OPB960, OPB970, OPB980, OPB990 Series

Features:

- Choice of logic and output driver circuits
- Choice of aperture size, covered or open
- Wire or PCB leads
- Choice of mounting features
- Direct TTL, LSTTL, CMOS Interface



Description:

The OPB960/ 970/ 980/ 990 series of non-contact Photologic[®] slotted optical switches provides flexibility in meeting application specific requirements for the design engineer.

Building from a standard housing with a 0.125" (3.18mm) wide slot, the user can specify output logic state, output driver circuit, aperture width, aperture surface and mounting tab locations. Furthermore, an option of wire or PCB leads allows electrical interface flexibility.

The device body is an opaque plastic which minimizes sensitivity to both visible and near-infrared external light sources which may impact operation. Aperture width choices provide different optical resolution for motion sensing. A covered aperture provides dust protection, while an open aperture provides maximum protection against external light sources.

Electrical operation is over a wide supply voltage range. LED emissions are near-infrared (850—940nm). Detector digital output logic choices of buffer or inverter with totem-pole or open-collector driver circuit simplify interface for various electrical requirements.

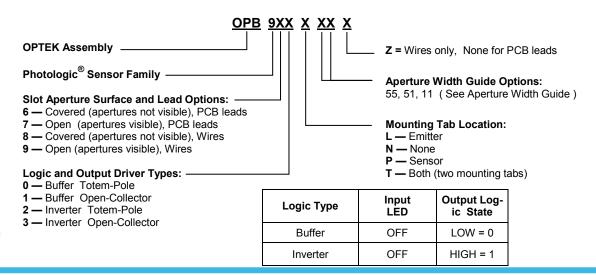
Custom electrical, wire and cabling services are available.

Contact your local representative or OPTEK for more information. Compliant to EU RoHS Directive 2002/95/EC

Applications:

- Speed and direction indication
- Rotary encoders
- Mechanical switch replacement
- Mechanical limit indication
- Printers Top of form, End of travel, Home position.
- Sliding Door Automotive and Lift gate applications

Part Number Guide

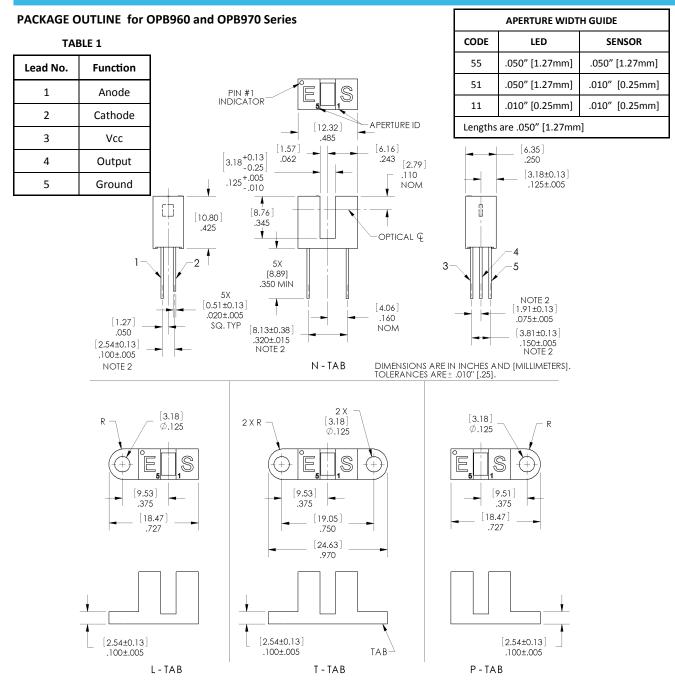


General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.



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Notes:

- (1) RMA flux recommended. Duration can be extended to 10 seconds max.
- (2) Feature controlled at body.
- (3) Highly activated water soluble fluxes may attack plastic. Recommend trial to verify application.
- (4) Maximum lead soldering temperature [1.6mm from case for 5 seconds with soldering iron] 260° C.
- (5) Cathode lead may be shorter.
- (6) Part number marking may be on any side.

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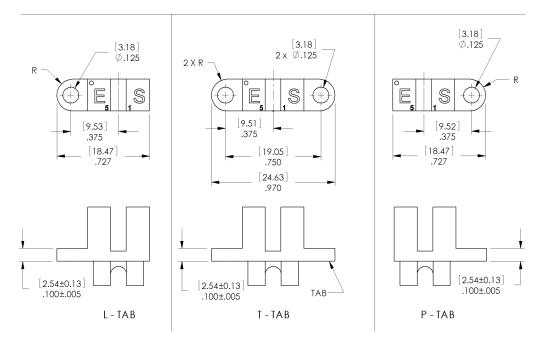


DIMENSIONS ARE IN INCHES AND [MILLIMETERS]. TOLERANCES ARE \pm .010 [0.25]

OPB960, OPB970, OPB980, OPB990 Series

PACKAGE OUTLINE for OPB980 and OPB990 Series **APERTURE WIDTH GUIDE** CODE LED **SENSOR** TABLE 2 55 .050" [1.27mm] .050" [1.27mm] Wire Color **Function** S 51 .050" [1.27mm] .010" [0.25mm] Red Anode .010" [0.25mm] .010" [0.25mm] APERTURE ID [12.32] Black Cathode .485 Lengths are .050" [1.27mm] [1.58] White Vcc .062 [6.16] 3.18^{+0.13} -0.25 [6.35] Blue Output .250 [2.79] [3.18±0.13] .125 +.005 Ground .110 Green .125±.005 -.010 NOM # [8.76] [10.80] .345 .425 1 OPTICAL G [4.83] .190 [609.6] 26 AWG UL RATED 24.0 MINН [4.83] [10.03] .395

N - TAB



Notes:

- (7) Wire is 26AWG, UL Rated PVC insulation.
- (8) Ideal torque for bolt or screw 0,45 to 0,68 Nm (4 to 6 Lb-in).
- (9) When using a thread lock compound, ND Industries "ND Vibra-Tite" Formula 3" will avoid stress cracking plastic.
- (10) Plastic is soluble in chlorinated hydrocarbons and ketones. Methanol or isopropanol are recommended as cleaning agents.

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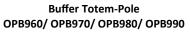
OPB960, OPB970, OPB980, OPB990 Series

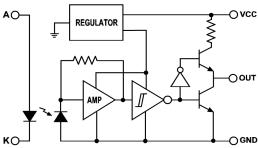
ALLIAN DE CENTRAL DE CONTRAL DE CONTRAL DE CONTRAL DE CONTRA DE CO				
Absolute Maximum Ratings (T _A = 25° C unless otherwise noted)				
Storage Temperature Range	-40°C to +85° C			
Operating Temperature Range	-40°C to +70° C			
Input Diode (E)				
Input Diode Power Dissipation	100 mW ⁽¹¹⁾			
Input Diode Forward D.C. Current, T _A = 25°C	40 mA ⁽¹⁴⁾			
Input Diode Reverse D.C. Voltage, T _A = 25°C	2 V			
Sensor (S)				
Supply Voltage (V _{cc} to Ground)	18 V ⁽¹³⁾			
Output Photologic® Power Dissipation	200 mW ⁽¹²⁾			
Voltage at Output Lead (Open-Collector Output), T _A = 25°C	35V			
Short Circuit Output Current to Ground (I _{OS}) 1 sec Max.	30 mA			

Notes:

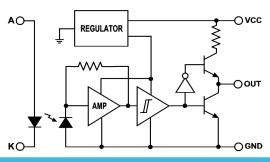
- (11) Derate linearly 2.22 mW / °C above 25° C.
- (12) Derate linearly 4.44 mW / °C above 25° C.
- (13) Prior to 2004 Vcc was limited to 5.5V maximum.
- (14) Do not connect input diode directly to a voltage source without an external current limiting resistor.

Block Diagram

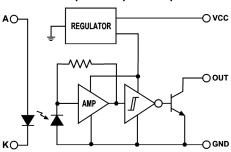




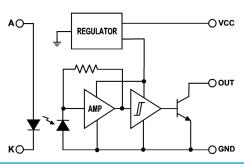
Inverter Totem-Pole OPB962/ OPB972/ OPB982/ OPB992



Buffer Open-Collector OPB961/ OPB971/ OPB981/ OPB991



Inverter Open-Collector OPB963/ OPB973/ OPB993





OPB960, OPB970, OPB980, OPB990 Series

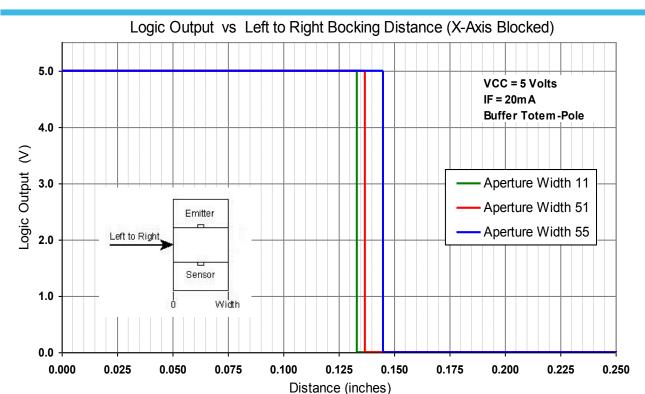
Electrical Characteristics (T _A = 25° C unless otherwise noted)							
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS	
Input Diode (See OP140 / OP240 LED for additional information)							
V _F	Forward Voltage	-	-	1.70	V	I _F = 20 mA, T _A = 25° C	
I _R	Reverse Current	-	-	100	μΑ	V _R = 2.0 V, T _A = 25° C	
Coupled	(See OPL560 Detector for additional information)						
V _{cc}	Operating D.C. Supply Voltage	4.5	-	16	V		
I _{cc}	Supply Current	-	-	12	mA	V _{CC} = 4.5V to 16V	
V _{OL}	Low Level Output Voltage: Buffer Totem-Pole OPB960,OPB970 OPB980,OPB990 Buffer Open-Collector OPB961,OPB971 OPB981,OPB991	-	-	0.4	V	$V_{CC} = 4.5V$, $I_{OL} = 12.8mA$ $I_F = 0 mA^{(14)}$	
	Inverter Totem-Pole OPB962,OPB972 OPB982,OPB992 Inverter Open-Collector OPB963,OPB973 OPB983,OPB993					$V_{CC} = 4.5V, I_{OL} = 12.8mA$ $I_F = 15 mA$	
V _{OH}	High Level Output Voltage: Buffer Totem-Pole OPB960,OPB970 OPB980,OPB990	V _{CC} -2.1	-	-	V	V_{CC} = 4.5V to 16V, I_{OH} = 800 μ A I_F = 15 mA	
	Inverter Totem-Pole OPB962,OPB972 OPB982,OPB992					V_{CC} = 4.5V to 16V, I_{OH} = 800 μA I_{F} = $~0$ mA $^{(14)}$	
Іон	High Level Output Current: Buffer Open-Collector OPB961,OPB971 OPB981,OPB991	-	-	100	μА	V_{CC} = 4.5V to 16V, V_{OH} = 30V I_F = 15 mA	
	Inverter Open-Collector OPB963,OPB973 OPB981,OPB991					V_{CC} = 4.5V to 16V, V_{OH} = 30V I_F = 0 mA $^{(14)}$	
I _F (+)	LED Positive-Going Threshold Current ⁽¹⁶⁾	-	-	15	mA	V _{CC} = 5.0V, T _A = 25° C	
I _F (+) / I _F (-)	Hysteresis Ratio	-	1.5	-	-	V _{CC} = 5.0V	
t _R , t _F	Output Rise Time, Output Fall Time	-	70	-	ns	V_{CC} = 5.0V, $I_{F peak}$ = 15 mA, T_A = 25° C 100 kHz square wave, C = 10pF max.	
t _{PLH} , t _{PHL}	Propagation Delay Time Low to High, High to Low	-	5.0	-	μs	$R_L = 360 \Omega$ to GND (Totem-Pole) $R_L = 1K\Omega$ pull-up (Open-Collector)	

Notes:

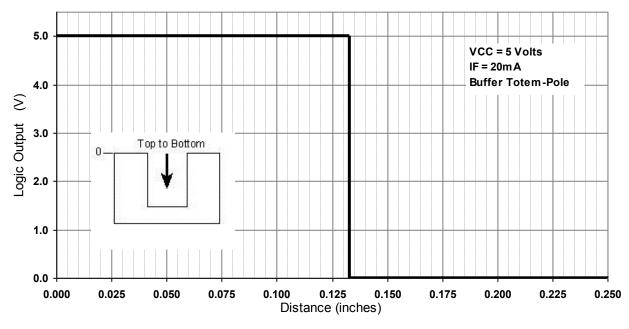
- 14) Normal application would be with light source blocked, simulated by $I_F = 0$ mA.
- 15) All parameters are tested using pulse techniques.
- 16) An increasing current applied to the LED which causes the output logic state to change. For proper application IF(+), LED current, should be more than the stated maximum.



OPB960, OPB970, OPB980, OPB990 Series



Logic Output vs Top to Bottom Bocking Distance (Y-Axis Blocked)



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EESX4009P1MID1 EE-SMR3-1T GP1A51HRJ00F HOA6991-500 EE-SX460-P1 OPB960N11 OPB120B OPB121B HOA0961-N51
HOA0963-T51 HOA0973-N51 HOA0973-T51 HOA2006-001 HOA2007-001 HOA6961-T51 HOA6971-T55 HOA6972-T51 HOA6981L55 HOA6981-T51 HOA6982-T51 HOA6990-L51 HOA6991-L51 HOA6991-T51 HOA6991-T55 HOA6992-L51 HOA6992-N55 EESA407-P2 EE-SPX303-N EE-SX3009-P1 EE-SX301 EE-SX305 EE-SX3070 EE-SX3081 EE-SX3088-W11 EE-SX3096-W11 EE-SX3160W11 EE-SX3161-W11 EE-SX3162-P1 EE-SX3162-P1-Z EE-SX3163-P1 EE-SX3163-P2 EE-SX3164-P1 EE-SX3239-P2 EE-SX384 EESX398 EE-SX4009-P1 EE-SX4009-P10 EE-SX4070 EE-SX4081 EE-SX4088