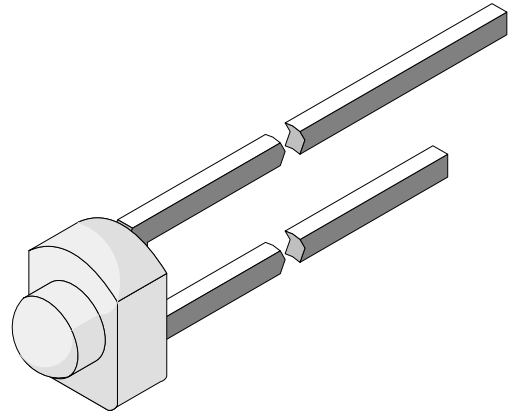


# Silicon NPN Phototransistor

## Description

BPW17N is a silicon NPN epitaxial planar phototransistor in a miniature plastic case with a  $\pm 12^\circ$  lens. With a lead center to center spacing of 2.54mm and a package width of 2.4mm the devices are easily stackable on PC boards and assembled to arrays of unlimited size.

Due to its waterclear epoxy the device is sensitive to visible and near infrared radiation.



94 8639

## Features

- Miniature T-3/4 clear plastic package with lens
- Narrow viewing angle  $\phi = \pm 12^\circ$
- Insensitive against background light due to narrow aperture
- Suitable for 0.1" (2.54 mm) center to center spacing
- Suitable for visible and near infrared radiation
- Compatible with IR diode CQY37N

## Applications

Detector in electronic control and drive circuits

## Absolute Maximum Ratings

$T_{amb} = 25^\circ\text{C}$

| Parameter                           | Test Conditions                       | Symbol     | Value      | Unit             |
|-------------------------------------|---------------------------------------|------------|------------|------------------|
| Collector Emitter Voltage           |                                       | $V_{CEO}$  | 32         | V                |
| Emitter Collector Voltage           |                                       | $V_{ECO}$  | 5          | V                |
| Collector Current                   |                                       | $I_C$      | 50         | mA               |
| Peak Collector Current              | $t_p/T = 0.5, t_p \leq 10 \text{ ms}$ | $I_{CM}$   | 100        | mA               |
| Total Power Dissipation             | $T_{amb} \leq 55^\circ\text{C}$       | $P_{tot}$  | 100        | mW               |
| Junction Temperature                |                                       | $T_j$      | 100        | $^\circ\text{C}$ |
| Storage Temperature Range           |                                       | $T_{stg}$  | -55...+100 | $^\circ\text{C}$ |
| Soldering Temperature               | $t \leq 3 \text{ s}$                  | $T_{sd}$   | 260        | $^\circ\text{C}$ |
| Thermal Resistance Junction/Ambient |                                       | $R_{thJA}$ | 450        | K/W              |

### Basic Characteristics

$T_{amb} = 25^{\circ}\text{C}$

| Parameter                            | Test Conditions                                                             | Symbol                | Min | Typ       | Max | Unit          |
|--------------------------------------|-----------------------------------------------------------------------------|-----------------------|-----|-----------|-----|---------------|
| Collector Emitter Breakdown Voltage  | $I_C = 1\text{ mA}$                                                         | $V_{(BR)CE}$<br>$V_O$ | 32  |           |     | V             |
| Collector Dark Current               | $V_{CE} = 20\text{ V}, E = 0$                                               | $I_{CEO}$             |     | 1         | 200 | nA            |
| Collector Emitter Capacitance        | $V_{CE} = 5\text{ V}, f = 1\text{ MHz}, E = 0$                              | $C_{CEO}$             |     | 8         |     | pF            |
| Collector Light Current              | $E_e = 1\text{ mW/cm}^2,$<br>$\lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$ | $I_{ca}$              | 0.5 | 1.0       |     | mA            |
| Angle of Half Sensitivity            |                                                                             | $\phi$                |     | $\pm 12$  |     | deg           |
| Wavelength of Peak Sensitivity       |                                                                             | $\lambda_p$           |     | 825       |     | nm            |
| Range of Spectral Bandwidth          |                                                                             | $\lambda_{0.5}$       |     | 620...960 |     | nm            |
| Collector Emitter Saturation Voltage | $E_e = 1\text{ mW/cm}^2,$<br>$\lambda = 950\text{ nm}, I_C = 0.1\text{ mA}$ | $V_{CEsat}$           |     |           | 0.3 | V             |
| Turn-On Time                         | $V_S = 5\text{ V}, I_C = 5\text{ mA},$<br>$R_L = 100\ \Omega$               | $t_{on}$              |     | 4.8       |     | $\mu\text{s}$ |
| Turn-Off Time                        | $V_S = 5\text{ V}, I_C = 5\text{ mA},$<br>$R_L = 100\ \Omega$               | $t_{off}$             |     | 5.0       |     | $\mu\text{s}$ |
| Cut-Off Frequency                    | $V_S = 5\text{ V}, I_C = 5\text{ mA},$<br>$R_L = 100\ \Omega$               | $f_c$                 |     | 120       |     | kHz           |

### Typical Characteristics ( $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

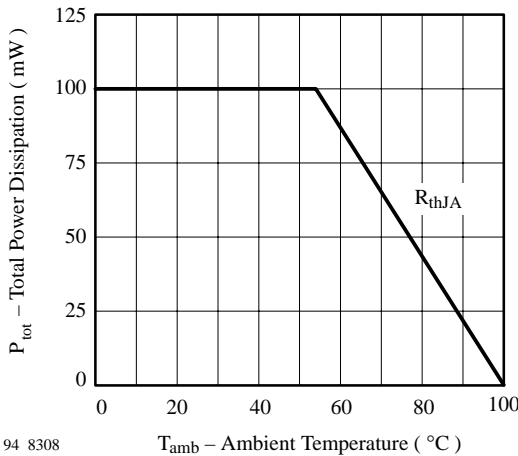


Figure 1. Total Power Dissipation vs. Ambient Temperature

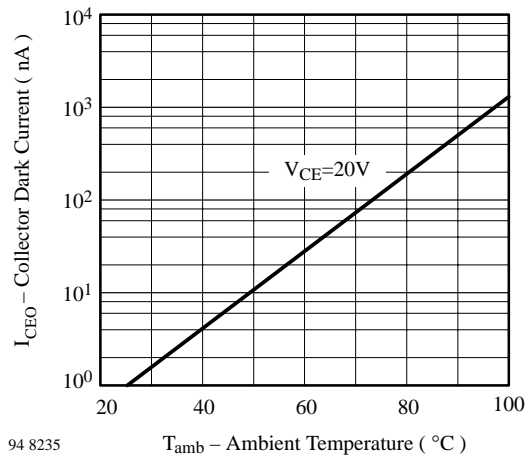
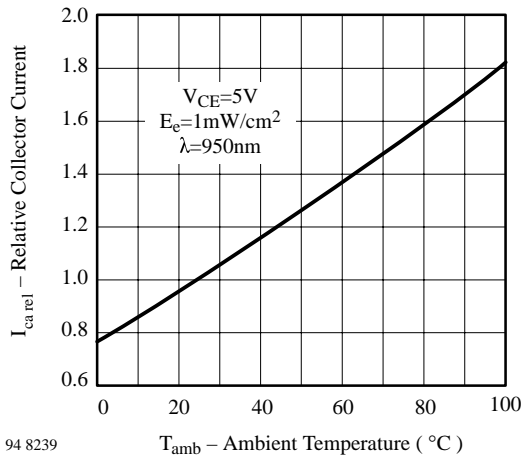
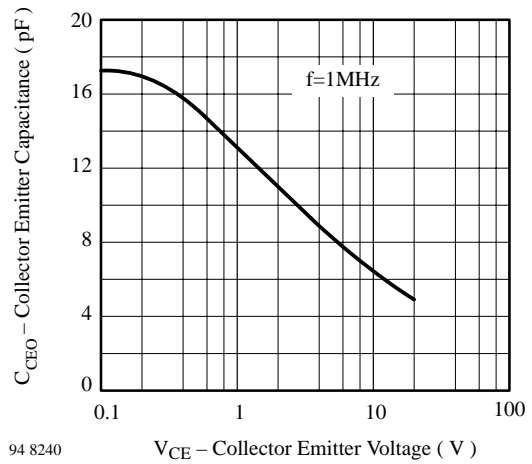


Figure 2. Collector Dark Current vs. Ambient Temperature



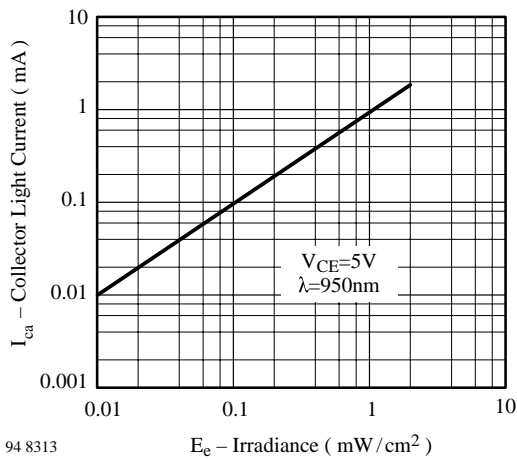
94 8239  $T_{amb}$  – Ambient Temperature ( °C )

Figure 3. Relative Collector Current vs. Ambient Temperature



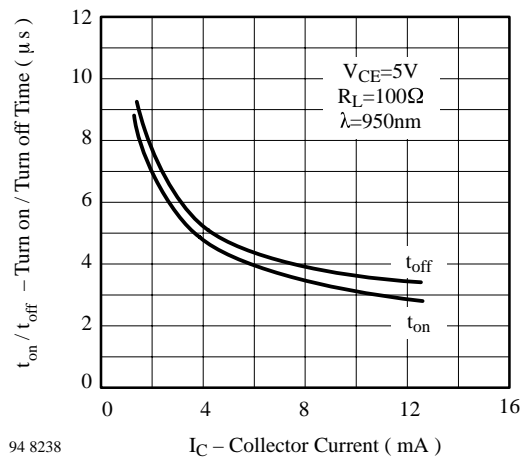
94 8240  $V_{CE}$  – Collector Emitter Voltage ( V )

Figure 6. Collector Emitter Capacitance vs. Collector Emitter Voltage



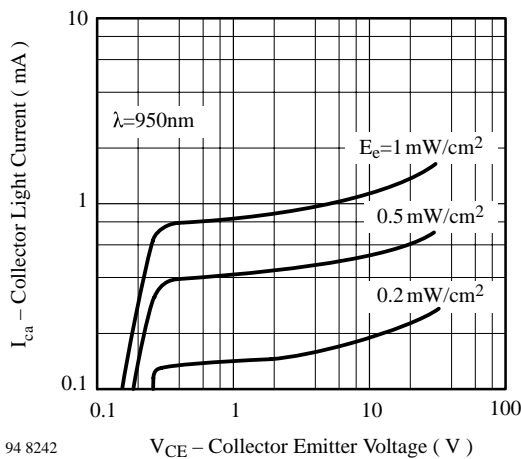
94 8313  $E_e$  – Irradiance ( mW/cm<sup>2</sup> )

Figure 4. Collector Light Current vs. Irradiance



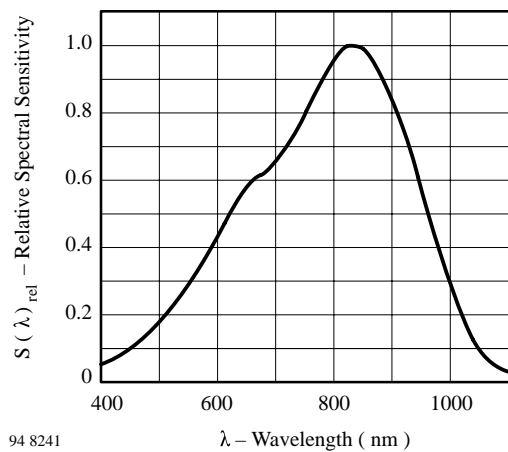
94 8238  $I_C$  – Collector Current ( mA )

Figure 7. Turn On/Turn Off Time vs. Collector Current



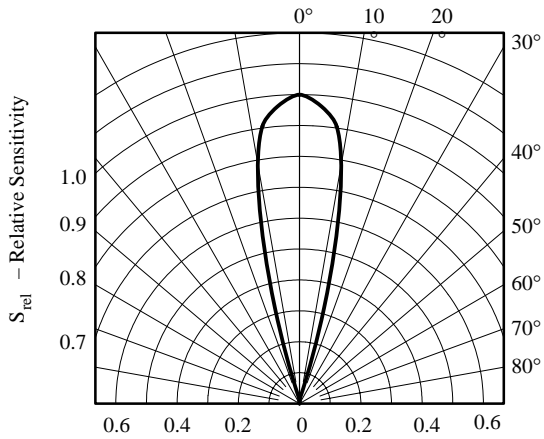
94 8242  $V_{CE}$  – Collector Emitter Voltage ( V )

Figure 5. Collector Light Current vs. Collector Emitter Voltage



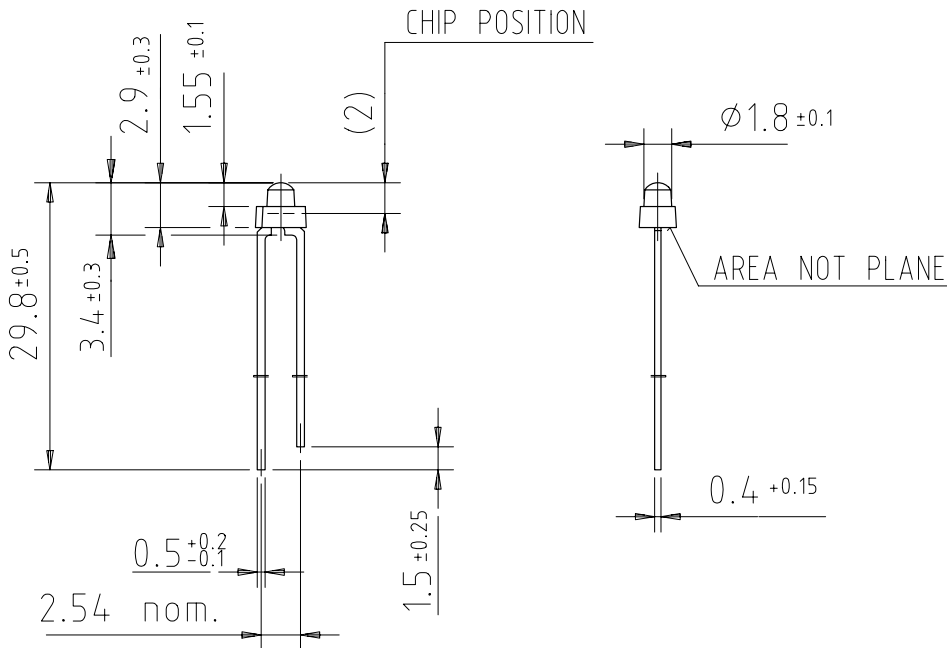
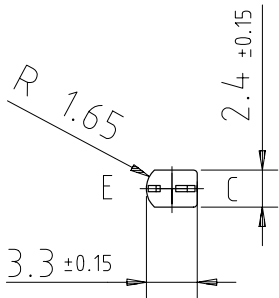
94 8241  $\lambda$  – Wavelength ( nm )

Figure 8. Relative Spectral Sensitivity vs. Wavelength

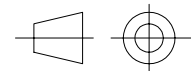


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Figure 9. Relative Radiant Sensitivity vs. Angular Displacement



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technical drawings according to DIN specifications



## **Ozone Depleting Substances Policy Statement**

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**Vishay Semiconductor GmbH** has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**Vishay Semiconductor GmbH** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design and may do so without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay-Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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