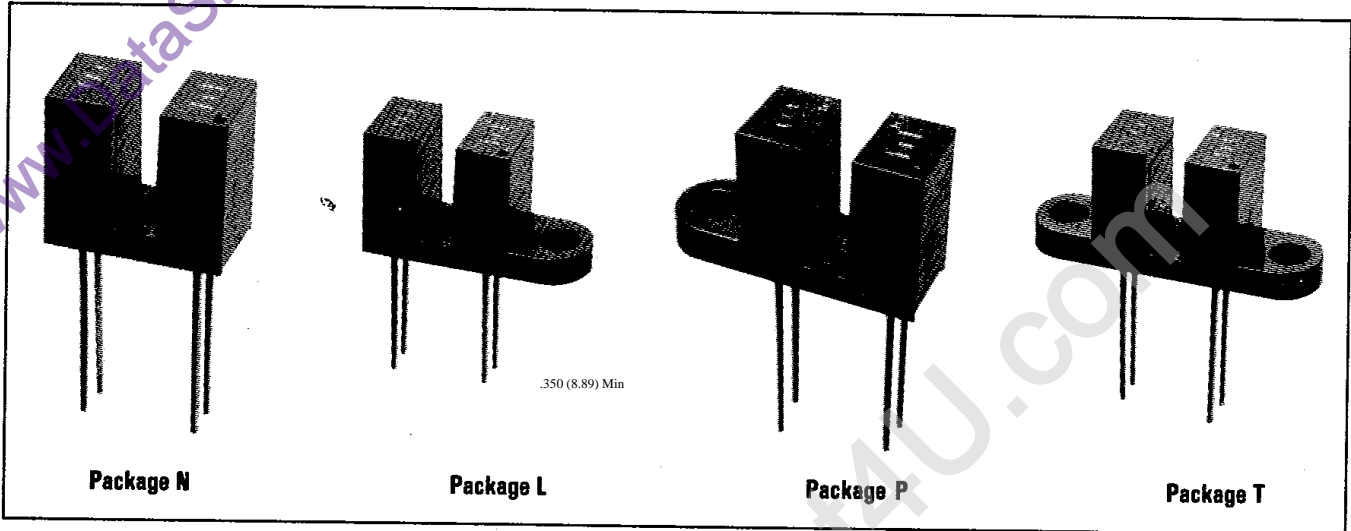


# Slotted Optical Switches

## Types OPB860, OPB870 Series



### Features

- 0.125" wide gap
- Choice of aperture
- Choice of opaque or IR transmissive shell material
- Choice of mounting configuration
- Choice of lead spacing

### Description

The OPB860/870 series of slotted switches provides the design engineer with the flexibility of a custom device from a standard product line. Building from a standard housing with a .125" wide slot, the user can specify (1) electrical output parameters, (2) mounting tab configuration, (3) choice of lead spacing, (4) discrete shell material, and (5) aperture width.

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 only on the parallel faces inside the device throat) are either IR transmissive plastic for applications where aperture contamination may occur or opaque plastic with aperture openings for maximum protection against ambient light.

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

Storage and Operating Temperature Range ..... -40°C to +85°C  
 Lead Soldering Temperature Range [1/16 inch (1.6mm) from case for 5 sec. with soldering iron] ..... 240°C<sup>(2)</sup>

#### Input Diode

Forward DC Current ..... 50mA  
 Peak Forward Current (1 μs pulse width, 300 pps) ..... 3.0A  
 Reverse DC Voltage ..... 2.0V  
 Power Dissipation ..... 100mW<sup>(1)</sup>

#### Output Phototransistor

Collector-Emitter Voltage ..... 30V  
 Emitter-Collector Voltage ..... 5.0V  
 Collector DC Current ..... 30mA  
 Power Dissipation ..... 100mW<sup>(1)</sup>

#### Notes:

- (1) Derate linearly 1.67mW/°C above 25°C.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) All parameters tested using pulse technique.
- (4) Lead spacing of .220" or .320" is available. Leads are 0.20" sq and .425" long (min).
- (5) Methyl and isopropyl alcohols are recommended as cleaning agents. Plastic housings are soluble in chlorinated hydrocarbons and ketones.

# Types OPB860, OPB870 Series

Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>						
V <sub>F</sub>	Forward Voltage			1.7	V	I <sub>F</sub> = 20mA
I <sub>R</sub>	Reverse Current			100	μA	V <sub>R</sub> = 2.0V
<b>Output Phototransistor</b>						
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage	30			V	I <sub>C</sub> = 1.0mA
V <sub>(BR)ECO</sub>	Emitter-Collector Breakdown Voltage	5.0			V	I <sub>E</sub> = 100μA
I <sub>CEO</sub>	Collector-Emitter Dark Current			100	nA	V <sub>CE</sub> = 10V, I <sub>F</sub> = 0, E <sub>θ</sub> = 0
<b>Coupled</b>						
V <sub>CE(SAT)</sub>	Saturation Voltage:					
	Parameter A	OPB860 / OPB870 OPB865 / OPB875			0.4	V I <sub>C</sub> = 400μA, I <sub>F</sub> = 20mA
	Parameter B	OPB861 / OPB871 OPB866 / OPB876			0.4	V I <sub>C</sub> = 800μA, I <sub>F</sub> = 10mA
	Parameter C	OPB862 / OPB872 OPB867 / OPB877			0.6	V I <sub>C</sub> = 1800μA, I <sub>F</sub> = 20mA
I <sub>C(ON)</sub>	On-State Collector Current:					
	Parameter A	OPB860 / OPB870 OPB865 / OPB875	500			μA V <sub>CE</sub> = 10V, I <sub>F</sub> = 20mA
	Parameter B	OPB861 / OPB871 OPB866 / OPB876	1000			μA V <sub>CE</sub> = 5V, I <sub>F</sub> = 10mA
	Parameter C	OPB862 / OPB872 OPB867 / OPB877	1800			μA V <sub>CE</sub> = 0.6V, I <sub>F</sub> = 20mA

## PART NUMBER GUIDE

OPB 8 X X X X X

Optek Assembly

Phototransistor Output Family

Discrete Shell Material Designation

6 - Base Mount IR Transmissive  
Plastic Discrete Shell  
PC Mountable Leads

7 - Base Mount Opaque  
Plastic Discrete Shell  
PC Mountable Leads

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  
Phototransistor Side

### Electrical Specification Variations

- 0 - Electrical Parameter A, Lead Spacing 0.320"
- 1 - Electrical Parameter B, Lead Spacing 0.320"
- 2 - Electrical Parameter C, Lead Spacing 0.320"
- 5 - Electrical Parameter A, Lead Spacing 0.220"
- 6 - Electrical Parameter B, Lead Spacing 0.220"
- 7 - Electrical Parameter C, Lead Spacing 0.220"

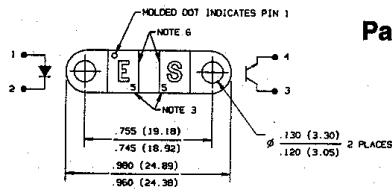
\*Assemblies with dual 0.010" apertures are currently available with electrical parameter "A" only.

TX-TXV Process

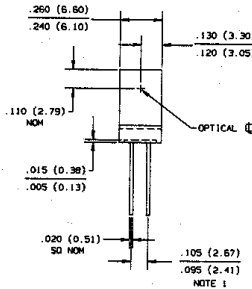
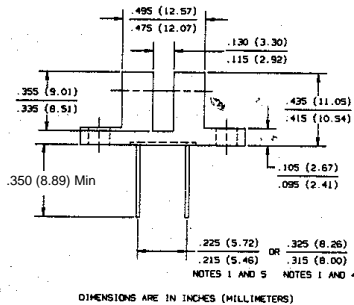
Available  
See Hi-Rel  
Section

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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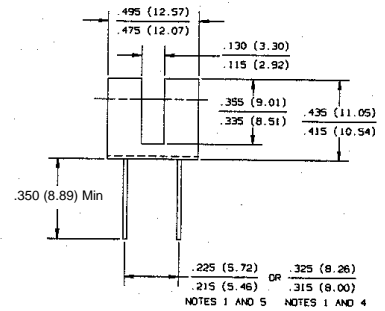
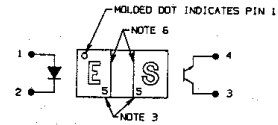
### Package Configuration T



DIMENSIONS ARE IN INCHES (MILLIMETERS)

NOTES 1 AND 5 OR NOTES 1 AND 4

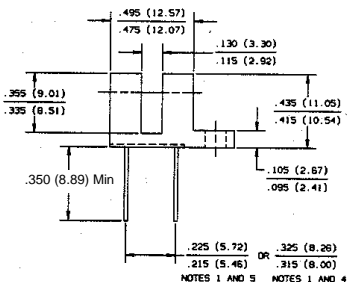
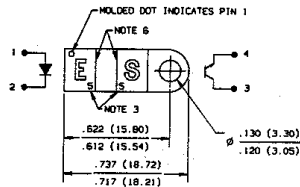
### Package Configuration N



DIMENSIONS ARE IN INCHES (MILLIMETERS)

NOTES 1 AND 5 OR NOTES 1 AND 4

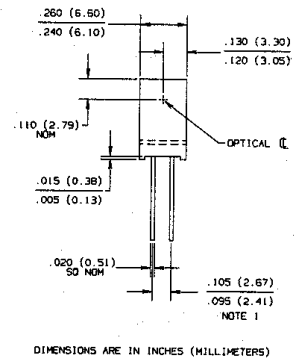
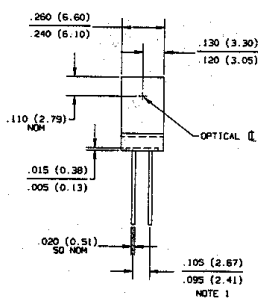
### Package Configuration P



DIMENSIONS ARE IN INCHES (MILLIMETERS)

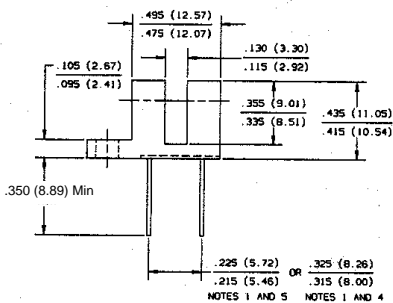
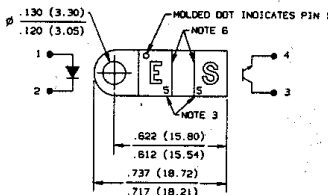
NOTES 1 AND 5 OR NOTES 1 AND 4

### Package Configuration P



DIMENSIONS ARE IN INCHES (MILLIMETERS)

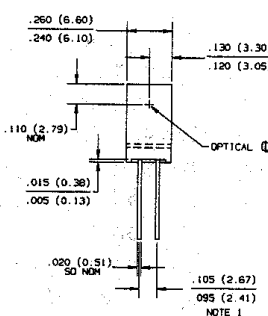
NOTES 1 AND 5 OR NOTES 1 AND 4



DIMENSIONS ARE IN INCHES (MILLIMETERS)

NOTES 1 AND 5 OR NOTES 1 AND 4

### Package Configuration L



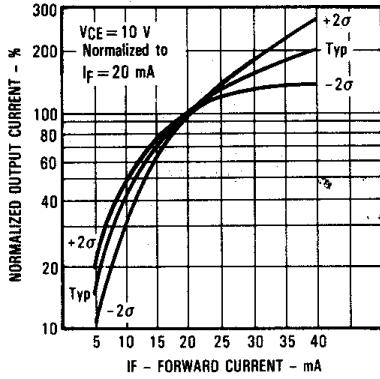
#### Notes:

- (1) Dimension controlled at housing surface only.
- (2) Methanol and isopropanol alcohols are recommended as cleaning agents. Housings are soluble in chlorinated hydrocarbons and ketones. Highly activated, water soluble fluxes may attack housings in some situations.
- (3) Molded number to identify aperture size. See part number guide.
- (4) OPB860, OPB861, OPB862, OPB870, OPB871, OPB872.
- (5) OPB865, OPB866, OPB867, OPB875, OPB876, OPB877.
- (6) Dimensions of aperture opening dependent on housing. See part number guide.

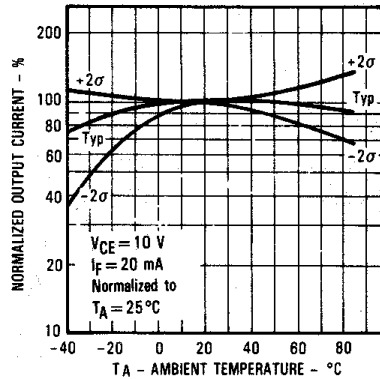
# Types OPB860, OPB870 Series

## Typical Performance Curves

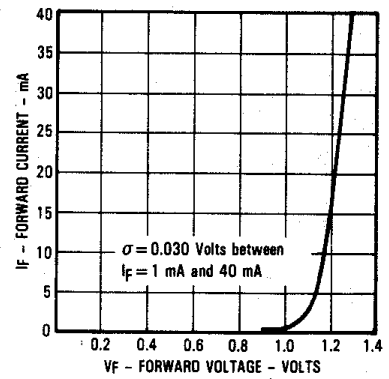
**Normalized Output Current vs Forward Current**



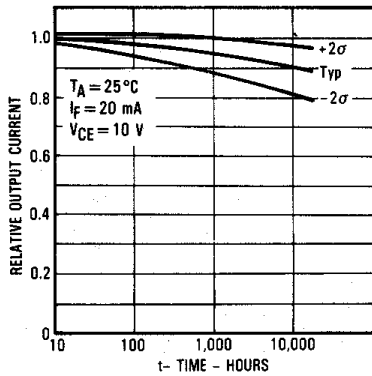
**Normalized Output Current vs Ambient Temperature**



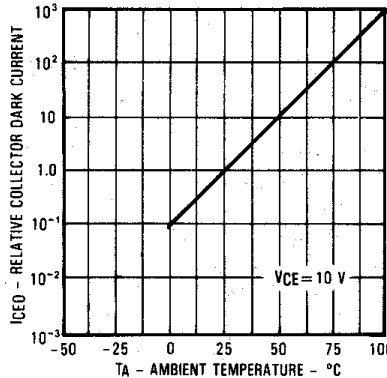
**Forward Current vs Forward Voltage Input Diode**



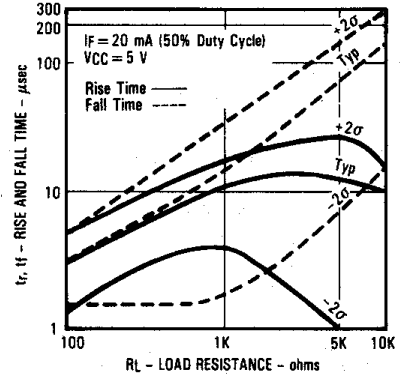
**Relative Output Current vs Time**



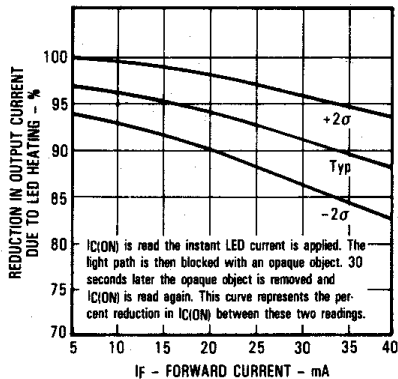
**Collector Dark Current vs Ambient Temperature**



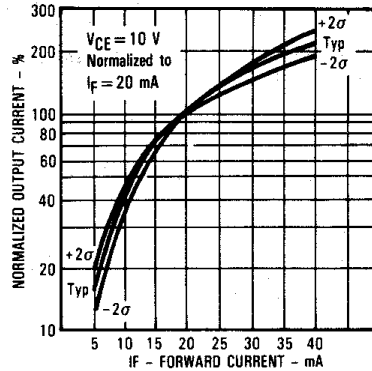
**Rise and Fall Time vs Load Resistance**



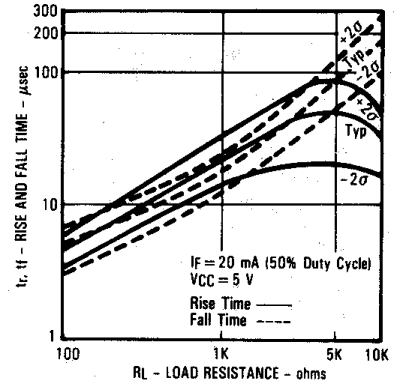
**Reduction in Output Current Due to LED Heating vs Forward Current**



**Normalized Output Current vs Input Current**



**Rise and Fall Time vs Load Resistance**



All Part Numbers Ending in "1"

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