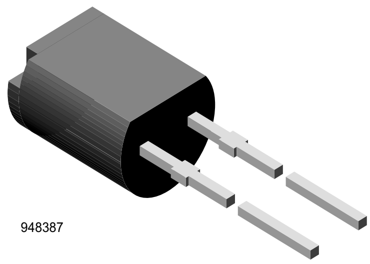
Silicon PIN Photodiode

Description

BPV21F(L) is a high speed and high sensitive PIN photodiode in a plasic package with a cylindrical side view lens. The epoxy package itself is an IR filter, spectrally matched to GaAs or GaAs/GaAlAs IR emitters (λ_p = 950 nm).

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 cylindrical lens package achieves a sensitivity improvement of 20 %.



948387

Features

- Large radiant sensitive area (A = 5.7 mm^2)
- Wide viewing angle φ = ± 65°
- Fast response times
- Low junction capacitance
- TO-92 plastic package with IR filter
- Filter designed for 950 nm transmission
- Option "L" long lead package optional available with suffix "L"; e.g.: BPV23FL
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

Infrared remote control and free air transmission systems in combination with IR emitter diodes (TSU...- or TSI...-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}	- 55 to + 100	°C
Storage Temperature Range		T_{stg}	- 55 to + 100	°C
Soldering Temperature	$t \le 5$ 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 = 10 V, E = 0	I_{ro}		2	30	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		48		pF
Serial Resistance	V_R = 12 V, f = 1 MHz	R_S		900		Ω

Optical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Open Circuit Voltage	E_e = 1 mW/cm^2, λ = 950 nm	V_o		380		mV
Temp. Coefficient of V_o	E_e = 1 mW/cm^2, λ = 950 nm	TK_{Vo}		- 2.6		mV/K
Short Circuit Current	E_e = 1 mW/cm^2, λ = 950 nm	I_k		35		μA
Reverse Light Current	E_e = 1 mW/cm^2, λ = 950 nm, V_R = 5 V	I_{ra}	27	38		μA
Temp. Coefficient of I_{ra}	E_e = 1 mW/cm^2, λ = 950 nm, V_R = 10 V	TK_{Ira}		0.1		%/K
Absolute Spectral Sensitivity	V_R = 5 V, λ = 870 nm	$s(\lambda)$		0.35		A/W
	V_R = 5 V, λ = 950 nm	$s(\lambda)$		0.6		A/W
Angle of Half Sensitivity		φ		± 65		deg
Wavelength of Peak Sensitivity		λ_p		950		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		870 to 1050		nm
Quantum Efficiency	λ = 950 nm	η		90		%
Noise Equivalent Power	V_R = 10 V, λ = 950 nm	NEP		4 x 10^{-14}		W/√ Hz
Detectivity	V_R = 10 V, λ = 950 nm	D^*		5 x 10^{12}		cm√Hz/W
Rise Time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_r		70		ns
Fall Time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f		70		ns
Cut-Off Frequency	V_R = 12 V, R_L = 1 kΩ, λ = 870 nm	f_c		4		MHz
	V_R = 12 V, R_L = 1 kΩ, λ = 950 nm	f_c		1		MHz

Typical Characteristics

T_{amb} = 25 °C unless otherwise specified

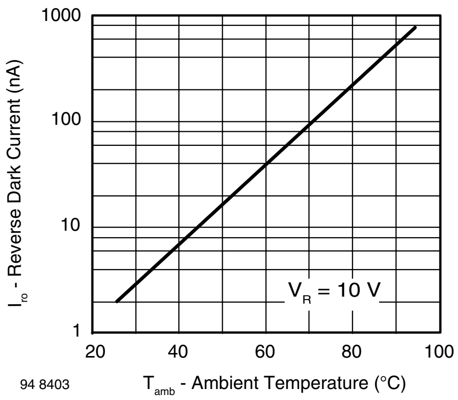


Figure 1. Reverse Dark Current vs. Ambient Temperature

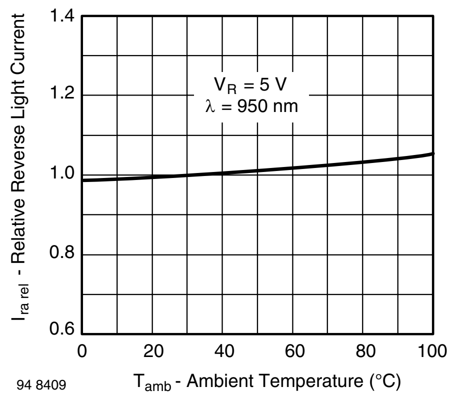


Figure 2. Relative Reverse Light Current vs. Ambient Temperature

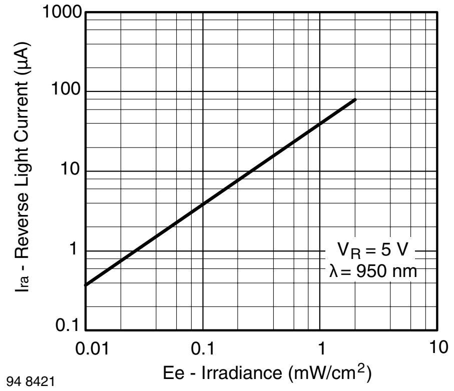


Figure 3. Reverse Light Current vs. Irradiance

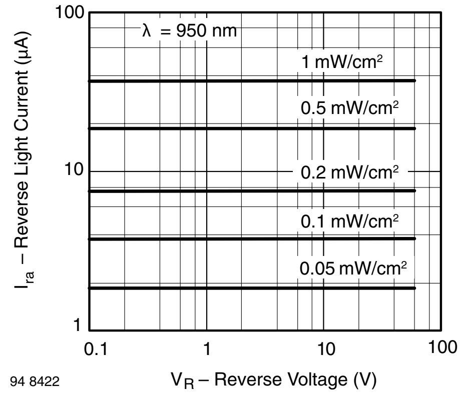


Figure 4. Reverse Light Current vs. Reverse Voltage

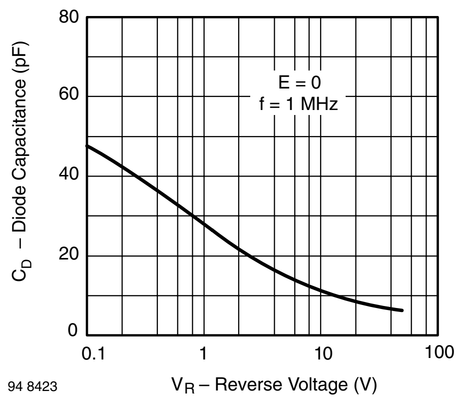


Figure 5. Diode Capacitance vs. Reverse Voltage

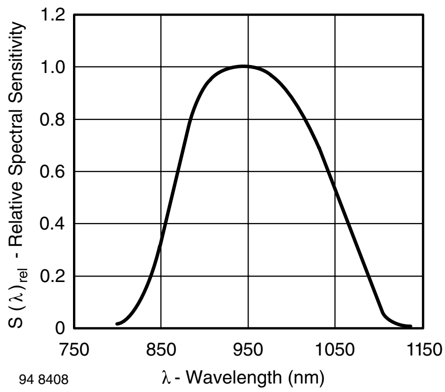


Figure 6. Relative Spectral Sensitivity vs. Wavelength

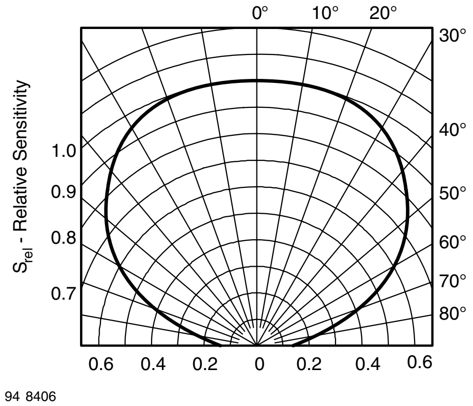
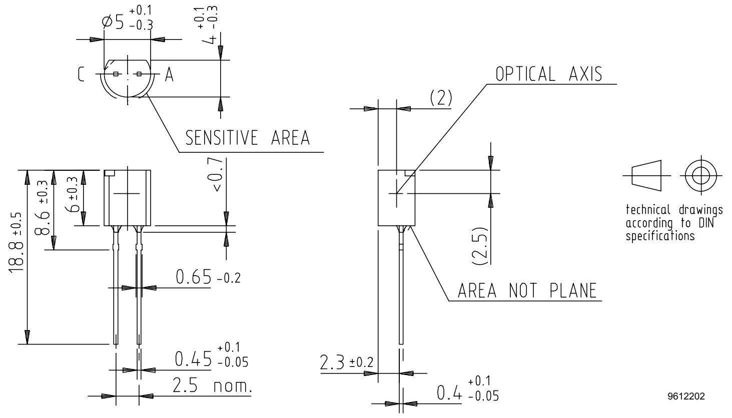
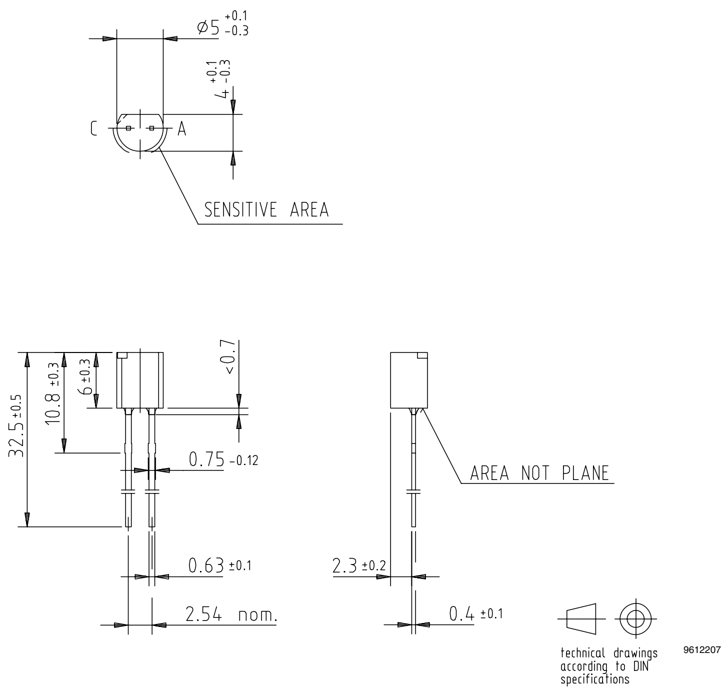


Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

Package Dimensions in mm



Package Dimensions in mm



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

Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.