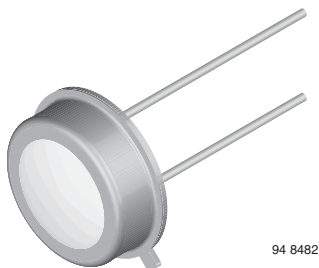


## Silicon Photodiode, RoHS Compliant



94 8482


**RoHS**  
COMPLIANT

### FEATURES

- Package type: leaded
- Package form: TO-5
- Dimensions (in mm):  $\varnothing$  8.13
- Radiant sensitive area (in mm<sup>2</sup>): 7.5
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Angle of half sensitivity:  $\phi = \pm 50^\circ$
- Hermetically sealed package
- Cathode connected to package
- Flat glass window
- UV enhanced
- Low dark current
- High shunt resistance
- High linearity
- Compliant to RoHS Directive 2002/95/EC and in accordance with WEEE 2002/96/EC

### DESCRIPTION

BPW20RF 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 responsivity reaches from blue to near infrared.

### 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.

### PRODUCT SUMMARY

| COMPONENT | $I_{ra}$ ( $\mu A$ ) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
|-----------|----------------------|--------------|----------------------|
| BPW20RF   | 60                   | $\pm 50$     | 400 to 1100          |

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                    | PACKAGE FORM |
|---------------|-----------|----------------------------|--------------|
| BPW20RF       | Bulk      | MOQ: 500 pcs, 500 pcs/bulk | TO-5         |

#### Note

- MOQ: minimum order quantity

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

| PARAMETER                           | TEST CONDITION                               | SYMBOL     | VALUE         | UNIT       |
|-------------------------------------|----------------------------------------------|------------|---------------|------------|
| Reverse voltage                     |                                              | $V_R$      | 10            | V          |
| Power dissipation                   | $T_{amb} \leq 50^\circ C$                    | $P_V$      | 300           | mW         |
| Junction temperature                |                                              | $T_j$      | 125           | $^\circ C$ |
| Operating temperature range         |                                              | $T_{amb}$  | - 40 to + 125 | $^\circ C$ |
| Storage temperature range           |                                              | $T_{stg}$  | - 40 to + 125 | $^\circ C$ |
| Soldering temperature               | $t \leq 5$ s                                 | $T_{sd}$   | 260           | $^\circ C$ |
| Thermal resistance junction/ambient | Connected with Cu wire, 0.14 mm <sup>2</sup> | $R_{thJA}$ | 250           | K/W        |

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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                                                                                | $E_A = 1\text{ klx}$                                                      | $V_o$             | 330  | 500      |      | mV               |
| Temperature coefficient of $V_o$                                                                    | $E_A = 1\text{ klx}$                                                      | $\text{TK}_{V_o}$ |      | - 2      |      | mV/K             |
| Short circuit current                                                                               | $E_A = 1\text{ klx}$                                                      | $I_k$             | 20   | 60       |      | $\mu\text{A}$    |
| Temperature coefficient of $I_k$                                                                    | $E_A = 1\text{ klx}$                                                      | $\text{TK}_{I_k}$ |      | 0.1      |      | %/K              |
| Reverse light current                                                                               | $E_A = 1\text{ klx}$ , $V_R = 5\text{ V}$                                 | $I_{ra}$          | 20   | 60       |      | $\mu\text{A}$    |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$ | $I_{ra}$          |      | 42       |      | $\mu\text{A}$    |
| Angle of half sensitivity                                                                           |                                                                           | $\varphi$         |      | $\pm 50$ |      | deg              |
| Wavelength of peak sensitivity                                                                      |                                                                           | $\lambda_p$       |      | 920      |      | nm               |
| Range of spectral bandwidth                                                                         |                                                                           | $\lambda_{0.1}$   | 400  |          | 1100 | nm               |
| Rise time                                                                                           | $V_R = 0\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$ | $t_r$             |      | 3.4      |      | $\mu\text{s}$    |
| Fall time                                                                                           | $V_R = 0\text{ V}$ , $R_L = 1\text{ k}\Omega$ , $\lambda = 820\text{ nm}$ | $t_f$             |      | 3.7      |      | $\mu\text{s}$    |

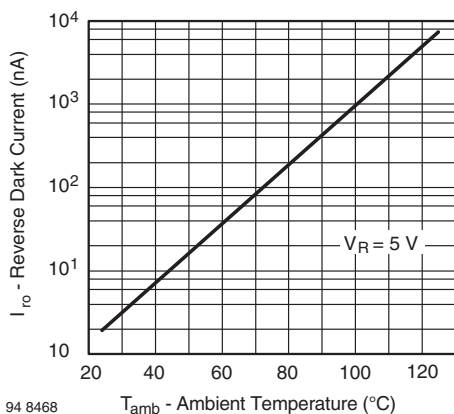
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

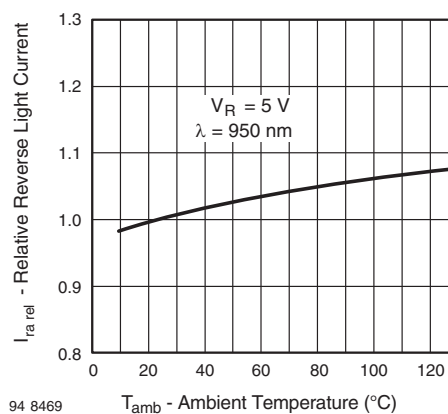


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

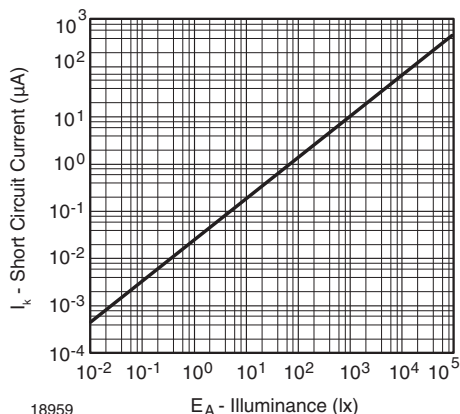


Fig. 3 - Short Circuit Current vs. Illuminance

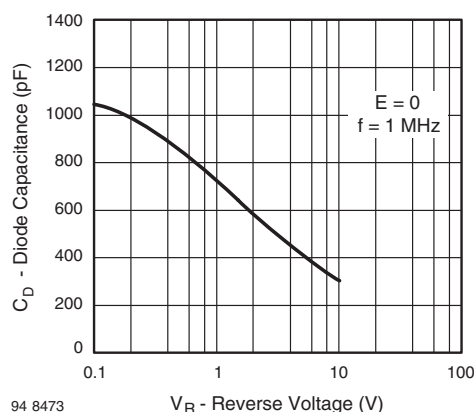


Fig. 6 - Diode Capacitance vs. Reverse Voltage

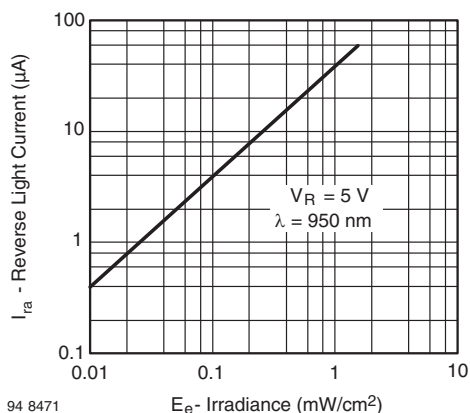


Fig. 4 - Reverse Light Current vs. Irradiance

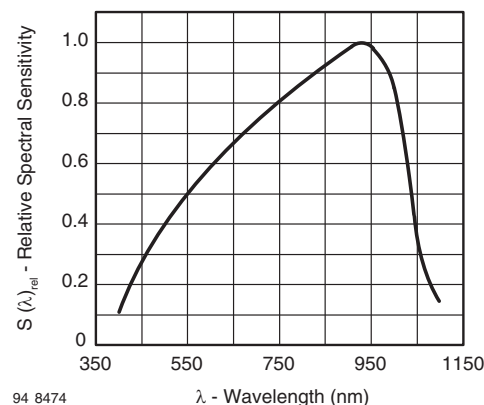


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

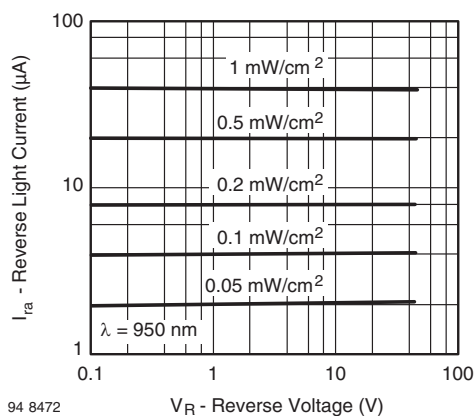


Fig. 5 - Reverse Light Current vs. Reverse Voltage

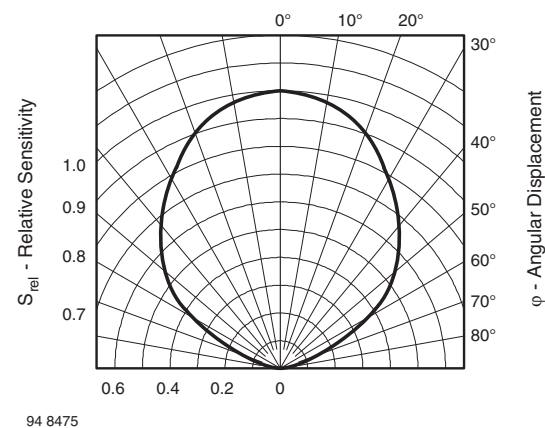
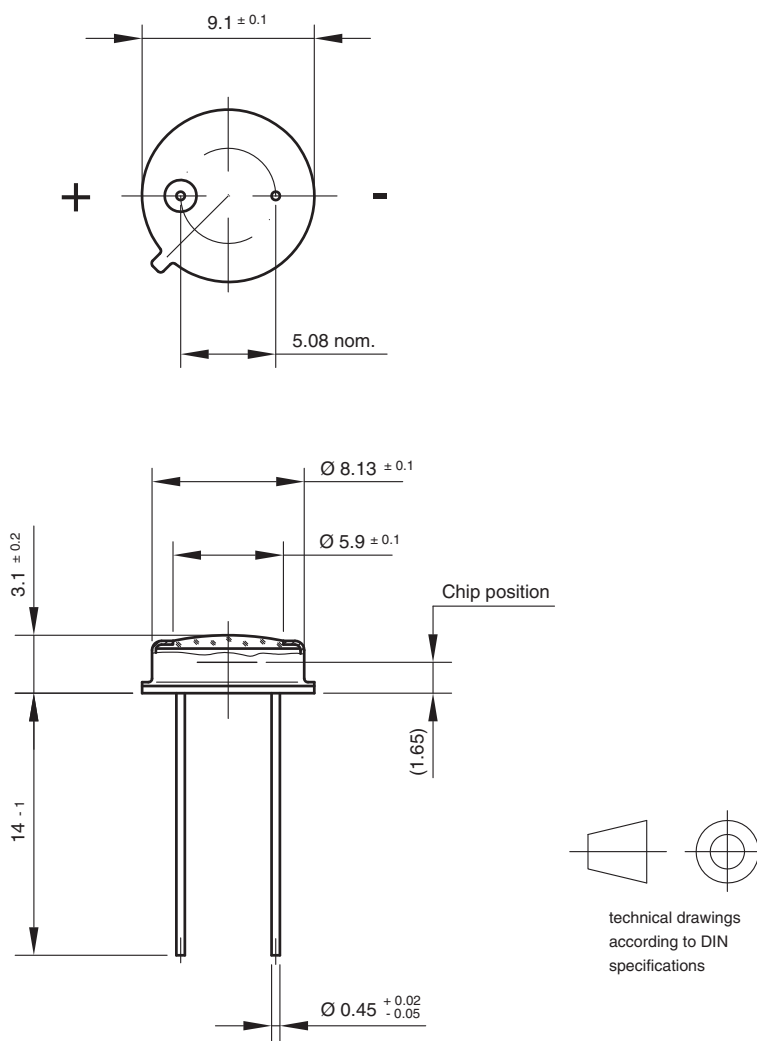


Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement



**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.511-5002.01-4

Issue:1; 01.07.96

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