

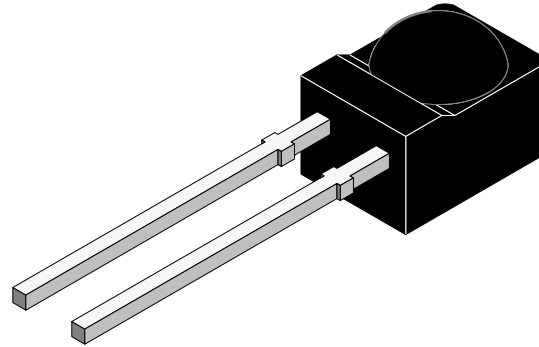
Silicon PIN Photodiode

Description

BPV23NF is a high speed and high sensitive PIN photodiode in a plastic package with a spherical side view lens.

The epoxy package itself is an IR filter, spectrally matched to GaAs on GaAs and GaAlAs on GaAlAs IR emitters ($\lambda_p = 950 \text{ nm}$, $S_{rel}(\lambda = 875 \text{ nm}) > 90 \%$). Lens radius and chip position are perfectly matched to the chip size, giving high sensitivity without compromising the viewing angle.

In comparison with flat packages the spherical lens package achieves a sensitivity improvement of 80%.



94 8633

Features

- Large radiant sensitive area ($A = 5.7 \text{ mm}^2$)
- Wide viewing angle $\varphi = \pm 60^\circ$
- Improved sensitivity
- Fast response times
- Low junction capacitance
- Plastic package with universal IR filter

Applications

Infrared remote control and free air transmission systems in combination with IR emitter diodes (TSU.-, TSI.-, or TSH.-Series). High sensitivity detector for high data rate transmission systems. The IR filter matches perfectly to the high speed infrared emitters in the 830 nm to 880 nm wavelength range.

Absolute Maximum Ratings

 $T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Value	Unit
Reverse Voltage		V_R	60	V
Power Dissipation	$T_{amb} \leq 25^{\circ}\text{C}$	P_V	215	mW
Junction Temperature		T_j	100	$^{\circ}\text{C}$
Operating Temperature Range		T_{amb}	-55...+100	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55...+100	$^{\circ}\text{C}$
Soldering Temperature	$t \leq 5\text{ s}$	T_{sd}	260	$^{\circ}\text{C}$
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

Basic Characteristics

 $T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	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		Ω
Open Circuit Voltage	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$	V_o		390		mV
Temp. 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		μA
Reverse Light Current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	45	65		μA
Temp. 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
Absolute Spectral Sensitivity	$V_R = 5\text{ V}$, $\lambda = 950\text{ nm}$	$s(\lambda)$		0.60		A/W
Angle of Half Sensitivity		φ		± 60		deg
Wavelength of Peak Sensitivity		λ_p		940		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		790...1050		nm
Quantum Efficiency	$\lambda = 950\text{ nm}$	η		90		%
Noise Equivalent Power	$V_R = 10\text{ V}$, $\lambda = 950\text{ nm}$	NEP		4×10^{-14}		$\text{W}/\sqrt{\text{Hz}}$
Detectivity	$V_R = 10\text{ V}$, $\lambda = 950\text{ nm}$	D^*		5×10^{12}		$\text{cm}\sqrt{\text{Hz}}/\text{W}$
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
Cut-Off Frequency	$V_R = 12\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 950\text{ nm}$	f_c		1		MHz

Typical Characteristics ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

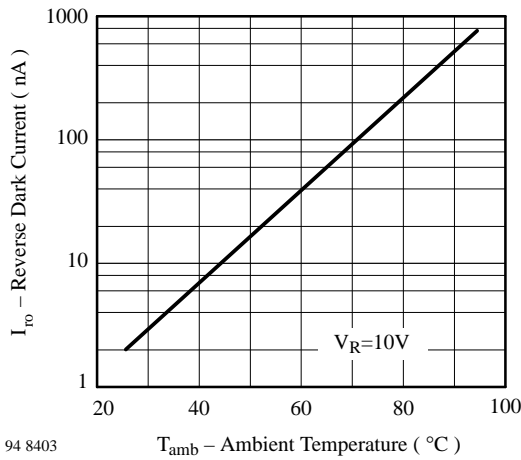


Figure 1 : Reverse Dark Current vs. Ambient Temperature

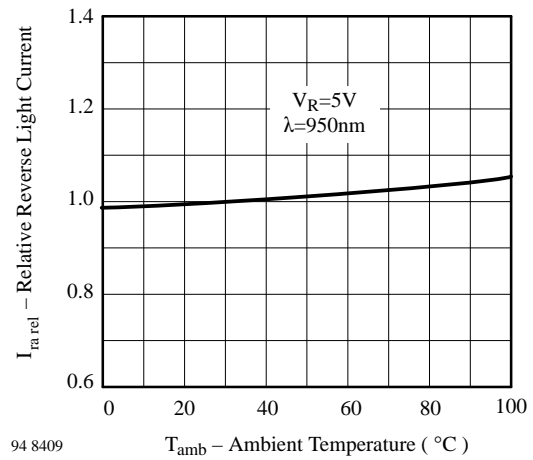


Figure 2 : Relative Reverse Light Current vs. Ambient Temperature

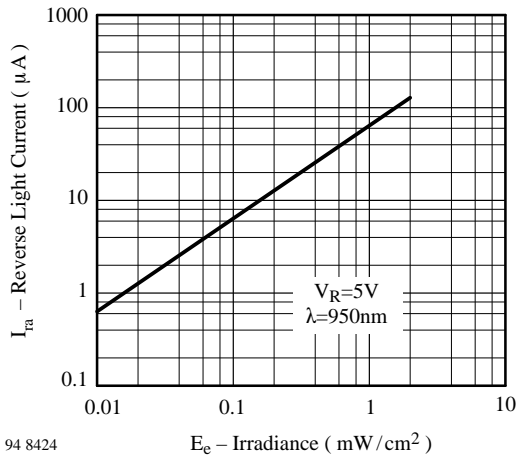


Figure 3 : Reverse Light Current vs. Irradiance

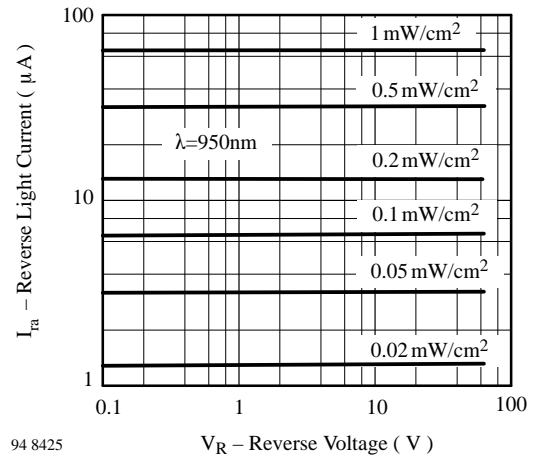


Figure 4 : Reverse Light Current vs. Reverse Voltage

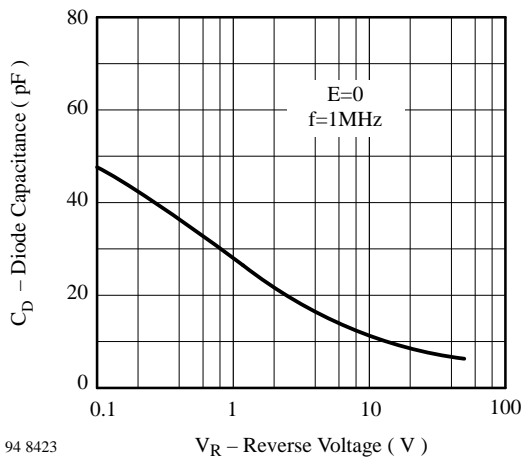


Figure 5 : Diode Capacitance vs. Reverse Voltage

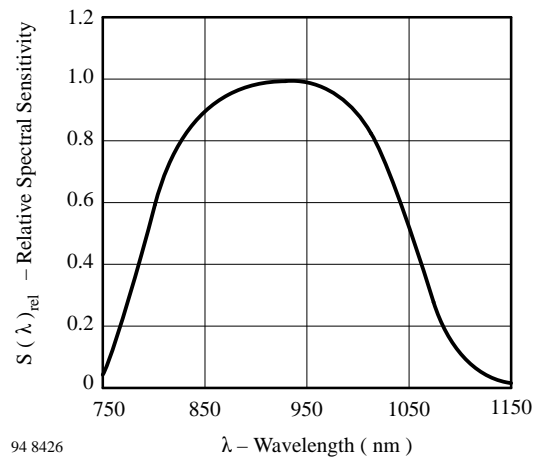
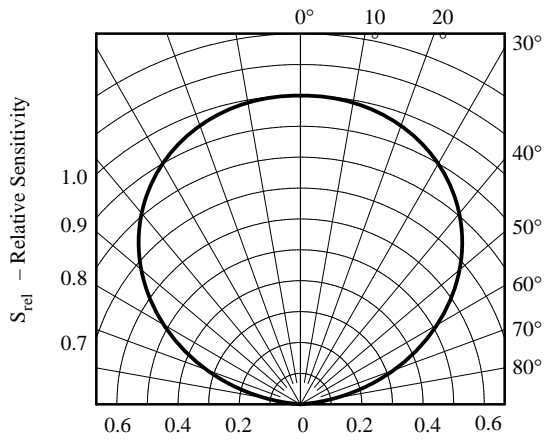


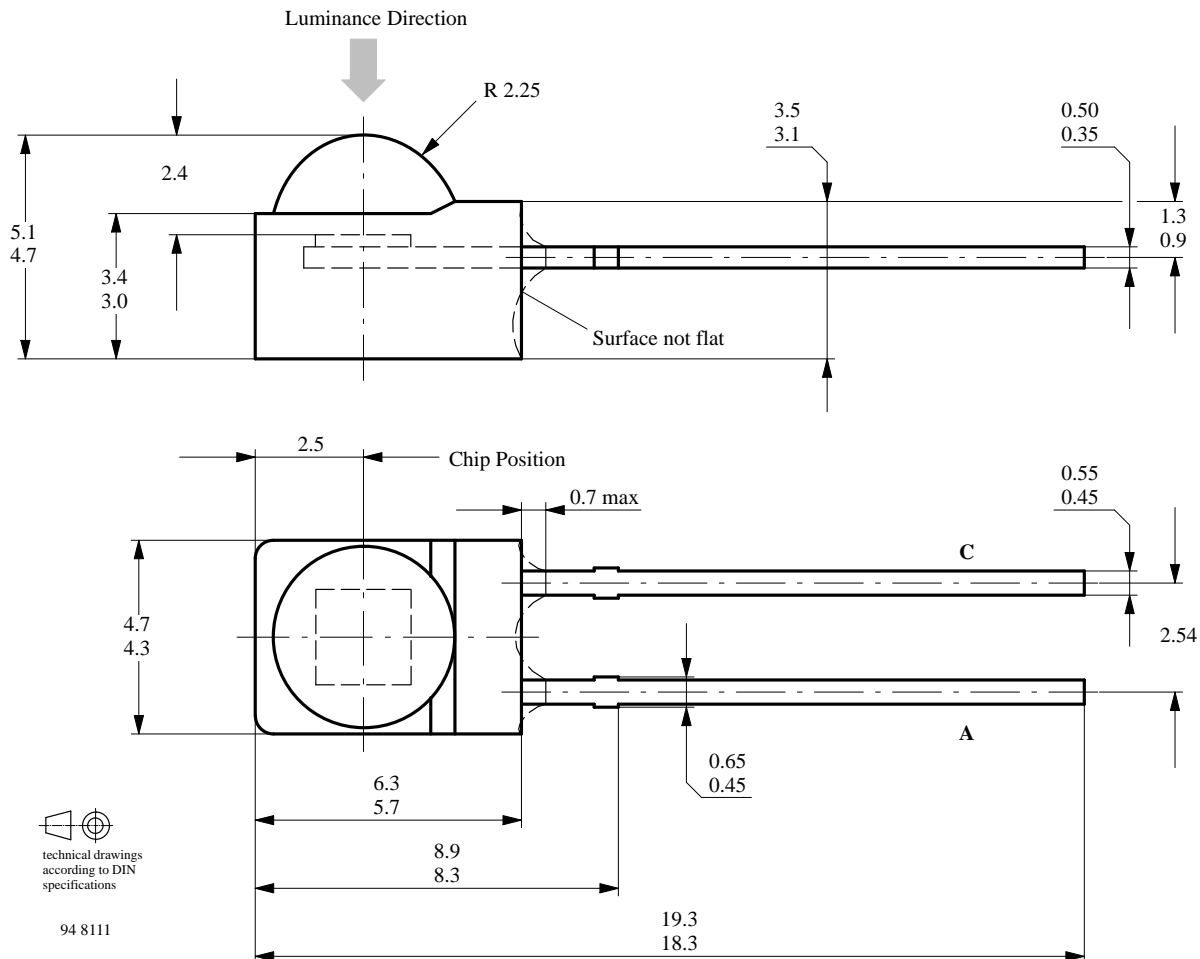
Figure 6 : Relative Spectral Sensitivity vs. Wavelength



94 8413

Figure 7 : Relative Radiant Sensitivity vs. Angular Displacement

Dimensions in mm



We reserve the right to make changes to improve technical design without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax Number: 49 (0)7131 67 2423