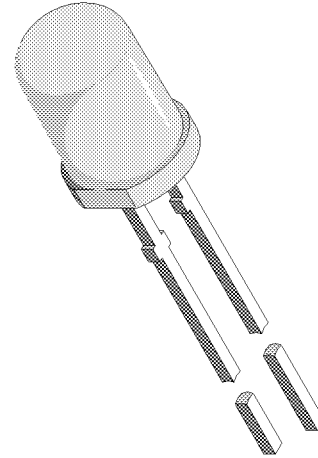

High Speed Silicon PIN Photodiode

Description

BPV10NF is a high sensitive and wide bandwidth PIN photodiode in a standard T-1 $\frac{3}{4}$ plastic package. The black epoxy is an universal IR filter, spectrally matched to GaAs ($\lambda=950\text{nm}$) and GaAlAs ($\lambda=870\text{nm}$) IR emitters.

BPV10NF is optimized for serial infrared links according to the IrDA standard.



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Features

- Extra fast response times
- High modulation bandwidth (>100 MHz)
- High radiant sensitivity
- Radiant sensitive area $A=0.78\text{mm}^2$
- Low junction capacitance
- Standard T-1 $\frac{3}{4}$ (\varnothing 5 mm) package with universal IR filter
- Angle of half sensitivity $\varphi = \pm 20^\circ$

Applications

Infrared high speed remote control and free air transmission systems with high modulation frequencies or high data transmission rate requirements, especially for direct point to point links.

BPV10NF is ideal for the design of transmission systems according to IrDA requirements and for carrier frequency based systems (e.g. ASK / FSK-coded, 450 kHz or 1.3 MHz). Recommended emitter diodes are TSHF 5...-series or TSSF 4500.

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	2 mm from body, $t \leq 5\text{ s}$	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	$V_R = 20\text{ V}$, $E = 0$	I_{r0}		1	5	nA
Diode Capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_D		11		pF
Open Circuit Voltage	$E_e = 1\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$	V_o		450		mV
Short Circuit Current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$	I_k		50		μA
Reverse Light Current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}		55		μA
Reverse Light Current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	30	60		μA
Temp. Coefficient of I_{ra}	$E_e = 1\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$, $V_R = 5\text{ V}$	TK_{Ira}		-0.1		%/K
Absolute Spectral Sensitivity	$V_R = 5\text{ V}$, $\lambda = 870\text{ nm}$	$s(\lambda)$		0.55		A/W
Angle of Half Sensitivity		φ		± 20		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		70		%
Noise Equivalent Power	$V_R = 20\text{ V}$, $\lambda = 950\text{ nm}$	NEP		3×10^{-14}		$\text{W}/\sqrt{\text{Hz}}$
Detectivity	$V_R = 20\text{ V}$, $\lambda = 950\text{ nm}$	D^*		3×10^{12}		$\text{cm}^2/\sqrt{\text{Hz}}/\text{W}$
Rise Time	$V_R = 50\text{ V}$, $R_L = 50\Omega$, $\lambda = 820\text{ nm}$	t_r		2.5		ns
Fall Time	$V_R = 50\text{ V}$, $R_L = 50\Omega$, $\lambda = 820\text{ nm}$	t_f		2.5		ns

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

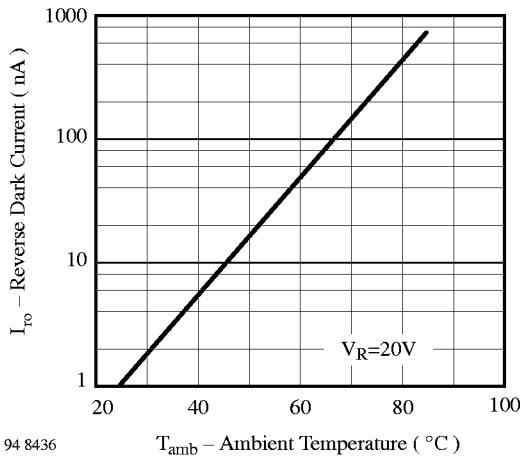


Figure 1 : Reverse Dark Current vs. Ambient Temperature

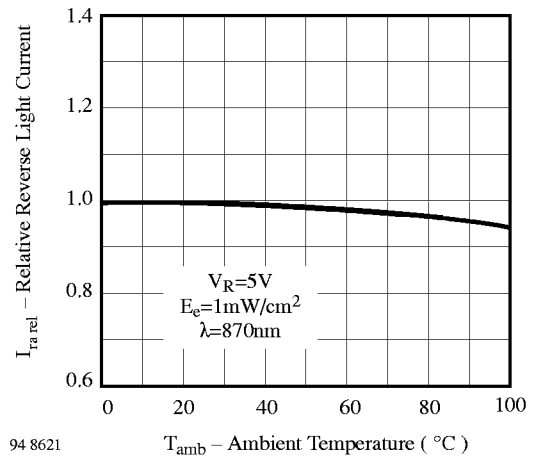


Figure 2 : Relative Reverse Light Current vs. Ambient Temperature

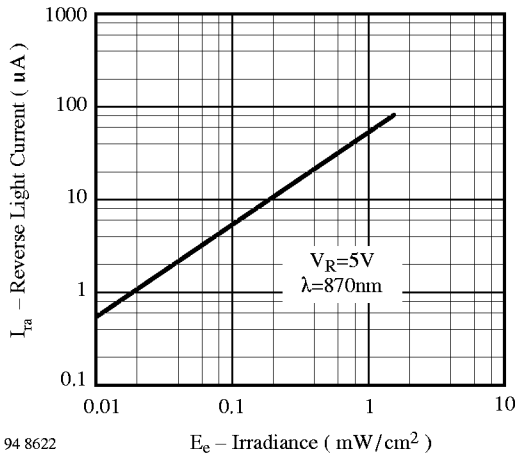


Figure 3 : Reverse Light Current vs. Irradiance

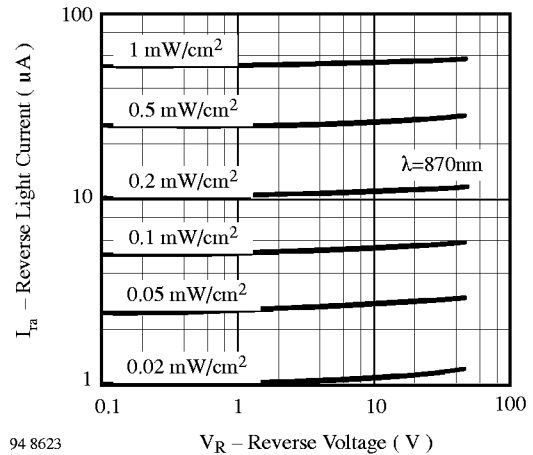


Figure 4 : Reverse Light Current vs. Reverse Voltage

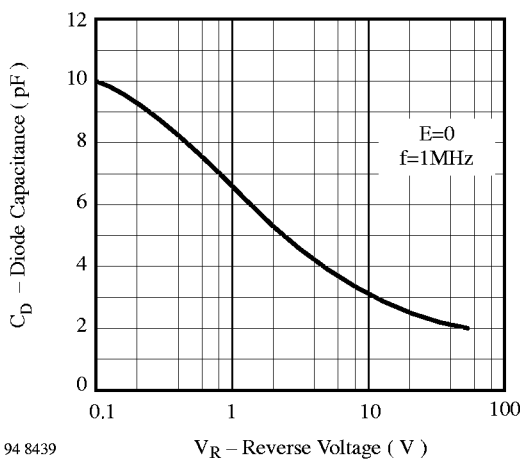


Figure 5 : Diode Capacitance vs. Reverse Voltage

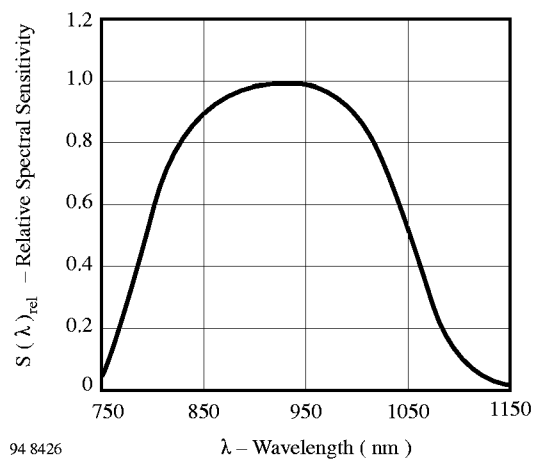
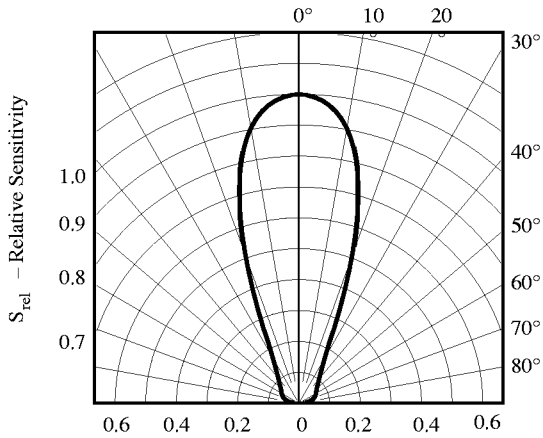


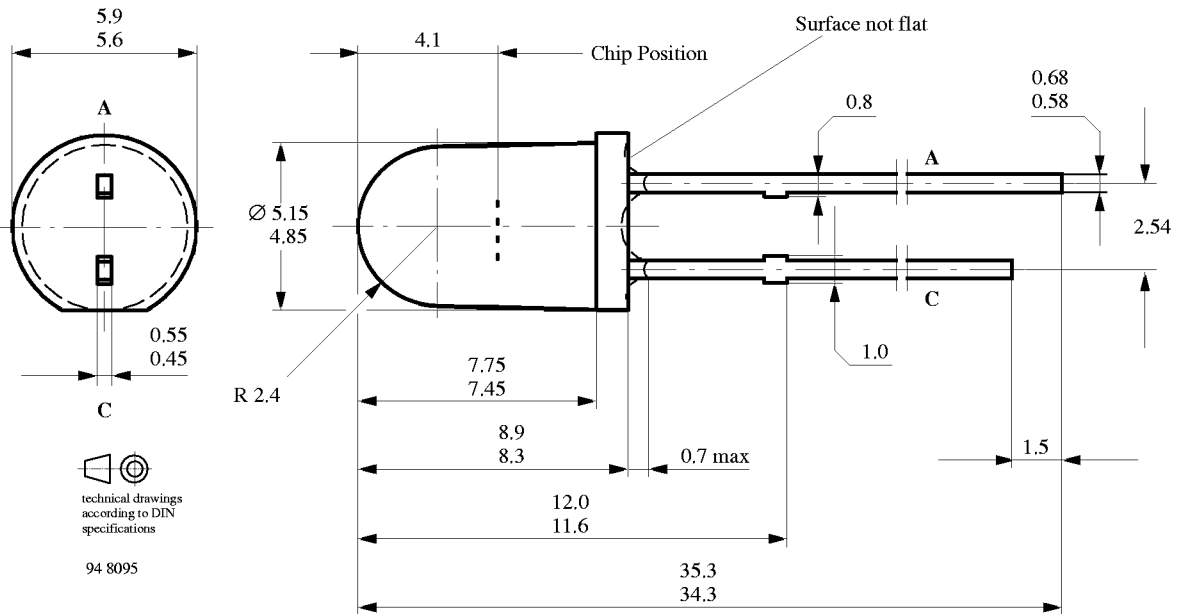
Figure 6 : Relative Spectral Sensitivity vs. Wavelength



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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.

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