

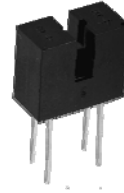
# High Resolution Slotted Optical Switch



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.*

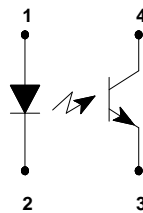
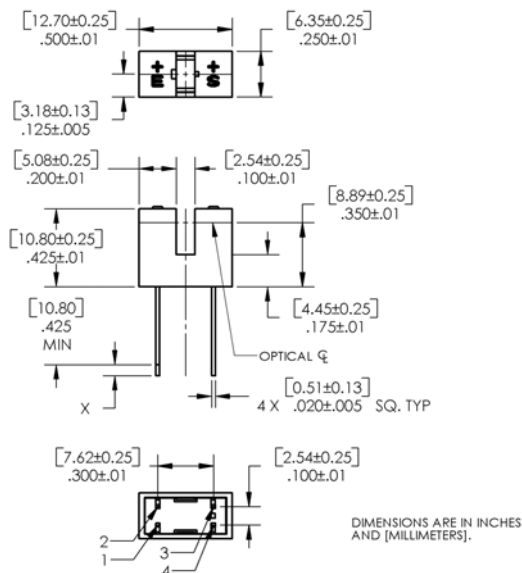
*Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.*

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.

OPTEK Technology, Inc.  
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200  
www.optekinc.com | www.ttelectronics.com

# High Resolution Slotted Optical Switch



OPB847TX, OPB847TXV, OPB848TX,  
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 |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

### 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



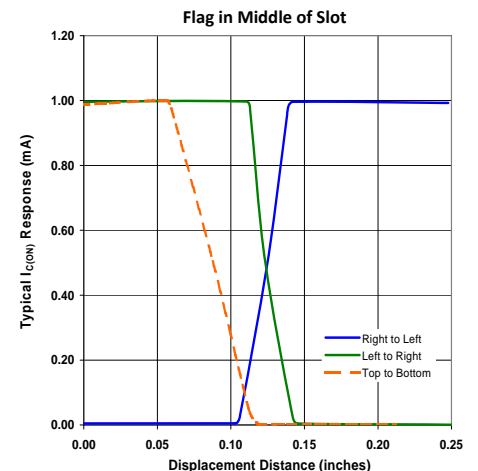
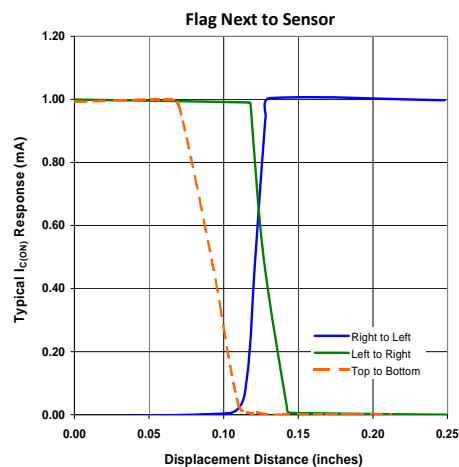
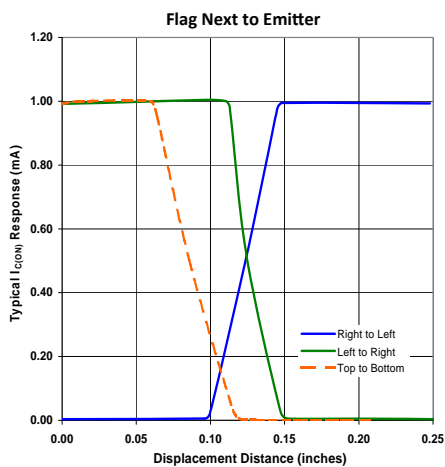
OPB847TX, OPB847TXV, OPB848TX,  
OPB848TXV

## 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.



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.

OPTEK Technology, Inc.  
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200  
www.optekinc.com | www.ttelectronics.com