

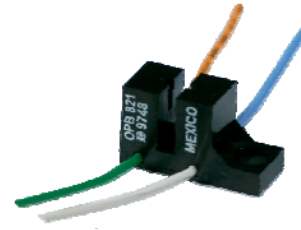
# High Resolution Slotted Optical Switch



OPB821TX, OPB821TXV

**Features:**

- Non-contact switching
- Low profile to facilitate stacking
- Hermetically sealed components
- 24" (609.60 mm) minimum length wire conforms to MIL-W-16878
- TX and TXV components processed to MIL-PRF-19500



**Description:**

Each **OPB821TX** and **OP821TXV** device consists of a gallium aluminum arsenide LED and a silicon phototransistor, which are soldered into a printed circuit board and mounted in a high temperature plastic housing on opposite sides of an 0.080" (2.03 mm) wide slot. Lead wires are #24 AWG polytetrafluoroethylene (PTFE) insulated, which conforms to MIL-W-16878.

Phototransistor switching takes place when an opaque object passes through the slot. For maximum output signal, neither the LED nor the phototransistor is apertured.

*TX and TXV device components are processed to OPTEK's military screening program patterned after MIL-PRF-19500.*

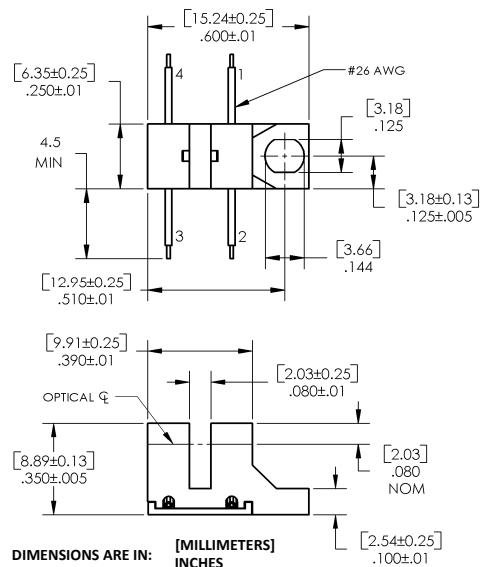
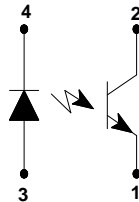
*Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.*

Contact your local representative or OPTEK for more information.

**Applications:**

- Non-contact object sensing
- Assembly line automation
- Machine automation
- Equipment safety
- Machine safety

Part Number	LED Peak Wavelength	Sensor	Slot Width / Depth	I <sub>C(ON)</sub> (mA) Min	I <sub>F</sub> (mA) Typ / Max	V <sub>CE</sub> (Volts) Max	Aperture Emitter / Sensor	Lead Length / Spacing
OPB821TX	880 nm	Transistor	0.080" / 0.255"	0.80	20 / 50	30	0.040" / 0.040"	24"/26 AWG wire
OPB821TXV								



RoHS

Color/Pin #	Description	Color/Pin #	Description
Green-3	Cathode	White-2	Collector
Orange-4	Anode	Blue-1	Emitter

General Note  
TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

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## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Storage Temperature	-65°C to +150°C
Operating Temperature	-65°C to +125°C
Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 seconds with soldering iron) <sup>(1)</sup>	260°C

### Input Diode

Continuous Forward Current	50 mA
Reverse Voltage	2 V
Power Dissipation <sup>(1)</sup>	100 mW

### Output Phototransistor

Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7 V
Power Dissipation <sup>(1)</sup>	100 mW

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
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### Input Diode

$V_F$	Forward Voltage <sup>(3)</sup>	1.00	1.35	1.70	V	$I_F = 20\text{ mA}$
		1.20	1.55	1.90		$I_F = 20\text{ mA}, T_A = -55^\circ\text{C}$
		0.80	1.20	1.60		$I_F = 20\text{ mA}, T_A = 100^\circ\text{C}$
$I_R$	Reverse Current	-	0.10	100	$\mu\text{A}$	$V_R = 2\text{ V}$

### Output Phototransistor

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	50	110	-	V	$I_C = 1\text{ mA}, I_F = 0$
$V_{(BR)ECO}$	Emitter-Collector Breakdown Voltage	7	10	-	V	$I_E = 100\ \mu\text{A}, I_F = 0$
$I_{C(OFF)}$	Collector-Emitter Dark Current	-	0.20	100	nA	$V_{CE} = 10\text{ V}, I_F = 0$
		-	10	100	$\mu\text{A}$	$V_{CE} = 10\text{ V}, I_F = 0, T_A = 100^\circ\text{C}$

### Coupled

$I_{C(ON)}$	On-State Collector Current <sup>(3)</sup>	800	-	-	$\mu\text{A}$	$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}$
		500	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = -55^\circ\text{C}$
		500	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = 100^\circ\text{C}$
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage OPB820S10, OPB821S10	-	0.20	0.30	V	$I_C = 250\ \mu\text{A}, I_F = 20\text{ mA}$

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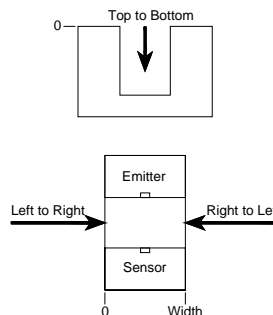
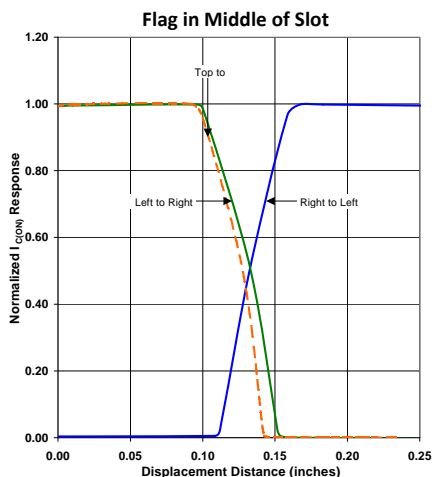
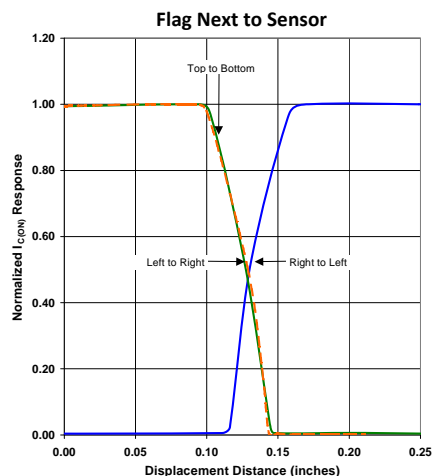
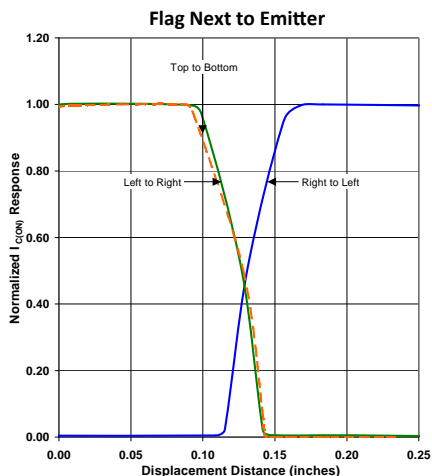
OPB821TX, OPB821TXV

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Coupled</b>						
$t_r$	Output Rise Time	-	12	20	$\mu\text{s}$	$V_{CC} = 10\text{ V}, I_F = 20\text{ mA}, R_L = 1000\ \Omega$
$t_f$	Output Fall Time	-	12	20		

### Notes:

- Derate linearly 1.00 mW/°C above 25°C.
- Methanol or isopropanol are recommended cleaning agents.
- Measurement is taken during the last 500  $\mu\text{s}$  of a single 1.0 ms test pulse. Heating due to increased pulse rate or pulse width can cause



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