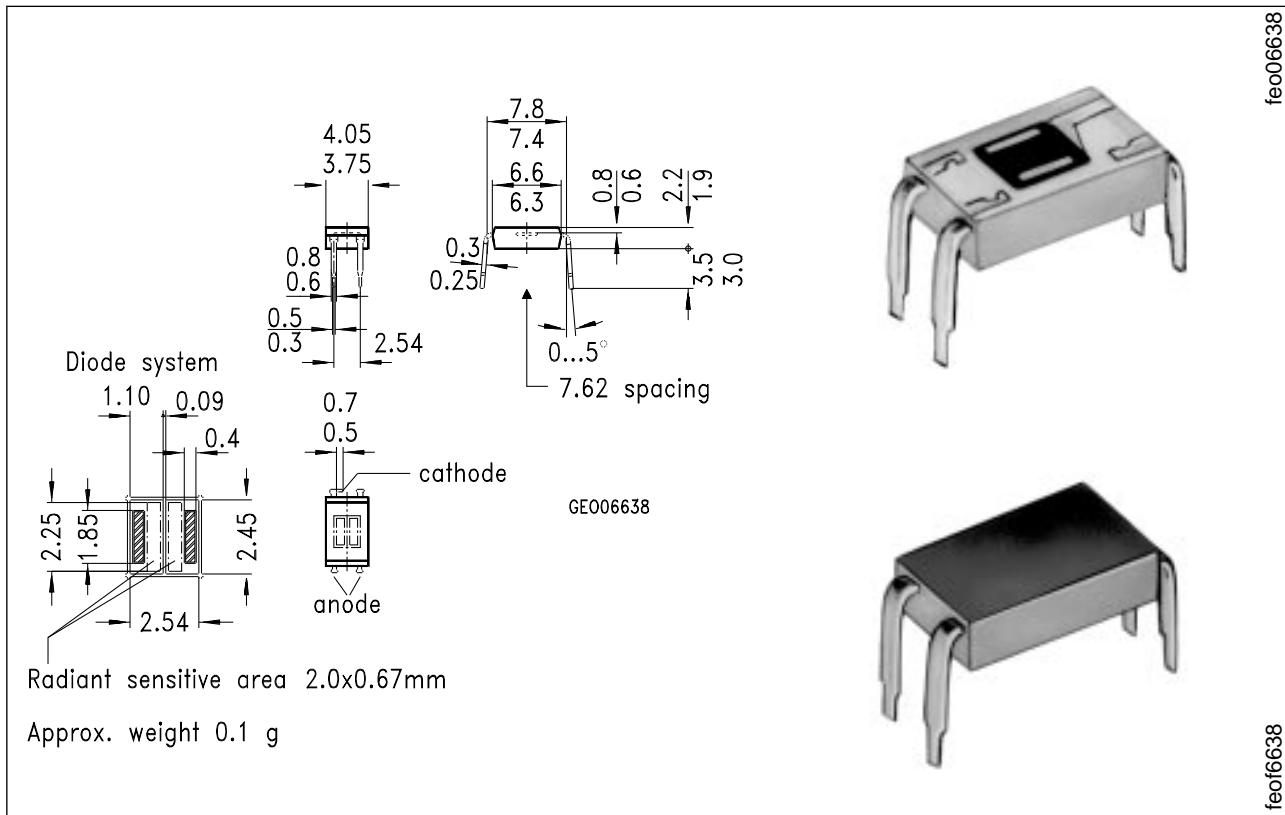


## Silizium-Differential-Fotodiode Silicon Differential Photodiode

**BPX 48**  
**BPX 48 F**



Maße in mm, wenn nicht anders angegeben/Dimensions in mm, unless otherwise specified.

### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm (BPX 48) und bei 920 nm (BPX 48 F)
- Hohe Fotoempfindlichkeit
- DIL-Plastikbauförm mit hoher Packungsdichte
- Doppeldiode mit extrem hoher Gleichmäßigkeit

### Anwendungen

- Nachlaufsteuerung
- Kantenführungen
- Weg- bzw. Winkelabtastungen
- Industrieelektronik
- "Messen/Steuern/Regeln"

### Features

- Especially suitable for applications from 400 nm to 1100 nm (BPX 48) and of 920 nm (BPX 48 F)
- High photosensitivity
- DIL plastic package with high packing density
- Double diode with extremely high homogeneousness

### Application

- Follow-up control
- Edge control
- Path and angle scanning
- Industrial electronics
- For control and drive circuits

| Typ<br>Type | Bestellnummer<br>Ordering Code |
|-------------|--------------------------------|
| BPX 48      | Q62702-P17-S1                  |
| BPW 48 F    | Q62702-P305                    |

### Grenzwerte

### Maximum Ratings

| Bezeichnung<br>Description  | Symbol<br>Symbol  | Wert<br>Value | Einheit<br>Unit |
|---|-------------------|---------------|-----------------|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range  | $T_{op}; T_{stg}$ | - 40 ... + 80 | °C              |
| Löttemperatur (Lötstelle 2 mm vom<br>Gehäuse entfernt bei Lötzeit $t \leq 3$ s)<br>Soldering temperature in 2 mm distance<br>from case bottom ( $t \leq 3$ s) | $T_s$             | 230           | °C              |
| Sperrspannung<br>Reverse voltage  | $V_R$             | 10            | V               |
| Verlustleistung, $T_A = 25$ °C<br>Total power dissipation   | $P_{tot}$         | 50            | mW              |

**Kennwerte** ( $T_A = 25$  °C) für jede Einzeldiode  
**Characteristics** ( $T_A = 25$  °C) per single diode system

| Bezeichnung<br>Description  | Symbol<br>Symbol    | Wert<br>Value    |                    | Einheit<br>Unit |
|---|---------------------|------------------|--------------------|-----------------|
|   |                     | BPX 48           | BPX 48 F           |                 |
| Fotoempfindlichkeit<br>Spectral sensitivity<br>$V_R = 5$ V, Normlicht/standard light A,<br>$T = 2856$ K,<br>$V_R = 5$ V, $\lambda = 950$ nm, $E_e = 0.5$ mW/cm <sup>2</sup> | $S$                 | 24 ( $\geq 15$ ) | -                  | nA/lx           |
|   | $S$                 | -                | 7.5 ( $\geq 4.0$ ) |                 |
| Wellenlänge der max. Fotoempfindlichkeit<br>Wavelength of max. sensitivity  | $\lambda_{S_{max}}$ | 900              | 920                | nm              |
| Spektraler Bereich der Fotoempfindlichkeit<br>$S = 10\%$ von $S_{max}$<br>Spectral range of sensitivity<br>$S = 10\%$ of $S_{max}$  | $\lambda$           | 400 ... 1150     | 750 ... 1150       | nm              |
| Bestrahlungsempfindliche Fläche<br>Radiant sensitive area   | $A$                 | 1.54             | 1.54               | mm <sup>2</sup> |

**Kennwerte ( $T_A = 25^\circ\text{C}$ ) für jede Einzeldiode**  
**Characteristics ( $T_A = 25^\circ\text{C}$ ) per single diode system**

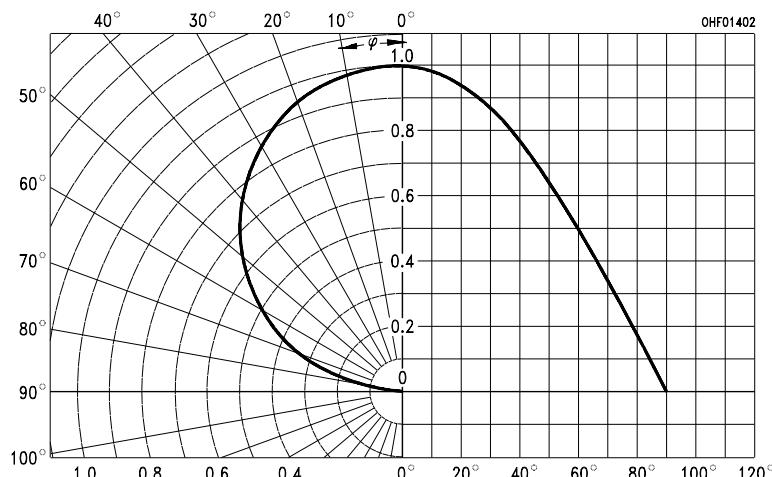
| <b>Bezeichnung</b><br><b>Description</b>  | <b>Symbol</b><br><b>Symbol</b> | <b>Wert</b><br><b>Value</b> |                         | <b>Einheit</b><br><b>Unit</b> |
|---|--------------------------------|-----------------------------|-------------------------|-------------------------------|
|   |                                | <b>BPX 48</b>               | <b>BPX 48 F</b>         |                               |
| Abmessung der bestrahlungsempfindlichen Fläche<br>Dimensions of radiant sensitive area  | $L \times B$<br>$L \times W$   | $0.7 \times 2.2$            | $0.7 \times 2.2$        | mm                            |
| Abstand Chipoberfläche zu Gehäuseoberfläche<br>Distance chip front to case surface  | $H$                            | 0.5                         | 0.5                     | mm                            |
| Halbwinkel<br>Half angle  | $\phi$                         | $\pm 60$                    | $\pm 60$                | Grad<br>deg.                  |
| Dunkelstrom, $V_R = 10\text{ V}$<br>Dark current  | $I_R$                          | 10 ( $\leq 100$ )           | 10 ( $\leq 100$ )       | nA                            |
| Spektrale Fotoempfindlichkeit<br>Spectral sensitivity<br>$\lambda = 850\text{ nm}$<br>$\lambda = 950\text{ nm}$   | $S_\lambda$<br>$S_\lambda$     | 0.55<br>–                   | –<br>0.65               | A/W                           |
| Max. Abweichung der Fotoempfindlichkeit der Systeme vom Mittelwert<br>Max. deviation of the system spectral sensitivity from the average  | $\Delta S$                     | $\pm 5$                     | $\pm 5$                 | %                             |
| Quantenausbeute<br>Quantum yield<br>$\lambda = 850\text{ nm}$<br>$\lambda = 950\text{ nm}$  | $\eta$                         | 0.8<br>–                    | –<br>0.95               | Electrons<br>Photon           |
| Leerlaufspannung<br>Open-circuit voltage<br>$E_v = 1000\text{ lx}$ , Normlicht/standard light A,<br>$T = 2856\text{ K}$<br>$E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$               | $V_O$<br>$V_O$                 | 330 ( $\geq 280$ )<br>–     | –<br>300 ( $\geq 280$ ) | mV                            |
| Kurzschlußstrom<br>Short-circuit current<br>$E_v = 1000\text{ lx}$ , Normlicht/standard light A,<br>$T = 2856\text{ K}$<br>$E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$               | $I_{SC}$<br>$I_{SC}$           | 24<br>–                     | –<br>7                  | $\mu\text{A}$                 |
| Anstiegs- und Abfallzeit des Fotostromes<br>Rise and fall time of the photocurrent<br>$R_L = 1\text{ k}\Omega$ ; $V_R = 5\text{ V}$ ; $\lambda = 850\text{ nm}$ ; $I_p = 20\text{ }\mu\text{A}$ | $t_r, t_f$                     | 500                         | 500                     | ns                            |
| Durchlaßspannung, $I_F = 40\text{ mA}$ , $E = 0$<br>Forward voltage   | $V_F$                          | 1.3                         | 1.3                     | V                             |

**Kennwerte ( $T_A = 25^\circ\text{C}$ ) für jede Einzeldiode**

**Characteristics ( $T_A = 25^\circ\text{C}$ ) per single diode system**

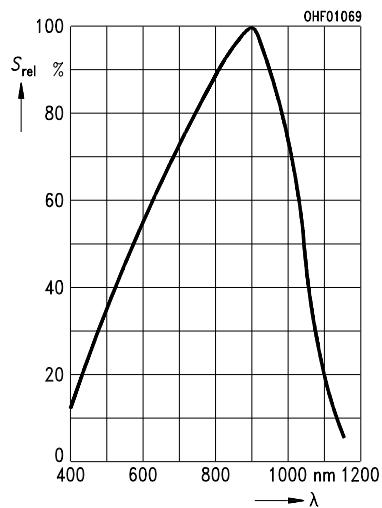
| <b>Bezeichnung</b><br><b>Description</b>  | <b>Symbol</b><br><b>Symbol</b> | <b>Wert</b><br><b>Value</b> |                       | <b>Einheit</b><br><b>Unit</b>                       |
|---|--------------------------------|-----------------------------|-----------------------|---|
|   |                                | <b>BPX 48</b>               | <b>BPX 48 F</b>       |   |
| Kapazität, $V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$<br>Capacitance   | $C_0$                          | 25                          | 25                    | pF  |
| Temperaturkoeffizient von $V_O$<br>Temperature coefficient of $V_O$   | $TC_V$                         | - 2.6                       | - 2.6                 | mV/K  |
| Temperaturkoeffizient von $I_{SC}$<br>Temperature coefficient of $I_{SC}$<br>Normlicht/standard light A<br>$\lambda = 950 \text{ nm}$ | $TC_I$<br>$TC_I$               | 0.18<br>-                   | -<br>0.2              | %/K<br>%/K  |
| Rauschäquivalente Strahlungsleistung<br>Noise equivalent power<br>$V_R = 10 \text{ V}$ , $\lambda = 950 \text{ nm}$                   | $NEP$                          | $1.0 \times 10^{-13}$       | $1.0 \times 10^{-13}$ | $\frac{\text{W}}{\sqrt{\text{Hz}}}$                 |
| Nachweisgrenze, $V_R = 10 \text{ V}$ , $\lambda = 950 \text{ nm}$<br>Detection limit  | $D^*$                          | $1.2 \times 10^{12}$        | $1.2 \times 10^{12}$  | $\frac{\text{cm} \cdot \sqrt{\text{Hz}}}{\text{W}}$ |

**Directional characteristics  $S_{rel} = f(\varphi)$**



### Relative spectral sensitivity BPX 48

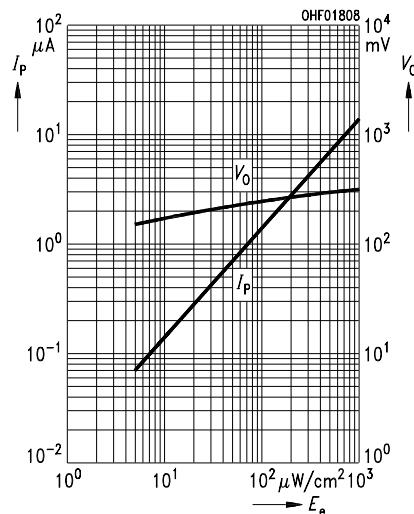
$$S_{\text{rel}} = f(\lambda)$$



### Photocurrent $I_P = f(E_e)$ , $V_R = 5 \text{ V}$

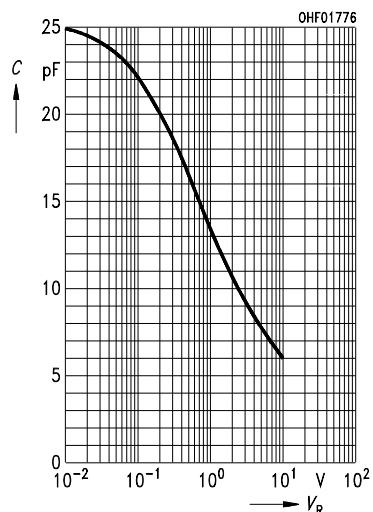
### Open-circuit-voltage $V_O = f(E_e)$

### BPX 48 F



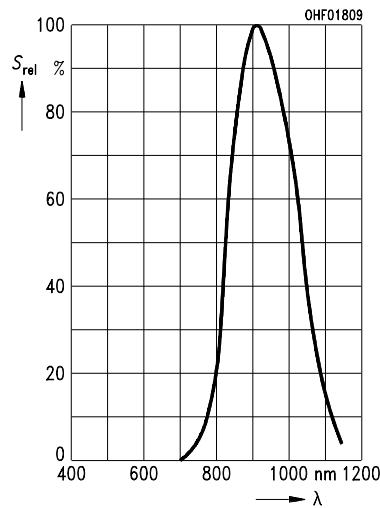
### Capacitance

$$C = f(V_R), f = 1 \text{ MHz}, E = 0$$



### Relative spectral sensitivity BPX 48 F

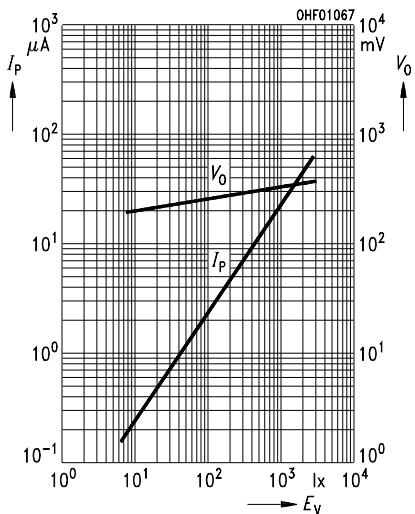
$$S_{\text{rel}} = f(\lambda)$$



### Photocurrent $I_P = f(E_V)$ , $V_R = 5 \text{ V}$

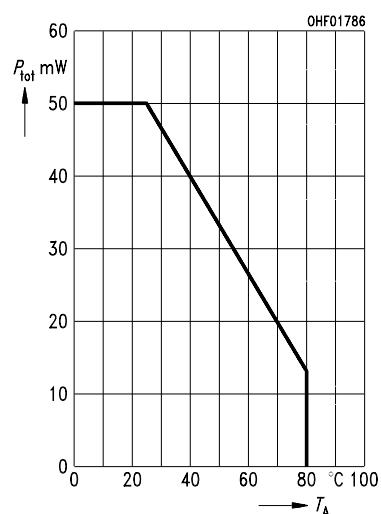
### Open-circuit-voltage $V_O = f(E_V)$

### BPX 48



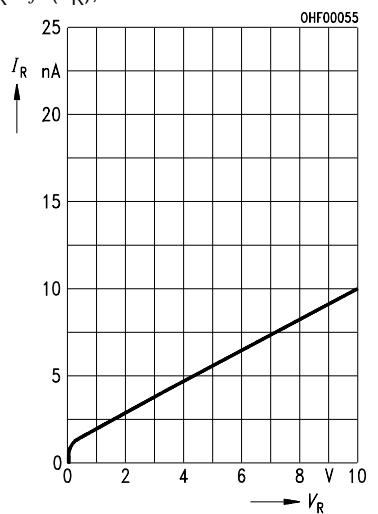
### Total power dissipation

$$P_{\text{tot}} = f(T_A)$$



### Dark current

$$I_R = f(V_R), E = 0$$



### Dark current

$$I_R = f(T_A), V_R = 10 \text{ V}$$

