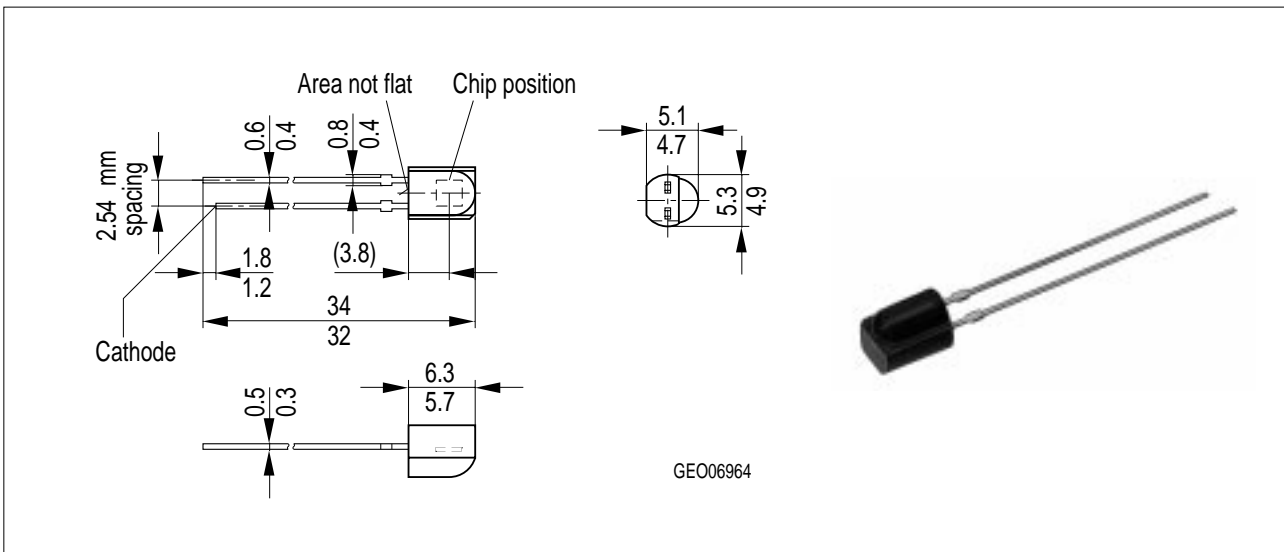


**Silizium-PIN-Fotodiode mit Tageslichtsperrfilter**  
**Silicon-PIN-Photodiode with Daylight Filter**

**SFH 204 F**  
**SFH 204 FA**



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

**Wesentliche Merkmale**

- Speziell geeignet für Anwendungen bei 880 nm
- Kurze Schaltzeit (typ. 20 ns)
- 5 mm-Plastikbauform im LED-Gehäuse
- Auch gegurtet lieferbar

**Anwendungen**

- IR-Fernsteuerung von Fernseh- und Rundfunkgeräten, Videorecordern, Lichtdimmern, Gerätefernsteuerungen
- Lichtschranken für Gleich- und Wechsellichtbetrieb

**Features**

- Especially suitable for applications of 880 nm
- Short switching time (typ. 20 ns)
- 5 mm LED plastic package
- Also available on tape

**Applications**

- IR-remote control of hi-fi and TV sets, video tape recorders, dimmers, remote control of various equipment
- Photointerrupters

| Typ<br>Type | Bestellnummer<br>Ordering Code |
|-------------|--------------------------------|
| SFH 204 F   | Q62702-P5052                   |
| SFH 204 FA  | Q62702-P1793                   |

## Grenzwerte Maximum Ratings

| Bezeichnung<br>Description  | Symbol<br>Symbol  | Wert<br>Value  | Einheit<br>Unit |
|---|-------------------|----------------|-----------------|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range  | $T_{op}; T_{stg}$ | - 55 ... + 100 | °C              |
| Löttemperatur (Lötstelle 2 mm vom Gehäuse entfernt bei Lötzeit $t \leq 3$ s)<br>Soldering temperature in 2 mm distance from case bottom ( $t \leq 3$ s) | $T_S$             | 230            | °C              |
| Sperrspannung<br>Reverse voltage  | $V_R$             | 20             | V               |
| Verlustleistung, $T_A = 25$ °C<br>Total power dissipation   | $P_{tot}$         | 150            | mW              |

## Kennwerte ( $T_A = 25$ °C) Characteristics

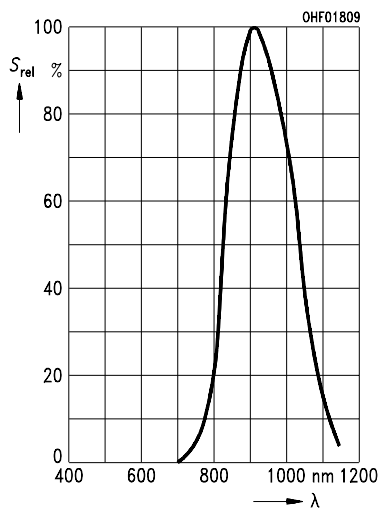
| Bezeichnung<br>Description   | Symbol<br>Symbol             | Wert<br>Value                   |                                  | Einheit<br>Unit |
|--|------------------------------|---------------------------------|----------------------------------|-----------------|
|  |                              | SFH 204 F<br>$\lambda = 950$ nm | SFH 204 FA<br>$\lambda = 870$ nm |                 |
| Fotoempfindlichkeit<br>Spectral sensitivity<br>$V_R = 5$ V, $E_e = 1$ mW/cm <sup>2</sup>   | $S$                          | 52 ( $\geq 43$ )                | 52 ( $\geq 43$ )                 | μA              |
| Wellenlänge der max. Fotoempfindlichkeit<br>Wavelength of max. sensitivity   | $\lambda_{S\ max}$           | 920                             | 900                              | nm              |
| Spektraler Bereich der Fotoempfindlichkeit<br>$S = 10$ % von $S_{max}$<br>Spectral range of sensitivity<br>$S = 10$ % of $S_{max}$ | $\lambda$                    | 780 ... 1120                    | 740 ... 1120                     | nm              |
| Bestrahlungsempfindliche Fläche<br>Radiant sensitive area  | $A$                          | 4.84                            | 4.84                             | mm <sup>2</sup> |
| Abmessung der bestrahlungsempfindlichen Fläche<br>Dimensions of radiant sensitive area   | $L \times B$<br>$L \times W$ | 2.20 × 2.20                     | 2.20 × 2.20                      | mm × mm         |
| Abstand Chipoberfläche zu Gehäuseoberfläche<br>Distance chip surface to case surface   | $H$                          | 1.9 ... 2.4                     | 1.9 ... 2.4                      | mm              |
| Halbwinkel horizontal<br>Half angle horizontal plane   | $\varphi$                    | ± 60                            | ± 60                             | Grad<br>deg.    |

**Kennwerte** ( $T_A = 25\text{ °C}$ )  
**Characteristics** (cont'd)

| Bezeichnung<br>Description   | Symbol<br>Symbol | Wert<br>Value                          |   | Einheit<br>Unit                                      |
|--|------------------|--|---|--|
|  |                  | SFH 204 F<br>$\lambda = 950\text{ nm}$ | SFH 204 FA<br>$\lambda = 870\text{ nm}$ |  |
| Halbwinkel vertikal<br>Half angle vertical plane   | $\varphi$        | + 60<br>– 75                           | + 60<br>– 75                            | Grad<br>deg.   |
| Dunkelstrom, $V_R = 10\text{ V}$<br>Dark current   | $I_R$            | 2 (< 30)                               | 2 (< 30)                                | nA   |
| Spektrale Fotoempfindlichkeit<br>Spectral sensitivity  | $S_\lambda$      | 0.59                                   | 0.63                                    | A/W  |
| Quantenausbeute<br>Quantum yield   | $\eta$           | 0.77                                   | 0.90                                    | <u>Electrons</u><br>Photons                          |
| Leerlaufspannung, $E_e = 0.5\text{ mW/cm}^2$<br>Open-circuit voltage   | $V_O$            | 340 (> 270)                            | 340 (> 270)                             | mV   |
| Kurzschlußstrom, $E_e = 0.5\text{ mW/cm}^2$<br>Short-circuit current   | $I_{SC}$         | 25                                     | 25                                      | $\mu\text{A}$  |
| Anstiegs- und Abfallzeit des Fotostromes<br>Rise and fall time of the photocurrent<br>$R_L = 50\ \Omega$ ; $V_R = 5\text{ V}$ ; $\lambda = 850\text{ nm}$ ; $I_p = 800\ \mu\text{A}$ | $t_r, t_f$       | 20                                     | 20                                      | ns   |
| Durchlaßspannung, $I_F = 100\text{ mA}$ , $E = 0$<br>Forward voltage   | $V_F$            | 1.3                                    | 1.3                                     | V  |
| Kapazität, $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$<br>Capacitance  | $C_0$            | 48                                     | 48                                      | 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 $I_{SC}$  | $TC_I$           | 0.18                                   | 0.1                                     | %/K  |
| Rauschäquivalente Strahlungsleistung<br>Noise equivalent power<br>$V_R = 10\text{ V}$  | $NEP$            | $3.6 \times 10^{14}$                   | $3.6 \times 10^{14}$                    | $\frac{\text{W}}{\sqrt{\text{Hz}}}$                  |
| Nachweisgrenze, $V_R = 10\text{ V}$<br>Detection limit   | $D^*$            | $6.1 \times 10^{12}$                   | $6.1 \times 10^{12}$                    | $\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$ |

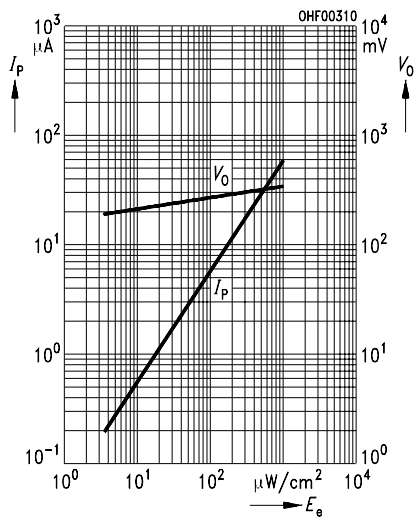
### Relative spectral sensitivity SFH 204 F

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



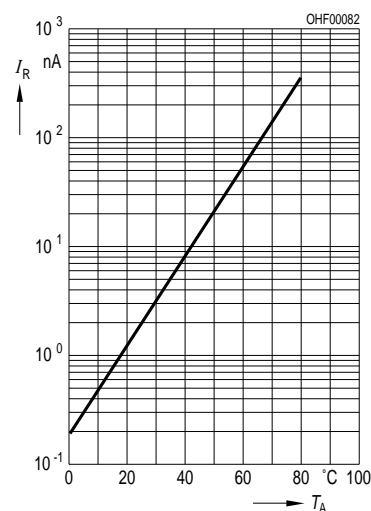
### Photocurrent $I_P = f(E_e), V_R = 5 V$

$$\text{Open-circuit voltage } V_O = f(E_e)$$



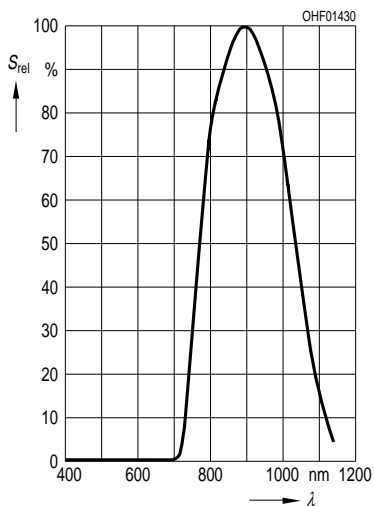
### Dark current

$$I_R = f(T_A), V_R = 10 V, E = 0$$



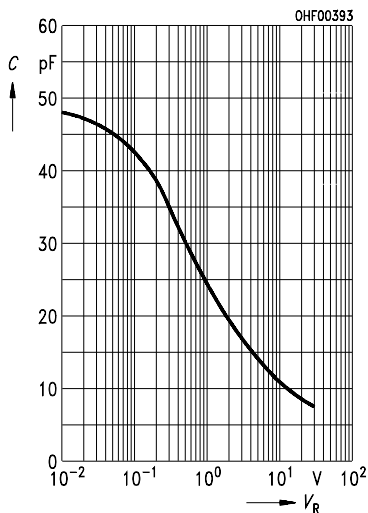
### Relative spectral sensitivity SFH 204 FA

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



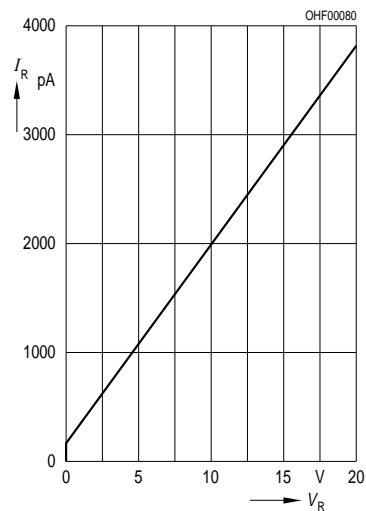
### Capacitance

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

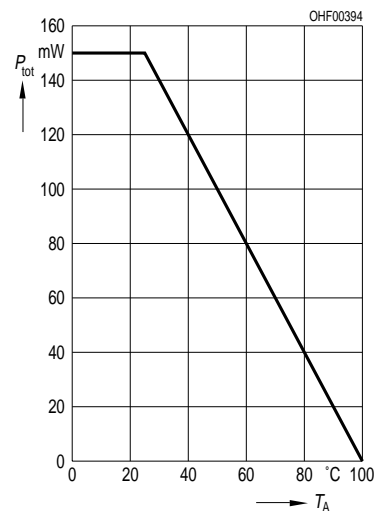


### Dark current

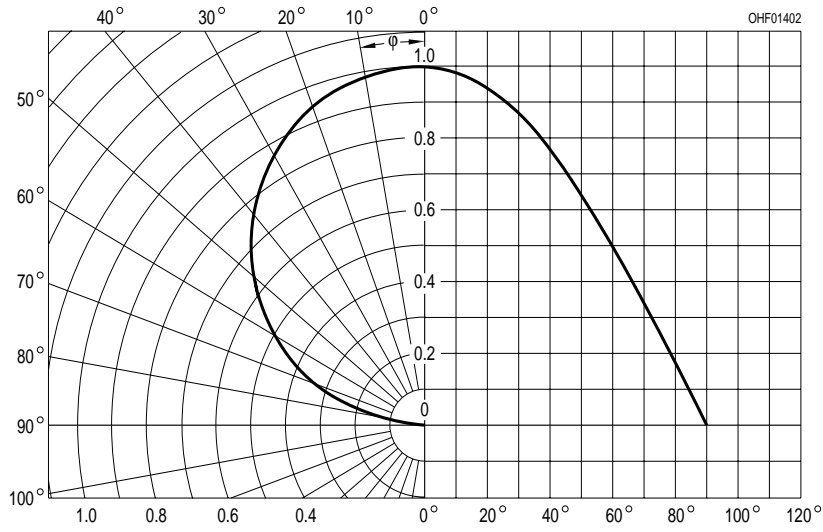
$$I_R = f(V_R), E = 0$$



### Total power dissipation $P_{tot} = f(T_A)$



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



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

