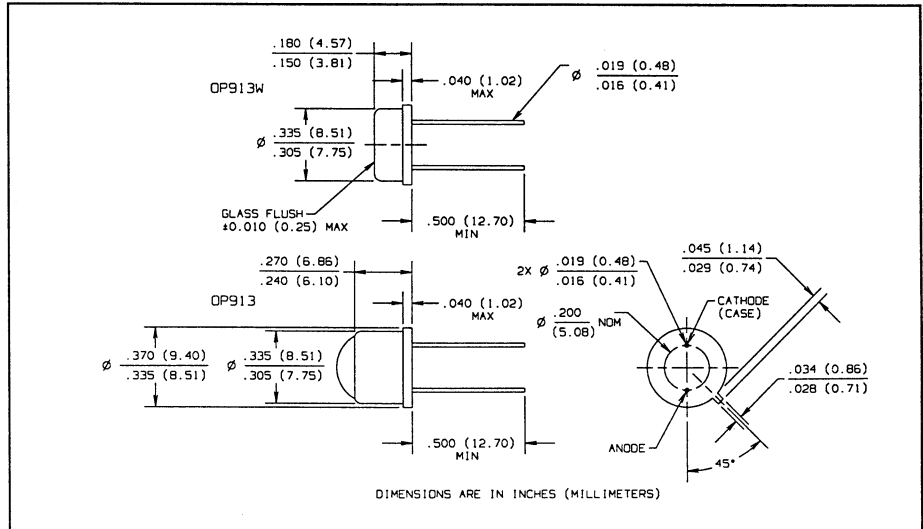
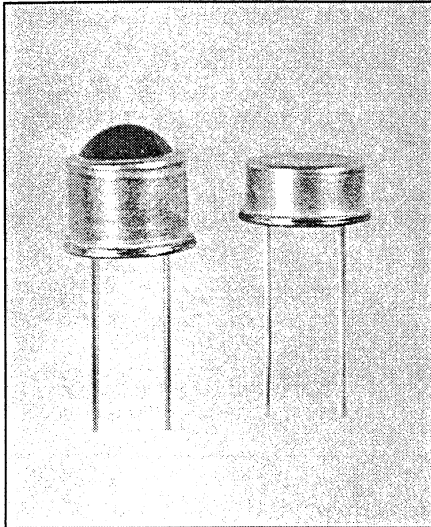


# PIN Silicon Photodiodes Types OP913SL, OP913WSL



### Features

- Wide or Narrow receiving angle available
- Large active area (.115" x .115")
- Fast switching time
- Linear response vs irradiance
- Enhanced temperature range

### Description

The OP913SL and OP913WSL each consist of a PIN silicon photodiode mounted in a two-leaded, TO-5 hermetically sealed package. The lensing effect of the OP913SL allows an acceptance angle of 10° measured from the optical axis to the half power point. The flat lens of the OP913WSL has an acceptance half angle of 30°. The large active area allows very low light level detection.

### Replaces

OP913 and OP913W

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

Reverse Voltage	32 V
Storage Temperature Range	-65° C to +150° C
Operating Temperature Range	-65° C to +125° C
Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]	260° C <sup>(1)</sup>
Power Dissipation	150 mW <sup>(2)</sup>

#### Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (2) Derate linearly 1.5 mW/° C above 25° C.
- (3) Junction temperature maintained at 25° C.
- (4) Light source is an unfiltered tungsten bulb operating at CT = 2870 K or equivalent infrared source.
- (5) At any particular wavelength the flux responsivity, R<sub>θ</sub>, is the ratio of the diode photocurrent to the radiant flux producing it. R<sub>θ</sub> is related to quantum efficiency by:

$$R_{\theta} = \eta q \left( \frac{\lambda}{1240} \right)$$

Where ηq is the quantum efficiency in electrons per photon and λ is the wavelength in nanometers. Thus at 900 nm, 0.60 A/W corresponds to a quantum efficiency of 83%.

- (6) NEP is the radiant flux at a specified wavelength, required for unity signal-to-noise ratio normalized for bandwidth.

$$NEP = \frac{IN\sqrt{\Delta f}}{R_{\theta}} \quad \text{where } IN\sqrt{\Delta f} \text{ is the bandwidth normalized shot noise.}$$

NEP calculation is made using responsivity at peak sensitivity wavelength, with spot noise measurement at 1000 Hz in a noise bandwidth of 6 Hz. (λ, f, Δf) = (λ<sub>p</sub>, 1000 Hz, 6 Hz).

# Types OP913SL, OP913WSL

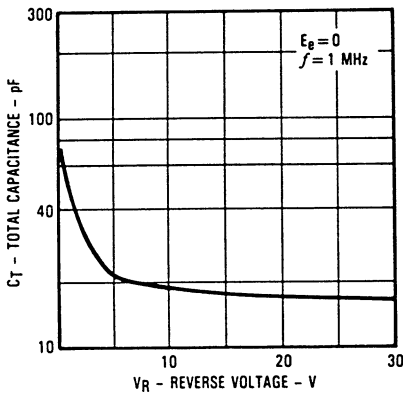
Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$I_L$	Reverse Light Current	OP913SL OP913WSL	120 40		$\mu\text{A}$ $\mu\text{A}$	$V_R = 5\text{ V}$ , $E_e = 5\text{ mW/cm}^2$ <sup>(3)(4)</sup>
$I_D$	Reverse Dark Current			25	nA	$V_R = 10\text{ V}$ , $E_e = 0$ <sup>(3)</sup>
$V_{CC}$	Open Circuit Voltage	OP913SL OP913WSL		400 300	mV mV	$E_e = 5\text{ mW/cm}^2$ <sup>(4)</sup>
$I_{SC}$	Short Circuit Current	OP913SL OP913WSL	120 40		$\mu\text{A}$ $\mu\text{A}$	$E_e = 5\text{ mW/cm}^2$ <sup>(4)</sup>
$V_{(BR)R}$	Reverse Breakdown Voltage		32		V	$I_R = 100\ \mu\text{A}$
$C_T$	Total Capacitance	OP913SL OP913WSL		150 150	pF pF	$V_R = 0$ , $E_e = 0$ , $f = 1\text{ MHz}$
$t_{on}, t_{off}$	Turn-On Time, Turn-Off Time	OP913SL OP913WSL		50 50	ns ns	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$

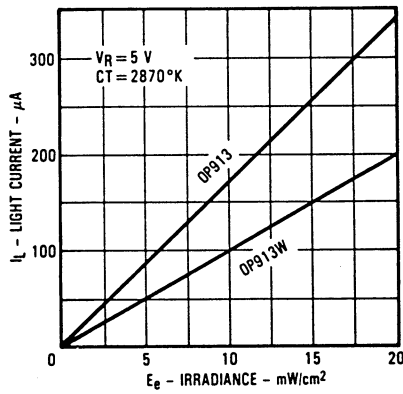
PHOTOSENSORS

## Typical Performance Curves

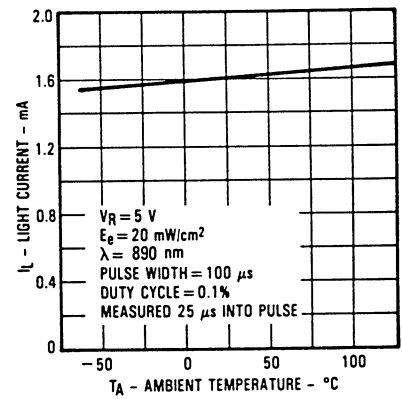
**Total Capacitance vs Reverse Bias Voltage**



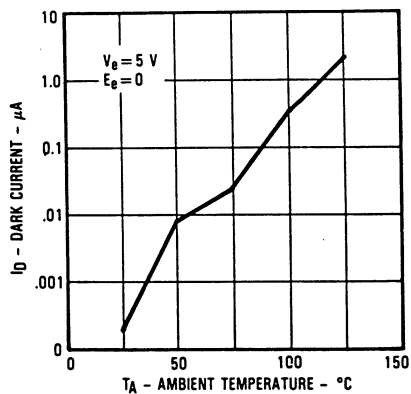
**Light Current vs Irradiance**



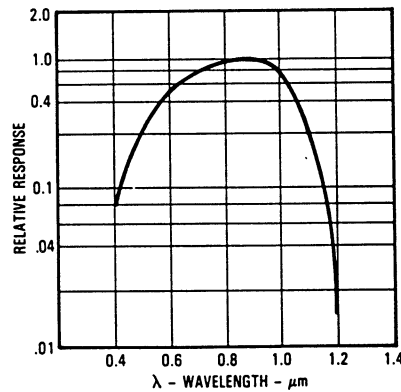
**Light Current vs Ambient Temperature**



**Dark Current vs Ambient Temperature**



**Relative Response vs Wavelength**



Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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