PIN Silicon Photodiode

OP993, OP999

Features:

- Choice of TO-18 (OP993) or T-1¾ package (OP999)
- Small package style ideal for space-limited applications
- Linear response vs. irradiance
- Fast switching time
- Choice of narrow or wide receiving angle

Description:

Each **OP993** and **OP999** device consists of a PIN silicon photodiode molded in a dark blue injection molded shell package that provides excellent optical and mechanical axis alignment, optical lens surface, control of chip placement and consistency of the outside package dimensions.

OP993 has a TO-18 package style and a *wide* receiving angle that provides excellent on-axis coupling. **OP999** has a T-1¾ package style and a *narrow* receiving angle that provides excellent on-axis coupling.

Both devices are 100% production tested for close correlation with OPTEK GaAlAs emitters.

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

Applications:

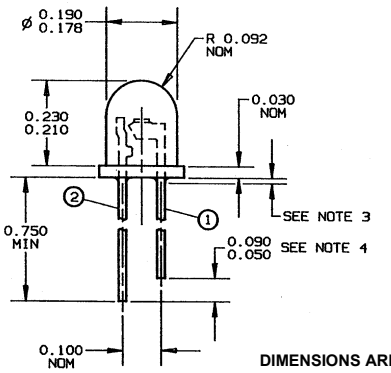
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Ordering Information			
Part Number	Sensor	Viewing Angle	Lead Length
OP993	Photodiode	118°	0.75 min
OP999	Photodiode	18°	

OP993

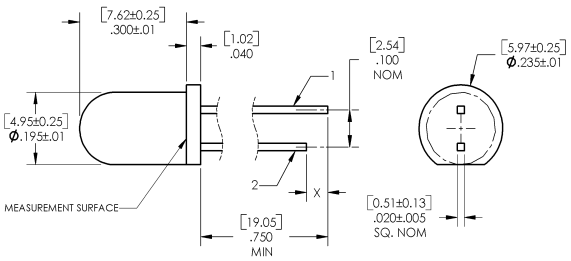
Pin #	Sensor
1	Cathode
2	Anode

OP993



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OP999



DIMENSIONS ARE IN: [MILLIMETERS] INCHES

OP999

Pin #	Sensor
1	Anode
2	Cathode

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

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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 (1.6 mm) 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 OP993 OP999	 12.5 6.5	 - -	 28.5 15	µA	 V_R = 5 V, E_E = 1.7 mW/cm^2 (3) V_R = 5 V, E_E = 0.25 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 GaAlAs emitting diode operating at peak emission wavelength of 890 nm and $E_{E(APT)}$ of 1.7 mW/cm^2 for OP993 and 0.25mW/cm^2 for OP999 average within a 0.25" diameter aperture.

(4) This dimension is held to within ± 0.005" on the flange edge and may vary up to ± 0.020" in the area of the leads.

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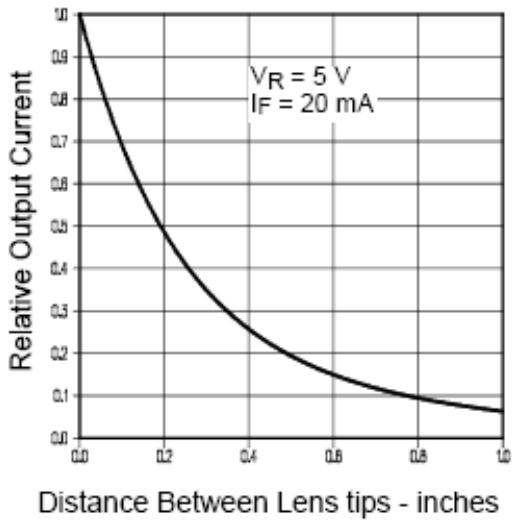
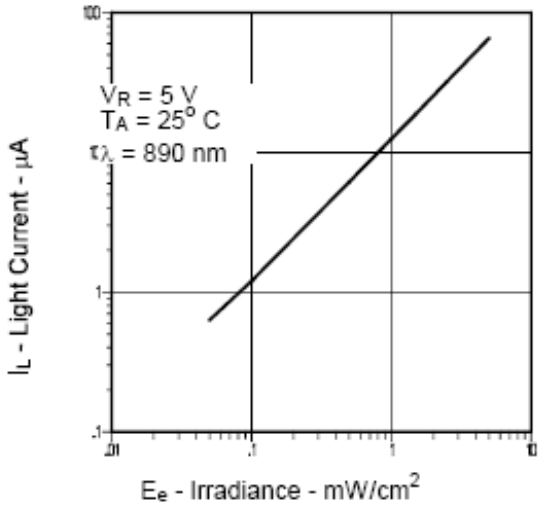
OP993

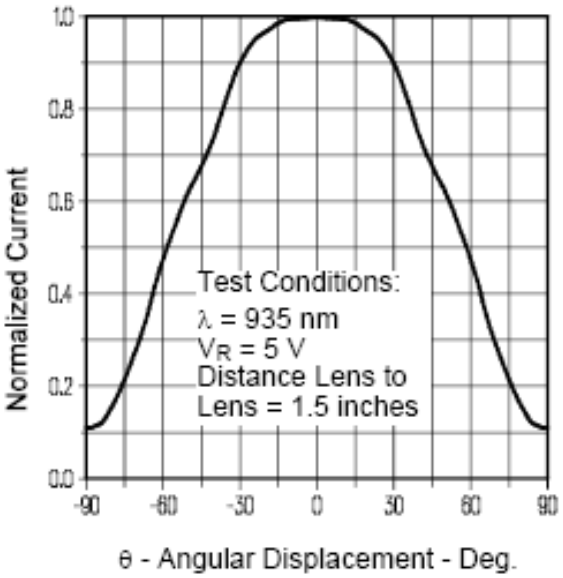
Coupling Characteristics OP993 and OP293



Light Current vs. Irradiance



Light Current vs. Angular Displacement



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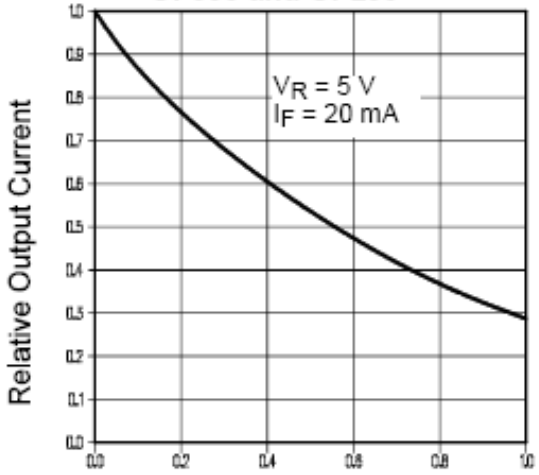
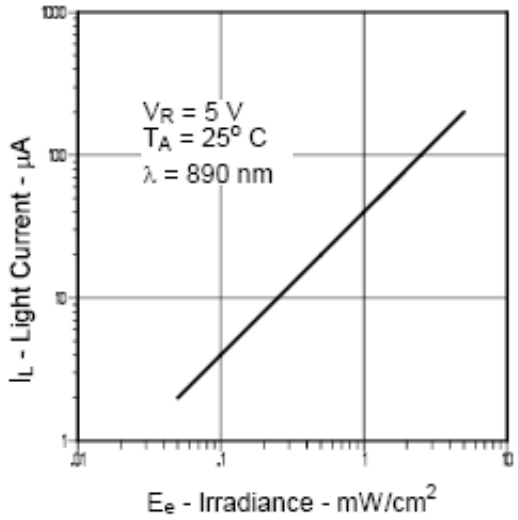
OP999

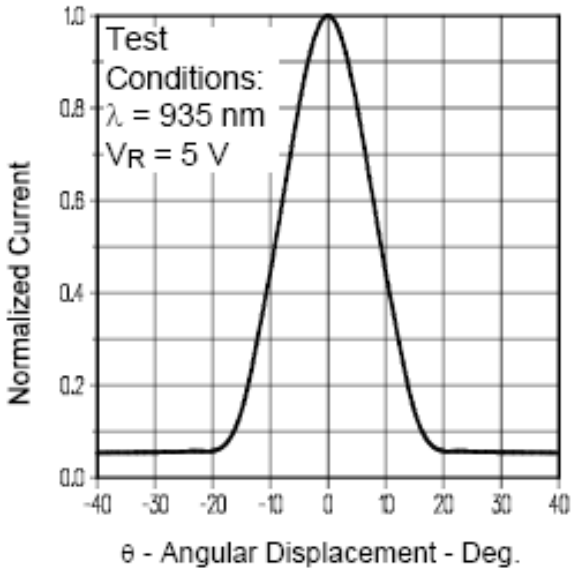
Coupling Characteristics OP999 and OP299



Light Current vs. Irradiance



Light Current vs. Angular Displacement



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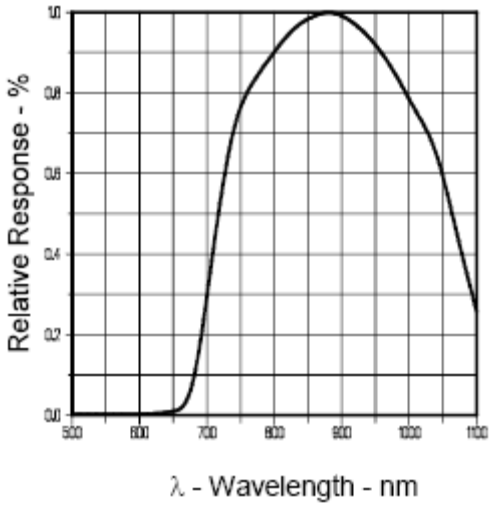
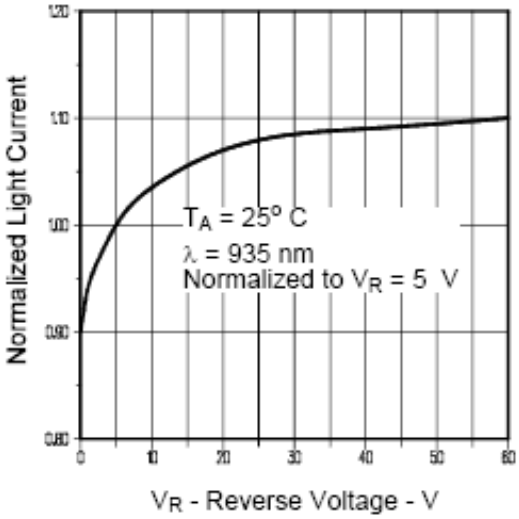
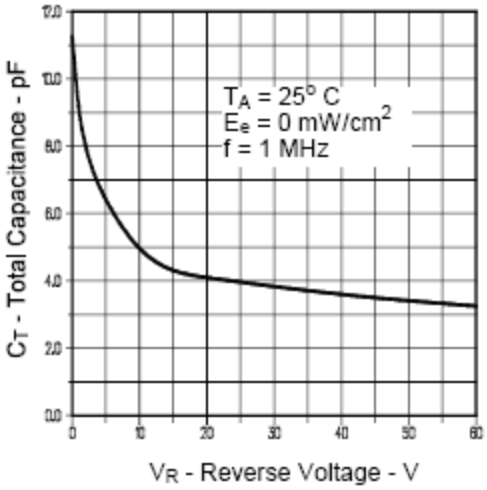
Relative Response vs. Wavelength



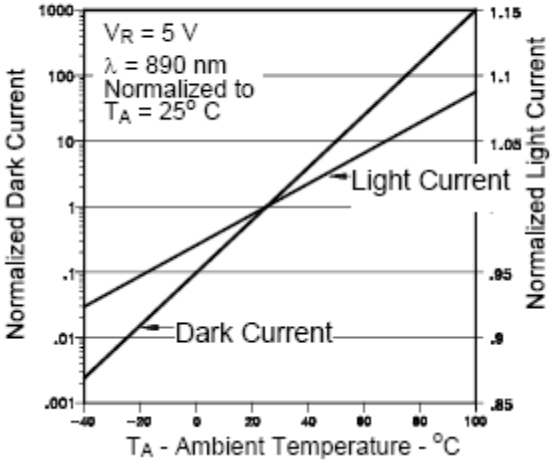
Normalized Light Current vs Reverse Voltage



Total Capacitance vs Reverse Voltage



Normalized Light and Dark Current vs Ambient Temperature



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