# PIN Silicon Photodiode

## OP905, OP906


### Features:

- Clear epoxy package
- Linear response vs. irradiance
- Fast switching time
- Narrow receiving angle
- T-1package style
- Small package style ideal for space-limited applications

### Description:

Each **OP905** and **OP906** device consists of a PIN silicon photodiode molded in a clear epoxy package that allows spectral response from visible to infrared light wavelengths. The T-1 package style is ideal for space-limited applications. Both devices have a narrow receiving angle, which provides excellent on-axis coupling. Both are also 100% production tested using infrared light for close correlation with OPTEK's GaAs and GaAiAs emitters.

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

| Ordering Information | | | |
|---|---|---|---|
| **Part Number** | **Sensor** | **Viewing Angle** | **Lead Length** |
| **OP905** | Photodiode | ±17° | 0.50" |
| **OP906** | | ±20° | |

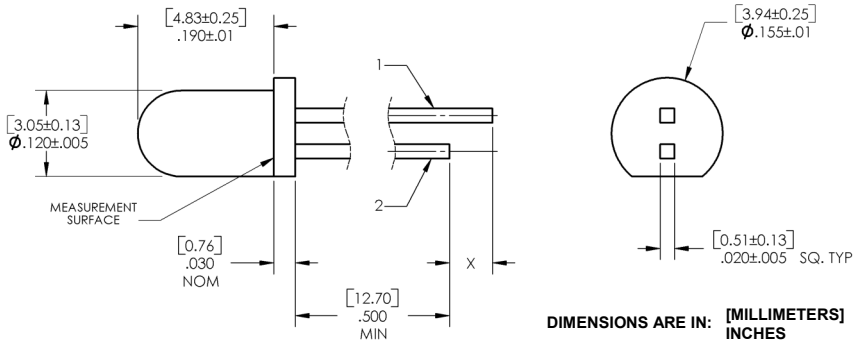
### Applications:

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

**OP905 - OP906**

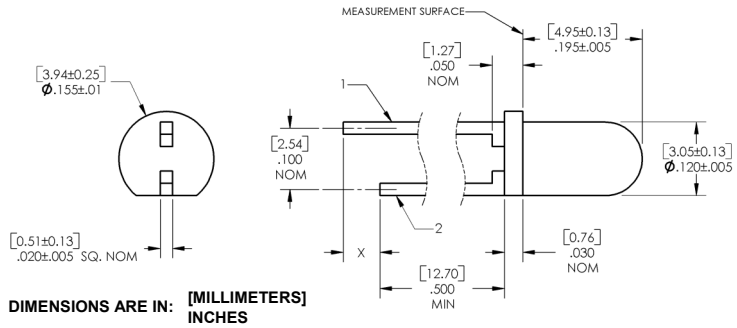

| Pin # | Diode |
|---|---|
| 1 | Anode |
| 2 | Cathode |

**OP905**




DIMENSIONS ARE IN: [MILLIMETERS] INCHES

**OP906**




DIMENSIONS ARE IN: [MILLIMETERS] INCHES

**CONTAINS POLYSULFONE**

To avoid stress cracking, we suggest using ND Industries' **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK'S molded plastics.

RoHS

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

## Electrical Specifications

| **Absolute Maximum Ratings** ($T_A$ = 25° C unless otherwise noted) | |
|---|---|
| Reverse Breakdown Voltage | 60 V |
| Storage & Operating Temperature Range | -40° C to +100° C |
| Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] | 260° C(1) |
| Reverse Breakdown Voltage | 60 V |
| Power Dissipation | 100 mW(2) |

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

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| $I_L$ | Reverse Light Current<br>OP905<br>OP906 | <br>14<br>16 | <br>-<br>- | <br>32<br>35 | µA | $V_R$ = 5 V, $E_E$ = 0.50 mW/cm$^2$ (3) |
| $I_D$ | Reverse Dark Current | - | 1 | 60 | nA | $V_R$ = 30 V, $E_E$ = 0(4) |
| $V_{(BR)}$ | Reverse Breakdown Voltage | 60 | - | - | V | $I_R$ = 100 µA |
| $V_F$ | Forward Voltage | - | - | 1.2 | V | $I_F$ = 1 mA |
| $C_T$ | Total Capacitance | - | 4 | - | pF | $V_R$ = 20 V, $E_E$ = 0, f = 1.0 MHz |
| $t_r$ | Rise Time | - | 5 | - | ns | $V_R$ = 20 V, λ = 850 nm, $R_L$ = 50 Ω |
| $t_f$ | Fall Time | - | 5 | - | | |

Notes:

(1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum of 20 grams force may be applied to leads when soldering.

(2) Derate linearly 1.67 mW/° C above 25° C.

(3) Light source is an unfiltered GaAs LED with a peak emission wavelength of 935 nm and a radiometric intensity level which varies less than 10% over the entire lens surface of the photodiode being tested.

(4) Calculate the typical dark current in nA using the formula $I_D = 10^{(0.042T_A - 1.5)}$ where $T_A$ is ambient temperature in °C.



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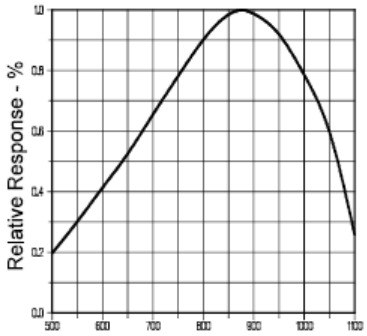
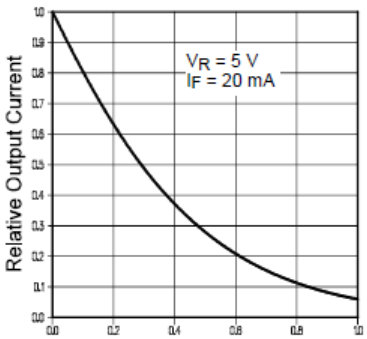
## Performance

### OP905

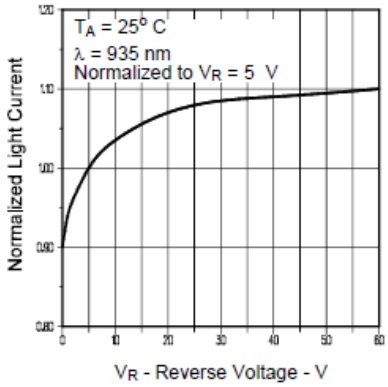
**Relative Response vs. Wavelength**



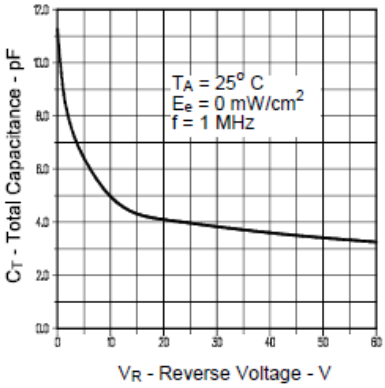

**Coupling Characteristics OP905 and OP265**



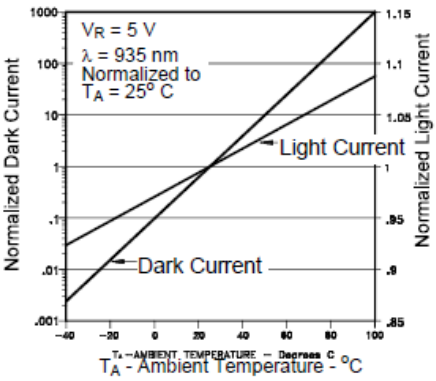

**Normalized Light Current vs Reverse Voltage**



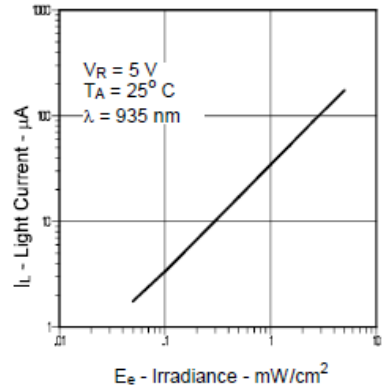

**Total Capacitance vs Reverse Voltage**



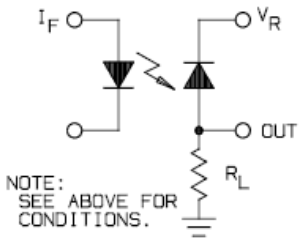

**Normalized Light and Dark Current vs Ambient Temperature**



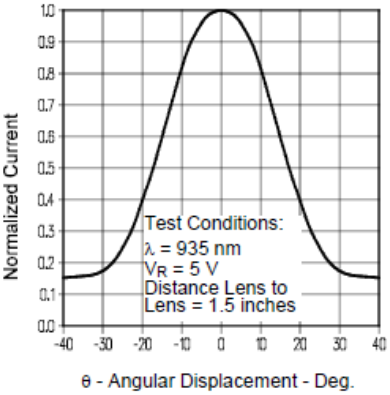

**Light Current vs. Irradiance**




**Switching Time Test Circuit**




**Light Current vs. Angular Displacement**







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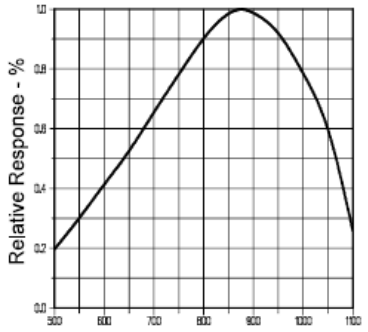
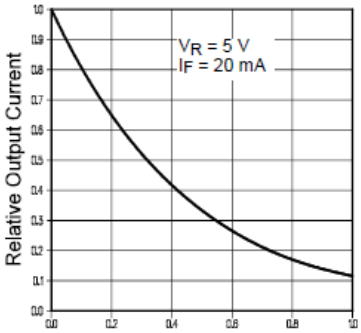
## Performance

### OP906

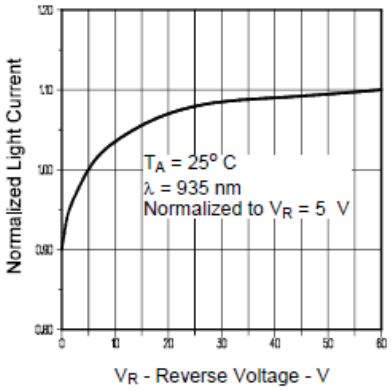
**Relative Response vs. Wavelength**



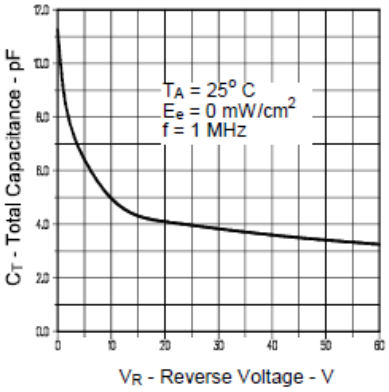

**Coupling Characteristics OP906 and OP266**



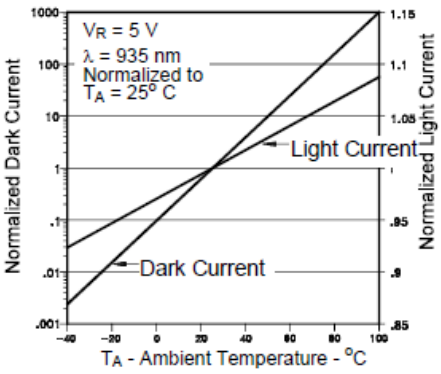

**Normalized Light Current vs Reverse Voltage**



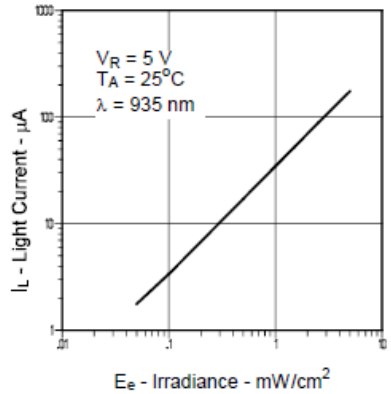

**Total Capacitance vs Reverse Voltage**



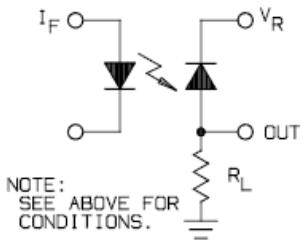

**Normalized Light and Dark Current vs Ambient Temperature**



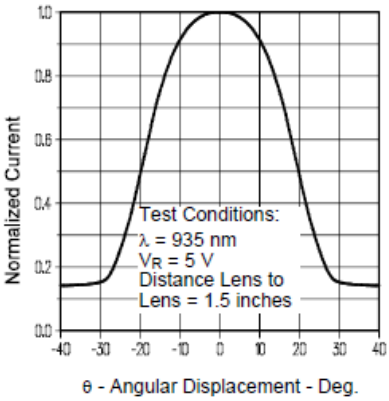

**Light Current vs. Irradiance**




**Switching Time Test Circuit**




**Light Current vs. Angular Displacement**







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