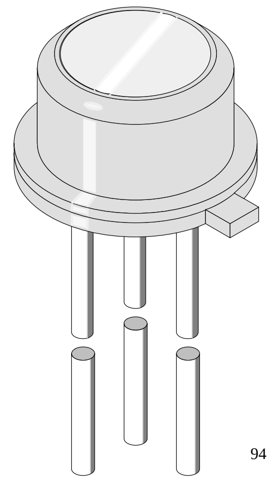
Silicon PIN Photodiode

Description

BPW97 is an extra high speed PIN photodiode in a hermetically sealed TO18 package.
Unlike most similar devices, the cathode terminal is isolated from case and connected to a third terminal, giving the user all the means to improve shielding of his system.
Due to its high precision flat glass window and its accurate chip alignment, this device is recommended for ambitious applications in the optical data transmission domain.



Features

- Extra fast response times at low operating voltages
- Exact central chip alignment
- Chip insulated
- Shielded construction
- Hermetically sealed TO–18 case
- Flat optical window
- Wide angle of half sensitivity $\varphi = \pm 55^\circ$
- Radiant sensitive area $A=0.25mm^2$
- Suitable for visible and near infrared radiation
- Suitable for coupling with 50 µm gradient index fiber

Applications

Wide band detector for demodulation of fast signals, e.g. of lasers and GaAs emitters.
Detector for optical communication, e.g. for optical fiber transmission systems with only 5 V power supply.

Absolute Maximum Ratings

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Value	Unit
Reverse Voltage		V_R	60	V
Power Dissipation	$T_{amb} \leqq 25$ °C	P_V	285	mW
Junction Temperature		T_j	125	°C
Storage Temperature Range		T_{stg}	–55...+125	°C
Soldering Temperature	t ≦ 5 s	T_{sd}	260	°C
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage	I_F = 50 mA	V_F		0.9	1.2	V
Breakdown Voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	60			V
Reverse Dark Current	V_R = 50 V, E = 0	I_{ro}		1	5	nA
Diode Capacitance	V_R = 50 V, f = 1 MHz, E = 0	C_D		1.7		pF
Dark Resistance	V_R = 10mV, E = 0, f = 0	R_D		5		GΩ
Serial Resistance	V_R = 50 V, f = 1 MHz	R_S		180		Ω
Reverse Light Current	E_e = 1 mW/cm^2, λ = 870 nm, V_R = 50 V	I_{ra}	1.0	1.3		µA
Reverse Light Current	E_e = 1 mW/cm^2, λ = 950 nm, V_R = 50 V	I_{ra}		0.9		µA
Temp. Coefficient of I_{ra}	V_R = 50 V, λ = 870 nm	TK_{Ira}		0.2		%/K
Absolute Spectral Sensitivity	V_R = 5 V, λ = 870 nm	s(λ)		0.50		A/W
Absolute Spectral Sensitivity	V_R = 5 V, λ = 950 nm	s(λ)		0.35		A/W
Angle of Half Sensitivity		φ		±55		deg
Wavelength of Peak Sensitivity		λ_p		810		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		560...960		nm
Quantum Efficiency	λ = 850 nm	η		80		%
Noise Equivalent Power	V_R=50V, λ=870 nm	NEP		3.6×10^{-14}		W/√ Hz
Detectivity	V_R=50V, λ=870nm	D^*		1.4×10^{12}		cm√Hz/ W
Rise Time	V_R=3.8V, R_L=50Ω, λ=780nm	t_r		1.2		ns
Fall Time	V_R=3.8V, R_L=50Ω, λ=780nm	t_f		1.2		ns
Rise Time	V_R=50V, R_L=50Ω, λ=820nm	t_r		0.6		ns
Fall Time	V_R=50V, R_L=50Ω, λ=820nm	t_f		0.6		ns
Cut–Off Frequency	λ=820 nm	f_c		1		GHz

Typical Characteristics (T$_{amb}$ = 25°C unless otherwise specified)

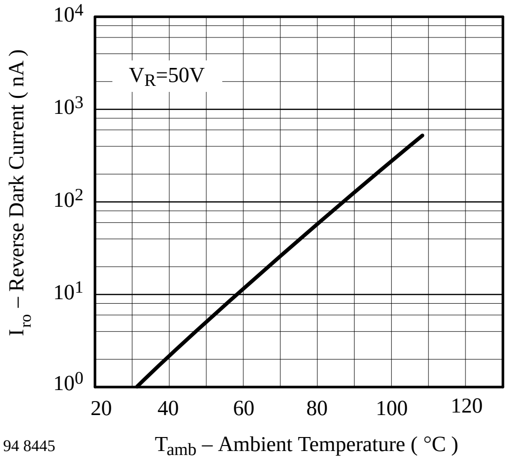


Figure 1 : Reverse Dark Current vs. Ambient Temperature

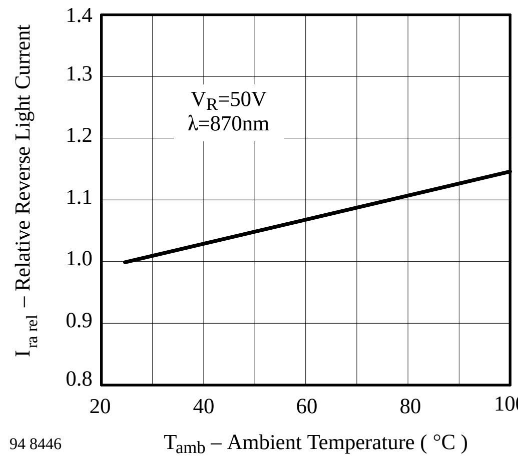


Figure 2 : Relative Reverse Light Current vs. Ambient Temperature

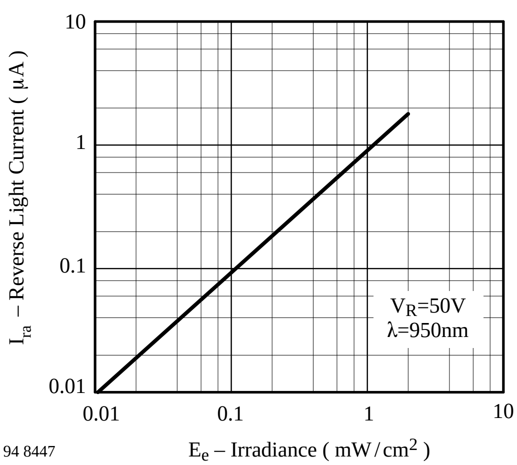


Figure 3 : Reverse Light Current vs. Irradiance

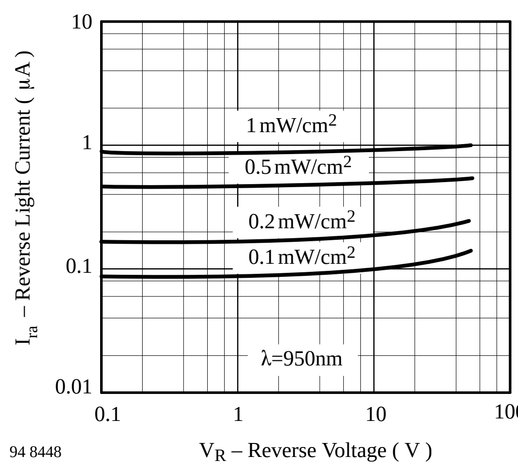


Figure 4 : Reverse Light Current vs. Reverse Voltage

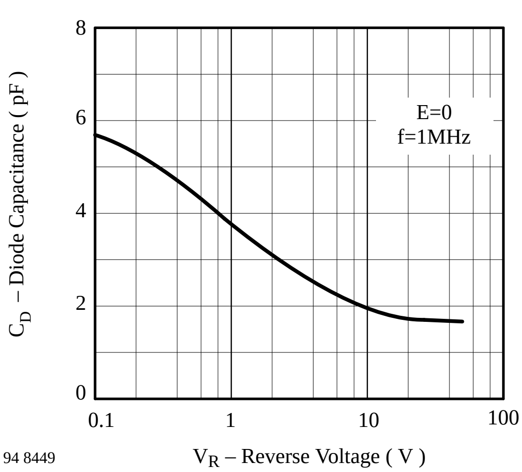


Figure 5 : Diode Capacitance vs. Reverse Voltage

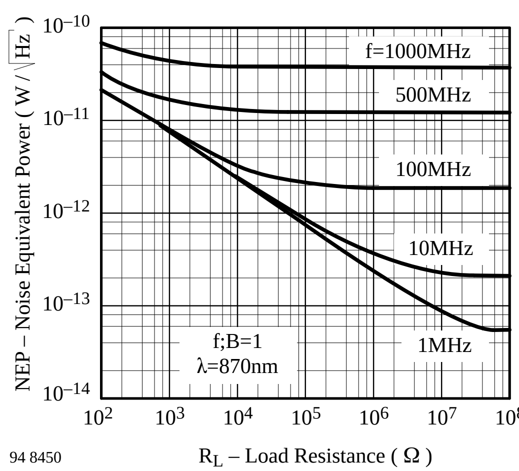


Figure 6 : Noise Equivalent Power vs. Load Resistance

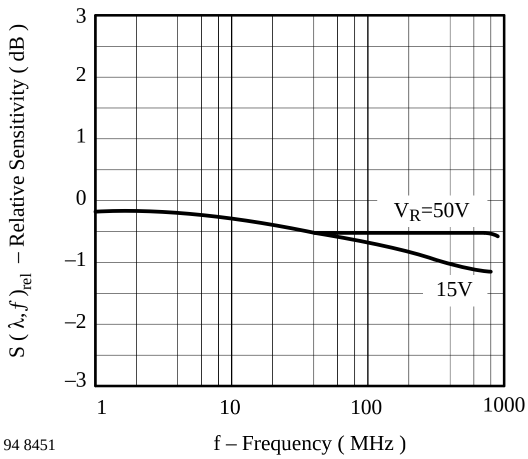


Figure 7 : Relative Sensitivity vs. Frequency

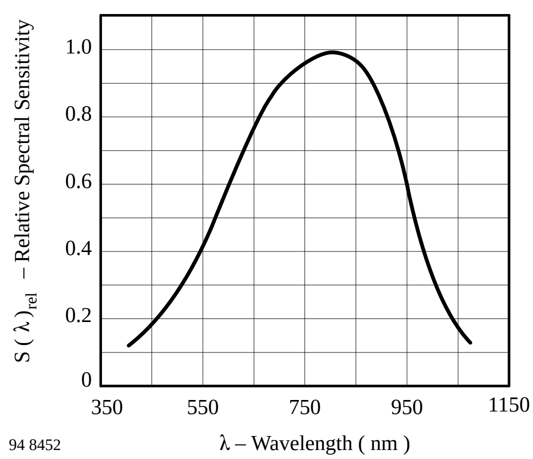


Figure 8 : Relative Spectral Sensitivity vs. Wavelength

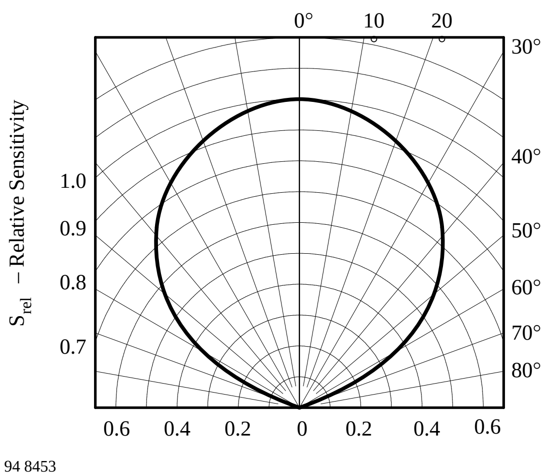
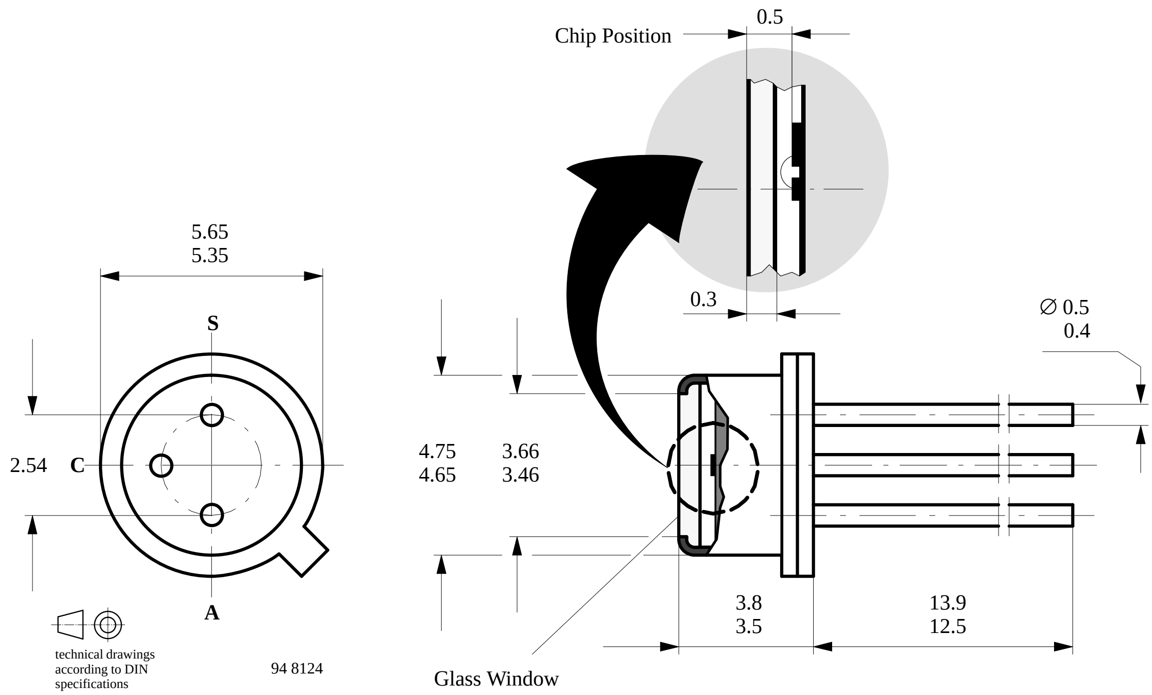


Figure 9 : Relative Radiant Sensitivity vs. Angular Displacement

Dimensions in mm



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