

### Silicon PN Photodiode

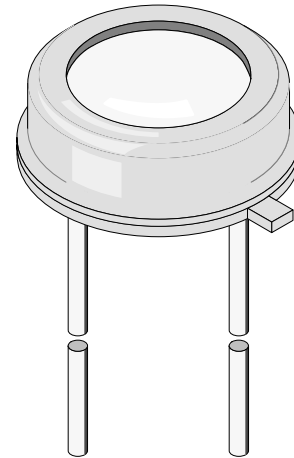
#### Description

BPW21R 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.

The device is equipped with a flat glass window with built in color correction filter, giving an approximation to the spectral response of the human eye.



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#### Features

- Hermetically sealed TO-5 case
- Flat glass window with built-in color correction filter for visible radiation
- Cathode connected to case
- Wide viewing angle  $\varphi = \pm 50^\circ$
- Large radiant sensitive area ( $A=7.5 \text{ mm}^2$ )
- Suitable for visible radiation
- High sensitivity
- Low dark current
- High shunt resistance
- Excellent linearity
- For photodiode and photovoltaic cell operation

#### Applications

Sensor in exposure and color measuring purposes

### Absolute Maximum Ratings

 $T_{amb} = 25^{\circ}\text{C}$ 

Parameter	Test Conditions	Symbol	Value	Unit
Reverse Voltage		$V_R$	10	V
Power Dissipation	$T_{amb} \leq 50^{\circ}\text{C}$	$P_V$	300	mW
Junction Temperature		$T_j$	125	$^{\circ}\text{C}$
Operating Temperature Range		$T_{amb}$	-55...+125	$^{\circ}\text{C}$
Storage Temperature Range		$T_{stg}$	-55...+125	$^{\circ}\text{C}$
Soldering Temperature	$t \leq 5\text{ s}$	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal Resistance Junction/Ambient		$R_{thJA}$	250	K/W

### Basic Characteristics

 $T_{amb} = 25^{\circ}\text{C}$ 

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward Voltage	$I_F = 50\text{ mA}$	$V_F$		1.0	1.3	V
Breakdown Voltage	$I_R = 100\text{ }\mu\text{A}, E = 0$	$V_{(BR)}$	10			V
Reverse Dark Current	$V_R = 5\text{ V}, E = 0$	$I_{ro}$		2	30	nA
Diode Capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$	$C_D$		1.2		nF
	$V_R = 5\text{ V}, f = 1\text{ MHz}, E = 0$	$C_D$		400		pF
Dark Resistance	$V_R = 10\text{ mV}$	$R_D$		38		$\text{G}\Omega$
Open Circuit Voltage	$E_A = 1\text{ klx}$	$V_o$	280	450		mV
Temp. Coefficient of $V_o$	$E_A = 1\text{ klx}$	$\text{TK}_{V_o}$		-2		mV/K
Short Circuit Current	$E_A = 1\text{ klx}$	$I_k$	4.5	9		$\mu\text{A}$
Temp. Coefficient of $I_k$	$E_A = 1\text{ klx}$	$\text{TK}_{I_k}$		-0.05		%/K
Reverse Light Current	$E_A = 1\text{ klx}, V_R = 5\text{ V}$	$I_{ra}$	4.5	9		$\mu\text{A}$
Sensitivity	$V_R = 5\text{ V}, E_A = 10^{-2} \dots 10^5\text{ lx}$	$S$		9		nA/lx
Angle of Half Sensitivity		$\varphi$		$\pm 50$		deg
Wavelength of Peak Sensitivity		$\lambda_p$		565		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		420...675		nm
Rise Time	$V_R = 0\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 660\text{ nm}$	$t_r$		3.1		$\mu\text{s}$
Fall Time	$V_R = 0\text{ V}, R_L = 1\text{ k}\Omega, \lambda = 660\text{ nm}$	$t_f$		3.0		$\mu\text{s}$

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

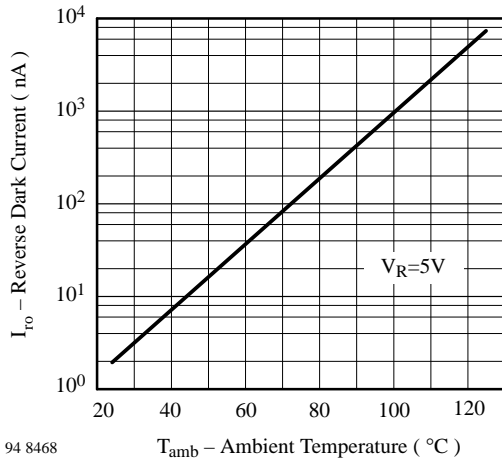


Figure 1 : Reverse Dark Current vs. Ambient Temperature

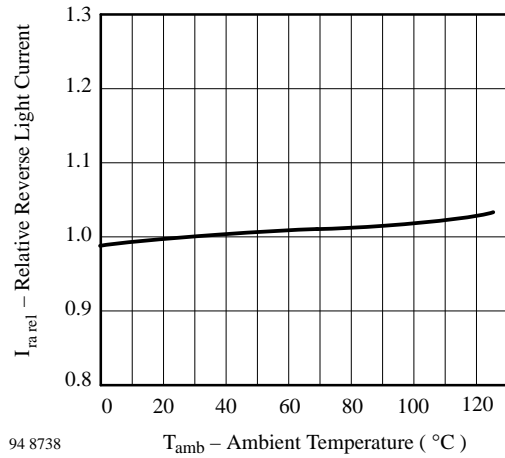


Figure 2 : Relative Reverse Light Current vs. Ambient Temperature

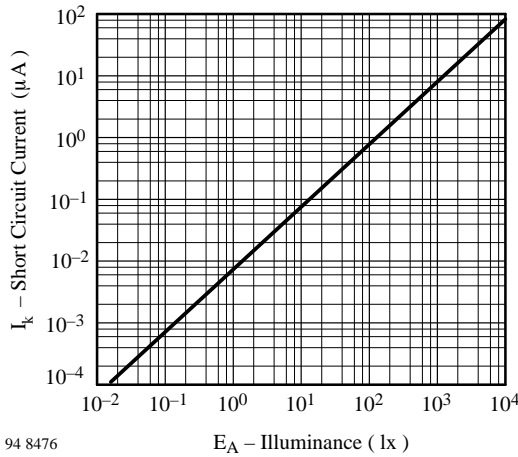


Figure 3 : Short Circuit Current vs. Illuminance

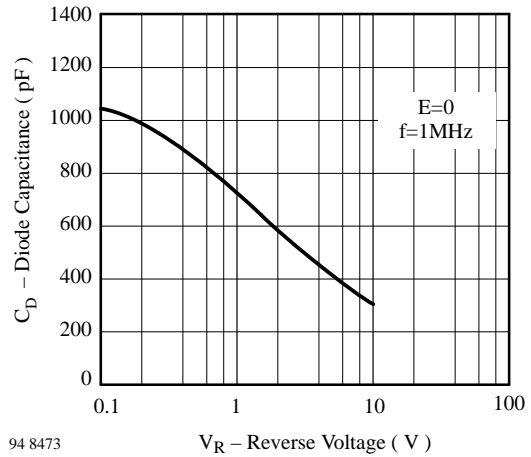


Figure 4 : Diode Capacitance vs. Reverse Voltage

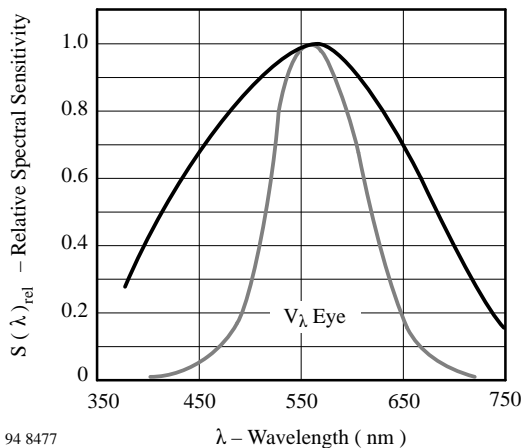


Figure 5 : Relative Spectral Sensitivity vs. Wavelength

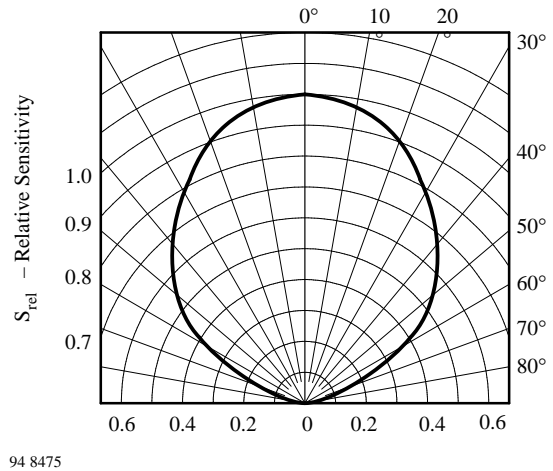
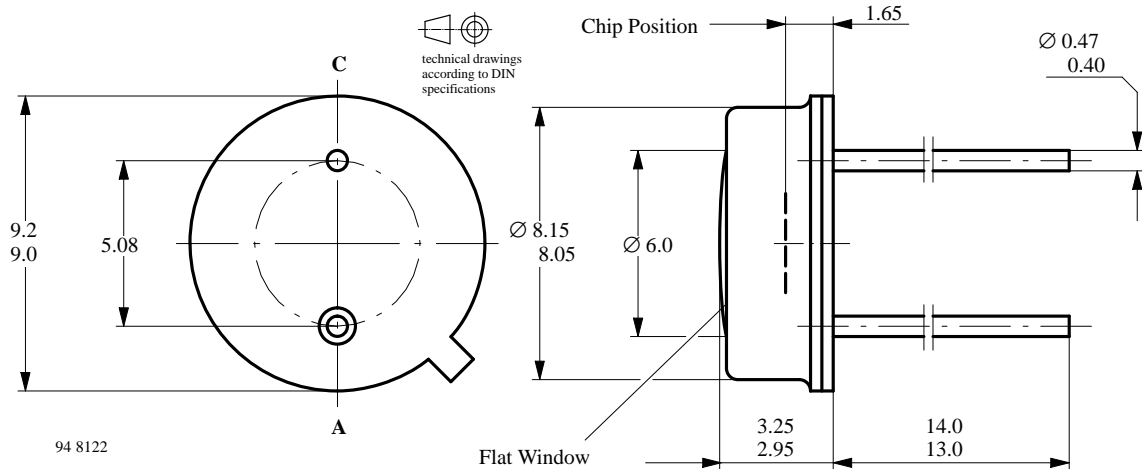


Figure 6 : Relative Radiant Sensitivity vs. Angular Displacement

## Dimensions in mm



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TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

Telephone: 49 (0)7131 67 2831, Fax Number: 49 (0)7131 67 2423