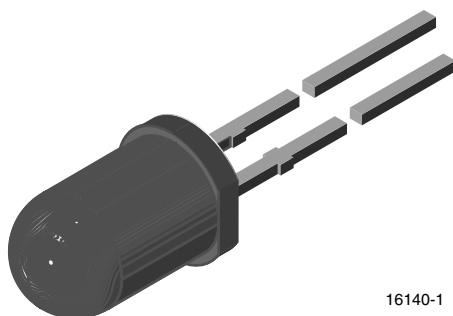


## Silicon PIN Photodiode



16140-1

### DESCRIPTION

BPV10NF is a PIN photodiode with high speed and high sensitivity in black, T-1¾ plastic package with daylight blocking filter. Filter bandwidth is matched with 850 nm to 950 nm IR emitters.

### FEATURES

- Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- Leads with stand-off
- High sensitivity
- Daylight blocking filter matched with 850 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\theta = \pm 20^\circ$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

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

### PRODUCT SUMMARY

| COMPONENT | $I_{ra}$ (µA)<br>at $E_e = 1.0 \text{ mW/cm}^2$ , $\lambda = 940 \text{ nm}$ , $V_R = 5.0 \text{ V}$ | $\phi$ (°) | $\lambda_{0.5}$ (nm) |
|-----------|------------------------------------------------------------------------------------------------------|------------|----------------------|
| BPV10NF   | 60                                                                                                   | $\pm 20$   | 780 to 1050          |

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM |
|---------------|-----------|------------------------------|--------------|
| BPV10NF       | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1¾         |
| BPV10NF-CS21  | Reel      | MOQ: 5000 pcs, 1000 pcs/reel | T-1          |

#### 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                        |                                              | $V_R$      | 60          | V                |
| Power dissipation                      | $T_{amb} \leq 25^\circ\text{C}$              | $P_V$      | 215         | mW               |
| Junction temperature                   |                                              | $T_j$      | 100         | $^\circ\text{C}$ |
| Operating temperature range            |                                              | $T_{amb}$  | -40 to +100 | $^\circ\text{C}$ |
| Storage temperature range              |                                              | $T_{stg}$  | -40 to +100 | $^\circ\text{C}$ |
| Soldering temperature                  | $t \leq 5 \text{ s}$ , 2 mm from body        | $T_{sd}$   | 260         | $^\circ\text{C}$ |
| Thermal resistance junction to ambient | Connected with Cu wire, 0.14 mm <sup>2</sup> | $R_{thJA}$ | 350         | 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                                                                                     | $I_F = 50\text{ mA}$                                                       | $V_F$           | -    | 0.85                | 1.3  | V                                |
| Breakdown voltage                                                                                   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                   | $V_{(BR)}$      | 60   | -                   | -    | V                                |
| Reverse dark current                                                                                | $V_R = 20\text{ V}$ , $E = 0$                                              | $I_{ro}$        | -    | 0.1                 | 5    | nA                               |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                          | $C_D$           | -    | 11                  | -    | pF                               |
| Open circuit voltage                                                                                | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 850\text{ nm}$                       | $V_O$           | -    | 410                 | -    | mV                               |
| Short circuit current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$                       | $I_K$           | -    | 50                  | -    | $\mu\text{A}$                    |
| Reverse light current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | -    | 55                  | -    | $\mu\text{A}$                    |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 940\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 30   | 60                  | -    | $\mu\text{A}$                    |
| Temperature coefficient of $I_{ra}$                                                                 | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$ , $V_R = 5\text{ V}$  | $TK_{Ira}$      | -    | -0.1                | -    | %/K                              |
| Absolute spectral sensitivity                                                                       | $V_R = 5\text{ V}$ , $\lambda = 870\text{ nm}$                             | $s(\lambda)$    | -    | 0.55                | -    | A/W                              |
| Angle of half sensitivity                                                                           |                                                                            | $\phi$          | -    | $\pm 20$            | -    | $^{\circ}$                       |
| Wavelength of peak sensitivity                                                                      |                                                                            | $\lambda_p$     | -    | 940                 | -    | nm                               |
| Range of spectral bandwidth                                                                         |                                                                            | $\lambda_{0.5}$ | -    | 780 to 1050         | -    | nm                               |
| Quantum efficiency                                                                                  | $\lambda = 950\text{ nm}$                                                  | $\eta$          | -    | 70                  | -    | %                                |
| Noise equivalent power                                                                              | $V_R = 20\text{ V}$ , $\lambda = 950\text{ nm}$                            | NEP             | -    | $3 \times 10^{-14}$ | -    | $\text{W}/\sqrt{\text{Hz}}$      |
| Detectivity                                                                                         | $V_R = 20\text{ V}$ , $\lambda = 950\text{ nm}$                            | D               | -    | $3 \times 10^{12}$  | -    | $\text{cm}^2/\text{Hz}/\text{W}$ |
| Rise time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$ | $t_r$           | -    | 80                  | -    | ns                               |
| Fall time                                                                                           | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$ | $t_f$           | -    | 60                  | -    | ns                               |

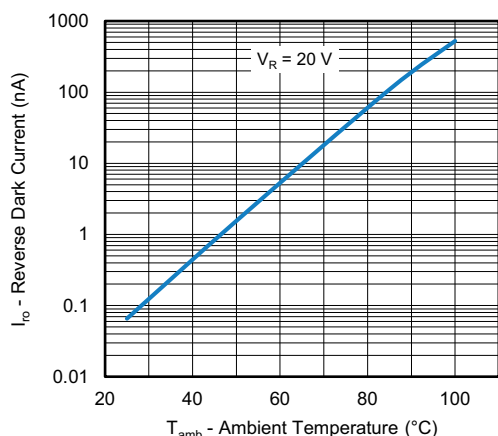
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

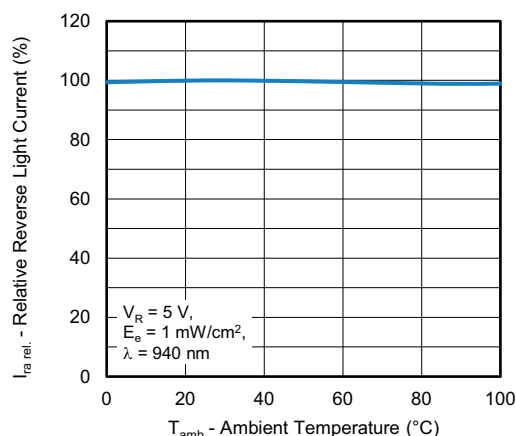


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

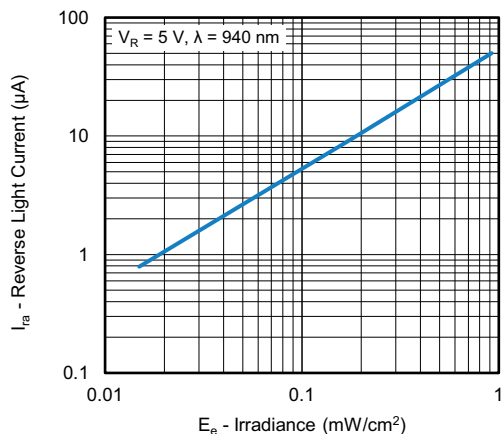


Fig. 3 - Reverse Light Current vs. Irradiance

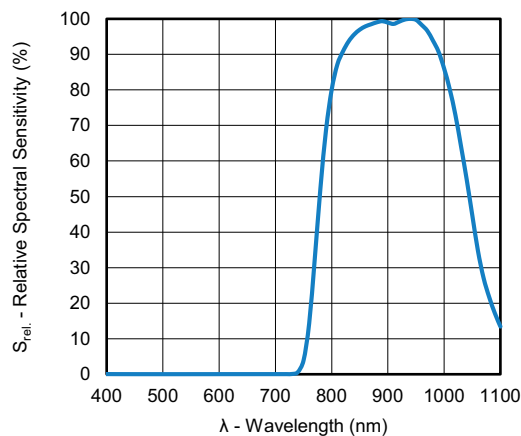


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

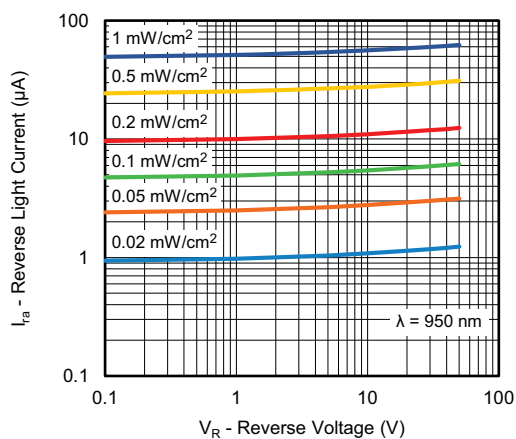


Fig. 4 - Reverse Light Current vs. Reverse Voltage

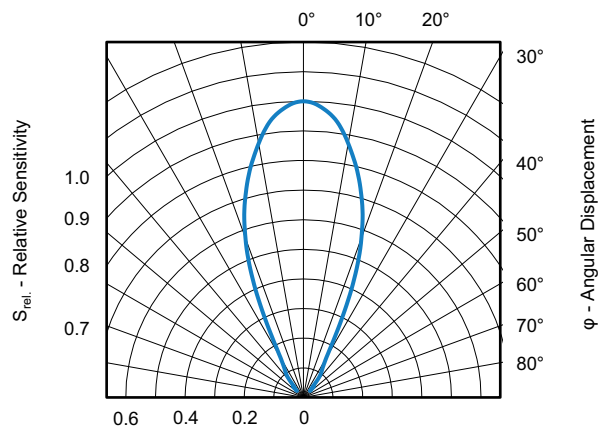


Fig. 7 - Relative Sensitivity vs. Angular Displacement

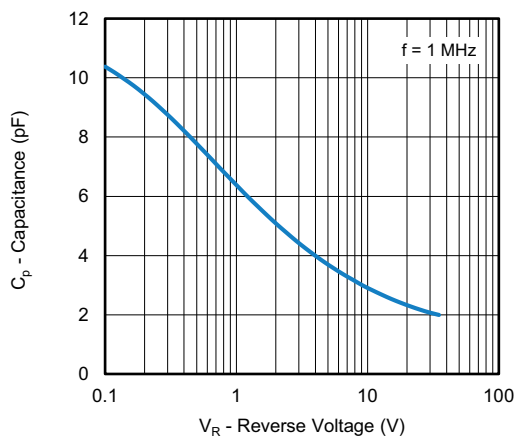
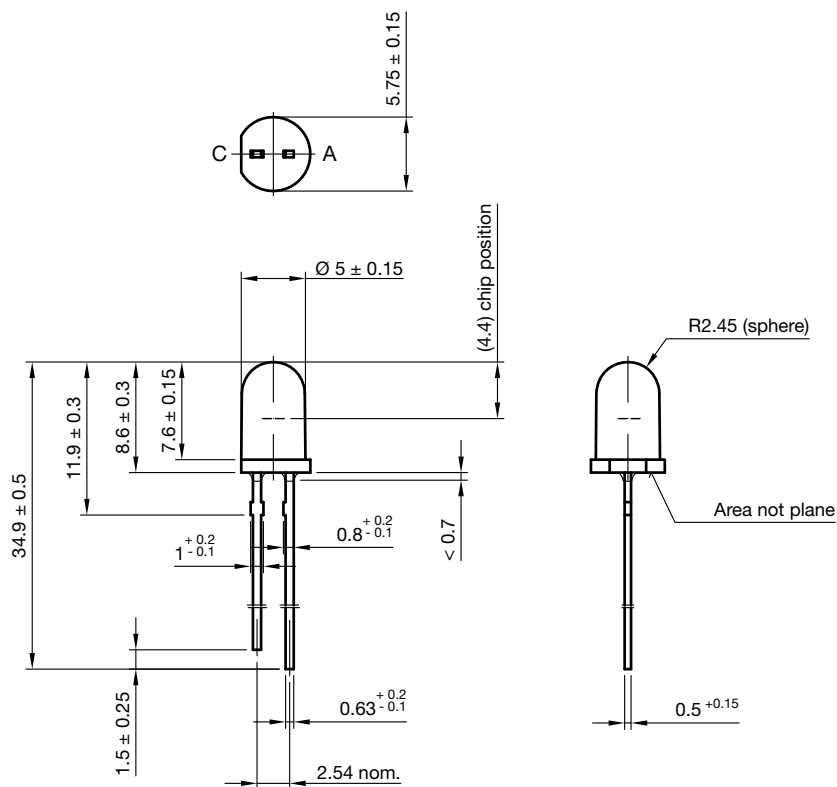


Fig. 5 - Diode Capacitance vs. Reverse Voltage

**PACKAGE DIMENSIONS** in millimeters


Technical drawings  
according to DIN  
specifications

Drawing-No.: 6.544-5185.01-4

Issue: 2; 11.04.2008



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