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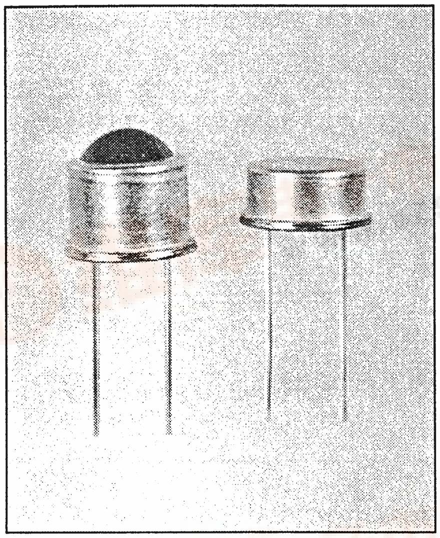
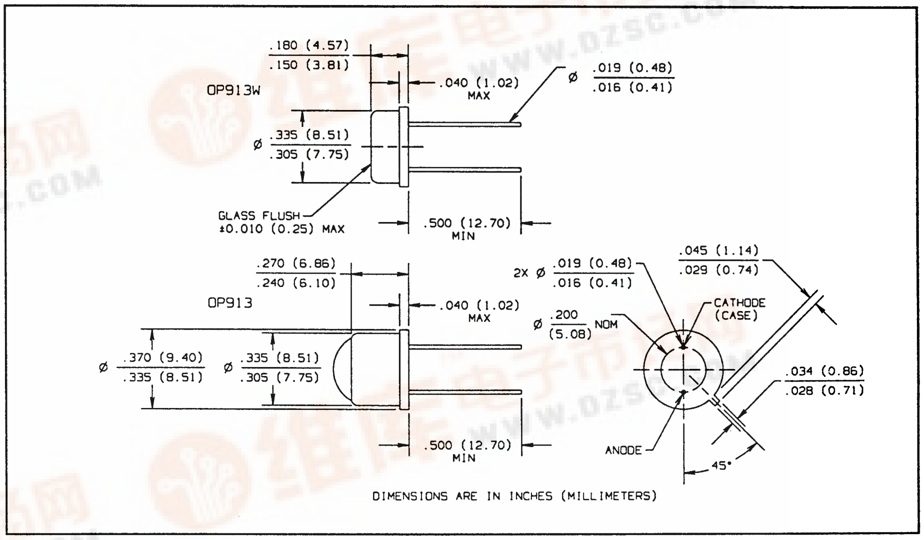
OPTEK

Product Bulletin OP913SL
June 1996

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 ($T_A = 25°$ 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(1)
Power Dissipation . . . . 150 mW(2)

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, Rθ, is the ratio of the diode photocurrent to the radiant flux producing it. Rθ 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.

$$NEP = \frac{I_N/\sqrt{\Delta f}}{R_\theta}$$ where $I_N/\sqrt{\Delta f}$ 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*,Δ *f*) = (λp,1000 Hz, 6 Hz).

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Types OP913SL, OP913WSL

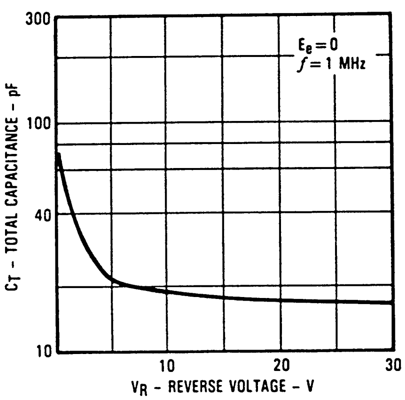
Electrical Characteristics (T_A = 25° C unless otherwise noted)

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

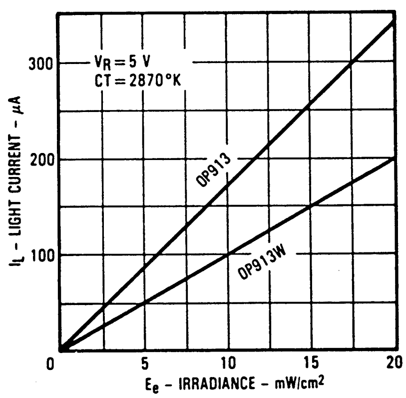
PHOTOSENSORS

Typical Performance Curves

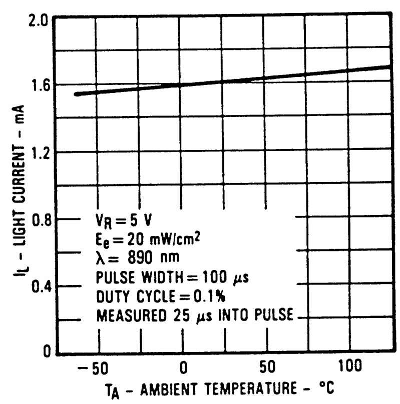
Total Capacitance vs Reverse Bias Voltage



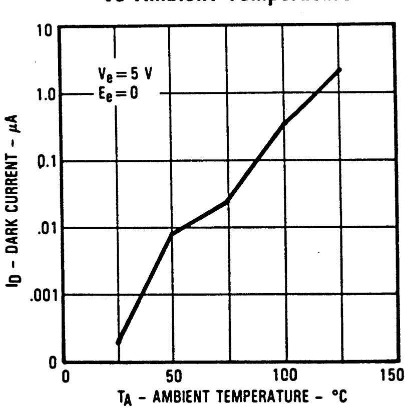
Light Current vs Irradiance



Light Current vs Ambient Temperature



Dark Current vs Ambient Temperature



Relative Response vs Wavelength