



# Silicon PIN Photodiode



94 8633

## FEATURES

- Package type: leaded
- Package form: side view
- Dimensions (in mm): 4.5 x 5 x 6
- Radiant sensitive area (in mm<sup>2</sup>): 4.4
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 60^\circ$
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



## Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

## DESCRIPTION

BPV23NF is a PIN photodiode with high speed and high radiant sensitivity in a black, plastic package with side view lens and daylight blocking filter. Filter bandwidth is matched with 870 nm to 950 nm IR emitters. The lens achieves 80 % of sensitivity improvement in comparison with flat package. BPV23NFL has long leads, other specifications like BPV23NF.

## APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmission systems, e.g. in combination with TSFFxxxx series IR emitters

PRODUCT SUMMARY			
COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.5</sub> (nm)
BPV23NF	65	± 60	790 to 1050
BPV23NFL	65	± 60	790 to 1050

## Note

- Test condition see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
BPV23NF	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	Side view
BPV23NFL	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	Side view, long leads

## Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	60	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		T <sub>J</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 100	°C
Soldering temperature	t ≤ 5 s	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	Connected with Cu wire, 0.14 mm <sup>2</sup>	R <sub>thJA</sub>	350	K/W

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$		1	1.3	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	60			V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$		2	30	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$		48		pF
Serial resistance	$V_R = 12\text{ V}$ , $f = 1\text{ MHz}$	$R_S$		900		$\Omega$
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_o$		390		mV
Temperature coefficient of $V_o$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{V_o}$		-2.6		mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_k$		65		$\mu\text{A}$
Reverse light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	45	65		$\mu\text{A}$
Temperature coefficient of $I_{ra}$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 10\text{ V}$	$TK_{I_{ra}}$		0.1		%/K
Absolute spectral sensitivity	$V_R = 5\text{ V}$ , $\lambda = 870\text{ nm}$	$s(\lambda)$		0.57		A/W
	$V_R = 5\text{ V}$ , $\lambda = 950\text{ nm}$	$s(\lambda)$		0.60		A/W
Angle of half sensitivity		$\phi$		$\pm 60$		deg
Wavelength of peak sensitivity		$\lambda_p$		940		nm
Range of spectral bandwidth		$\lambda_{0.5}$		790 to 1050		nm
Quantum efficiency	$\lambda = 950\text{ nm}$	$\eta$		90		%
Noise equivalent power	$V_R = 10\text{ V}$ , $\lambda = 950\text{ nm}$	NEP		$4 \times 10^{-14}$		$\text{W}/\sqrt{\text{Hz}}$
Detectivity	$V_R = 10\text{ V}$ , $\lambda = 950\text{ nm}$	$D^*$		$5 \times 10^{12}$		$\text{cm}^2\sqrt{\text{Hz}}/\text{W}$
Rise time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$	$t_r$		70		ns
Fall time	$V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$	$t_f$		70		ns
Cut-off frequency	$V_R = 12\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 870\text{ nm}$	$f_c$		4		MHz
	$V_R = 12\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 950\text{ nm}$	$f_c$		1		MHz

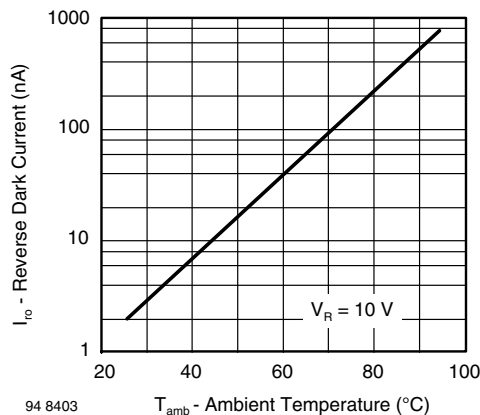
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

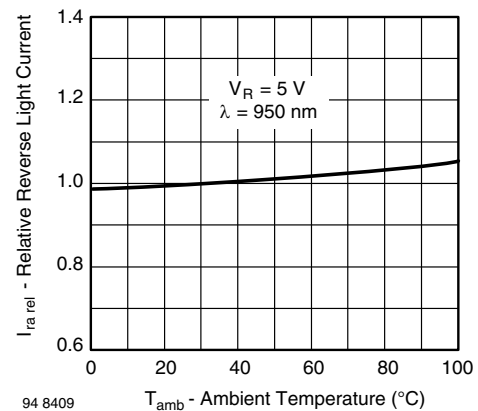


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

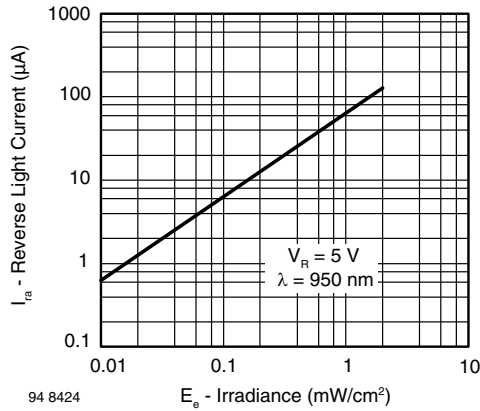


Fig. 3 - Reverse Light Current vs. Irradiance

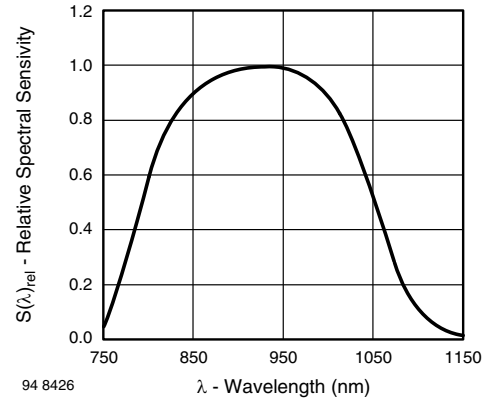


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

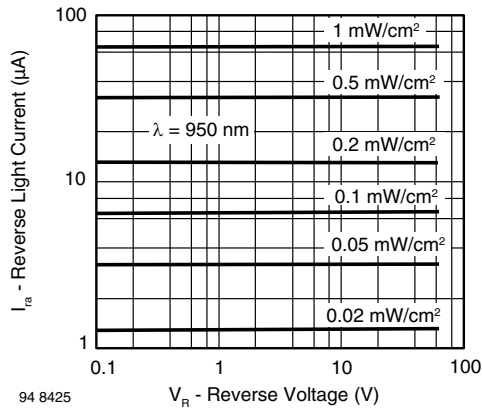


Fig. 4 - Reverse Light Current vs. Reverse Voltage

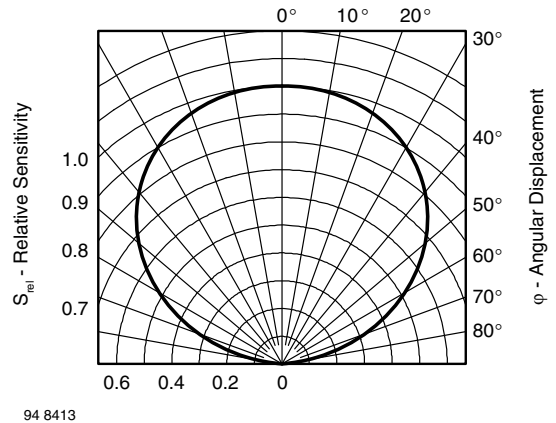


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

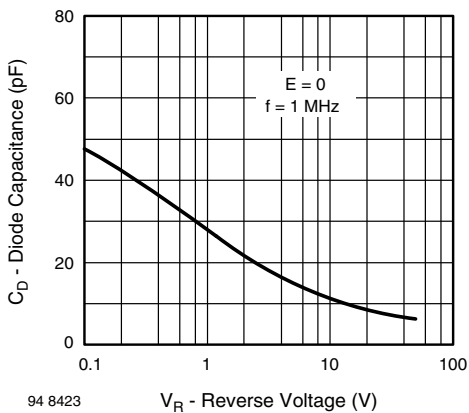
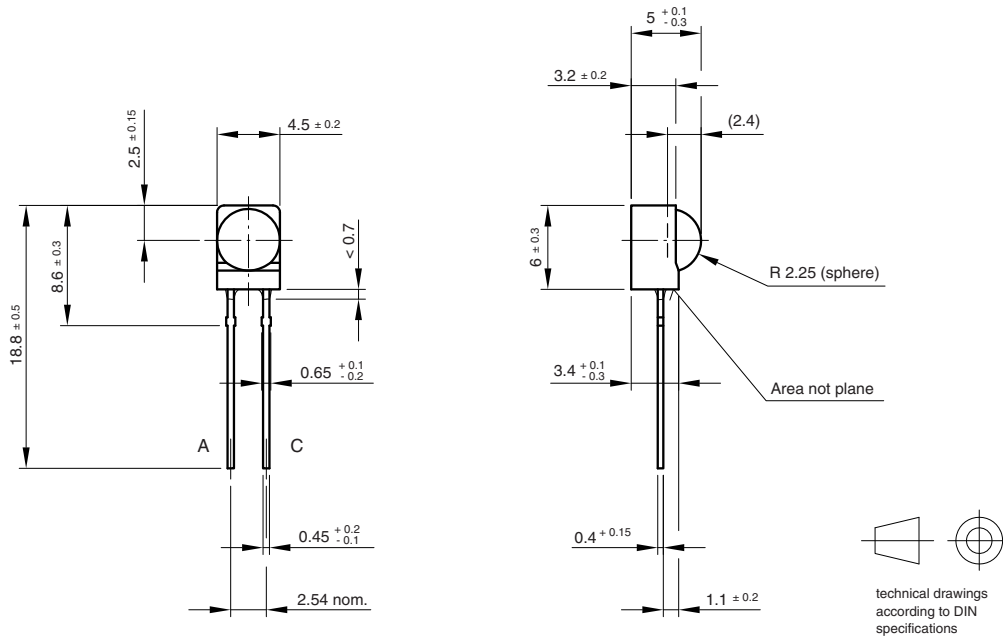


Fig. 5 - Diode Capacitance vs. Reverse Voltage

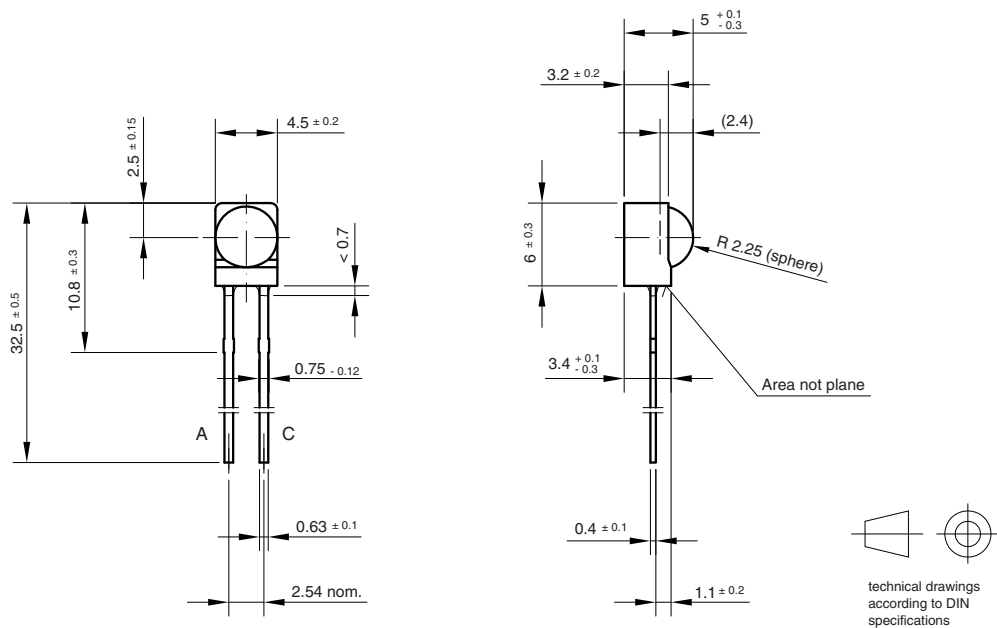


### PACKAGE DIMENSIONS in millimeters: BPV23NF



Drawing-No.: 6.544-5199.01-4  
Issue: 2; 19.06.01  
95 11475

### PACKAGE DIMENSIONS in millimeters: BPV23NFL



Drawing-No.: 6.544-5236.01-4  
Issue: 2; 07.07.97  
96 12205



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