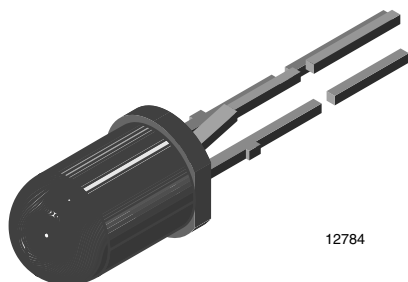


# Silicon NPN Phototransistor



## FEATURES

- Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- High radiant sensitivity
- Daylight blocking filter matched with 940 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 15^\circ$
- Base terminal connected
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## DESCRIPTION

BPV11F is a silicon NPN phototransistor with high radiant sensitivity in black, T-1¾ plastic package with base terminal and daylight blocking filter. Filter bandwidth is matched with 900 nm to 950 nm IR emitters.

## APPLICATIONS

- Detector for industrial electronic circuitry, measurement and control

## PRODUCT SUMMARY

| COMPONENT | $I_{ca}$ (mA) | $\phi$ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------|--------------|----------------------|
| BPV11F    | 9             | $\pm 15$     | 900 to 980           |

### Note

- Test condition see table "Basic Characteristics"

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM |
|---------------|-----------|------------------------------|--------------|
| BPV11F        | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1¾         |

### Note

- MOQ: minimum order quantity

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

| PARAMETER                           | TEST CONDITION                               | SYMBOL     | VALUE         | UNIT             |
|-------------------------------------|----------------------------------------------|------------|---------------|------------------|
| Collector base voltage              |                                              | $V_{CBO}$  | 80            | V                |
| Collector emitter voltage           |                                              | $V_{CEO}$  | 70            | V                |
| Emitter base voltage                |                                              | $V_{EBO}$  | 5             | V                |
| Collector current                   |                                              | $I_C$      | 50            | mA               |
| Collector peak current              | $t_p/T = 0.5, t_p \leq 10 \text{ ms}$        | $I_{CM}$   | 100           | mA               |
| Power dissipation                   | $T_{amb} \leq 47^\circ\text{C}$              | $P_V$      | 150           | 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               | $t \leq 5 \text{ s}, 2 \text{ mm from body}$ | $T_{sd}$   | 260           | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | Connected with Cu wire, $0.14 \text{ mm}^2$  | $R_{thJA}$ | 350           | K/W              |

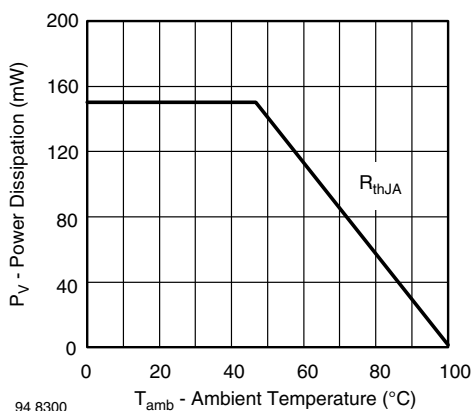


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified) |                                                                        |                 |      |            |      |               |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------|------|------------|------|---------------|
| PARAMETER                                                                            | TEST CONDITION                                                         | SYMBOL          | MIN. | TYP.       | MAX. | UNIT          |
| Collector emitter breakdown voltage                                                  | $I_C = 1\text{ mA}$                                                    | $V_{(BR)CEO}$   | 70   |            |      | V             |
| Collector emitter dark current                                                       | $V_{CE} = 10\text{ V}, E = 0$                                          | $I_{CEO}$       |      | 1          | 50   | nA            |
| DC current gain                                                                      | $V_{CE} = 5\text{ V}, I_C = 5\text{ mA}, E = 0$                        | $h_{FE}$        |      | 450        |      |               |
| Collector emitter capacitance                                                        | $V_{CE} = 0\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_{CEO}$       |      | 15         |      | pF            |
| Collector base capacitance                                                           | $V_{CE} = 0\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_{CBO}$       |      | 19         |      | pF            |
| Collector light current                                                              | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_{CB} = 5\text{ V}$ | $I_{ca}$        | 3    | 9          |      | mA            |
| Angle of half sensitivity                                                            |                                                                        | $\phi$          |      | $\pm 15$   |      | deg           |
| Wavelength of peak sensitivity                                                       |                                                                        | $\lambda_p$     |      | 930        |      | nm            |
| Range of spectral bandwidth                                                          |                                                                        | $\lambda_{0.5}$ |      | 900 to 980 |      | nm            |
| Collector emitter saturation voltage                                                 | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, I_C = 1\text{ mA}$   | $V_{CEsat}$     |      | 130        | 300  | mV            |
| Turn-on time                                                                         | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\ \Omega$               | $t_{on}$        |      | 6          |      | $\mu\text{s}$ |
| Turn-off time                                                                        | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\ \Omega$               | $t_{off}$       |      | 5          |      | $\mu\text{s}$ |
| Cut-off frequency                                                                    | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\ \Omega$               | $f_c$           |      | 110        |      | kHz           |

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

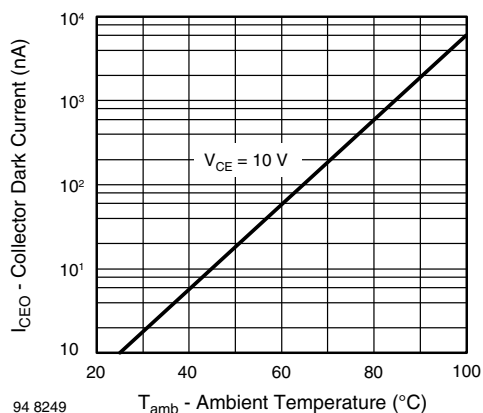


Fig. 2 - Collector Dark Current vs. Ambient Temperature

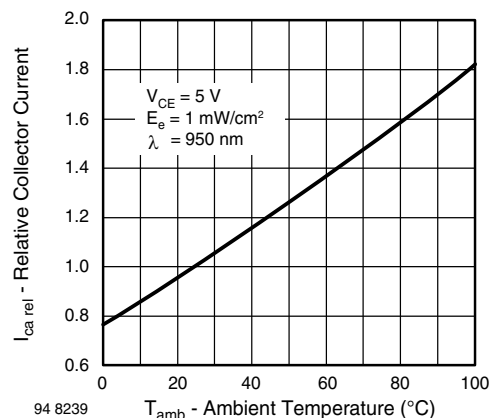


Fig. 3 - Relative Collector Current vs. Ambient Temperature

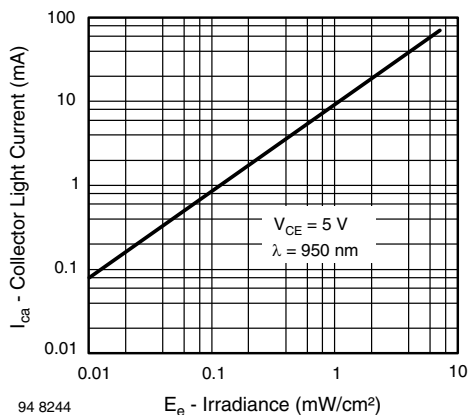


Fig. 4 - Collector Light Current vs. Irradiance

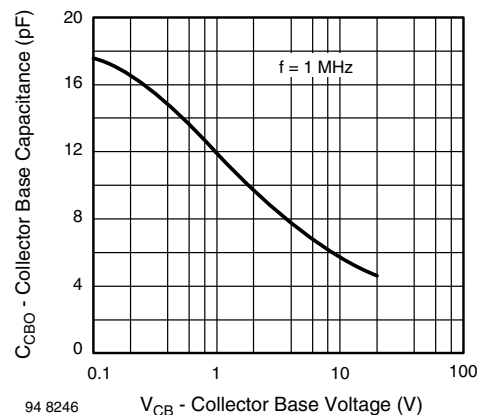


Fig. 7 - Collector Base Capacitance vs. Collector Base Voltage

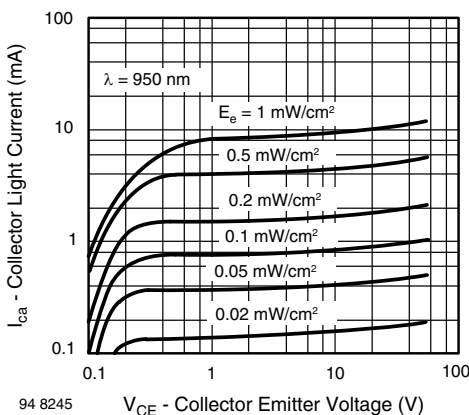


Fig. 5 - Collector Light Current vs. Collector Emitter Voltage

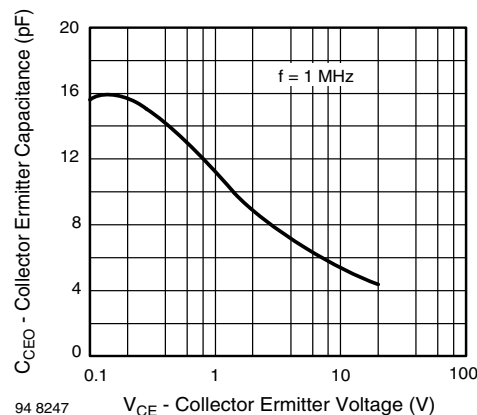


Fig. 8 - Collector Emitter Capacitance vs. Collector Emitter Voltage

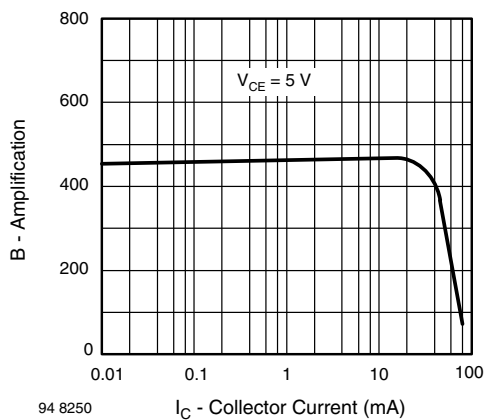


Fig. 6 - Amplification vs. Collector Current

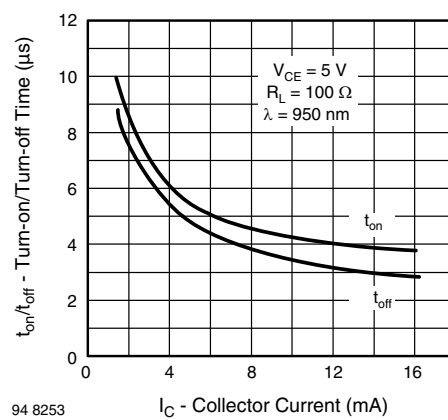


Fig. 9 - Turn-on/Turn-off Time vs. Collector Current

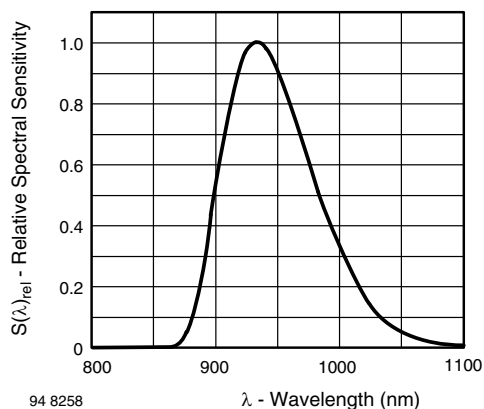


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

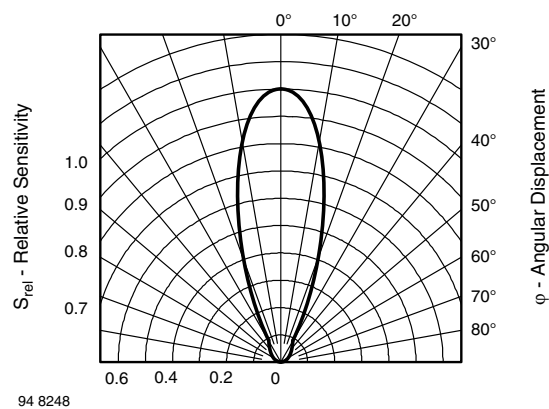
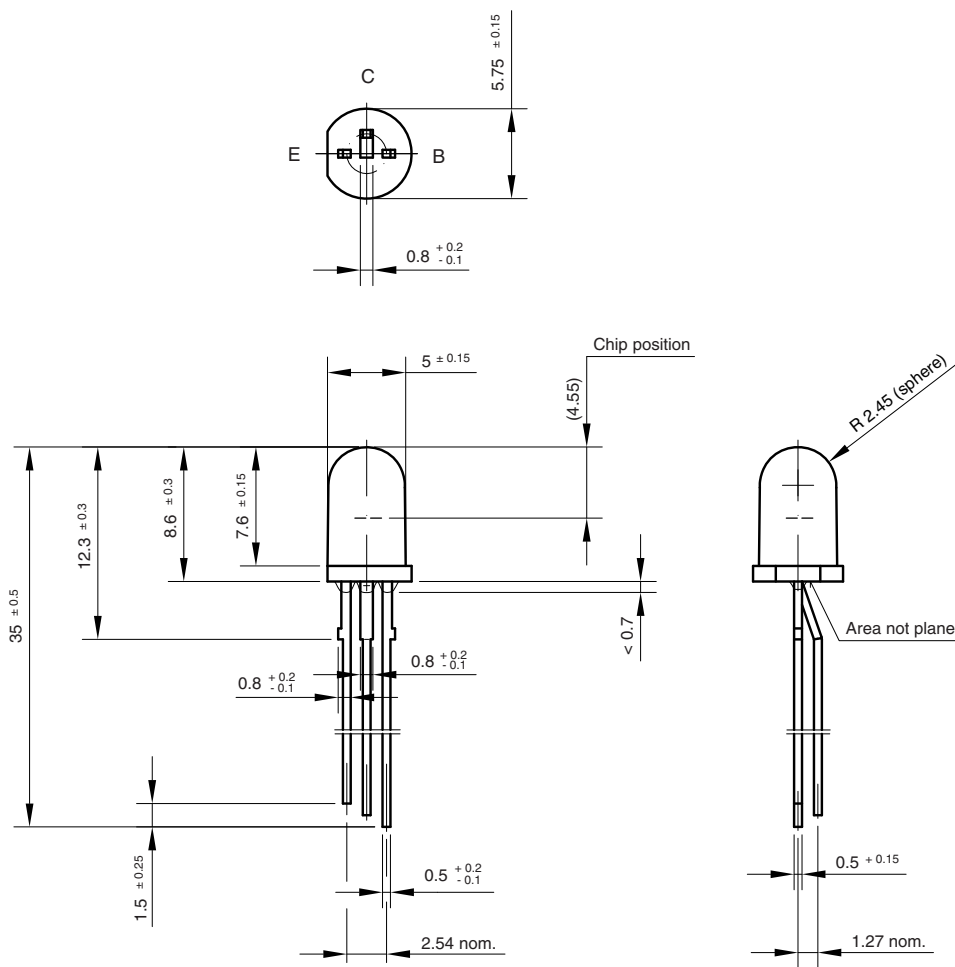


Fig. 11 - Relative Radiant Sensitivity vs. Angular Displacement

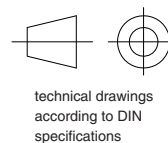
### PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5188.01-4

Issue:1; 01.07.96

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