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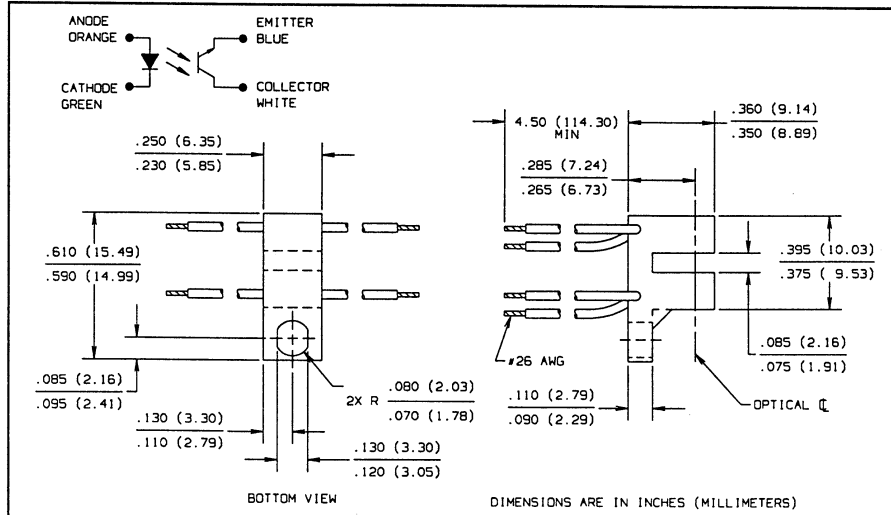
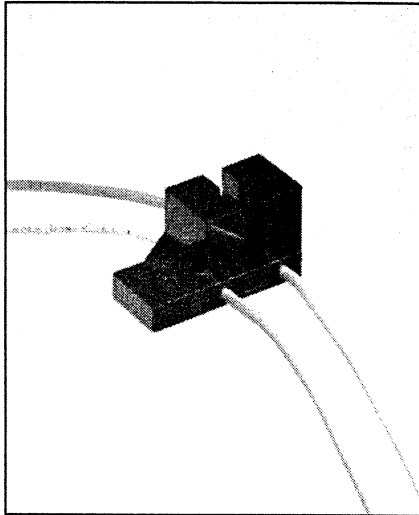
For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)

Product Bulletin OPB821  
 July 1996

# Slotted Optical Switches

## Types OPB821, OPB821S10, OPB821S5, OPB821S3



### Features

- Three standard aperture sizes for high resolution
- Low profile, 0.080" (2.03 mm) wide slot
- 4.5" min, 26 AWG wire leads
- TX-TXV process available (see Hi-Rel section)

### Description

The OPB821 series each consist of an infrared emitting diode and an NPN silicon phototransistor mounted in a low cost black plastic housing on opposite sides of a 0.080" (2.03 mm) wide slot. Phototransistor switching takes place whenever an opaque object passes through the slot. All assemblies have 0.040" (1.02 mm) wide apertures located in front of the infrared diode. For phototransistor side aperture size, see chart below. A minimum of 4.5" (114.3 mm) lead wires ease assembly where PC board mounting is not practical. Available with PC board mountable leads as OPB820 series.

OPB#	Phototransistor Aperture Width
OPB821	0.040"
OPB821S10	0.010"
OPB821S5	0.005"
OPB821S3	0.003"

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

Storage and Operating Temperature Range . . . . . -40° C to +80° C  
 Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron] . . . . . 240° C<sup>(1)</sup>

### Input Diode

Continuous Forward Current . . . . . 50 mA  
 Peak Forward Current (1 μs pulse width, 300 pps) . . . . . 3.0 A  
 Reverse Voltage . . . . . 2.0 V  
 Power Dissipation . . . . . 100 mW<sup>(2)</sup>

### Output Phototransistor

Collector-Emitter Voltage . . . . . 30 V  
 Emitter-Collector Voltage . . . . . 5.0 V  
 Power Dissipation . . . . . 100 mW<sup>(2)</sup>

### Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate linearly 1.82 mW/° C above 25° C.
- (3) Methanol or isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
- (4) All parameters tested using pulse technique.

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Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

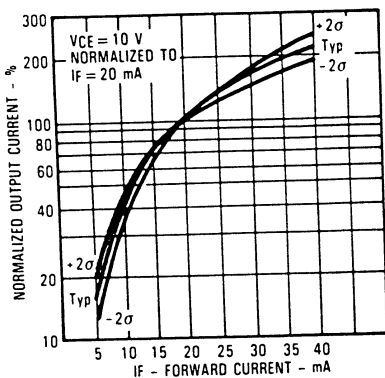
SYMBOL	PARAMETER	MIN	MAX	UNITS	TEST CONDITIONS
<b>Input Diode</b>					
$V_F$	Forward Voltage		1.70	V	$I_F = 20\text{ mA}$
$I_R$	Reverse Current		100	$\mu\text{A}$	$V_R = 2\text{ V}$
<b>Output Phototransistor</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	30		V	$I_C = 1\text{ mA}$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	5.0		V	$I_E = 100\text{ }\mu\text{A}$
$I_{CEO}$	Collector-Emitter Dark Current		100	nA	$V_{CE} = 10\text{ V}, I_F = 0, E_e = 0$
<b>Coupled</b>					
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	OPB821 OPB821S10 OPB821S5 OPB821S3	0.4 0.4 0.4 0.4	V V V V	$I_C = 250\text{ }\mu\text{A}, I_F = 20\text{ mA}$ $I_C = 250\text{ }\mu\text{A}, I_F = 20\text{ mA}$ $I_C = 125\text{ }\mu\text{A}, I_F = 20\text{ mA}$ $I_C = 40\text{ }\mu\text{A}, I_F = 20\text{ mA}$
$I_{C(ON)}$	On-State Collector Current	OPB821 OPB821S10 OPB821S5 OPB821S3	500 400 300 60	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$	$V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$ $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$ $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$ $V_{CE} = 5\text{ V}, I_F = 20\text{ mA}$

SLOTTED OPTICAL SWITCHES

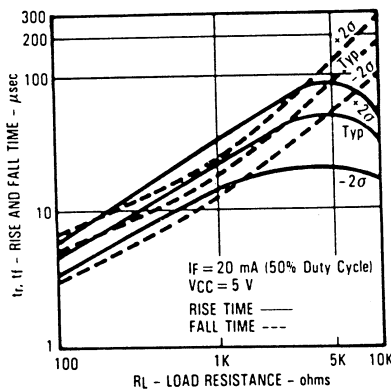
## Typical Performance Curves

OPB821, OPB821S10, OPB821S5, OPB821S3

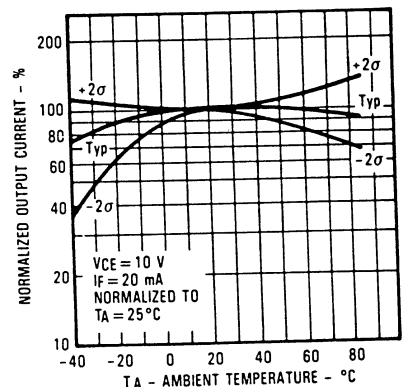
Normalized Output Current vs Input Current



Rise and Fall Time vs Load Resistance

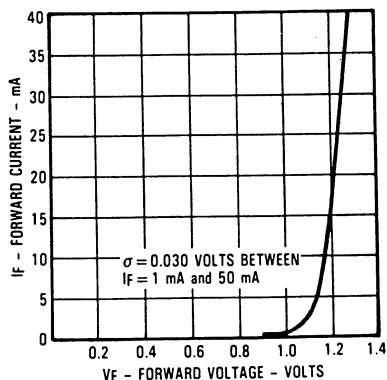


Normalized Output Current vs Ambient Temperature

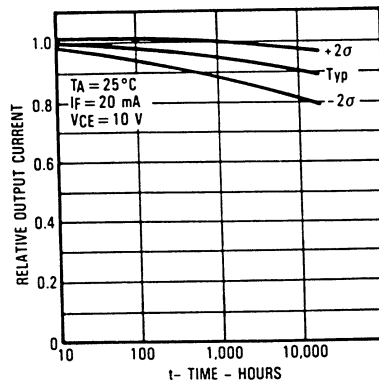


## All Assemblies

Forward Current vs Forward Voltage Input Diode



Relative Output Current vs Time



Reduction in Output Current Due to LED Heating vs Forward Current

