# **High Reliability Reflective Object Sensor**

# OPB700TX, OPB700TXV



#### 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 OPB700TX and OPB700TXV sensor consists of a gallium aluminum arsenide LED and a silicon phototransistor mounted side-by-side on converging optical axes in a high-temperature black plastic housing. The phototransistor responds to the radiation from the LED only when a reflective object passes within its field of view. Lead wires are #26 AWG polytetraflouroethylene (PTEF) insulated, which conforms to MIL-W-16878.

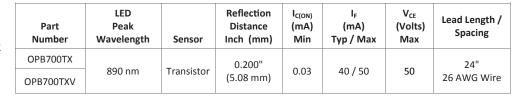
TX and TXV device components are processed to OPTEK's military screening program patterned after MIL-PRF-19500.

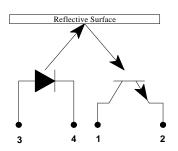
Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.

Contact your local representative or OPTEK for more information.

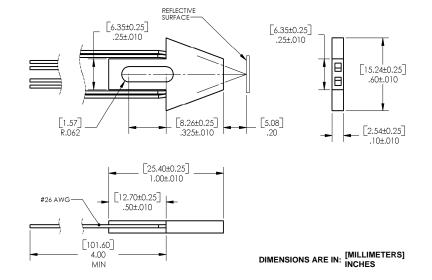
### **Applications:**

- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor





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



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OPB700TX, OPB700TXV

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

| Storage Temperature Range   | -65° C to + 150° C |
|-----------------------------|--------------------|
| Operating Temperature Range | -65° C to + 125° C |
| Lead Soldering Temperature  | 260° C             |

#### **Input Diode**

| Forward DC 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<sub>A</sub> = 25°C unless otherwise noted)

| SYMBOL                 | PARAMETER                      | MIN | TYP | MAX | UNITS | TEST CONDITIONS                                 |  |
|------------------------|--------------------------------|-----|-----|-----|-------|---|--|
| Input Diode            |                                |     |     |     |       |   |  |
|                        |                                | 1.1 | 1.6 | 1.8 |       | I <sub>F</sub> = 50 mA                          |  |
| V <sub>F</sub> Forward | Forward Voltage <sup>(6)</sup> | 1.3 | 1.8 | 2.0 | V     | I <sub>F</sub> = 50 mA, T <sub>A</sub> = -55° C |  |
|                        |                                | 0.9 | 1.4 | 1.7 |       | I <sub>F</sub> = 50 mA, T <sub>A</sub> = 100° C |  |
| I <sub>R</sub>         | Reverse Current                | 1   | 0.1 | 100 | μΑ    | V <sub>R</sub> = 2 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  | $I_E = 100 \ \mu A, I_F = 0$                                  |
|                     | I <sub>C(OFF)</sub> Collector-Emitter Dark Current | 1  | -   | 100 | nA | $V_{CE} = 10 \text{ V}, I_F = 0$                              |
| <sup>I</sup> C(OFF) |  | -  | 10  | 100 | μΑ | $V_{CE} = 10 \text{ V}, I_F = 0, T_A = 100^{\circ} \text{ C}$ |

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# High Reliability Reflective Object Sensor





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

| SAMBOL                 | PARAMETER   | MIIN | IYP | MAX | UNITS | TEST CONDITIONS  |  |
|------------------------|---|------|-----|-----|-------|--|--|
| Output Phototransistor |   |      |     |     |       |  |  |
|                        |   |      | 200 | -   |       | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 40 mA                          |  |
| I <sub>C(ON)</sub>     | $I_{C(ON)}$ On-State Collector Current $d = 0.20'' (5.08 \text{ mm})^{(2)(3)(6)}$ | 25   | ı   | -   | μΑ    | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 40 mA, T <sub>A</sub> = -55° C |  |
|                        | ,   | 25   | ı   | -   |       | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 40 mA, T <sub>A</sub> = 100° C |  |
| I <sub>CX</sub>        | Crosstalk (No reflective surface) <sup>(3)</sup>                                  | -    | 2   | -   | μΑ    | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 40 mA                          |  |
| V <sub>CE(SAT)</sub>   | Collector-Emitter Saturation Voltage d = 0.20" (5.08 mm) <sup>(2)(3)</sup>        | -    | -   | 0.4 | V     | I <sub>C</sub> = 10 μA, I <sub>F</sub> = 40 mA                         |  |
| t <sub>r</sub>         | Output Rise Time  | -    | 12  | 20  | μs    | $V_{CC} = 10 \text{ V, I}_F = 20 \text{ mA, R}_L = 1,000 \Omega$       |  |
| t <sub>f</sub>         | Output Fall Time  | -    | 12  | 20  |       |  |  |

#### Notes:

- (1) Derate linearly 1.00 mW/°C above 25 °C.
- (2) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflective surface.
- (3) Crosstalk (I<sub>CX</sub>) is the collector current measured with the indicated current in the input diode and no reflective surface.
- (4) The distance from the assembly head to the reflective surface is "d".
- (5) Methanol or isopropyl alcohol is recommended as a cleaning agent.
- (6) Measurement is taken during the last 500 μs of a single 1.0 ms test phase. Heating due to increment pulse rate or pulse width can cause change in measurement results.

