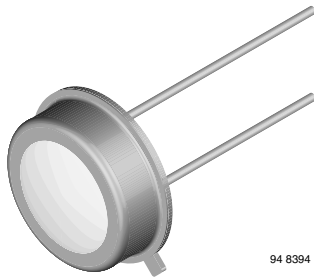


Silicon Photodiode



94 8394

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.

FEATURES

- Package type: leaded
- Package form: TO-5
- Dimensions (in mm): \varnothing 8.13
- Radiant sensitive area (in mm²): 7.5
- High photo sensitivity
- Adapted to human eye responsivity
- Angle of half sensitivity: $\varphi = \pm 50^\circ$
- Hermetically sealed package
- Cathode connected to package
- Flat glass window
- Low dark current
- High shunt resistance
- High linearity
- Compliant to RoHS Directive 2002/95/EC and in accordance with WEEE 2002/96/EC


RoHS
COMPLIANT

APPLICATIONS

- Sensor in exposure and color measuring purposes

PRODUCT SUMMARY

| COMPONENT | I_{ra} (μ A) | φ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------------|-----------------|----------------------|
| BPW21R | 9 | ± 50 | 420 to 675 |

Note

- Test condition see table “Basic Characteristics”

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|-----------|----------------------------|--------------|
| BPW21R | Bulk | MOQ: 500 pcs, 500 pcs/bulk | TO-5 |

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | TEST CONDITION | 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} | - 40 to + 125 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | - 40 to + 125 | $^\circ\text{C}$ |
| Soldering temperature | $t \leq 5$ s | T_{sd} | 260 | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | Connected with Cu wire, 0.14 mm ² | R_{thJA} | 250 | K/W |

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|---|-------------------|------|------------|------|------------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | $I_F = 50\text{ mA}$ | V_F | | 1.0 | 1.3 | V |
| Breakdown voltage | $I_R = 20\text{ }\mu\text{A}$, $E = 0$ | $V_{(BR)}$ | 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 |
| Temperature coefficient of V_o | $E_A = 1\text{ klx}$ | TK_{V_o} | | -2 | | mV/K |
| Short circuit current | $E_A = 1\text{ klx}$ | I_k | 4.5 | 9 | | μA |
| Temperature coefficient of I_k | $E_A = 1\text{ klx}$ | TK_{I_k} | | -0.05 | | %/K |
| Reverse light current | $E_A = 1\text{ klx}$, $V_R = 5\text{ V}$ | I_{ra} | 4.5 | 9 | | μA |
| Sensitivity | $V_R = 5\text{ V}$, $E_A = 10^{-2}$ to 10^5 lx | S | | 9 | | nA/lx |
| Angle of half sensitivity | | φ | | ± 50 | | deg |
| Wavelength of peak sensitivity | | λ_p | | 565 | | nm |
| Range of spectral bandwidth | | $\lambda_{0.5}$ | | 420 to 675 | | nm |
| Rise time | $V_R = 0\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 660\text{ nm}$ | t_r | | 3.1 | | μs |
| Fall time | $V_R = 0\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 660\text{ nm}$ | t_f | | 3.0 | | μs |

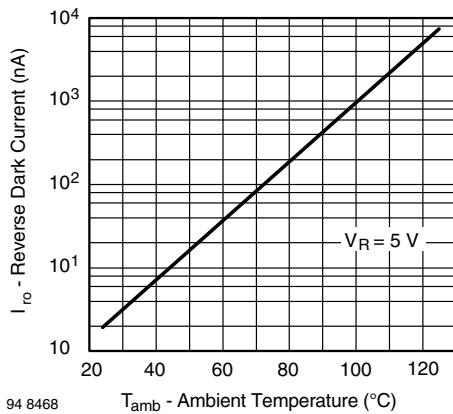
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

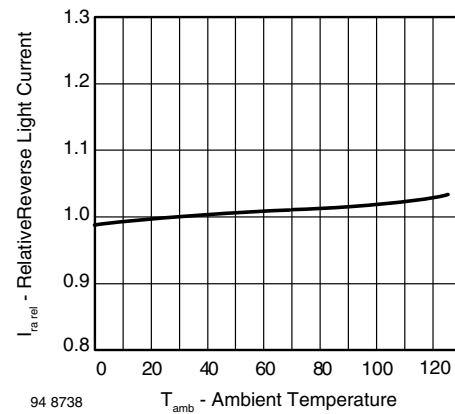


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

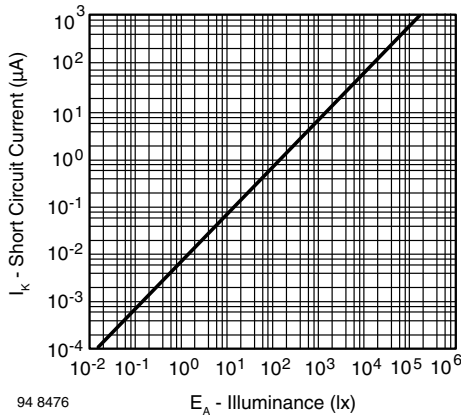


Fig. 3 - Short Circuit Current vs. Illuminance

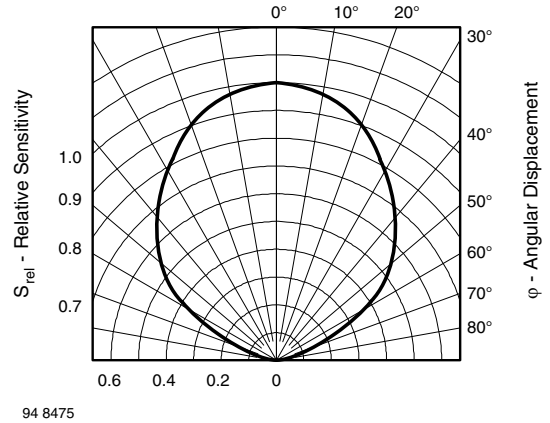


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

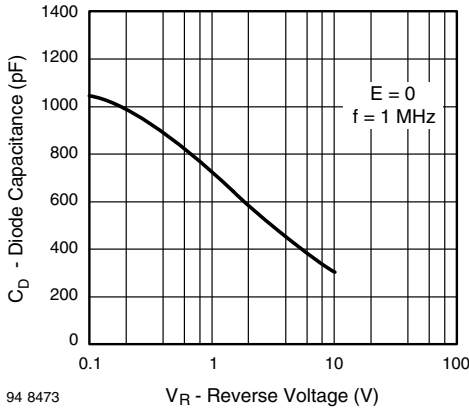


Fig. 4 - Diode Capacitance vs. Reverse Voltage

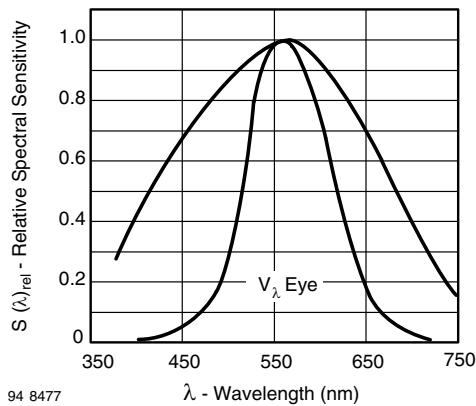
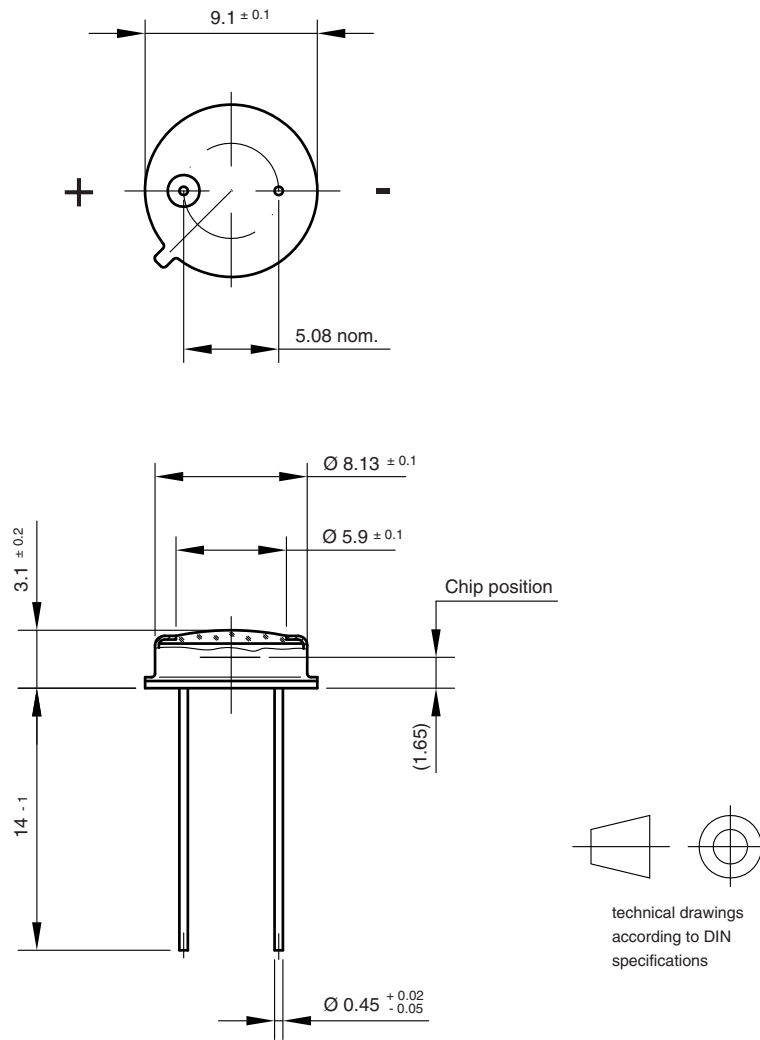


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

PACKAGE DIMENSIONS in millimeters



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