

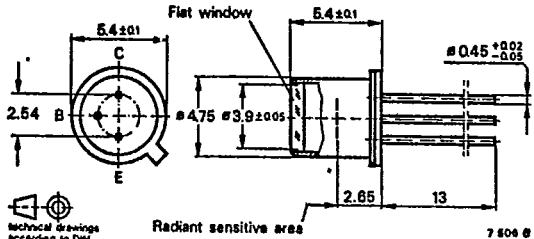
**Silicon NPN Epitaxial Planar Phototransistors**

**Applications:** Detector in electronic control and drive circuits

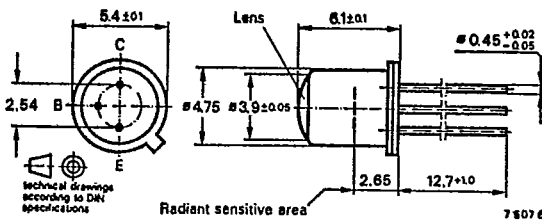
**Features:**

- Hermetically sealed case
- BPW 13 - flat window, BPW 14 - lens
- Suitable for visible and near infrared radiation
- Exact central chip alignment typ.:  $\pm 50 \mu\text{m}$
- BPW 13 - Long range light barrier with an additional optics
- Base terminal is available
- Selected in groups

**Dimensions in mm**



Technical drawings according to DIN specifications  
**BPW 13**



Technical drawings according to DIN specifications

**BPW 14**

Angle of half sensitivity  
 BPW 13  $\pm \phi = 40^\circ$   
 BPW 14  $\pm \phi = 12.5^\circ$   
 Collector connected with case  
 ~ JEDEC TO 18  
 ~ 18A3 DIN 41876  
 ~ JEDEC TO 18  
 Weight max. 0.5 g

## BPW 13 · BPW 14

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## Absolute maximum ratings

|   |           |            |    |
|---|-----------|------------|----|
| Collector-base voltage  | $V_{CBO}$ | 32         | V  |
| Collector-emitter voltage   | $V_{CEO}$ | 32         | V  |
| Emitter-base voltage  | $V_{EBO}$ | 5          | V  |
| Collector current   | $I_C$     | 50         | mA |
| Peak collector current<br>$\frac{t_p}{T} = 0.5, t_p \leq 10 \text{ ms}$ | $I_{CM}$  | 100        | mA |
| Total power dissipation<br>$T_{amb} \leq 25 \text{ °C}$                 | $P_{tot}$ | 310        | mW |
| Junction temperature  | $T_j$     | 150        | °C |
| Storage temperature range   | $T_{stg}$ | -55...+150 | °C |

## Thermal resistance

|                  |            | Min. | Typ. | Max. |     |
|------------------|------------|------|------|------|-----|
| Junction ambient | $R_{thJA}$ |      |      | 400  | K/W |
| Junction case    | $R_{thJC}$ |      |      | 150  | K/W |

## Optical and electrical characteristics

 $T_{amb} = 25 \text{ °C}$ 

|  |           |  |    |     |    |
|--|-----------|--|----|-----|----|
| Collector dark current<br>$V_{CE} = 20 \text{ V}, E = 0$ | $I_{CEO}$ |  | 10 | 100 | nA |
|--|-----------|--|----|-----|----|

Collector light current  
 $V_{CE} = 5 \text{ V}, E_A = 1 \text{ klx}^{1)}$ 

|          |          |  |      |  |    |
|----------|----------|--|------|--|----|
| BPW 13 A | $I_{ca}$ |  | 0.30 |  | mA |
| BPW 13 B | $I_{ca}$ |  | 0.45 |  | mA |
| BPW 13 C | $I_{ca}$ |  | 1.0  |  | mA |
| BPW 14 A | $I_{ca}$ |  | 3.0  |  | mA |
| BPW 14 B | $I_{ca}$ |  | 4.5  |  | mA |
| BPW 14 C | $I_{ca}$ |  | 10.0 |  | mA |

 $V_{CE} = 5 \text{ V}, E_s = 1 \text{ mW/cm}^2, \lambda_p = 950 \text{ nm}$ 

|          |               |      |      |      |    |
|----------|---------------|------|------|------|----|
| BPW 13 A | $I_{ca}^{1)}$ | 0.07 | 0.10 | 0.14 | mA |
| BPW 13 B | $I_{ca}^{1)}$ | 0.10 | 0.15 | 0.20 | mA |
| BPW 13 C | $I_{ca}^{1)}$ | 0.17 | 0.30 |      | mA |
| BPW 14 A | $I_{ca}^{1)}$ | 0.7  | 1.0  | 1.4  | mA |
| BPW 14 B | $I_{ca}^{1)}$ | 1.0  | 1.5  | 2.0  | mA |
| BPW 14 C | $I_{ca}^{1)}$ | 1.7  | 3.0  |      | mA |

<sup>1)</sup>AQL = 0.65 %    <sup>1)</sup> Standard illuminant A (DIN 5033/IEC 306-1)

**BPW 13 · BPW 14**

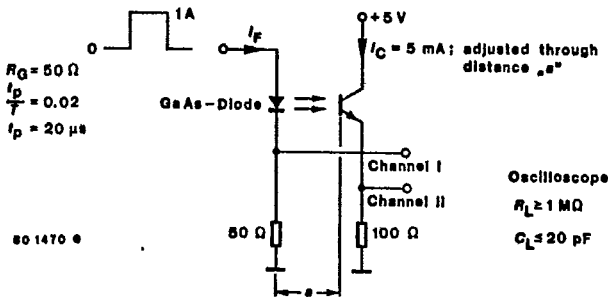
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|   |                    | Min. | Typ.      | Max. |     |
|---|--------------------|------|-----------|------|-----|
| Peak wavelength sensitivity                               | $\lambda_p$        |      | 780       |      | nm  |
| Range of spectral bandwidth (50%)                         | $\lambda_{0.5}$    |      | 520...950 |      | nm  |
| Collector-emitter breakdown voltage                       |                    |      |           |      |     |
| $I_C = 1 \text{ mA}$                                      | $V_{(BR)CEO}^{*)}$ | 32   |           |      | V   |
| Collector-emitter saturation voltage                      |                    |      |           |      |     |
| $I_C = 0.1 \text{ mA}, I_B = 10 \mu\text{A}$              | BPW 13             |      |           | 0.3  | V   |
| $I_C = 1.0 \text{ mA}, I_B = 100 \mu\text{A}$             | BPW 14             |      |           | 0.3  | V   |
| Collector-emitter saturation voltage                      | $V_{CEsat}^{*)}$   |      |           |      | V   |
| Cut-off frequency   |                    |      |           |      |     |
| $V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$ | $f_c$              |      | 170       |      | kHz |
| Capacitance, collector-emitter                            |                    |      |           |      |     |
| $V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}, E = 0$          | $C_{CEO}$          |      | 4.5       |      | pF  |

**Switching characteristics**

$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$   
 $\lambda_p = 950 \text{ nm}$ , see test circuit

|               |           |  |     |  |               |
|---------------|-----------|--|-----|--|---------------|
| Delay time    | $t_d$     |  | 1.8 |  | $\mu\text{s}$ |
| Rise time     | $t_r$     |  | 1.6 |  | $\mu\text{s}$ |
| Turn-on time  | $t_{on}$  |  | 3.4 |  | $\mu\text{s}$ |
| Storage time  | $t_s$     |  | 0.3 |  | $\mu\text{s}$ |
| Fall time     | $t_f$     |  | 1.7 |  | $\mu\text{s}$ |
| Turn-off time | $t_{off}$ |  | 2.0 |  | $\mu\text{s}$ |

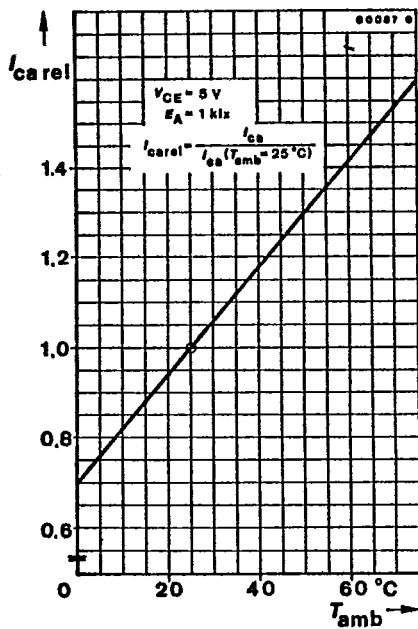
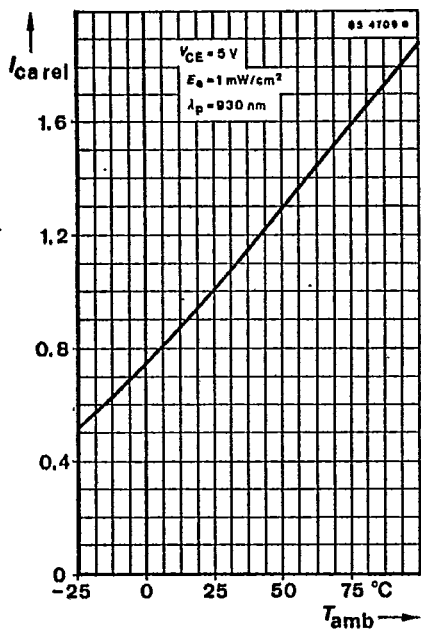
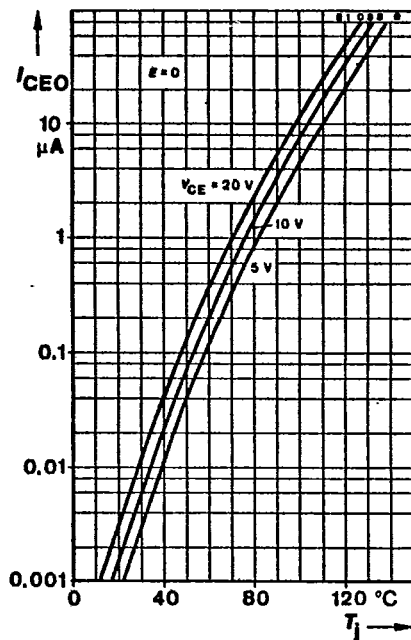
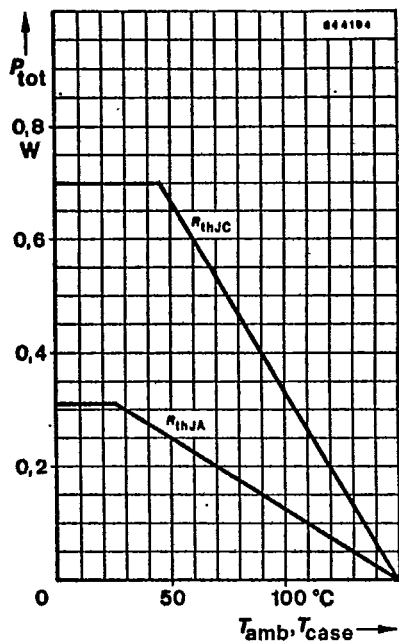


Test circuit

<sup>\*)</sup> AQL = 0.65% <sup>1)</sup> Standard illuminant A (DIN 5033/IEC 306-1)

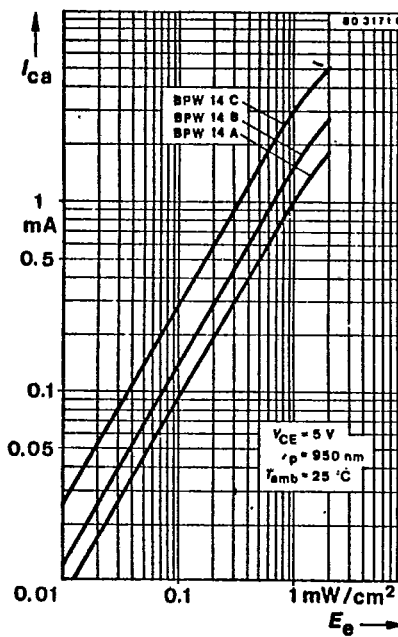
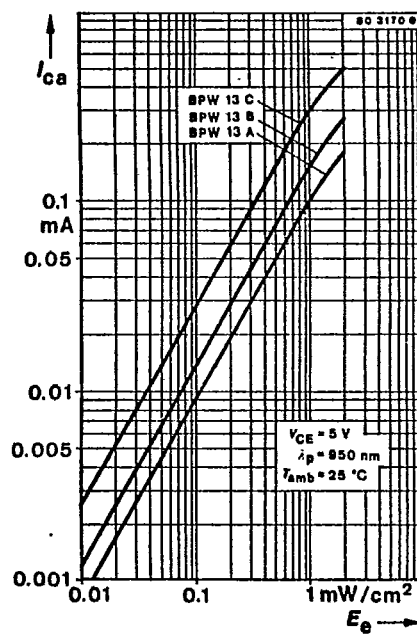
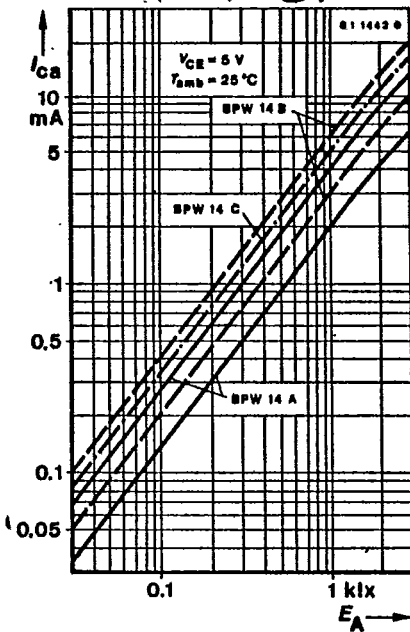
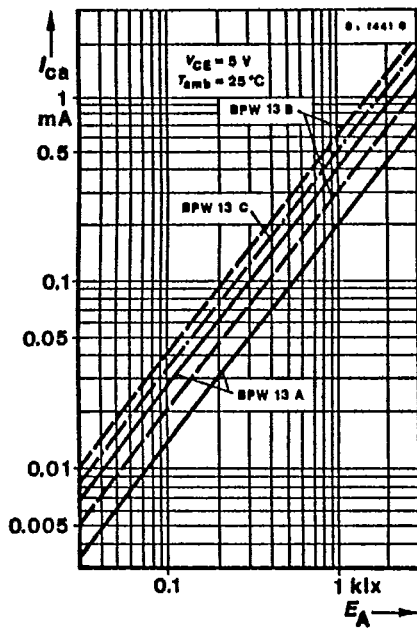
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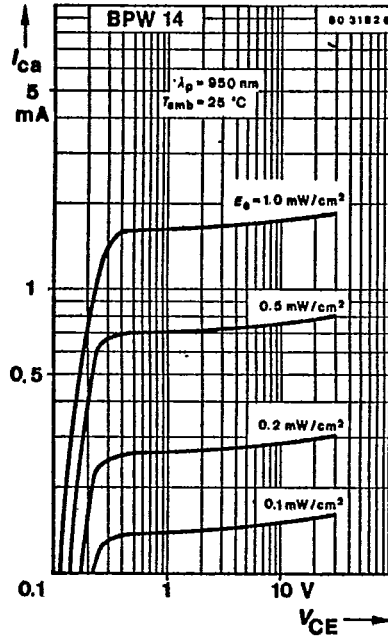
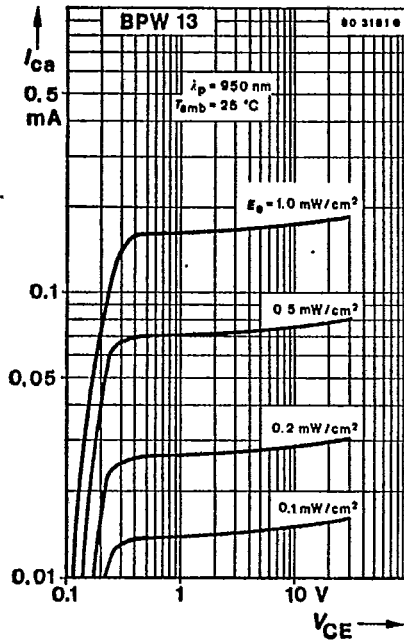
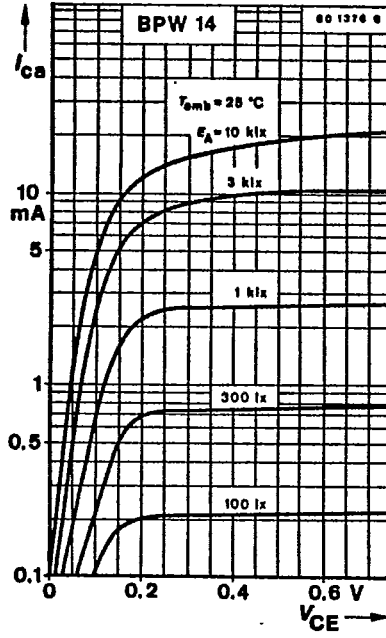
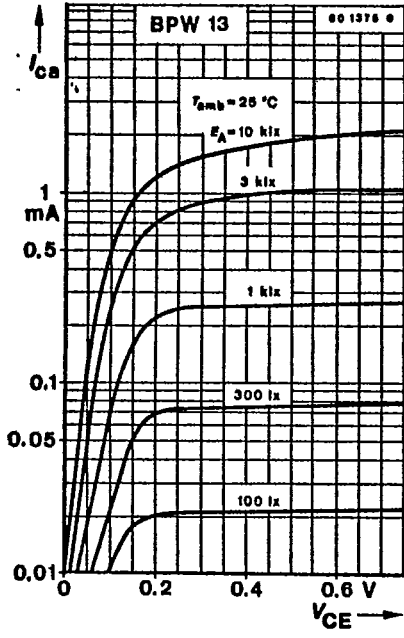


BPW 13 · BPW 14

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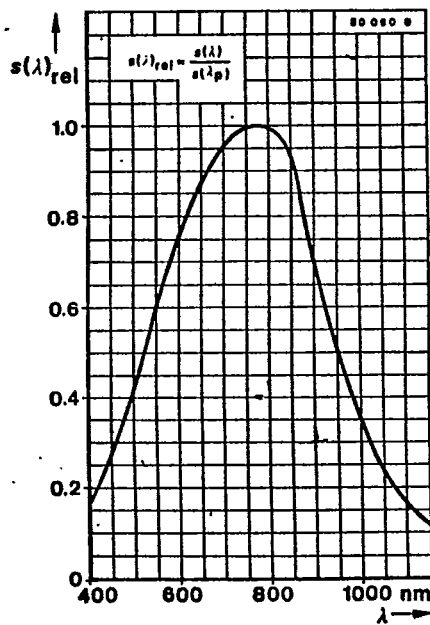
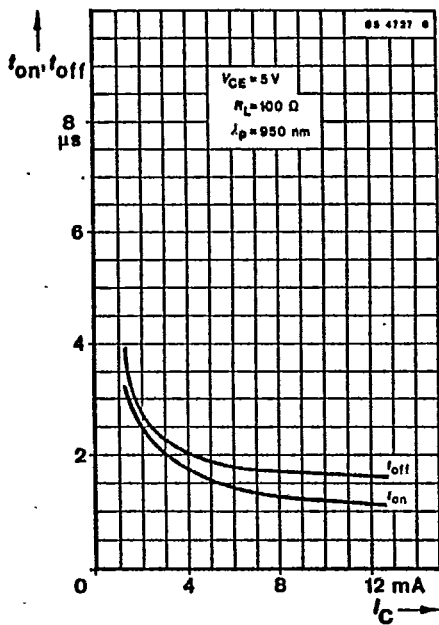
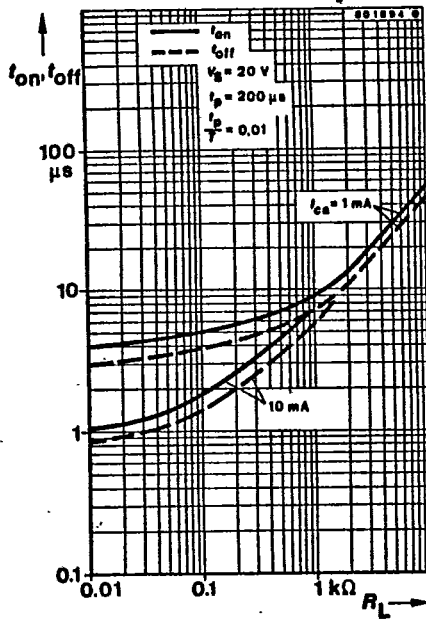
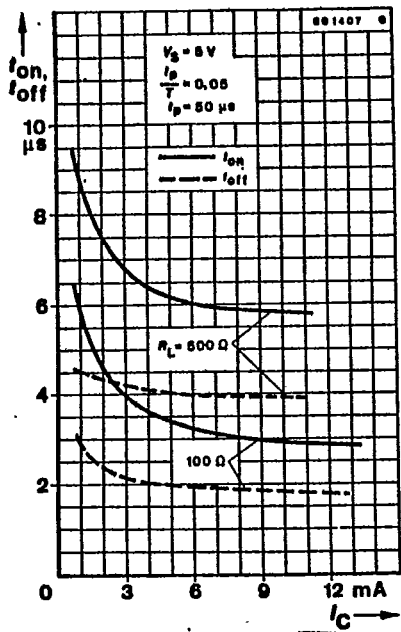


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BPW 13 · BPW 14

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BPW 13 · BPW 14

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