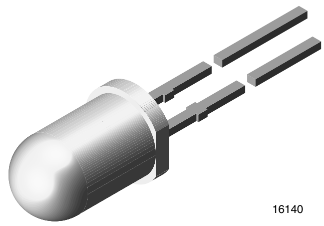
High Speed Silicon PIN Photodiode

Description

BPV10NF is a high sensitive and wide bandwidth PIN photodiode in a standard T-1¾ plastic package. The black epoxy is an universal IR filter, spectrally matched to GaAs (λ = 950 nm) and GaAlAs (λ = 870 nm) IR emitters.

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



Features

- Extra fast response times
- High modulation bandwidth: f_c > 100 MHz
- High radiant sensitivity
- Radiant sensitive area: A = 0.78 mm^2
- Low junction capacitance
- Standard T-1¾ (∅ 5 mm) package with IR band-pass filter
- Angle of half sensitivity: $\varphi = \pm 20°$
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC

Pb
Pb-free
e4

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 TSHF5... series or TSFF5... series.

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	60	V
Power dissipation	$T_{amb} \le 25$ °C	P_V	215	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	2 mm from body, t ≤ 5 s	T_{sd}	260	°C
Thermal resistance junction/ ambient		R_{thJA}	350	K/W

Electrical Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 50 mA	V_F		1	1.3	V
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse dark current	V_R = 20 V, E = 0	I_{ro}		1	5	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		11		pF

Optical Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Open circuit voltage	E_e = 1 mW/cm², λ = 870 nm	V_o		450		mV
Short circuit current	E_e = 1 mW/cm², λ = 870 nm	I_k		50		µA
Reverse light current	E_e = 1 mW/cm², λ = 870 nm, V_R = 5 V	I_{ra}		55		µA
	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	30	60		µA
Temp. coefficient of I_{ra}	E_e = 1 mW/cm², λ = 870 nm, V_R = 5 V	TK_{Ira}		- 0.1		%/K
Absolute spectral sensitivity	V_R = 5 V, λ = 870 nm	s(λ)		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 to 1050		nm
Quantum efficiency	λ = 950 nm	η		70		%
Noise equivalent power	V_R = 20 V, λ = 950 nm	NEP		3×10^{-14}		W/√ Hz
Detectivity	V_R = 20 V, λ = 950 nm	D^*		3×10^{12}		cm√Hz/W
Rise time	V_R = 50 V, R_L = 50 Ω, λ = 820 nm	t_r		2.5		ns
Fall time	V_R = 50 V, R_L = 50 Ω, λ = 820 nm	t_f		2.5		ns

Typical Characteristics

T_{amb} = 25 °C unless otherwise specified

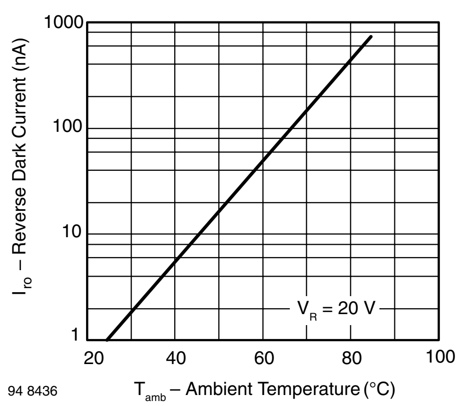


Figure 1. Reverse Dark Current vs. Ambient Temperature

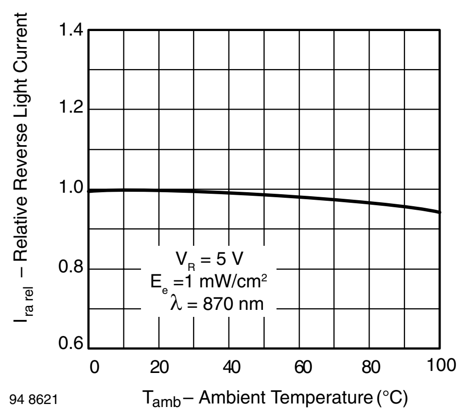


Figure 2. Relative Reverse Light Current vs. Ambient Temperature

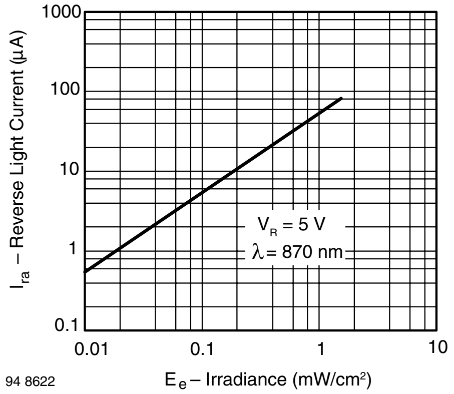


Figure 3. Reverse Light Current vs. Irradiance

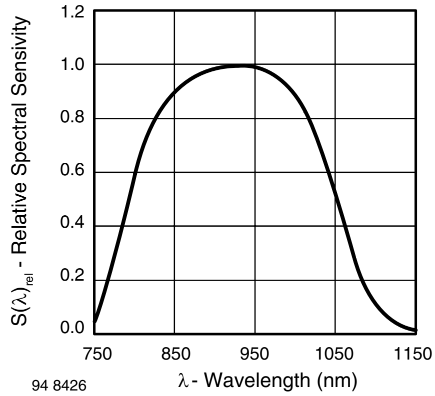


Figure 6. Relative Spectral Sensitivity vs. Wavelength

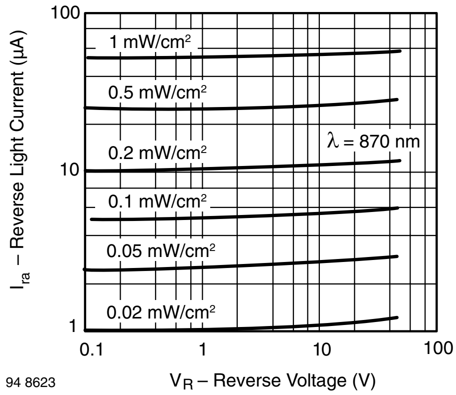


Figure 4. Reverse Light Current vs. Reverse Voltage

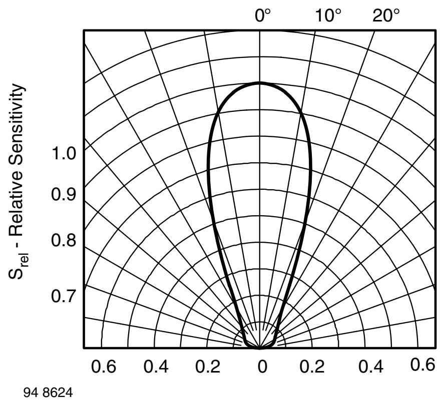


Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

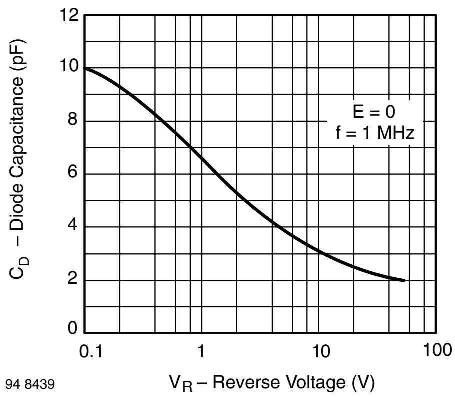
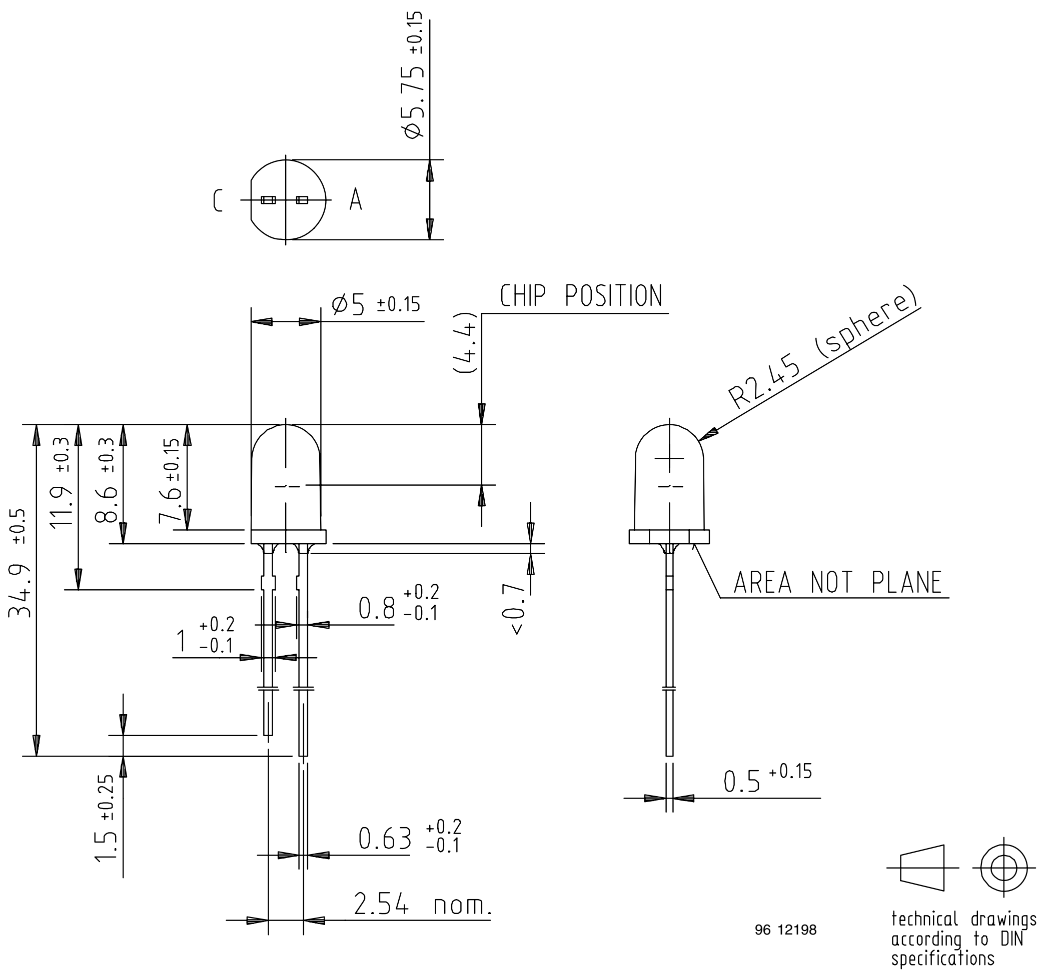


Figure 5. Diode Capacitance vs. Reverse Voltage

Package Dimensions in millimeters



Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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