

# PIN Silicon Photodiode

OP905, OP906



**Features:**

- Clear epoxy package
- Linear response vs. irradiance
- Fast switching time
- Narrow receiving angle
- T-1 package 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.*

**Applications:**

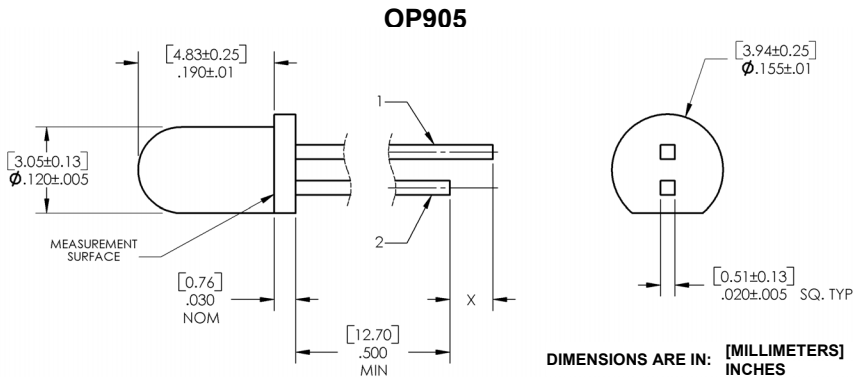
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Ordering Information			
Part Number	Sensor	Viewing Angle	Lead Length
OP905	Photodiode	95°	0.50"
OP906			

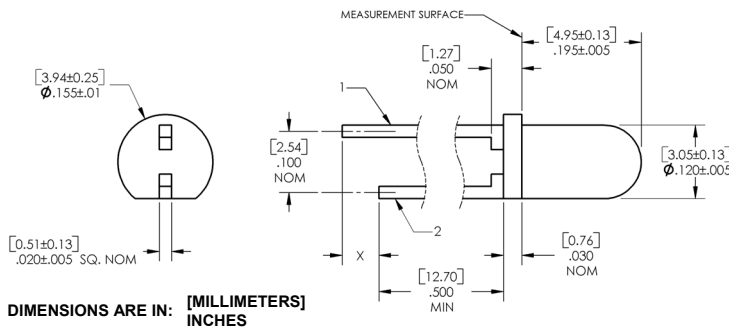
**OP905 - OP906**



Pin #	Diode
1	Anode
2	Cathode



**OP906**



**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.



General Note  
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## Electrical Specifications

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

Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_L$	Reverse Light Current OP905 OP906	14 16	- -	32 35	$\mu\text{A}$	$V_R = 5\text{ V}, E_E = 0.50\text{ mW/cm}^2^{(3)}$
$I_D$	Reverse Dark Current	-	1	60	nA	$V_R = 30\text{ V}, E_E = 0^{(4)}$
$V_{(BR)}$	Reverse Breakdown Voltage	60	-	-	V	$I_R = 100\ \mu\text{A}$
$V_F$	Forward Voltage	-	-	1.2	V	$I_F = 1\text{ mA}$
$C_T$	Total Capacitance	-	4	-	pF	$V_R = 20\text{ V}, E_E = 0, f = 1.0\text{ MHz}$
$t_r$	Rise Time	-	5	-	ns	$V_R = 20\text{ V}, \lambda = 850\text{ nm}, R_L = 50\ \Omega$
$t_f$	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  $1.67\text{ mW}/^\circ\text{C}$  above  $25^\circ\text{C}$ .
- (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  $^\circ\text{C}$ .

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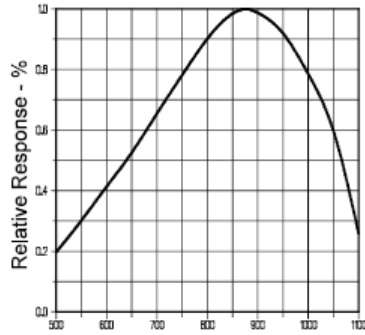
OP905, OP906



## Performance

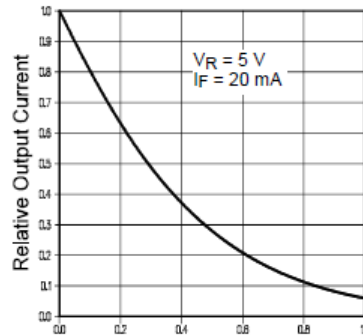
OP905

Relative Response vs. Wavelength



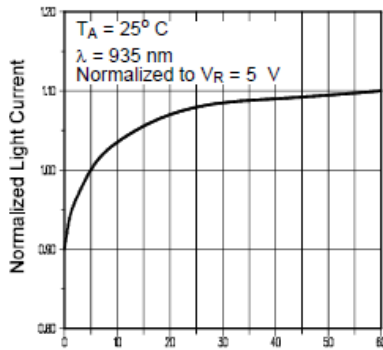
$\lambda$  - Wavelength - nm

Coupling Characteristics  
OP905 and OP265



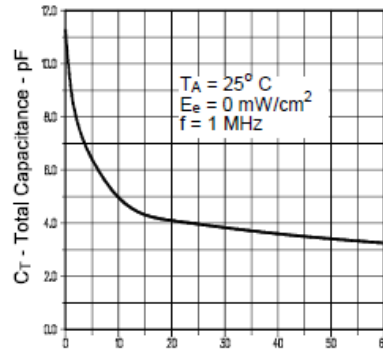
Distance Between Lens Tips - inches

Normalized Light Current vs Reverse Voltage



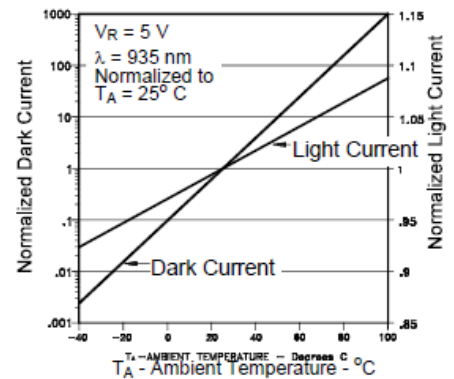
$V_R$  - Reverse Voltage - V

Total Capacitance vs Reverse Voltage

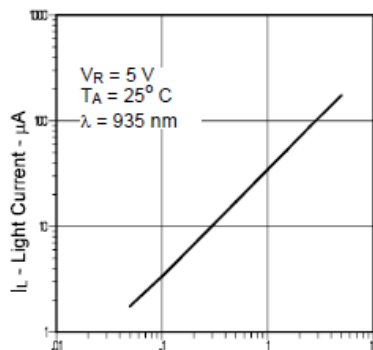


$V_R$  - Reverse Voltage - V

Normalized Light and Dark Current vs Ambient Temperature

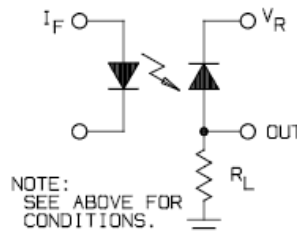


Light Current vs. Irradiance

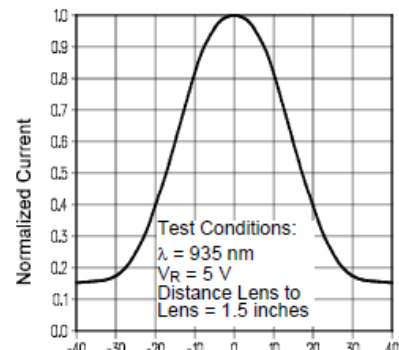


$E_e$  - Irradiance -  $\text{mW}/\text{cm}^2$

Switching Time Test Circuit



Light Current vs. Angular Displacement



$\theta$  - Angular Displacement - Deg.

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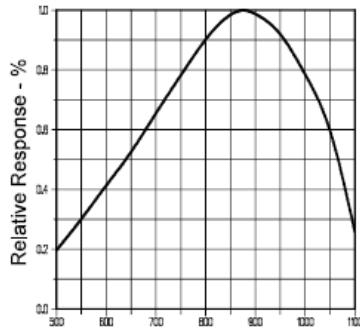
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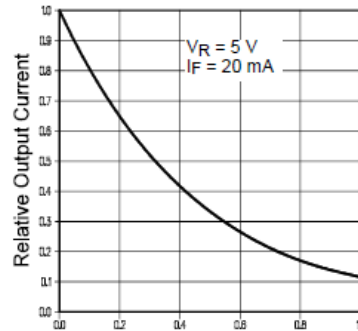
## Performance OP906

Relative Response vs. Wavelength



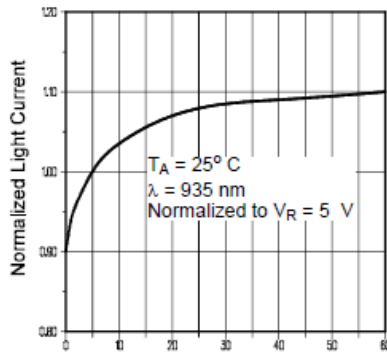
$\lambda$  - Wavelength - nm

Coupling Characteristics  
OP906 and OP266



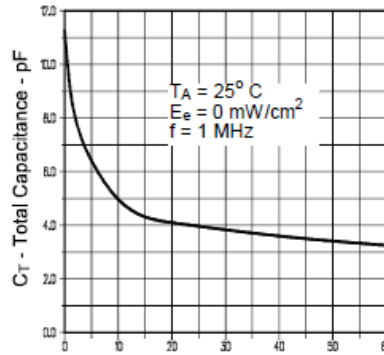
Distance Between Lens Tips - inches

Normalized Light Current vs Reverse Voltage



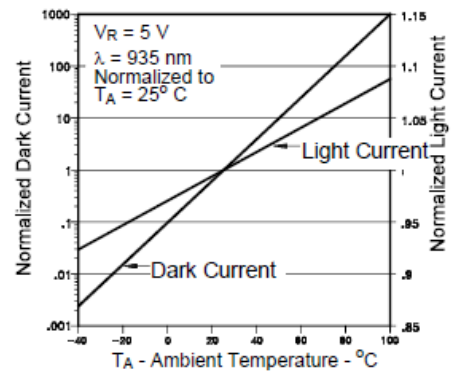
$V_R$  - Reverse Voltage - V

Total Capacitance vs Reverse Voltage

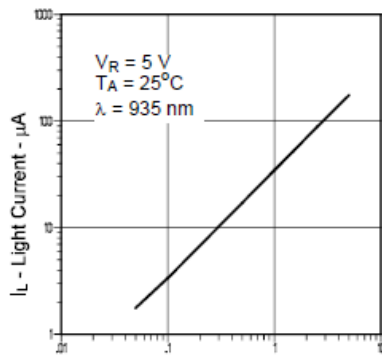


$V_R$  - Reverse Voltage - V

Normalized Light and Dark Current vs Ambient Temperature

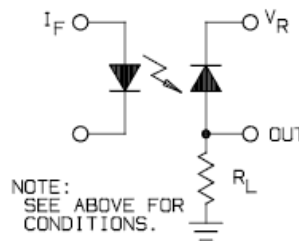


Light Current vs. Irradiance

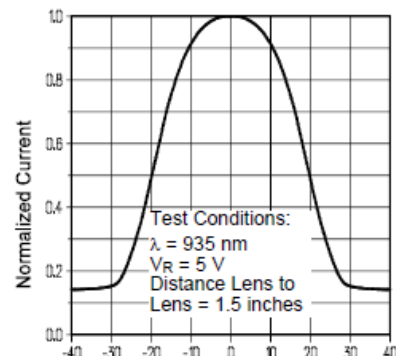


$E_e$  - Irradiance -  $mW/cm^2$

Switching Time Test Circuit



Light Current vs. Angular Displacement



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