# 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.*

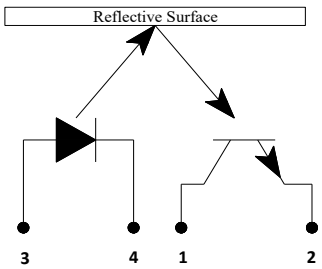
*Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.*

Contact your local representative or OPTEK for more information.

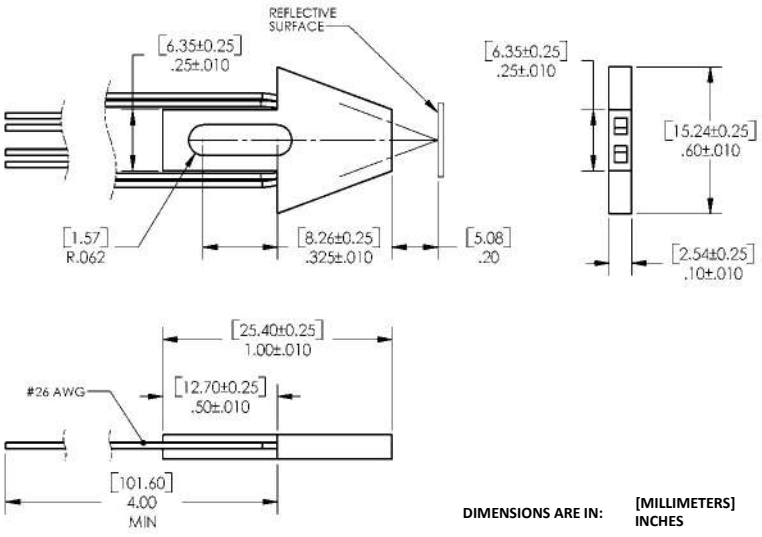
### Applications:

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

| Part Number | LED Peak Wavelength | Sensor | Reflection Distance Inch (mm) | $I_{C(ON)}$ (mA) Min | $I_F$ (mA) Typ / Max | $V_{CE}$ (Volts) Max | Lead Length / Spacing |
|---|---|---|---|---|---|---|---|
| OPB700TX | 890 nm | Transistor | 0.200" (5.08 mm) | 0.03 | 40 / 50 | 50 | 24" 26 AWG Wire |
| OPB700TXV | | | | | | | |




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



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## Electrical Specifications

**Absolute Maximum Ratings** ($T_A$=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[1] | 100 mW |

**Output Phototransistor**

| | |
|---|---|
| Collector-Emitter Voltage | 50 V |
| Emitter-Collector Voltage | 7 V |
| Power Dissipation[1] | 100 mW |

**Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| **Input Diode** | | | | | | |
| $V_F$ | Forward Voltage[6] | 1.1 | 1.6 | 1.8 | V | $I_F$ = 50 mA |
| | | 1.3 | 1.8 | 2.0 | | $I_F$ = 50 mA, $T_A$ = -55° C |
| | | 0.9 | 1.4 | 1.7 | | $I_F$ = 50 mA, $T_A$ = 100° C |
| $I_R$ | Reverse Current | - | 0.1 | 100 | µA | $V_R$ = 2 V |
| **Output Phototransistor** | | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage | 50 | 110 | - | V | $I_C$ = 1 mA, $I_F$ = 0 |
| $V_{(BR)ECO}$ | Emitter-Collector Breakdown Voltage | 7 | 10 | - | V | $I_E$ = 100 µA, $I_F$ = 0 |
| $I_{C(OFF)}$ | Collector-Emitter Dark Current | - | - | 100 | nA | $V_{CE}$ = 10 V, $I_F$ = 0 |
| | | - | 10 | 100 | µA | $V_{CE}$ = 10 V, $I_F$ = 0, $T_A$ = 100° C |




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## Electrical Specifications

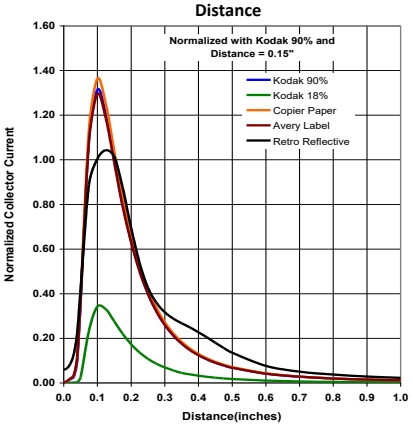
**Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| **Output Phototransistor** | | | | | | |
| $I_{C(ON)}$ | On-State Collector Current d = 0.20" (5.08 mm)(2)(3)(6) | 50 | 200 | - | µA | $V_{CE}$ = 5 V, $I_F$ = 40 mA |
| | | 25 | - | - | | $V_{CE}$ = 5 V, $I_F$ = 40 mA, $T_A$ = -55° C |
| | | 25 | - | - | | $V_{CE}$ = 5 V, $I_F$ = 40 mA, $T_A$ = 100° C |
| $I_{CX}$ | Crosstalk (No reflective surface)(3) | - | 2 | - | µA | $V_{CE}$ = 5 V, $I_F$ = 40 mA |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage d = 0.20" (5.08 mm)(2)(3) | - | - | 0.4 | V | $I_C$ = 10 µA, $I_F$ = 40 mA |
| $t_r$ | Output Rise Time | - | 12 | 20 | µs | $V_{CC}$ = 10 V, $I_F$ = 20 mA, $R_L$ = 1,000 Ω |
| $t_f$ | Output Fall Time | - | 12 | 20 | | |

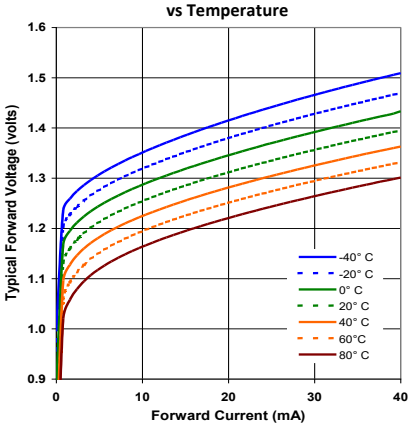
Notes:

(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 ($I_{CX}$) 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.

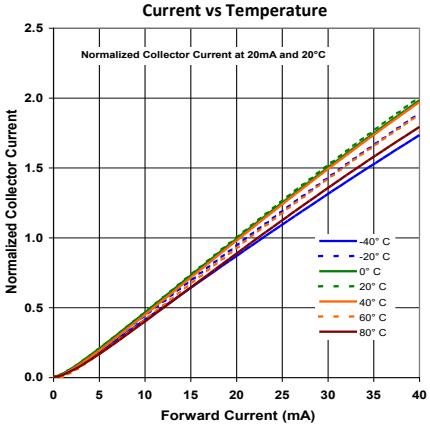
**Normalized Collector Current vs Distance**




**Forward Voltage vs Forward Current vs Temperature**




**Normalized Collector Current vs Forward Current vs Temperature**







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