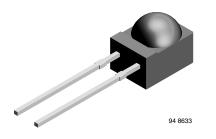
# BPV23F, BPV23FL

### **Vishay Semiconductors**



# Silicon PIN Photodiode



### DESCRIPTION

BPV23F is a PIN photodiode with high speed and high radiant sensitivity in a black, plastic package with side view lens and daylight blocking filter. Filter bandwidth is matched with 900 nm to 950 nm IR emitters. The lens achieves 80 % of sensitivity improvement in comparison with flat package. BPV23FL has long leads, other specifications like BPV23F.

### **FEATURES**

- Package type: leaded
- · Package form: side view
- Dimensions (in mm): 4.5 x 5 x 6
- Radiant sensitive area (in mm<sup>2</sup>): 4.4
- High radiant sensitivity
- Daylight blocking filter matched with 940 nm emitters
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 60^{\circ}$
- · Compliant to PoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

#### Note

Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

#### **APPLICATIONS**

- · High speed detector for infrared radiation
- · Infrared remote control and free air data transmission systems, e.g. in combination with TSALxxxx series IR emitters

| PRODUCT SUMMARY |                      |         |                       |  |
|-----------------|----------------------|---------|-----------------------|--|
| COMPONENT       | I <sub>ra</sub> (μΑ) | φ (deg) | λ <sub>0.5</sub> (nm) |  |
| BPV23F          | 63                   | ± 60    | 870 to 1050           |  |
| BPV23FL         | 63                   | ± 60    | 870 to 1050           |  |

| ORDERING INFORMATION |           |                              |                       |  |
|----------------------|-----------|------------------------------|-----------------------|--|
| ORDERING CODE        | PACKAGING | REMARKS                      | PACKAGE FORM          |  |
| BPV23F               | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | Side view             |  |
| BPV23FL              | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | Side view, long leads |  |

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25 \text{ °C}$ , unless otherwise specified) |  |                   |               |      |  |
|---|--|-------------------|---------------|------|--|
| PARAMETER   | TEST CONDITION                               | SYMBOL            | VALUE         | UNIT |  |
| Reverse voltage   |  | V <sub>R</sub>    | 60            | V    |  |
| Power dissipation   | $T_{amb} \le 25 \ ^{\circ}C$                 | Pv                | 215           | mW   |  |
| Junction temperature  |  | Tj                | 100           | °C   |  |
| Operating temperature range   |  | T <sub>amb</sub>  | - 40 to + 100 | °C   |  |
| Storage temperature range   |  | T <sub>stg</sub>  | - 40 to + 100 | °C   |  |
| Soldering temperature   | t ≤ 5 s                                      | T <sub>sd</sub>   | 260           | °C   |  |
| Thermal resistance junction/ambient   | Connected with Cu wire, 0.14 mm <sup>2</sup> | R <sub>thJA</sub> | 350           | K/W  |  |



RoHS

COMPLIANT

**GREEN** (5-2008)\*\*

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| PARAMETER                      | TEST CONDITION  | SYMBOL            | MIN. | TYP.                  | MAX. | UNIT    |
|--------------------------------|---|-------------------|------|-----------------------|------|---------|
| Forward voltage                | I <sub>F</sub> = 50 mA  | V <sub>F</sub>    |      | 1                     | 1.3  | V       |
| Breakdown voltage              | I <sub>R</sub> = 100 μA, E = 0  | V <sub>(BR)</sub> | 60   |                       |      | V       |
| Reverse dark current           | V <sub>R</sub> = 10 V, E = 0  | I <sub>ro</sub>   |      | 2                     | 30   | nA      |
| Diode capacitance              | $V_{R} = 0 V, f = 1 MHz, E = 0$   | CD                |      | 48                    |      | pF      |
| Serial resistance              | V <sub>R</sub> = 12 V, f = 1 MHz  | R <sub>S</sub>    |      | 900                   |      | Ω       |
| Open circuit voltage           | $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$                              | Vo                |      | 390                   |      | mV      |
| Temperature coefficient of Vo  | $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$                              | TK <sub>Vo</sub>  |      | - 2.6                 |      | mV/K    |
| Short circuit current          | $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$                              | l <sub>k</sub>    |      | 60                    |      | μA      |
| Reverse light current          | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_R = 5 \text{ V}$              | I <sub>ra</sub>   | 45   | 63                    |      | μA      |
| Temperature coefficient of Ira | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, \\ V_R = 10 \text{ V}$          | TK <sub>Ira</sub> |      | 0.2                   |      | %/K     |
| Absolute spectral sensitivity  | $V_R = 5 V$ , $\lambda = 870 nm$  | s(λ)              |      | 0.35                  |      | A/W     |
|                                | $V_{\rm R} = 5 \text{ V}, \ \lambda = 950 \text{ nm}$                               | s(λ)              |      | 0.6                   |      | A/W     |
| Angle of half sensitivity      |   | φ                 |      | ± 60                  |      | deg     |
| Wavelength of peak sensitivity |   | λ <sub>p</sub>    |      | 950                   |      | nm      |
| Range of spectral bandwidth    |   | λ <sub>0.5</sub>  |      | 870 to 1050           |      | nm      |
| Quantum efficiency             | $\lambda = 950 \text{ nm}$  | η                 |      | 90                    |      | %       |
| Noise equivalent power         | $V_{\rm R} = 10 \text{ V}, \lambda = 950 \text{ nm}$                                | NEP               |      | 4 x 10 <sup>-14</sup> |      | W/√ Hz  |
| Detectivity                    | $V_{\rm R} = 10 \text{ V}, \lambda = 950 \text{ nm}$                                | D*                |      | 5 x 10 <sup>12</sup>  |      | cm√Hz/W |
| Rise time                      | $V_{R} = 10 \text{ V}, \text{ R}_{L} = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$ | t <sub>r</sub>    |      | 70                    |      | ns      |
| Fall time                      | $V_R = 10 \text{ V}, \text{ R}_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$     | t <sub>f</sub>    |      | 70                    |      | ns      |
| Cut-off frequency              | $V_R$ = 12 V, $R_L$ = 1 k $\Omega$ , $\lambda$ = 870 nm                             | f <sub>c</sub>    |      | 4                     |      | MHz     |
|                                | $V_{R} = 12 V, R_{L} = 1 k\Omega, \lambda = 950 nm$                                 | f <sub>c</sub>    |      | 1                     |      | MHz     |

BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

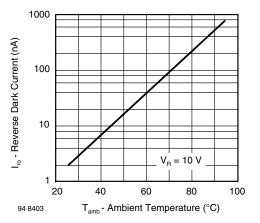


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

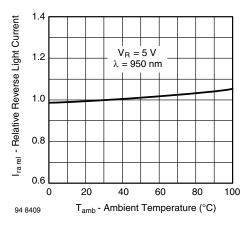


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

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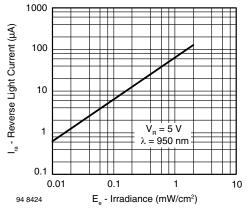


Fig. 3 - Reverse Light Current vs. Irradiance

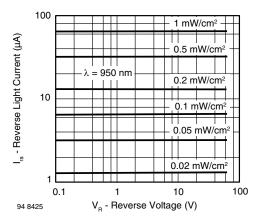


Fig. 4 - Reverse Light Current vs. Reverse Voltage

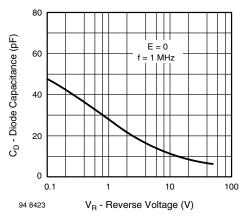


Fig. 5 - Diode Capacitance vs. Reverse Voltage

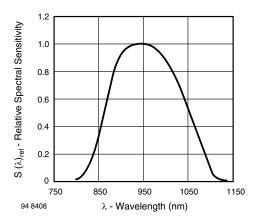


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

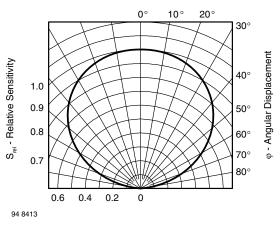


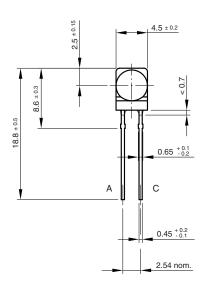
Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

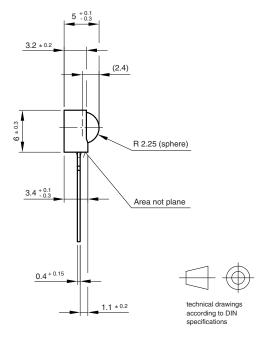
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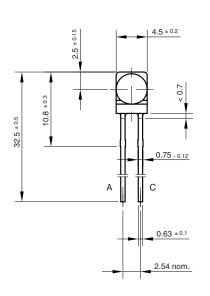
### PACKAGE DIMENSIONS in millimeters: BPV23F

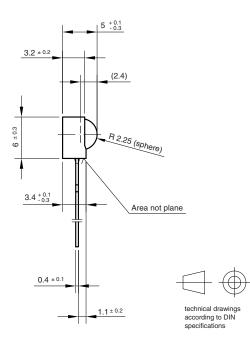




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### PACKAGE DIMENSIONS in millimeters: BPV23FL





Drawing-No.: 6.544-5236.01-4 Issue: 2; 07.07.97 96 12205

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