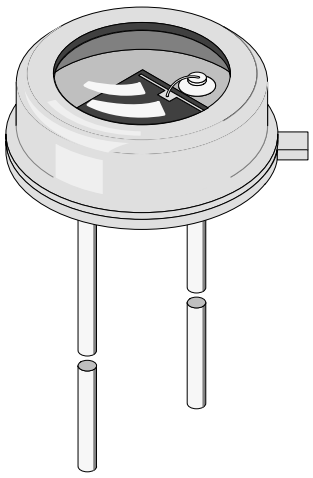
Silicon PN Photodiode

Description

BPW20R is a planar Silicon PN photodiode in a hermetically sealed short TO–5 case, especially designed for high precision linear applications.
Due to its extremely high dark resistance, the short circuit photocurrent is linear over seven decades of illumination level.
On the other hand, there is a strictly logarithmic correlation between open circuit voltage and illumination over the same range.
Equipped with a clear, flat glass window, the spectral responsitivity reaches from blue to near infrared.



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Features

- Hermetically sealed TO–5 case
- Flat glass window
- Cathode connected to case
- Wide viewing angle $\varphi = \pm 50^\circ$
- Large radiant sensitive area (A=7.5 mm^2)
- Suitable for visible and near infrared radiation
- High sensitivity
- UV enhanced
- Low dark current
- High shunt resistance
- Excellent linearity
- For photodiode and photovoltaic cell operation

Applications

Sensor for light measuring techniques in cameras, photometers, color analyzers, exposure meters (e.g. solariums) and other medical and industrial measuring and control applications.

Absolute Maximum Ratings

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Value	Unit
Reverse Voltage		V_R	10	V
Power Dissipation	$T_{amb} \leqq 50$ ˚C	P_V	300	mW
Junction Temperature		T_j	125	˚C
Operating Temperature Range		T_{amb}	–55...+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}	250	K/W

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage	I_F = 50 mA	V_F		1.0	1.3	V
Breakdown Voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	10			V
Reverse Dark Current	V_R = 5 V, E = 0	I_{ro}		2	30	nA
Diode Capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		1.2		nF
Diode Capacitance	V_R = 5 V, f = 1 MHz, E = 0	C_D		400		pF
Dark Resistance	V_R=10 mV	R_D		38		GΩ
Open Circuit Voltage	E_A = 1 klx	V_o	330	500		mV
Temp. Coefficient of V_o	E_A = 1 klx	TK_{Vo}		–2		mV/K
Short Circuit Current	E_A = 1 klx	I_k	20	60		µA
Temp. Coefficient of I_k	E_A = 1 klx	TK_{Ik}		0.1		%/K
Reverse Light Current	E_A = 1 klx, V_R = 5 V	I_{ra}	20	60		µA
Reverse Light Current	E_e = 1 mW/cm^2, λ = 950 nm, V_R = 5 V	I_{ra}		42		µA
Angle of Half Sensitivity		φ		±50		deg
Wavelength of Peak Sensitivity		λ_p		920		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		550...1040		nm
Rise Time	V_R=0V, R_L=1kΩ, λ=820nm	t_r		3.4		µs
Fall Time	V_R=0V, R_L=1kΩ, λ=820nm	t_f		3.7		µs

Typical Characteristics (T_{amb} = 25°C unless otherwise specified)

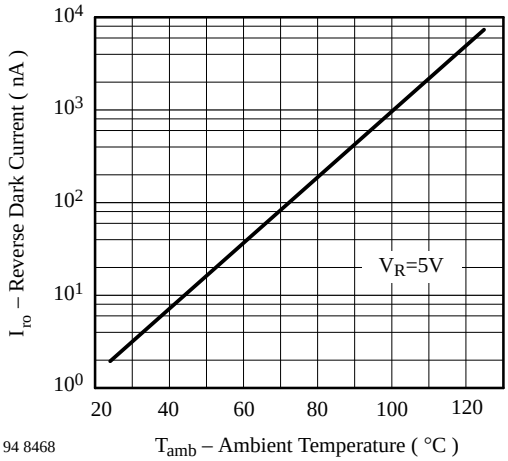


Figure 1 : Reverse Dark Current vs. Ambient Temperature

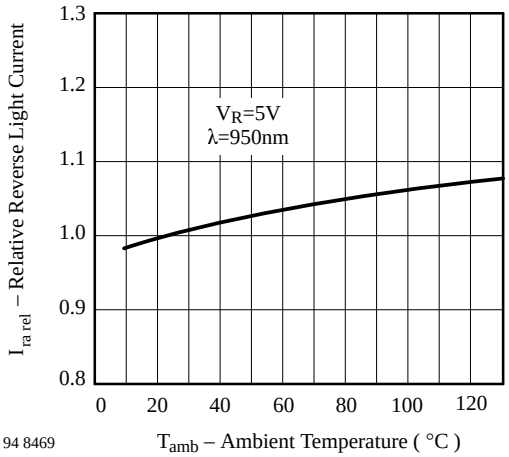


Figure 2 : Relative Reverse Light Current vs. Ambient Temperature

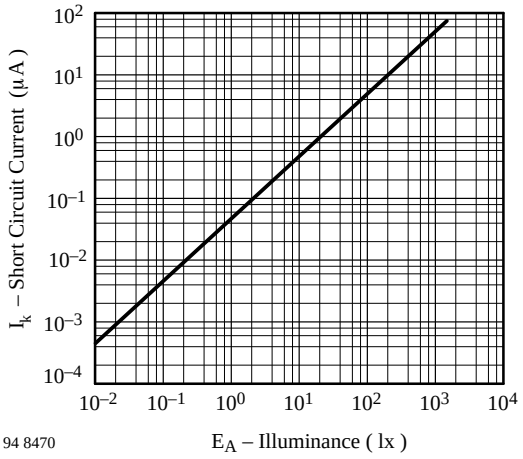


Figure 3 : Short Circuit Current vs. Illuminance

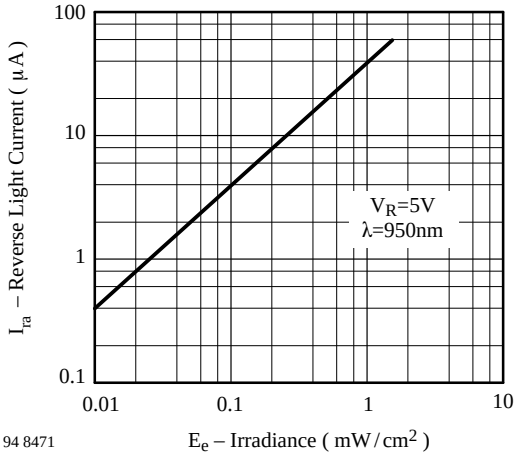


Figure 4 : Reverse Light Current vs. Irradiance

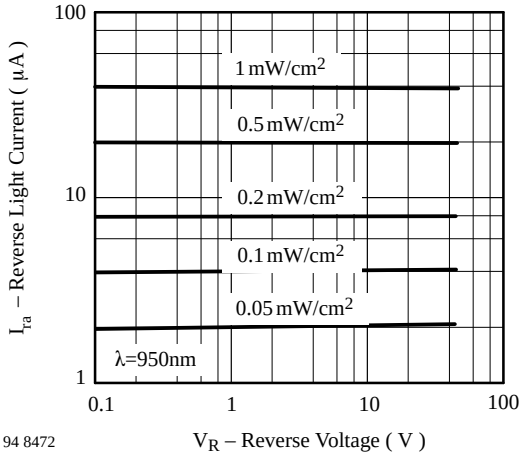


Figure 5 : Reverse Light Current vs. Reverse Voltage

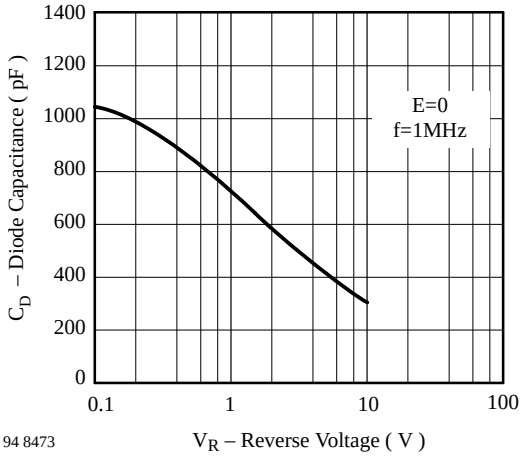


Figure 6 : Diode Capacitance vs. Reverse Voltage

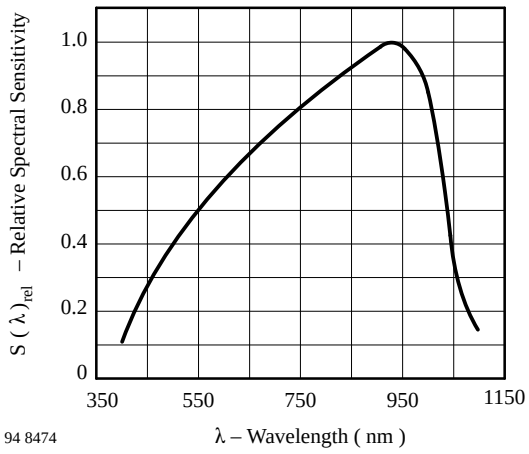


Figure 7 : Relative Spectral Sensitivity vs. Wavelength

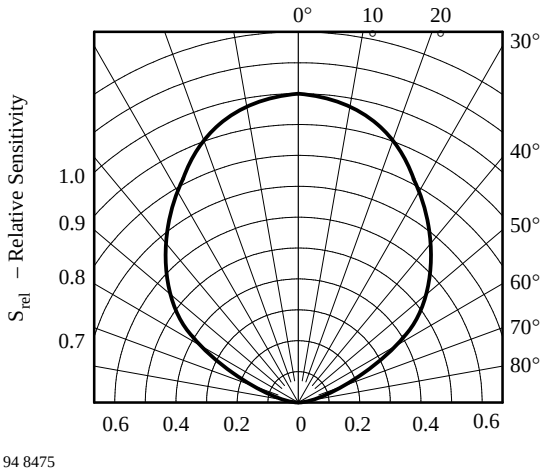
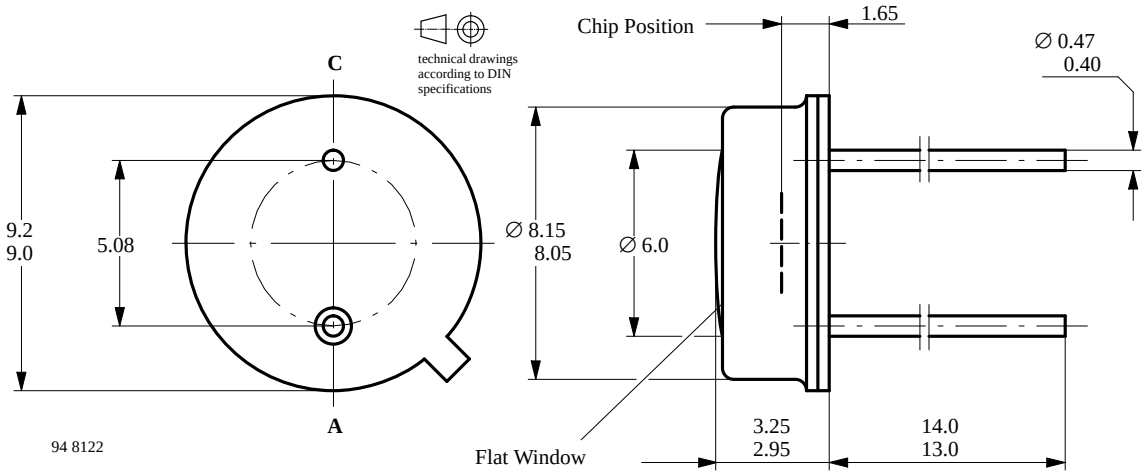


Figure 8 : Relative Radiant Sensitivity vs. Angular Displacement

Dimensions in mm



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