

Product Bulletin OPB930W  
July 1996

# Photologic® Slotted Optical Switches

## Types OPB930W, OPB940W Series



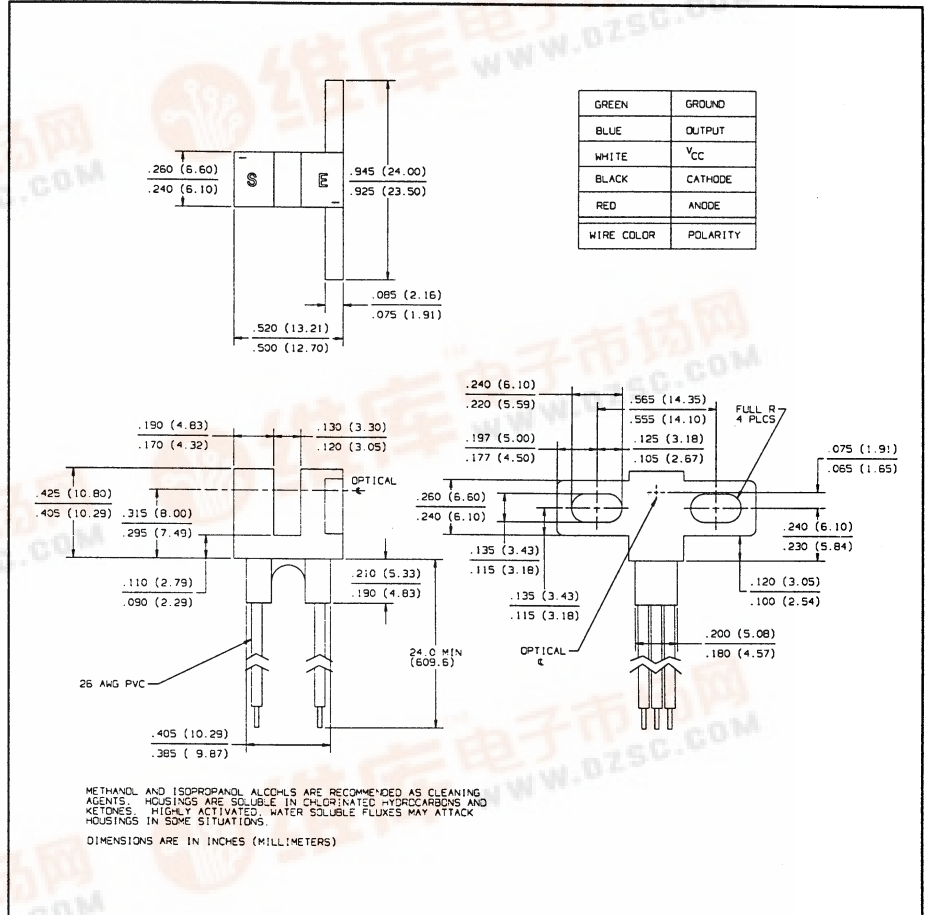
### Features

- 24" min 26AWG wire leads
- Choice of aperture
- Choice of output configuration
- Choice of opaque or IR transmissive shell material
- Data rates to 250 kBaud
- Side mount configuration

### Description

The OPB930W and OPB940W 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, and (3) aperture width. Available with PC board mountable leads as OPB930L/OPB940L 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.



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

Supply Voltage, V <sub>CC</sub> (Not to exceed 3 sec.)	10 V
Storage Temperature Range	-40° C to +80° C
Operating Temperature Range	-40° C to +70° C
Input Diode Power Dissipation	100 mW <sup>(1)</sup>
Output Photologic™ Power Dissipation	200 mW <sup>(2)</sup>
Total Device Power Dissipation	300 mW <sup>(3)</sup>
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) Derate linearly 2.22 mW/° C above 25° C.
- (2) Derate linearly 4.44 mW/° C above 25° C.
- (3) Derate linearly 6.66 mW/° C above 25° C.
- (4) The OPB930W/OPB940W series of switches are terminated with 24 inches of 7 strand 26 AWG, UL 1429 insulated wire on each terminal. Insulation colors and functions are:

RED - IRED Anode                      WHITE - V<sub>CC</sub>  
BLACK - IRED Cathode                BLUE - Output  
GREEN - Ground

Other wire lengths and/or colors in addition to customer selected connectors are available. Contact your local representative or call the factory.

- (5) Normal application would be with light source blocked, simulated by I<sub>f</sub> = 0 mA.
- (6) All parameters tested using pulse technique.



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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	$\mu\text{A}$	$V_R = 2\text{ V}$ , $T_A = 25^\circ\text{C}$
<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: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(5)}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$
$I_{CCH}$	High Level Supply Current: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(5)}$
$V_{OL}$	Low Level Output Voltage: Buffered Totem-Pole Output Buffered Open-Collector Output			0.4	V	$V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$ $I_F = 0\text{ mA}^{(5)}$
	Inverted Totem-Pole Output Inverted Open-Collector Output			0.4	V	$V_{CC} = 4.75\text{ V}$ , $I_{OL} = 12.8\text{ mA}$ $I_F = 15\text{ mA}$
$V_{OH}$	High Level Output Voltage: Buffered Totem-Pole Output	2.4			V	$V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ mA}$ $I_F = 15\text{ mA}$
	Inverted Totem-Pole Output	2.4			V	$V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ mA}$ $I_F = 0\text{ mA}^{(5)}$
$I_{OH}$	High Level Output Current: Buffered Open-Collector Output			100	$\mu\text{A}$	$V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $I_F = 15\text{ mA}$ , $T_A = 25^\circ\text{C}$
	Inverted Open-Collector Output			100	$\mu\text{A}$	$V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $I_F = 0\text{ mA}$ , $T_A = 25^\circ\text{C}$
$I_{F(+)}$	LED Positive-Going Threshold Current			15	mA	$V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$
$I_{F(+)} / I_{F(-)}$	Hysteresis		2.0			$V_{CC} = 5\text{ V}$
$I_{OS}$	Short Circuit Output Current: Buffered Totem-Pole Output	-30		-100	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 15\text{ mA}$ Output = GND
	Inverted Totem-Pole Output	-30		-100	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}$ Output = GND
$t_r, t_f$	Output Rise Time, Output Fall Time		70		ns	$V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$ $I_F = 0$ or $15\text{ mA}$ $R_L = 8\text{ TTL Loads (Totem-Pole)}$ $R_L = 360\ \Omega$ (Open-Collector)
$t_{PLH}, t_{PHL}$	Propagation Delay Low-High & High-Low		5.0		$\mu\text{s}$	

SLOTTED  
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SWITCHES

## Housing

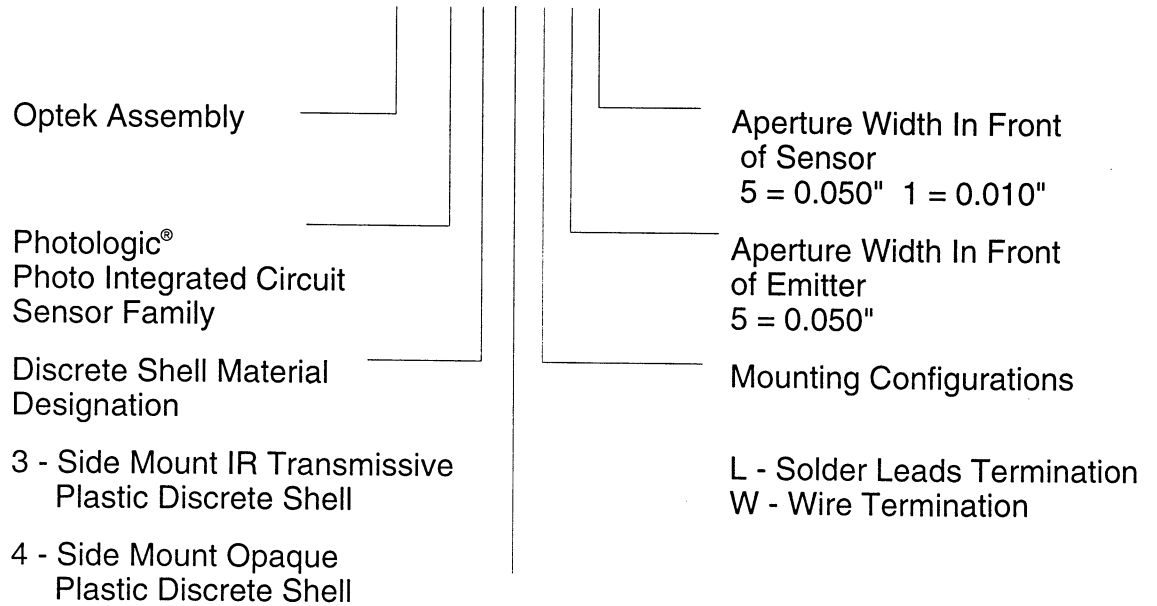
All housings are an opaque grade of injection-molded plastic to minimize the assembly's sensitivity to ambient radiation, both visible and near-infrared. Discrete shells (exposed on the parallel faces inside the device throat) are either IR transmissive plastic for applications where aperture contamination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

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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## PART NUMBER GUIDE

OPB 9 X X X X X

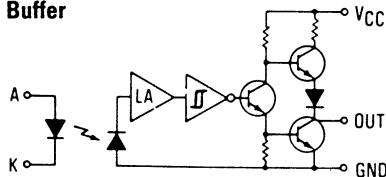


### Electrical Specification Variations

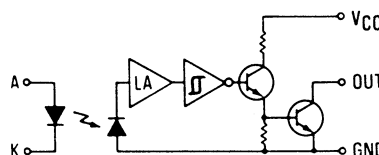
- 0 - Buffered Totem-Pole Output
- 1 - Buffered Open-Collector Output
- 2 - Inverted Totem-Pole Output
- 3 - Inverted Open-Collector Output

### Schematics

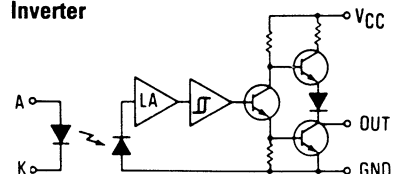
**OPB930, OPB940  
(Totem-Pole Output)  
Buffer**



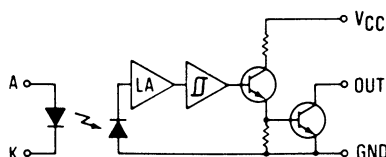
**OPB931, OPB941  
(Open-Collector Output)  
Buffer**



**OPB932, OPB942  
(Totem-Pole Output)  
Inverter**



**OPB933, OPB943  
(Open-Collector Output)  
Inverter**



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$I_{CCL}$	Low Level Supply Current: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	$V_{CC} = 5.25\text{ V}$ , $I_F = 0\text{ mA}^{(5)}$
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	Inverted Totem-Pole Output	2.4			V	$V_{CC} = 4.75\text{ V}$ , $I_{OH} = -800\text{ mA}$ $I_F = 0\text{ mA}^{(5)}$
$I_{OH}$	High Level Output Current: Buffered Open-Collector Output			100	$\mu\text{A}$	$V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $I_F = 15\text{ mA}$ , $T_A = 25^\circ\text{C}$
	Inverted Open-Collector Output			100	$\mu\text{A}$	$V_{CC} = 4.75\text{ V}$ , $V_{OH} = 30\text{ V}$ , $I_F = 0\text{ mA}$ , $T_A = 25^\circ\text{C}$
$I_{F(+)}$	LED Positive-Going Threshold Current			15	mA	$V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$
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$t_{PLH}, t_{PHL}$	Propagation Delay Low-High & High-Low		5.0		$\mu\text{s}$	

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