output Rise Time, Output Fall Time | | 50 | | ns | $V_{CC} = 5\text{ V}$, $T_A = 25^{\circ}\text{C}$ $I_F = 0$ or 8 mA |
| t_{PLH}, t_{PHL} | Propagation Delay Low-High & High-Low | | 3.0 | | μs | $R_L = 300\text{ }\Omega$ to 5 V $C_L = 50\text{ pF}$ |

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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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Types OPB460, OPB470 “11” Series

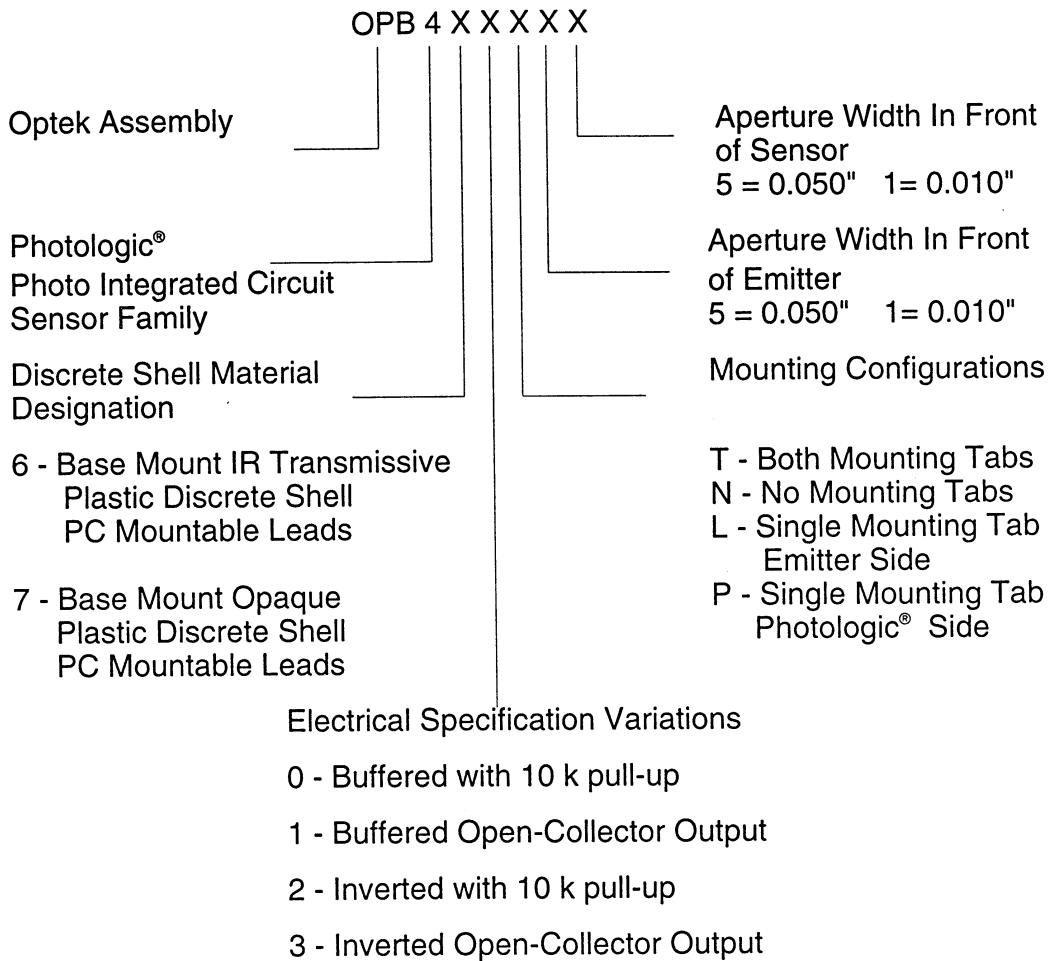


Electrical Characteristics (T_A = -40° C to +85° C unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|--|----------------------|-----|------|-------|--|
| Input Diode | | | | | | |
| 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 | | | | | | |
| V _{CC} | Operating D.C. Supply Voltage | 4.5 | | 16.0 | V | |
| I _{CCL} | Low Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | V _{CC} = 16 V, I _F = 0 mA ⁽⁶⁾ |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | V _{CC} = 16 V, I _F = 12 mA |
| I _{CC} H | High Level Supply Current: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 7.5 | mA | V _{CC} = 16 V, I _F = 12 mA |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 7.5 | mA | V _{CC} = 16 V, I _F = 0 mA ⁽⁶⁾ |
| V _{OL} | Low Level Output Voltage: Buffered with 10 k pull-up Buffered Open-Collector Output | | | 0.4 | V | V _{CC} = 4.5 V, I _{OL} = 16 mA I _F = 0 mA |
| | Inverted with 10 k pull-up Inverted Open-Collector Output | | | 0.4 | V | V _{CC} = 4.5 V, I _{OL} = 16 mA I _F = 12 mA ⁽⁶⁾ |
| V _{OH} | High Level Output Voltage: Buffered with 10 k pull-up | V _{CC} -1.5 | | | V | V _{CC} = 4.5 V to 16 V, I _{OH} = -800 μA I _F = 12 mA |
| | Inverted with 10 k pull-up | V _{CC} -1.5 | | | V | V _{CC} = 4.5 V to 16 V, I _{OH} = -800 μA I _F = 0 mA ⁽⁶⁾ |
| I _{OH} | High Level Output Current: Buffered Open-Collector Output | | | 10 | μA | V _{CC} = 16 V, V _{OH} = 30 V, I _F = 12 mA, T _A = 25° C |
| | Inverted Open-Collector Output | | | 10 | μA | V _{CC} = 16 V, V _{OH} = 30 V, I _F = 0 mA ⁽⁶⁾ , T _A = 25° C |
| I _F (+) | LED Positive-Going Threshold Current | | | 12 | mA | V _{CC} = 5 V, T _A = 25° C |
| I _F (+)/I _F (-) | Hysteresis | | 1.2 | | | V _{CC} = 5 V |
| t _r , t _f | Output Rise Time, Output Fall Time | | 50 | | ns | V _{CC} = 5 V, T _A = 25° C I _F = 0 or 12 mA |
| t _{PLH} , t _{PHL} | Propagation Delay Low-High & High-Low | | 3.0 | | μs | R _L = 300 Ω to 5 V C _L = 50 pF |

Types OPB460, OPB470 Series

PART NUMBER GUIDE



SLOTTED OPTICAL SWITCHES

Schematics

