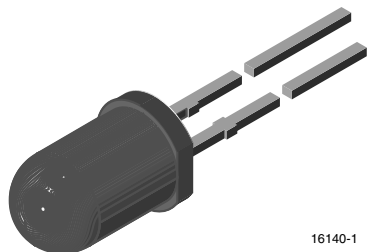


## Silicon PIN Photodiode



16140-1

### FEATURES

- Package type: leaded
- Package form: T-1 1/4
- Dimensions (in mm):  $\varnothing$  5
- Radiant sensitive area (in mm<sup>2</sup>): 0.78
- Leads with stand-off
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- High bandwidth: > 100 MHz at  $V_R = 12$  V
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 20^\circ$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### DESCRIPTION

BPV10NF is a PIN photodiode with high speed and high radiant sensitivity in black, T-1 1/4 plastic package with daylight blocking filter. Filter bandwidth is matched with 870 nm to 950 nm IR emitters.

### 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) | $\varphi$ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------|-----------------|----------------------|
| BPV10NF   | 60            | $\pm 20$        | 790 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-1 1/4      |
| BPV10NF-CS21  | Reel      | MOQ: 5000 pcs, 1000 pcs/reel | T-1 1/4      |

#### 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                 | $t \leq 5$ s, 2 mm from body                 | $T_{sd}$   | 260         | $^\circ\text{C}$ |
| Thermal resistance junction / 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                                                                                     | $I_F = 50\text{ mA}$                                                       | $V_F$           |      | 1.0                 | 1.3  | V                                       |
| Breakdown voltage                                                                                   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                   | $V_{(BR)}$      | 60   |                     |      | V                                       |
| Reverse dark current                                                                                | $V_R = 20\text{ V}$ , $E = 0$                                              | $I_{ro}$        |      | 1                   | 5    | nA                                      |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                          | $C_D$           |      | 11                  |      | pF                                      |
| Open circuit voltage                                                                                | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$                       | $V_O$           |      | 450                 |      | 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                  |      | $\mu\text{A}$                           |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 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                                                                           |                                                                            | $\varphi$       |      | $\pm 20$            |      | deg                                     |
| Wavelength of peak sensitivity                                                                      |                                                                            | $\lambda_p$     |      | 940                 |      | nm                                      |
| Range of spectral bandwidth                                                                         |                                                                            | $\lambda_{0.5}$ |      | 790 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                                                                                         | $V_R = 20\text{ V}$ , $\lambda = 950\text{ nm}$                            | $D^*$           |      | $3 \times 10^{12}$  |      | $\text{cm}^2/\sqrt{\text{Hz}}/\text{W}$ |
| Rise time                                                                                           | $V_R = 50\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 820\text{ nm}$ | $t_r$           |      | 2.5                 |      | ns                                      |
| Fall time                                                                                           | $V_R = 50\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 820\text{ nm}$ | $t_f$           |      | 2.5                 |      | ns                                      |

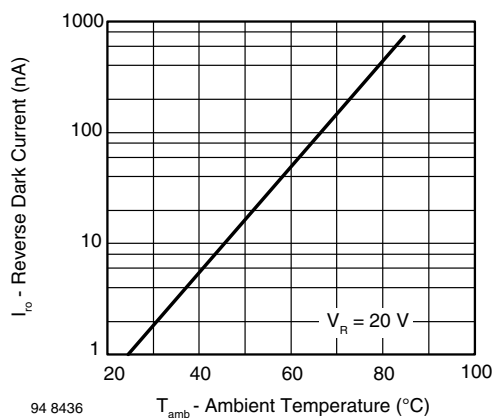
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

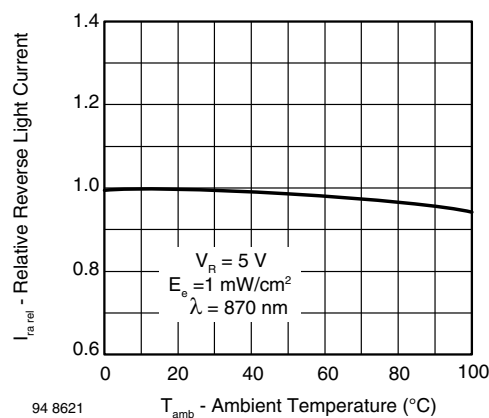


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

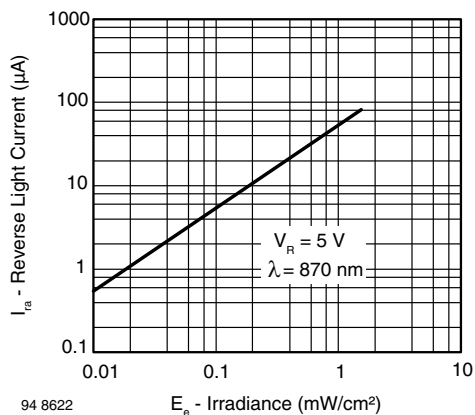


Fig. 3 - Reverse Light Current vs. Irradiance

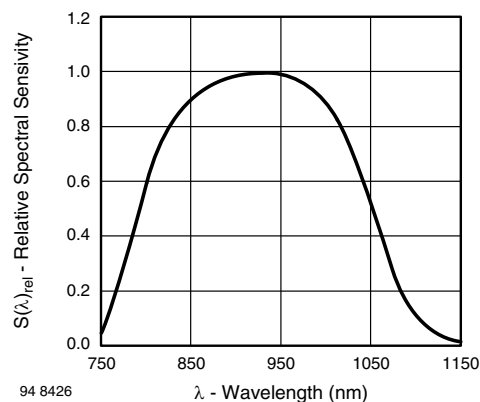


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

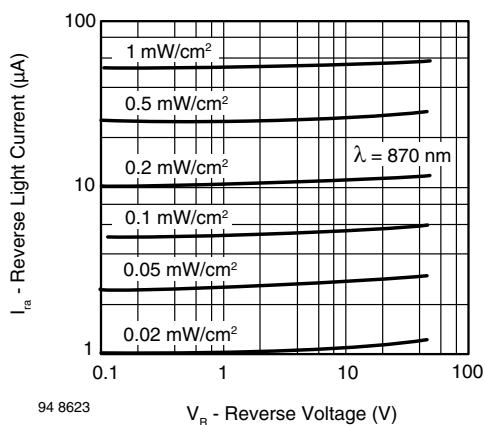


Fig. 4 - Reverse Light Current vs. Reverse Voltage

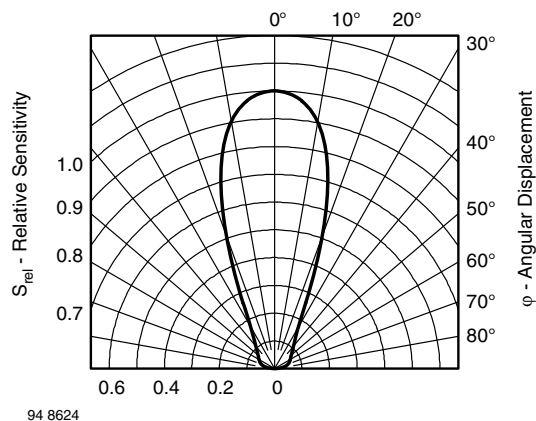


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

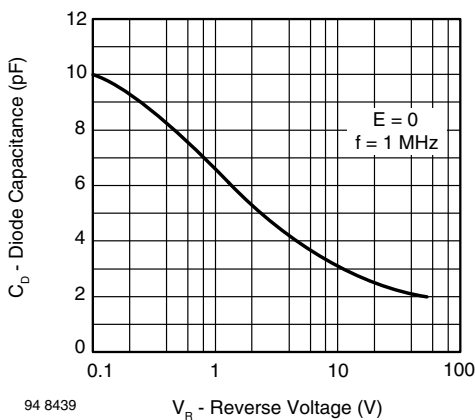
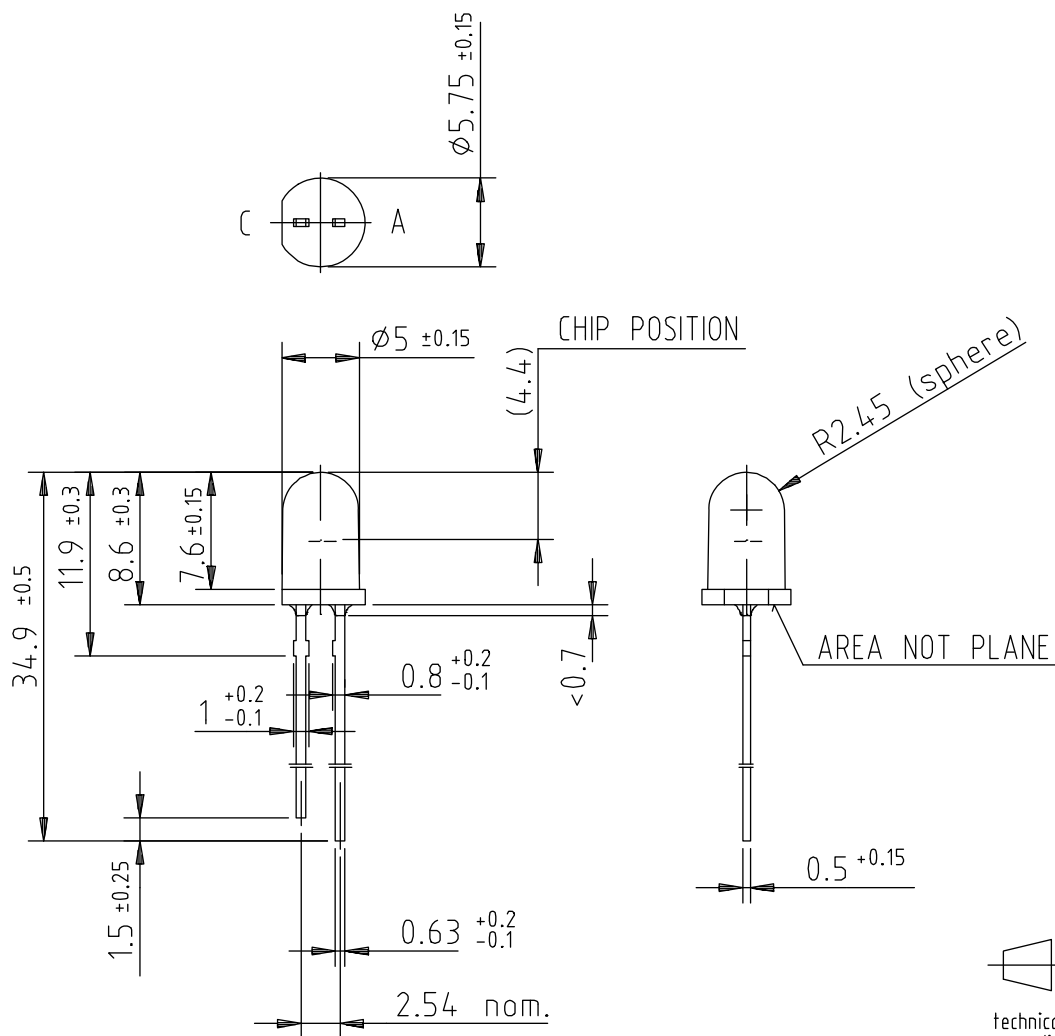
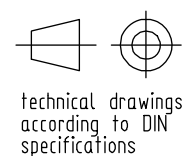


Fig. 5 - Diode Capacitance vs. Reverse Voltage

**PACKAGE DIMENSIONS** in millimeters


Drawing-No.: 6.544-5185.01-4

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