# NPN-Silizium-Fototransistor mit Tageslichtsperrfilter
# Silicon NPN Phototransistor with Daylight-Cutoff Filter
## Lead (Pb) Free Product - RoHS Compliant

## SFH 3100 F

### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 840 nm bis 1080 nm
- Enge Empfangscharakteristik
- Geringe Außenabmessungen
- Gleiche Bauform wie IRED SFH 4110
- Hoher Koppelfaktor in Lichtschranken mit SFH 4110
- IR-Filter
- Leichte Unterscheidbarkeit zwischen SFH 3100 F (schwarzes Gehäuse) und SFH 4110 (klares Gehäuse)

### Features

- Especially suitable for applications from 840 nm to 1080 nm
- Narrow half angle
- Small outline dimensions
- Same package as IRED SFH 4110
- High coupling factor in light barriers with SFH 4110
- IR filter
- Easy identification of SFH 3100 F (black package) and SFH 4110 (clear package)

### Anwendungen

- Empfänger in Lichtschranken
- Bandende-Erkennung (z.B. Videorecorder)
- Datenübertragung
- Positionsüberwachung
- Barcode-Leser
- „Messen/Steuern/Regeln“
- Münzzähler

### Applications

- Detector in photointerrupters
- Tape end detection
- Data transmission
- Position sensing
- Barcode reader
- For control and drive circuits
- Coin counters

| **Typ**<br>**Type** | **Bestellnummer**<br>**Ordering Code** | $I_{PCE}$ **(mA)**<br>($\lambda$ = 950 nm, $E_e$ = 0.5 mW/cm$^2$, $V_{CE}$ = 5 V) |
|---|---|---|
| SFH 3100 F<br>SFH 3100 F-2/3/4 | Q62702P5073<br>Q62702P5475 | >0.4<br>0.63 ... 3.2 |

**Grenzwerte**
**Maximum Ratings**

| **Bezeichnung**<br>**Parameter** | **Symbol**<br>**Symbol** | **Wert**<br>**Value** | **Einheit**<br>**Unit** |
|---|---|---|---|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range | $T_{op}$; $T_{stg}$ | – 40 … + 85 | °C |
| Kollektor-Emitterspannung<br>Collector-emitter voltage | $V_{CE}$<br>$V_{CE}$ ($t$ < 2 min) | 30<br>70 | V |
| Kollektorstrom<br>Collector current | $I_C$ | 50 | mA |
| Kollektorspitzenstrom, $t$ < 10 µs<br>Collector surge current | $I_{CS}$ | 100 | mA |
| Emitter-Kollektorspannung<br>Emitter-collector voltage | $V_{EC}$ | 7 | V |
| Verlustleistung, $T_A$ = 25 °C<br>Total power dissipation | $P_{tot}$ | 150 | mW |
| Wärmewiderstand Sperrschicht - Umgebung<br>Thermal resistance junction - ambient | $R_{thJA}$ | 280 | K/W |

**Kennwerte** ($T_A$ = 25 °C, λ = 950 nm)
**Characteristics**

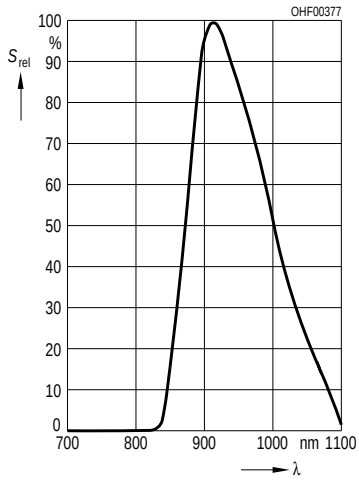
| **Bezeichnung**<br>**Parameter** | **Symbol**<br>**Symbol** | **Wert**<br>**Value** | **Einheit**<br>**Unit** |
|---|---|---|---|
| Wellenlänge der max. Fotoempfindlichkeit<br>Wavelength of max. sensitivity | $\lambda_{S\ max}$ | 920 | nm |
| Spektraler Bereich der Fotoempfindlichkeit<br>$S$ = 10% von $S_{max}$<br>Spectral range of sensitivity<br>$S$ = 10% of $S_{max}$ | λ | 840 … 1080 | nm |
| Abmessungen der Chip-Fläche<br>Dimension of chip area | $L \times B$<br>$L \times W$ | 0.55 × 0.55 | mm × mm |
| Bestrahlungsempfindliche Fläche<br>Radiant sensitive area | $A$ | 0.11 | $mm^2$ |
| Halbwinkel<br>Half angle | φ | ± 14 | Grad<br>deg. |
| Kapazität<br>Capacitance<br>$V_{CE}$ = 0 V, $f$ = 1 MHz, $E$ = 0<br>$V_{CE}$ = 5 V, $f$ = 1 MHz, $E$ = 0 | $C_{CE}$ | 6.5<br>3.0 | pF |
| Dunkelstrom, $V_{CE}$ = 20 V<br>Dark current | $I_{CEO}$ | 2 (≤ 50) | nA |
| Fotostrom<br>Photocurrent<br>$E_e$ = 0.5 mW/cm², $V_{CE}$ = 5 V | $I_{PCE}$ | >0.4 | mA |

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | | | Einheit<br>Unit |
|---|---|---|---|---|---|
| | | -2 | -3 | -4 | |
| Fotostrom, $\lambda = 950$ nm<br>Photocurrent<br>$E_e$ = 0.5 mW/cm$^2$, $V_{CE}$ = 5 V | $I_{PCE}$ | 0.63 … 1.25 | 1 … 2 | 1.6 … 3.2 | mA |
| Anstiegszeit/Abfallzeit<br>Rise and fall time<br>$I_C$ = 1 mA, $V_{CC}$ = 5 V, $R_L$ = 1 kΩ | $t_r$,<br>$t_f$ | 7<br>9 | | | µs |
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage<br>$I_C = I_{PCEmin}$ [1] × 0.3,<br>$E_e$ = 0.5 mW/cm$^2$, $\lambda = 950$ nm | $V_{CEsat}$ | 110 (≤ 400) | | | mV |

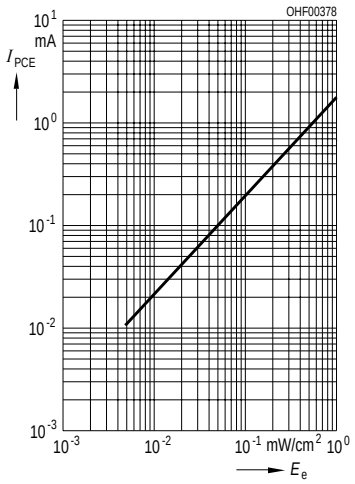
[1] $I_{PCEmin}$ ist der minimale Fotostrom der jeweiligen Gruppe.

[1] $I_{PCEmin}$ is the min. photocurrent of the specified group.

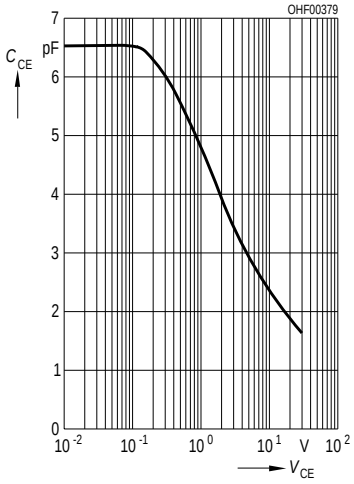
**Relative Spectral Sensitivity**
$S_{rel} = f(\lambda)$



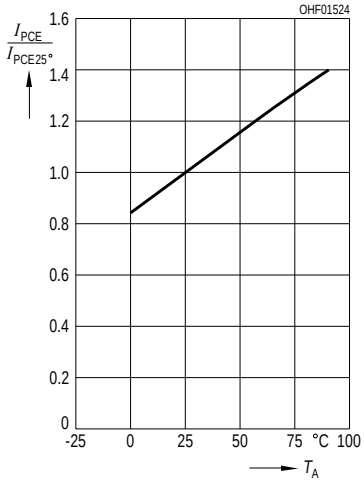

**Photocurrent**
$I_{PCE} = f(E_e)$, $V_{CE}$ = 5 V



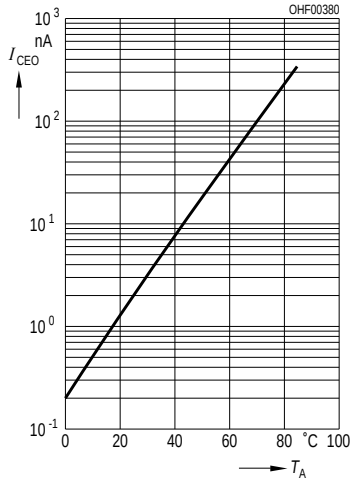

**Collector-Emitter Capacitance**
$C_{CE} = f(V_{CE})$, $f$ = 1 MHz, $E$ = 0



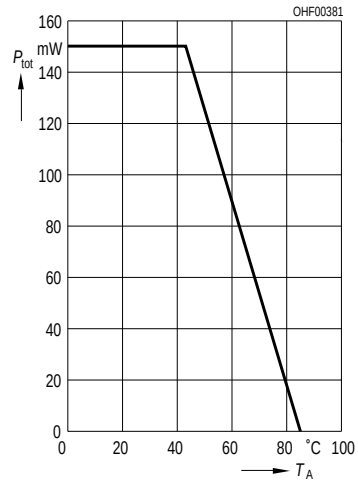

**Photocurrent** $I_{PCE} = f(T_A)$,
$V_{CE}$ = 5 V, normalized to 25 °C



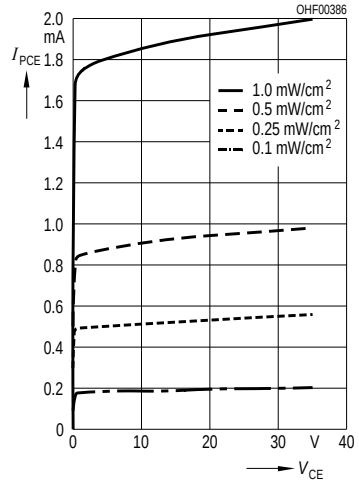

**Dark Current**
$I_{CEO} = f(T_A)$, $V_{CE}$ = 20 V, $E$ = 0



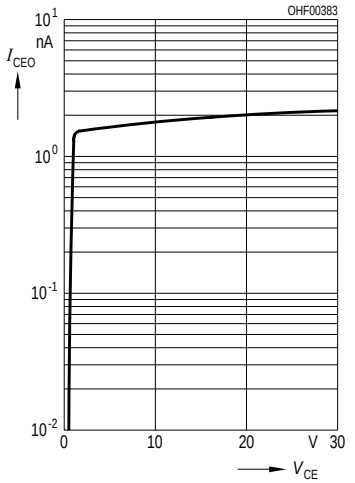

**Total Power Dissipation**
$P_{tot} = f(T_A)$



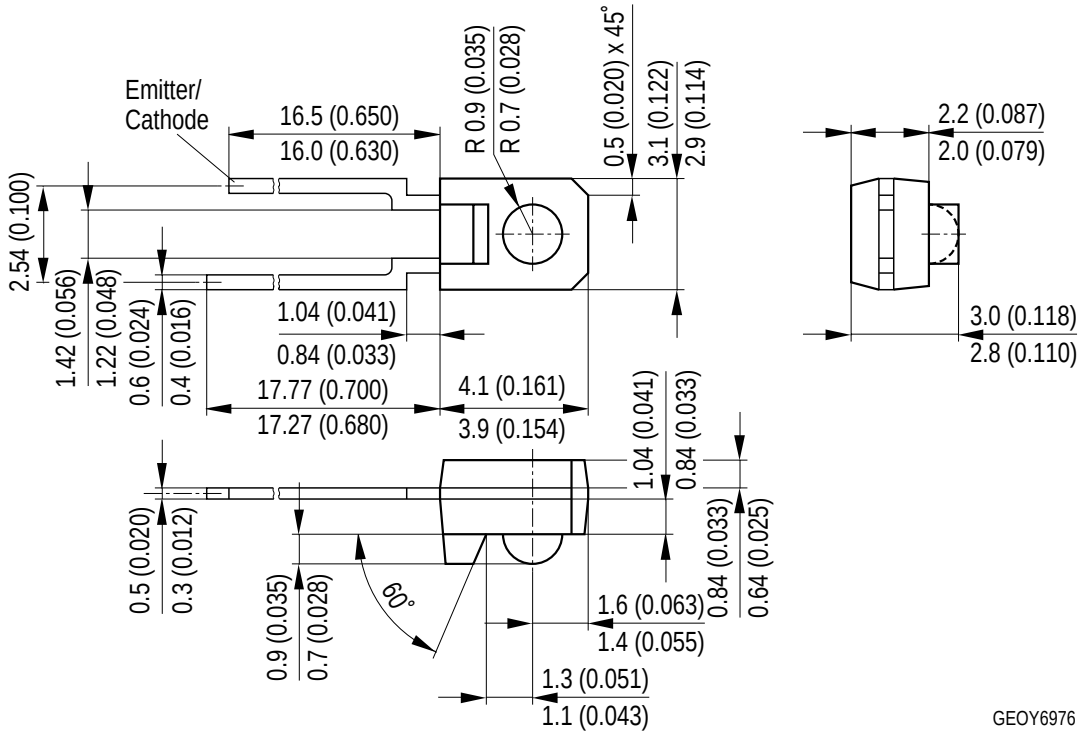

**Photocurrent SFH 3100 F**
$I_{PCE} = f(V_{CE})$




**Dark Current**
$I_{CEO} = f(V_{CE})$, $E$ = 0



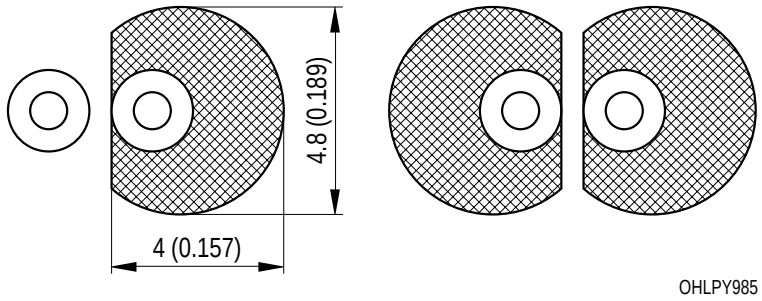
**Maßzeichnung**
**Package Outlines**



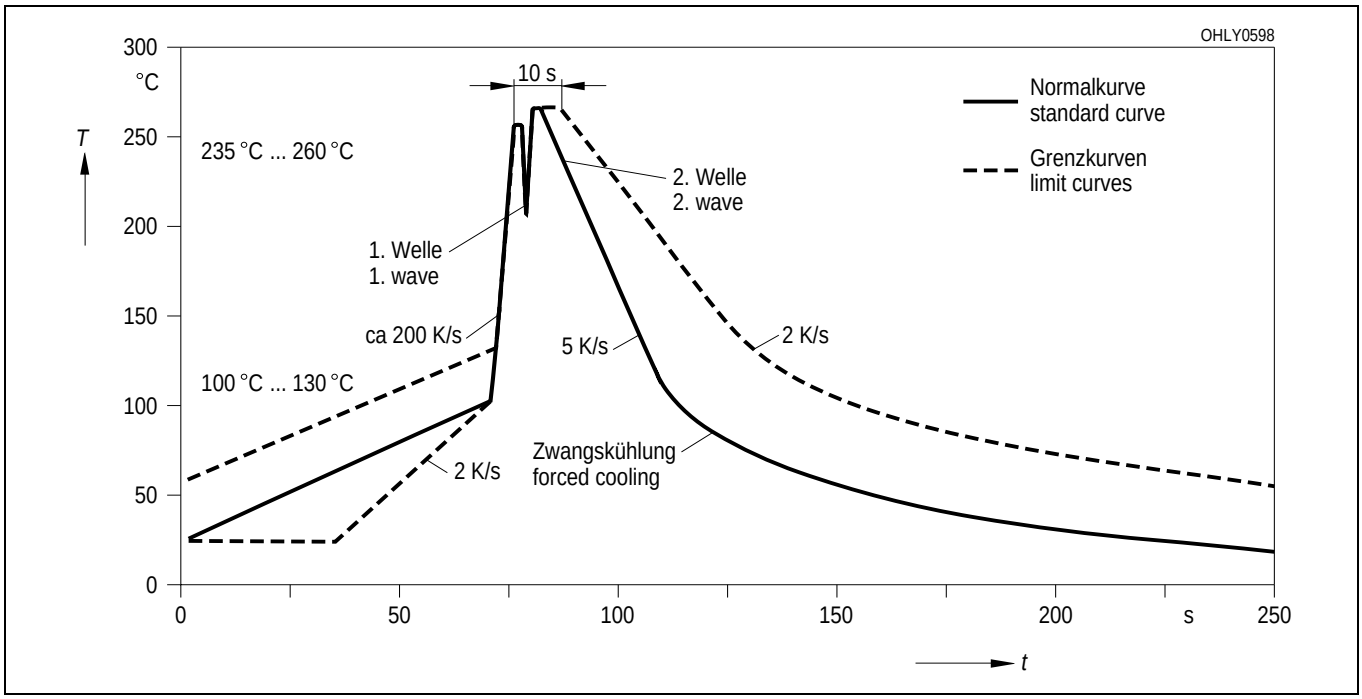

Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

**Empfohlenes Lötpaddesign**
**Recommended Solder Pad**

Wellenlöten (TTW)
TTW Soldering



**Lötbedingungen**
**Soldering Conditions**
**Wellenlöten (TTW)** (nach CECC 00802)
**TTW Soldering** (acc. to CECC 00802)

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