

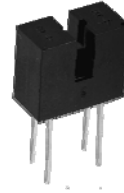
# High Resolution Slotted Optical Switch



OPB847TX, OPB847TXV, OPB848TX,  
OPB848TXV

## Features:

- Non-contact switching
- Apertured for high resolution
- Hermetically sealed components
- TX and TXV devices processed to MIL-PRF-19500



## Description:

The **OPB847TX**, **OPB847TXV**, **OPB848TX** and **OPB848TXV** each consist of a gallium aluminum arsenide LED and a silicon phototransistor, which is soldered into a printed PCBoard and then mounted in a high-temperature plastic housing on opposite sides of a 0.10 inch (2.54 mm) wide slot. Both device types have a 0.025 inch by 0.060 inch (0.635 mm by 1.524 mm) aperture in front of the phototransistor for high resolution positioning sensing. Phototransistor switching takes place when an opaque object passes through the slot.

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

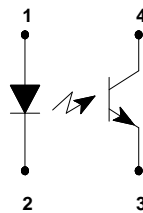
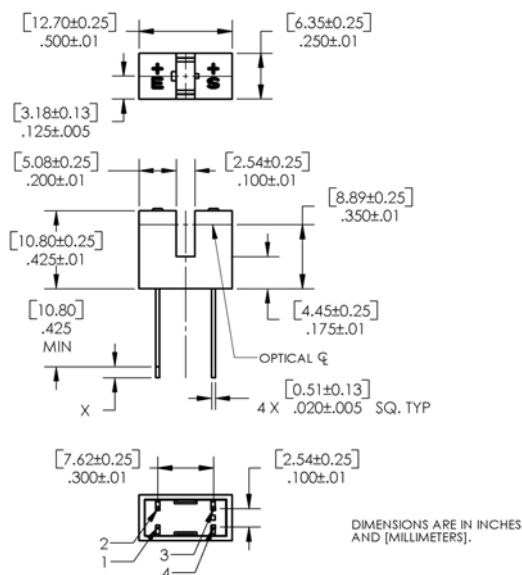
*Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.*

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	Aperture Emitter/Sensor	Lead Length / Spacing
OPB847TX	890 nm	Transistor	0.100" / 0.250"	0.025" / 0.025"	0.425" / 0.300"
OPB847TXV					
OPB848TX	890 nm	Transistor	0.100" / 0.250"	0.025" / 0.025"	0.425" / 0.300"
OPB848TXV					



Pin #	Description
1	Anode
2	Cathode
3	Emitter
4	Collector

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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OPB848TXV

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

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

### Input Diode

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

### Output Phototransistor

Collector-Emitter Voltage	50 V
Emitter-Collector Voltage	7 V
Power Dissipation <sup>(2)</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>(4)</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	$\mu\text{A}$	$V_{CE} = 10\text{ V}, I_F = 0, T_A = 100^\circ\text{C}$

#### Notes:

- (1) Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.00 mW/° C above 25° C.
- (3) Methanol and isopropanol are recommended as cleaning agents.
- (4) 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 change in measurement results.

# High Resolution Slotted Optical Switch



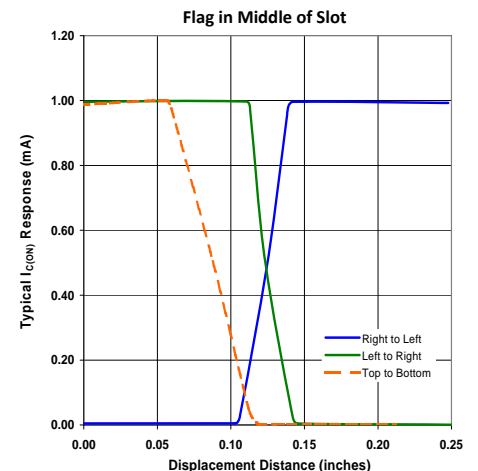
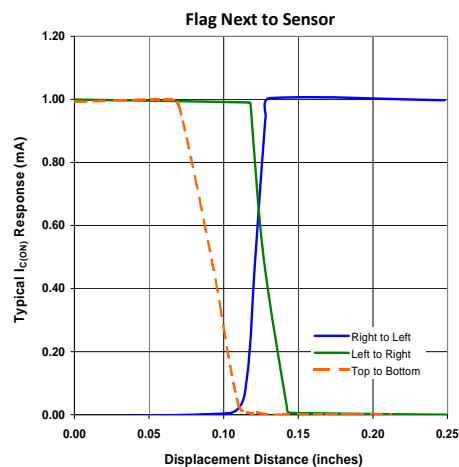
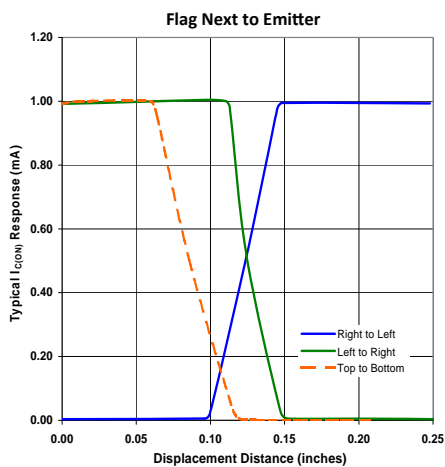
OPB847TX, OPB847TXV, OPB848TX,  
OPB848TXV

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

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>Combined</b>						
$I_{C(ON)}$	On-State Collector Current <sup>(1)</sup>					
	OPB847 (TX, TXV)	4.00	-	-	mA	$V_{CE} = 10\text{ V}, I_F = 20\text{ mA},$
	OPB847 (TX, TXV)	2.50	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = -55^\circ\text{ C}$
	OPB847 (TX, TXV)	2.50	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = 100^\circ\text{ C}$
	OPB848 (TX, TXV)	1.00	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA},$
	OPB848 (TX, TXV)	0.60	-	-		$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = -55^\circ\text{ C}$
OPB848 (TX, TXV)	0.60	-	-	$V_{CE} = 10\text{ V}, I_F = 20\text{ mA}, T_A = 100^\circ\text{ C}$		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage				V	
	OPB847 (TX, TXV)	-	0.20	0.30		$I_C = 2\text{ mA}, I_F = 20\text{ mA}$
	OPB848 (TX, TXV)	-	0.20	0.30	$I_C = 500\text{ }\mu\text{A}, I_F = 20\text{ mA}$	
$t_r$	Output Rise Time				$\mu\text{s}$	$V_{CC} = 10\text{ V}, I_F = 20\text{ mA}, R_L = 1000\Omega$
	OPB847 (TX, TXV)		12	20		
OPB848 (TX, TXV)		8	15			
$t_f$	Output Fall Time					
	OPB847 (TX, TXV)		12	20		
	OPB848 (TX, TXV)		8	15		

**Notes:**

- 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 change in measurement results.



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