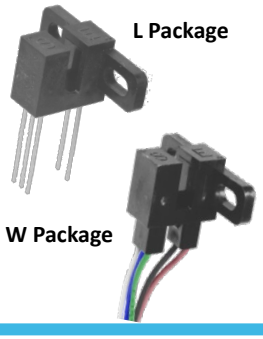
Photologic® Slotted Optical Switch

OPB930 and OPB940 (L and W Series)



Features:

- Choice of aperture size
- Choice of 4 output configurations
- Choice of opaque or IR transmissive shell
- Choice of pins (L) or wires (W)
- 0.125” (3.18 mm) slot width
- 0.320” (8.128 mm) lead spacing for printed circuit board (side mounting)
- Data rates to 200 kBaud

Description:

The **OPB930** and **OPB940** series of Photologic® integrated circuit switches provide optimum flexibility for the design engineer. Building from a standard housing with a 0.125” (3.18 mm) wide slot, a user can specify the type and polarity of TTL output, discrete shell material, aperture width and either 0.350” (8.9 mm) long pins **(L Series)** or 24” (610 mm) #26 AWG, UL rated wire leads **(W Series)**.

All housings are made from an opaque grade of injection-molded plastic that minimizes the assembly’s sensitivity to both visible and near-infrared ambient radiation. 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).

Electrical output can be specified as either TTL Totem Pole or TTL Open Collector, either of which can be supplied with buffer or inverter output polarity. All devices have the added stability of a built-in hysteresis amplifier.

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

Part Number Guide – OPB930 and OPB940 Series

OPB 9 X X X X X Z – – – – – **For “W” series only**

Optek Assembly

Photologic® Integrated Circuit Sensor Family

Discrete Shell Material:
3 – Side mount IR transmissive Plastic discrete shell
4 – Side mount opaque Plastic discrete shell

Electrical Specification Variations:
0 = Buffered Totem-Pole Output
1 = Buffered Open-Collector Output
2 = Inverted Totem-Pole Output
3 = Inverted Open-Collector Output

Sensor Aperture:
1 – 0.010” (.254 mm)
5 – 0.050” (1.27 mm)

Emitter Aperture:
5 – 0.050” (12.70 mm)

Mounting Configurations:
L –Solder leads termination
W –Wire termination

RoHS

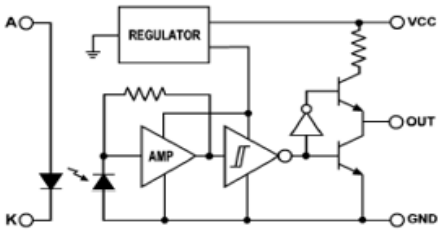
CONTAINS POLYSULFONE
To avoid stress cracking, we suggest using ND Industries’ **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK’s molded plastics.

General Note
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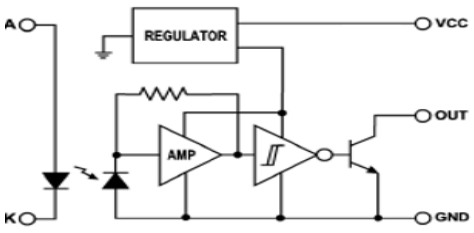
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OPB930, OPB940 Buffered Totem-Pole



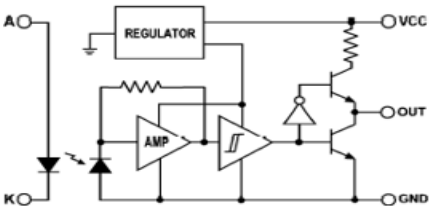
Light On—Output High

OPB931, OPB941 Buffered Open-Collector



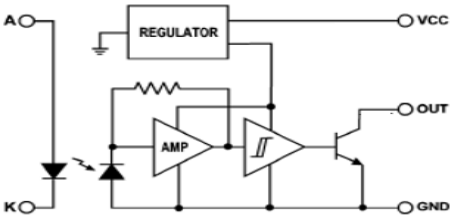
Light On—Output High

OPB932, OPB942 Inverted Totem-Pole



Light On—Output Low

OPB933 & OPB943 Inverted Open-Collector



Light On—Output Low

Electrical Specifications

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

Supply Voltage, V_{CC} (not to exceed 3 seconds)	18 V
Operating Temperature Range	-40° C to +70° C
Storage Temperature Range	-40° C to +85° C
Lead Soldering Temperature (1/16 inch (1.6 mm) from the case for 5 sec. with soldering iron [1]	260° C
Input Infrared LED	
Input Diode Power Dissipation [2]	100 mW
Output Photologic® Power Dissipation [3]	200 mW
Total Device Power Dissipation [4]	300 mW
Output Photologic®	
Voltage at Output Lead (Open Collector Output)	35 V
Diode Forward DC Current	40 mA
Diode Reverse DC Voltage	2 V

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
(2) Derate linearly 1.77 mW/° C above 25°.
(3) Derate linearly 2.50 mW/° C above 25°.
(4) Derate linearly 4.27 mW/° C above 25°.
(5) OPB930L/OPB940L series devices are terminated with 0.020” square leads designed for printed circuit board mounting.
(6) Methanol and isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
(7) All parameters tested using pulse technique.

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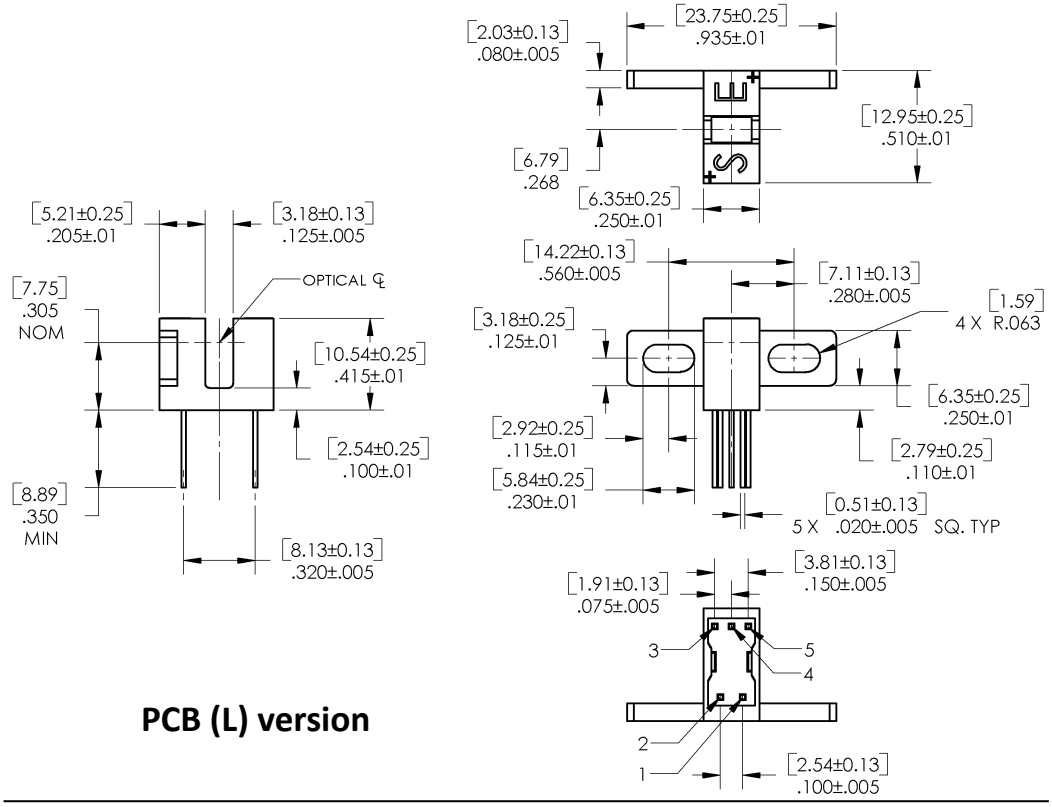
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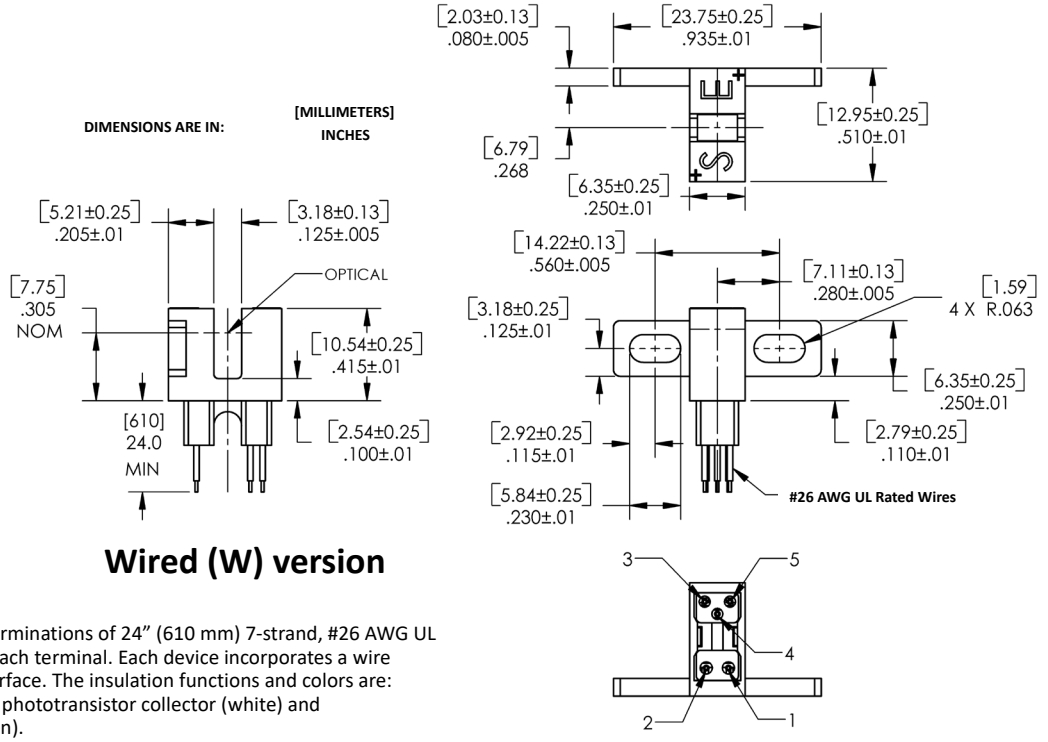
Photologic® Slotted Optical Switch

OPB930 and OPB940 (L and W Series)

Color- Pin #	Description
Red—1	Anode
Black—2	Cathode
White—3	V_{CC}
Blue—4	Output
Green—5	Ground



PCB (L) version



Wired (W) version

The W Series includes wire terminations of 24” (610 mm) 7-strand, #26 AWG UL approved insulated wire on each terminal. Each device incorporates a wire strain relief at the housing surface. The insulation functions and colors are: anode (red), cathode (black), phototransistor collector (white) and phototransistor emitter (green).

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Electrical Specifications

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage	1.0	-	1.7	V	I_F = 20 mA
I_R	Reverse Current	-	-	100	µA	V_R = 2.0 V
Output Photologic® Sensor						
V_{CC}	Operating D.C. Supply Voltage	4.5	-	16	V	-
I_{CCL} (1)	Low Level Supply Current: Buffered Totem Pole Output Buffered Open-Collector Output	-	-	15	mA	V_{CC} = 16 V, I_F = 0 mA
	Inverted Totem-Pole Output Inverted Open-Collector Output					V_{CC} = 16 V, I_F = 20 mA
I_{CCH} (1)	High Level Supply Current: Buffered Totem Pole Output Buffered Open-Collector Output	-	-	15	mA	V_{CC} = 16 V, I_F = 20 mA
	Inverted Totem-Pole Output Inverted Open-Collector Output					V_{CC} = 16 V, I_F = 0 mA
V_{OL} (1)	Low Level Output Voltage: Buffered Totem Pole Output Buffered Open-Collector Output	-	-	0.4	V	V_{CC} = 4.5 V, I_{OL} = 16 mA, I_F = 0 mA
	Inverted Totem-Pole Output Inverted Open-Collector Output					V_{CC} = 4.5 V, I_{OL} = 16 mA, I_F = 20 mA
V_{OH} (1)	High Level Output Voltage: Buffered Totem-Pole Output	V_{CC} -2.1	-	-	V	V_{CC} = 4.5 V, I_{OH} = -800 µA, I_F = 20 mA
	Inverted Totem-Pole Output					V_{CC} = 4.5 V, I_{OH} = -800 µA, I_F = 0 mA
I_{OH}	High Level Output Current: Buffered Open-Collector Output	-	-	100	µA	V_{CC} = 4.5 V to 16 V, V_{OH} = 30 V, I_F = 20 mA
	Inverted Open-Collector Output (1)					V_{CC} = 4.5 V to 16 V, V_{OH} = 30 V, I_F = 0 mA
$I_{F(+)}$	LED Positive-Going Threshold Current	-	-	20	mA	V_{CC} = 5.0 V
$I_{F(+)}$, $I_{F(-)}$	Hysteresis	-	1.5	2.0	V	V_{CC} = 5.0 V

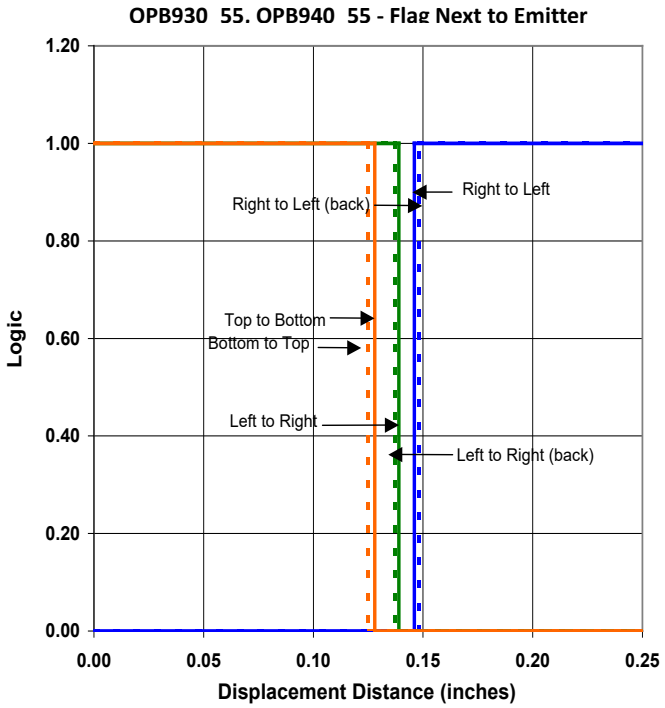
Notes:
(1) Normal application would be with light source blocked, simulated by I_F = 0 mA.
(2) All parameters tested using pulse technique.

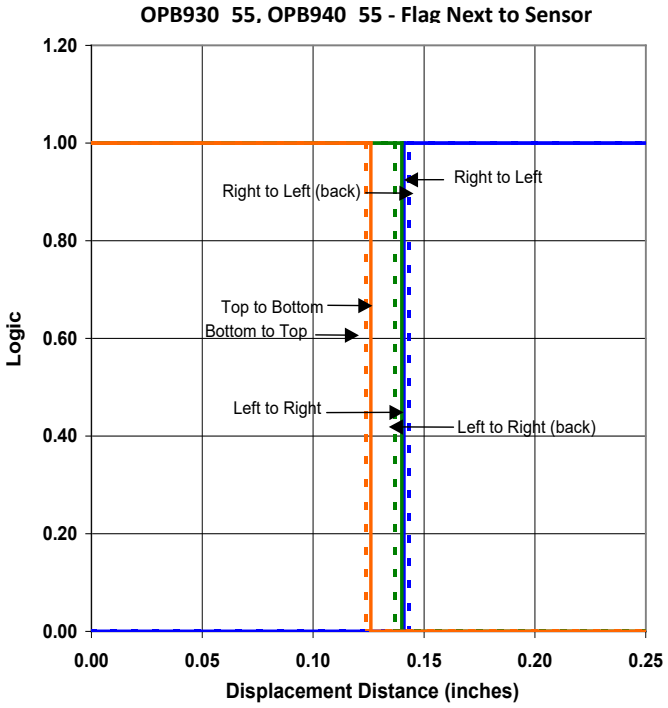
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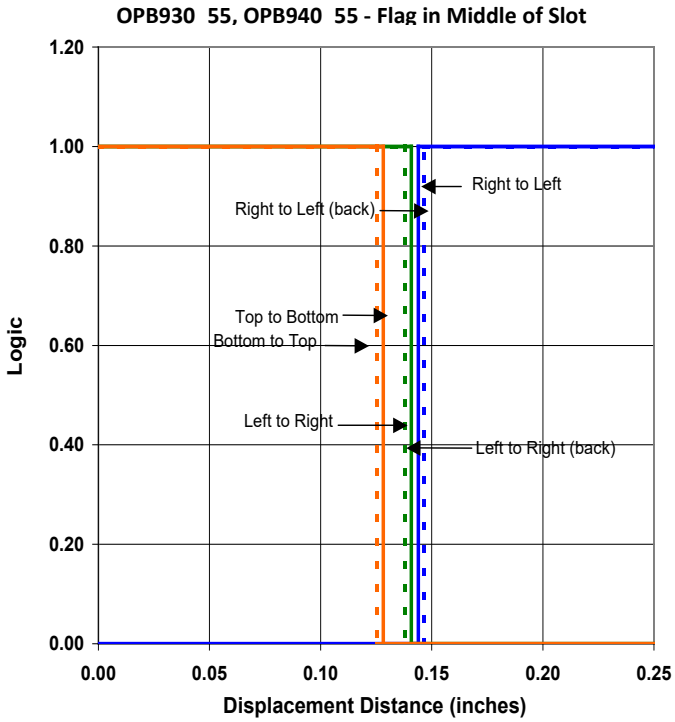
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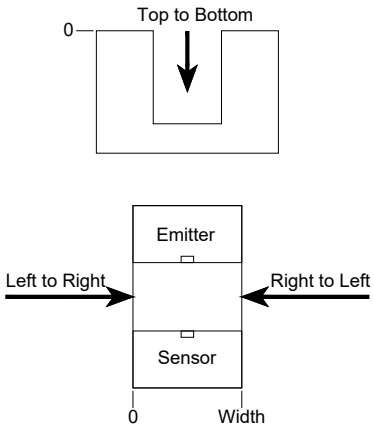
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Typical Performance







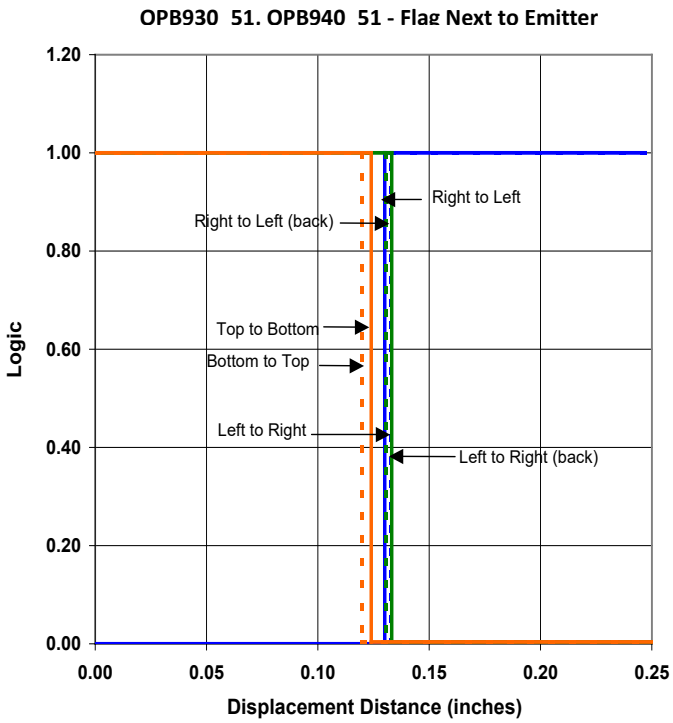


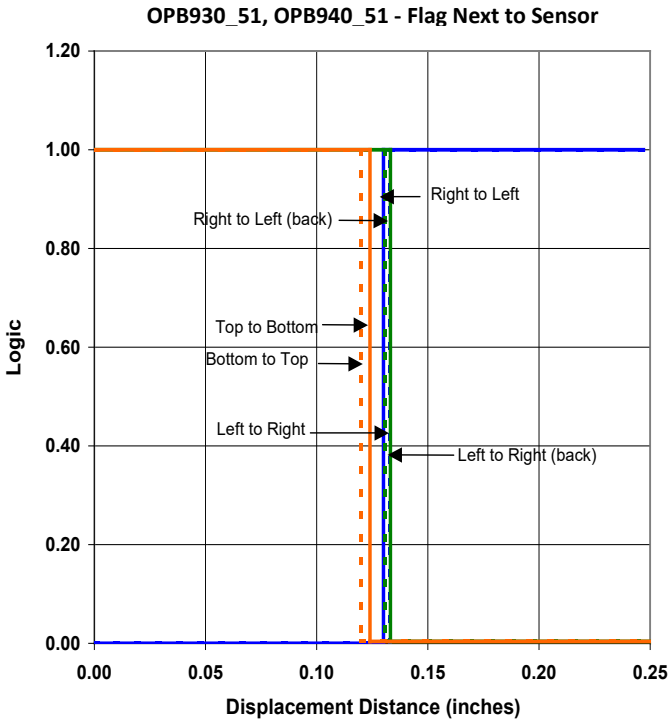
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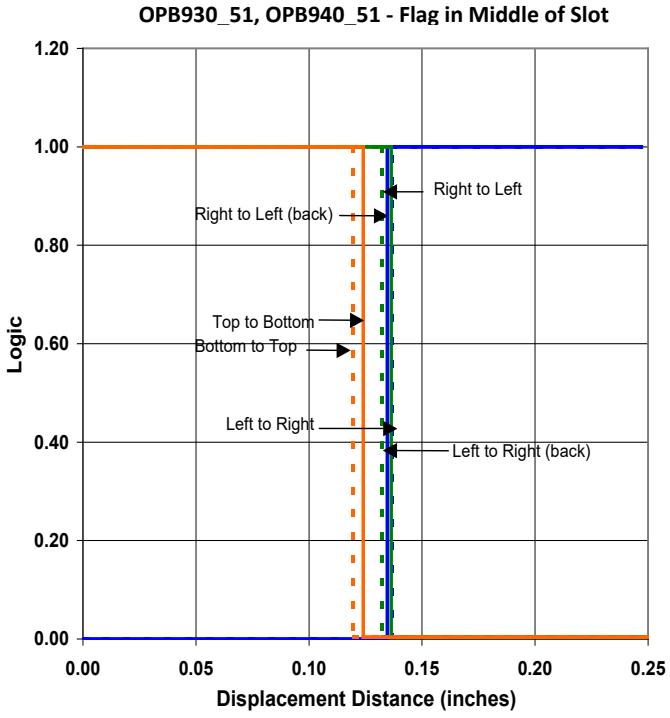
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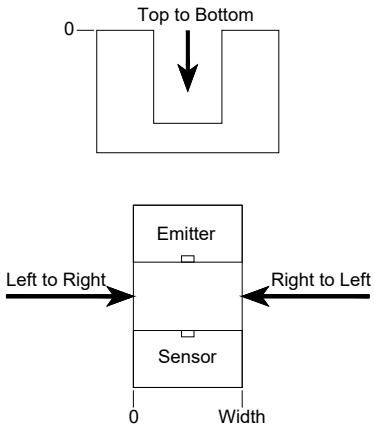
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Typical Performance









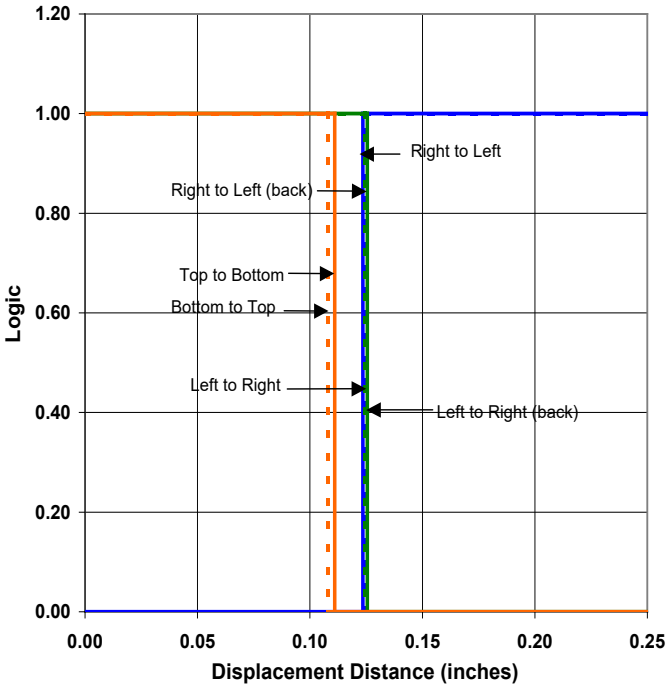
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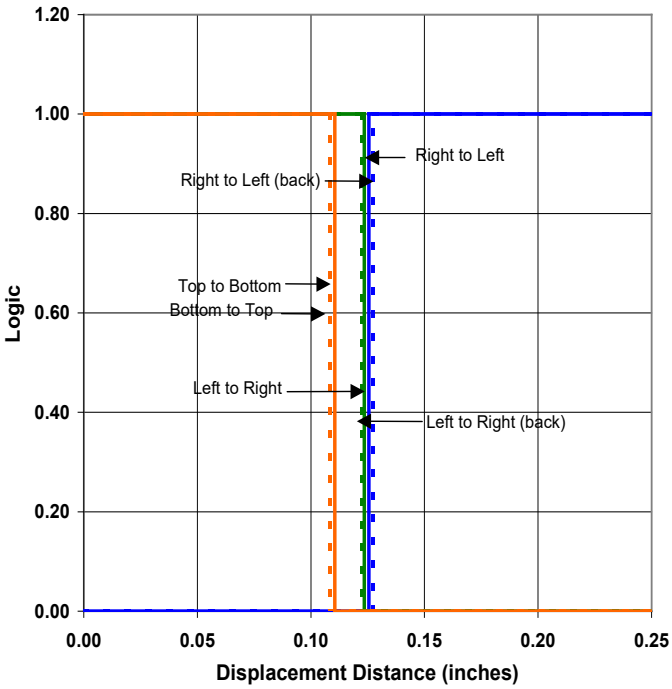
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Typical Performance

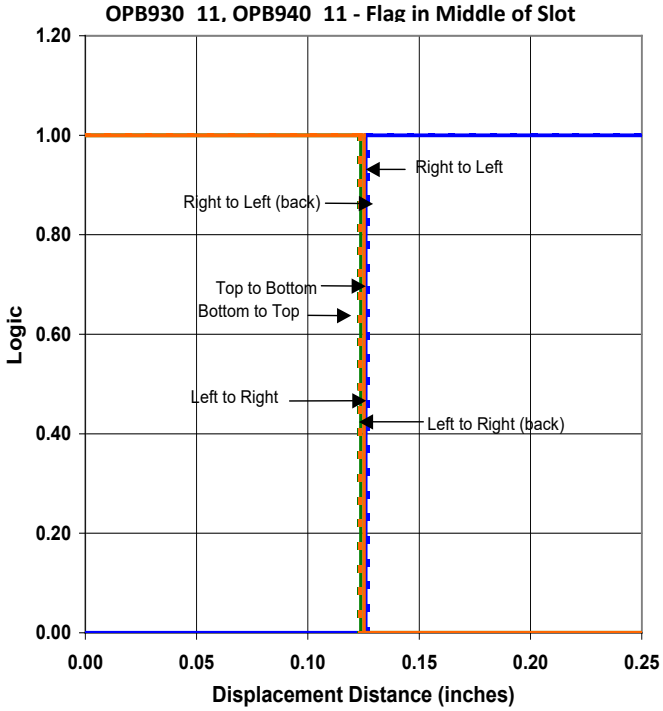
OPB930 11, OPB940 11 - Flag Next to Emitter

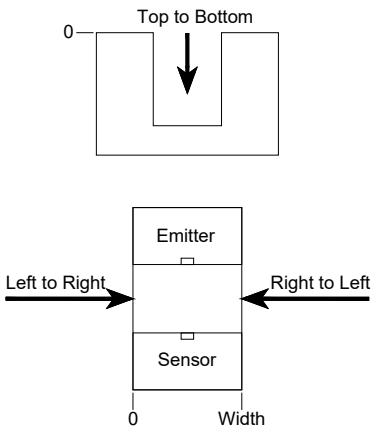


OPB930 11, OPB940 11 - Flag Next to Sensor



OPB930 11, OPB940 11 - Flag in Middle of Slot





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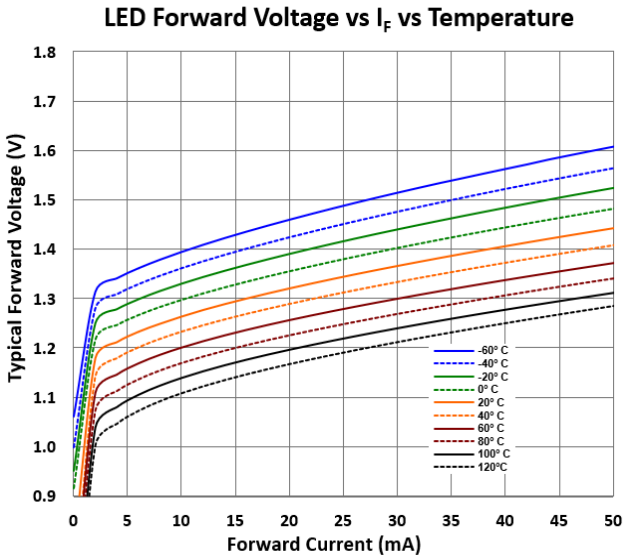
Electrical Specifications

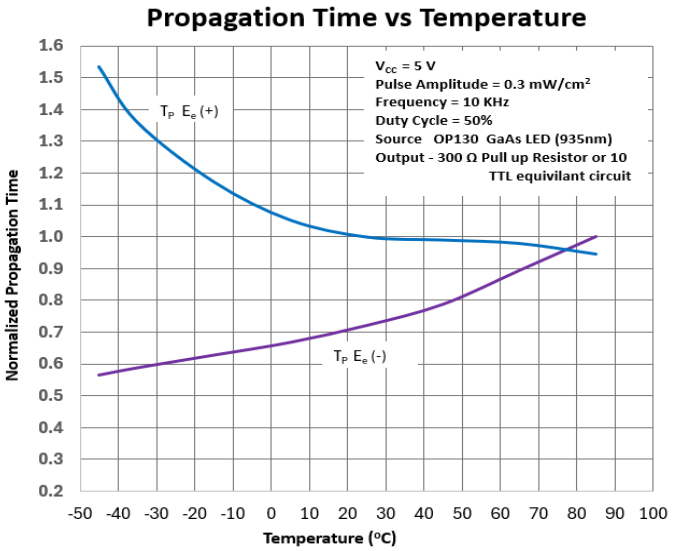
Electrical Characteristics (T_A = 25° C unless otherwise noted)

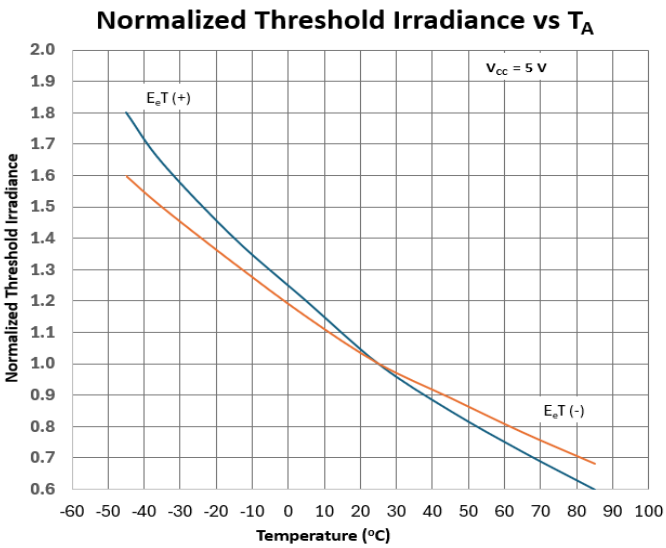
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
t_r, t_f	Output Rise Time, Output Fall Time	-	70	-	ns	V_{CC} = 5 V, I_F = 0 or 15 mA
T_{PLH}	Propagation Delay Low-High	-	5.0	-	µs	R_L = 8TTL loads (Totem Pole)
T_{PHL}	Propagation Delay High-Low	-	5.0	-	µs	R_L = 360 Ω (Open-Collector)

Notes:
(1) Normal application would be with light source blocked, simulated by I_F = 0 mA.
(2) All parameters are tested using pulse techniques.

Typical Performance







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