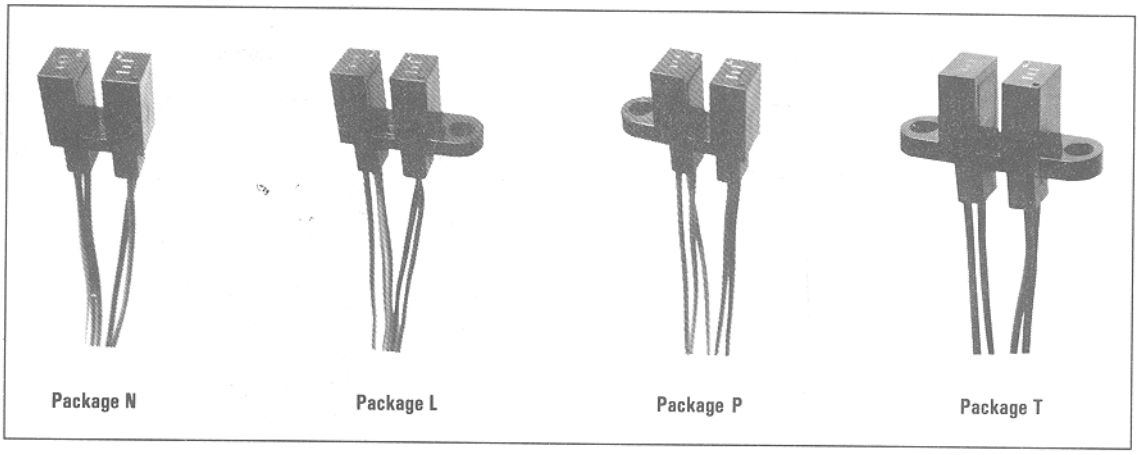
Product Bulletin OPB980

January 2006

Photologic™ Slotted Optical Switches
Types OPB980, OPB990 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
- 24" min 26AWG wire leads

Description

The OPB980 and OPB990 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) choice of mounting configuration.

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.

Replaces

KT980/990, KLT180/190 series.
Upgrades OPB980/OPB990 series

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

Supply Voltage, V_{CC} (Not to exceed 3 sec.)	10V
Storage Temperature Range	-40°C to +80°C
Operating Temperature Range	-40°C to +70°C
Input Diode Power Dissipation	100mW(1)
Output Photologic™ Power Dissipation	200mW(2)
Total Device Power Dissipation	300mW(3)
Voltage at Output Lead (Open Collector Output)	35V
Diode Forward D.C. Current	40mA
Diode Reverse D.C. Voltage	2V

Notes:
(1) Derate linearly 2.22mW/°C above 25°C.
(2) Derate linearly 4.44mW/°C above 25°C.
(3) Derate linearly 6.66mW/°C above 25°C.
(4) The OPB980/OPB990 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_{CC}
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_F = 0mA.
(6) All parameters tested using pulse techniques.

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.

Pb For RoHS compliant devices add "Z" to the end of the part number: OPB980N51Z

Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (214) 323-2200 Fax (214) 323-2396

Types OPB980, OPB990 Series

Electrical Characteristics (T_A = -40°C to +70°C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_F	Forward Voltage			1.7	V	I_F = 20mA, T_A = 25°C
I_R	Reverse Current			100	µA	V_R = 2.0V, T_A = 25°C
Output Photologic™ Sensor						
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} = 5.25V, I_F = 0mA(5)
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	V_{CC} = 5.25V, I_F = 15mA
I_{CCH}	High Level Supply Current: Buffered Totem-Pole Output Buffered Open-Collector Output			15	mA	V_{CC} = 5.25V, I_F = 15mA
	Inverted Totem-Pole Output Inverted Open-Collector Output			15	mA	V_{CC} = 5.25V, I_F = 0mA(5)
V_{OL}	Low Level Output Voltage: Buffered Totem-Pole Output Buffered Open-Collector Output			0.4	V	V_{CC} = 4.75V, I_{OL} = 12.8mA I_F = 0mA(5)
	Inverted Totem-Pole Output Inverted Open-Collector Output			0.4	V	V_{CC} = 4.75V, I_{OL} = 12.8mA I_F = 15mA
V_{OH}	High Level Output Voltage: Buffered Totem-Pole Output	2.4			V	V_{CC} = 4.75V, I_{OH} = -800µA I_F = 15mA
	Inverted Totem-Pole Output	2.4			V	V_{CC} = 4.75V, I_{OH} = -800µA I_F = 0mA(5)
I_{OH}	High Level Output Current: Buffered Open-Collector Output			100	µA	V_{CC} = 4.75V, V_{OH} = 30V I_F = 15mA, T_A = 25°C
	Inverted Open-Collector Output			100	µA	V_{CC} = 4.75V, V_{OH} = 30V, I_F = 0mA, T_A = 25°C
$I_{F(+)}$	LED Positive-Going Threshold Current			15	mA	V_{CC} = 5.0V, T_A = 25°C
$I_{F(+)}/I_{F(-)}$	Hysteresis		2.0			V_{CC} = 5.0V
I_{OS}	Short Circuit Output Current: Buffered Totem-Pole Output	-15		-60	mA	V_{CC} = 5.25V, I_F = 15mA Output = GND
	Inverted Totem-Pole Output	-15		-60	mA	V_{CC} = 5.25V, I_F = 0mA Output = GND
t_r,t_f	Output Rise Time, Output Fall Time		70		ns	V_{CC} = 5V, T_A = 25°C I_F = 0 or 15mA
t_{PLH}, t_{PHL}	Propagation Delay Low-High & High-Low		5.0		µs	R_L = 8TTL Loads (Totem Pole) R_L = 360Ω (Open Collector)

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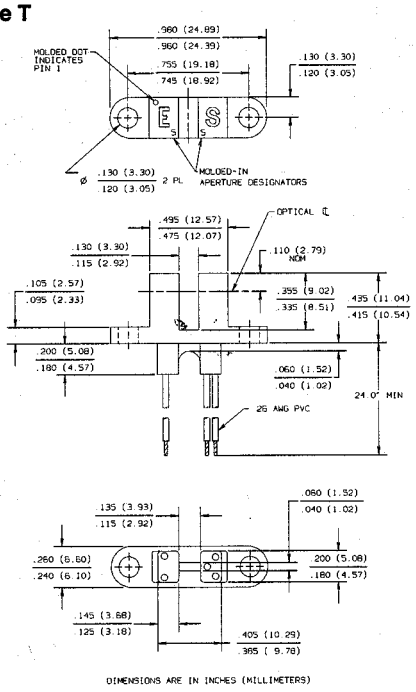
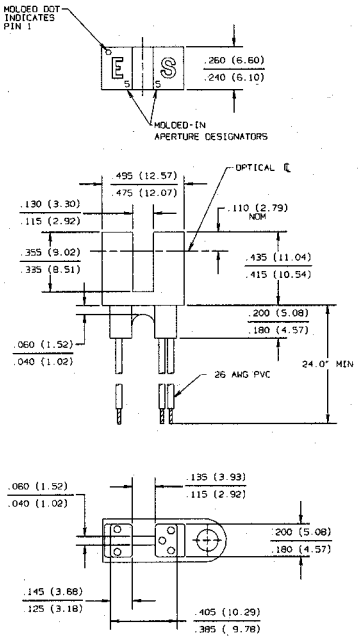
Package T



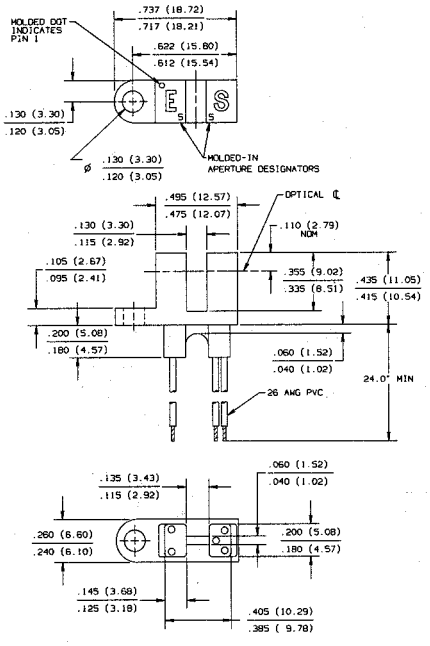
DIMENSIONS ARE IN INCHES (MILLIMETERS)

Package N



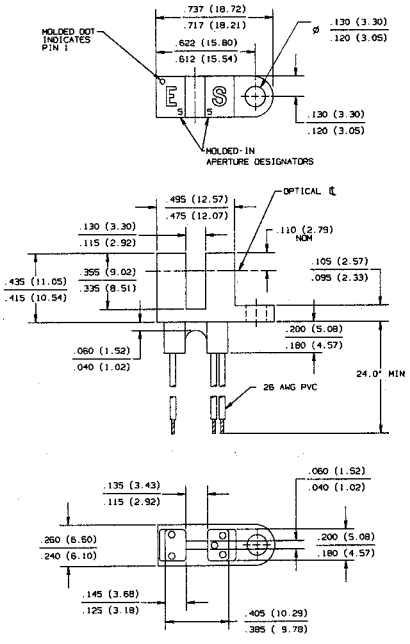
DIMENSIONS ARE IN INCHES (MILLIMETERS)

Package L



DIMENSIONS ARE IN INCHES (MILLIMETERS)

Package P



DIMENSIONS ARE IN INCHES (MILLIMETERS)

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

Optek Assembly

Photologic™
Photo Integrated Circuit
Sensor Family

Discrete Shell Material
Designation

8 - Base Mount IR Transmissive
Plastic Discrete Shell
With Wire Termination

9 - Base Mount Opaque
Plastic Discrete Shell
With Wire Termination

Aperture Width In Front
of Sensor
5 = 0.050" 1= 0.010"

Aperture Width In Front
of Emitter
5 = 0.050" 1= 0.010"

Mounting Configurations

T - Both Mounting Tabs
N - No Mounting Tabs
L - Single Mounting Tab
Emitter Side
P - Single Mounting Tab
Photologic™ Side

Electrical Specification Variations

0 - Buffered Totem-Pole Output

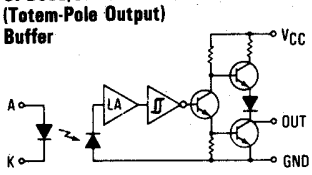
1 - Buffered Open-Collector Output

2 - Inverted Totem-Pole Output

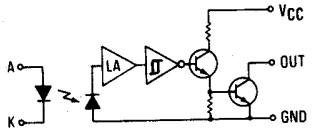
3 - Inverted Open-Collector Output

Schematics

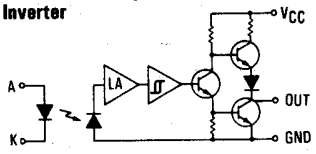
OPB980/OPB990
(Totem-Pole Output)
Buffer



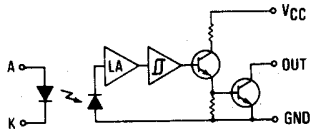
OPB981/OPB991
(Open-Collector Output)
Buffer



OPB982/OPB992
(Totem-Pole Output)
Inverter



OPB983/OPB993
(Open-Collector Output)
Inverter



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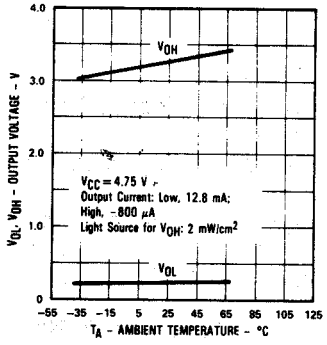
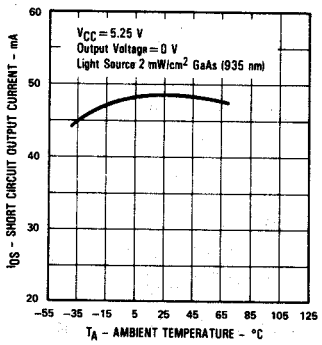
Typical Performance Curves

OPB980, OPB982, OPB990, OPB992

Output Voltage vs Ambient Temperature

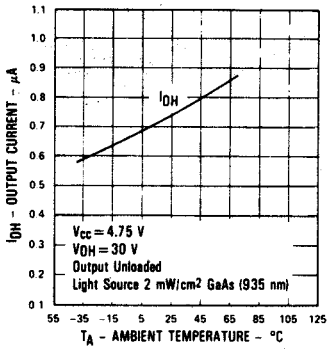


Short Circuit Output Current vs Ambient Temperature

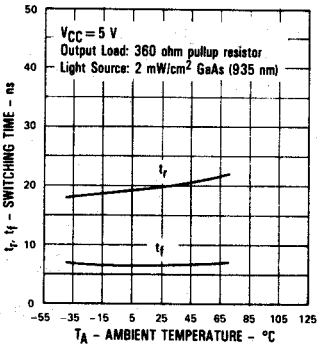


OPB981, OPB983, OPB991, OPB993

Output Current (High) vs Ambient Temperature

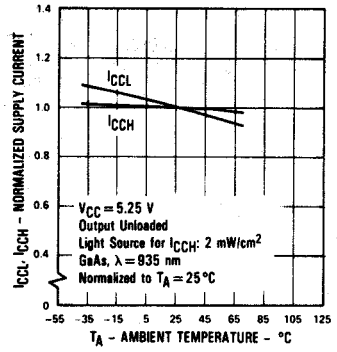


Rise Time and Fall Time vs Ambient Temperature



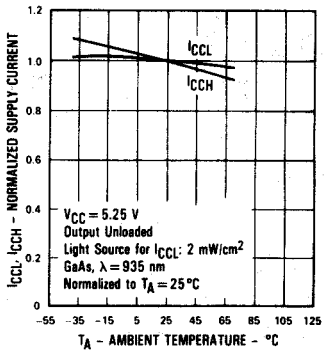
OPB980, OPB981, OPB990, OPB991

Normalized Supply Current vs Ambient Temperature



OPB982, OPB983, OPB992, OPB993

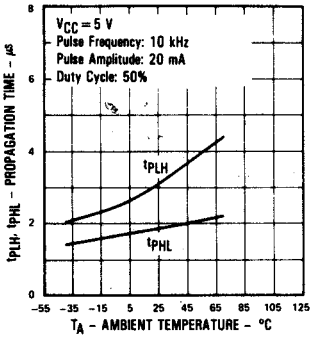
Normalized Supply Current vs Ambient Temperature



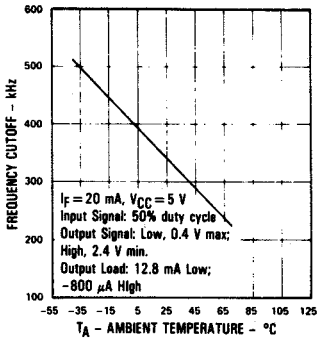
Typical Performance Curves

All Assemblies

Propagation Time vs Ambient Temperature

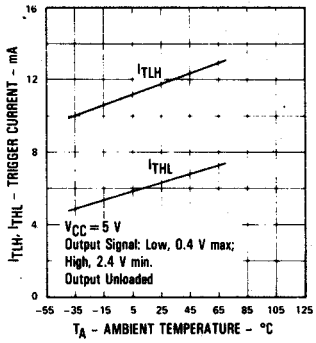


Data Rate vs Ambient Temperature

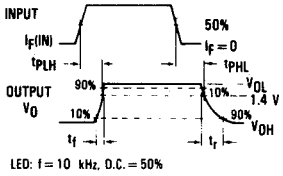


All Assemblies

Trigger Current vs Ambient Temperature

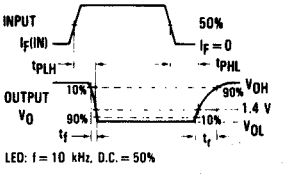


Switching Test Curve for Buffers



LED: f = 10 kHz, D.C. = 50%

Switching Test Curve for Inverters



LED: f = 10 kHz, D.C. = 50%