

NPN-Silizium-Fototransistor
Silicon NPN Phototransistor
Lead (Pb) Free Product - RoHS Compliant

SFH 309
SFH 309 FA



SFH 309



SFH 309 FA

Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 380 nm bis 1180 nm (SFH 309) und bei 880 nm (SFH 309 FA)
- Hohe Linearität
- 3 mm-Plastikbauform im LED-Gehäuse
- Gruppiert lieferbar

Anwendungen

- Lichtschranken für Gleich- und Wechsellichtbetrieb
- Industrieelektronik
- „Messen/Steuern/Regeln“

Features

- Especially suitable for applications from 380 nm to 1180 nm (SFH 309) and of 880 nm (SFH 309 FA)
- High linearity
- 3 mm LED plastic package
- Available in groups

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

| Typ Type | Bestellnummer Ordering Code | Typ Type | Bestellnummer Ordering Codes |
|-------------|--------------------------------|----------------|---------------------------------|
| SFH 309 | Q62702P0859 | SFH 309 FA | Q62702-P0941 |
| SFH 309-3/4 | Q62702P3592 | SFH 309 FA-3/4 | Q62702-P3590 |
| SFH 309-4 | Q62702P0998 | SFH 309 FA-4 | Q62702-P0178 |
| SFH 309-4/5 | Q62702P3593 | SFH 309 FA-4/5 | Q62702-P3591 |
| SFH 309-5 | Q62702P0999 | SFH 309 FA-5 | Q62702-P0180 |
| SFH 309-5/6 | Q62702P3594 | SFH 309 FA-5/6 | Q62702-P5199 |

Grenzwerte
Maximum Ratings

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|-------------------|----------------|-----------------|
| Betriebs- und Lagertemperatur Operating and storage temperature range | $T_{op}; T_{stg}$ | - 40 ... + 100 | °C |
| Kollektor-Emitterspannung Collector-emitter voltage | V_{CE} | 35 | V |
| Kollektorstrom Collector current | I_C | 15 | mA |
| Kollektorspitzenstrom, $\tau < 10 \mu s$ Collector surge current | I_{CS} | 75 | mA |
| Verlustleistung, $T_A = 25 \text{ }^\circ\text{C}$ Total power dissipation | P_{tot} | 165 | mW |
| Wärmewiderstand Thermal resistance | R_{thJA} | 450 | K/W |

Kennwerte ($T_A = 25\text{ °C}$, $\lambda = 950\text{ nm}$)

Characteristics

| Bezeichnung Parameter | Symbol Symbol | Wert Value | | Einheit Unit |
|--|------------------------------|--------------------|--------------------|------------------------------|
| | | SFH 309 | SFH 309 FA | |
| Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity | $\lambda_{S_{\max}}$ | 860 | 900 | nm |
| Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von S_{\max} Spectral range of sensitivity $S = 10\%$ of S_{\max} | λ | 380 ... 1150 | 730 ... 1120 | nm |
| Bestrahlungsempfindliche Fläche ($\varnothing 220\ \mu\text{m}$) Radiant sensitive area | A | 0.038 | 0.038 | mm^2 |
| Abmessungen der Chipfläche Dimensions of chip area | $L \times B$ $L \times W$ | 0.45×0.45 | 0.45×0.45 | $\text{mm} \times \text{mm}$ |
| Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface | H | 2.4 ... 2.8 | 2.4 ... 2.8 | mm |
| Halbwinkel Half angle | φ | ± 12 | ± 12 | Grad deg. |
| Kapazität, $V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ Capacitance | C_{CE} | 5.0 | 5.0 | pF |
| Dunkelstrom Dark current $V_{CE} = 25\text{ V}$, $E = 0$ | I_{CEO} | 1 (≤ 200) | 1 (≤ 200) | nA |

Die Fototransistoren werden nach ihrer Fotoempfindlichkeit gruppiert und mit arabischen Ziffern gekennzeichnet.

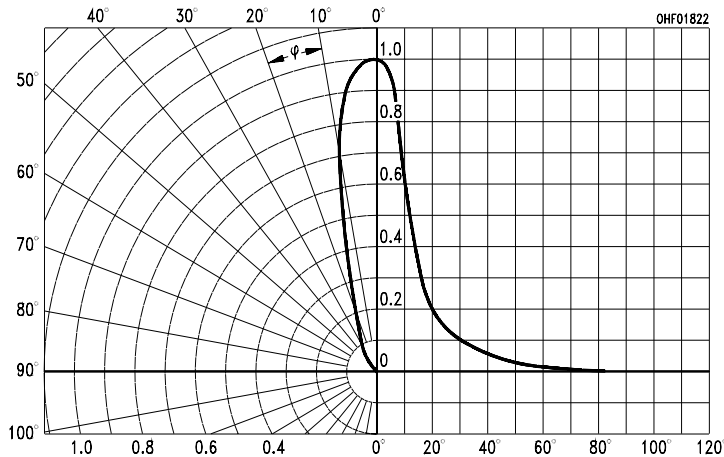
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

| Bezeichnung Parameter | Symbol Symbol | Wert Value | | | | | Einheit Unit |
|--|------------------|---------------|----------|---------|---------|---------|-----------------|
| | | -2 | -3 | -4 | -5 | -6 | |
| Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | I_{PCE} | 0.4 ... | 0.63 ... | 1.0 ... | 1.6 ... | 2.5 ... | mA |
| SFH 309: $E_v = 1000 \text{ lx}$, Normlicht/ standard light A, $V_{CE} = 5 \text{ V}$ | I_{PCE} | 0.8 | 1.25 | 2.0 | 3.2 | 5.0 | mA |
| Anstiegszeit/Abfallzeit Rise and fall time $I_C = 1 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 1 \text{ k}\Omega$ | t_r, t_f | 5 | 6 | 7 | 8 | 9 | μs |
| Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCEmin}^{1)} \times 0.3,$ $E_e = 0.5 \text{ mW/cm}^2$ | V_{CEsat} | 200 | 200 | 200 | 200 | 200 | mV |

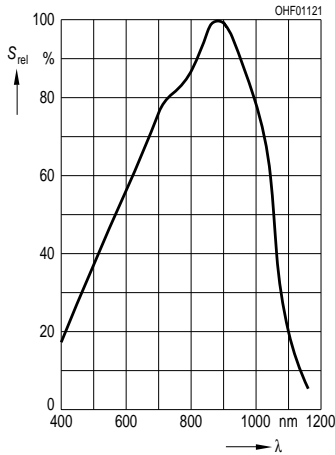
1) I_{PCEmin} ist der minimale Fotostrom der jeweiligen Gruppe.

1) I_{PCEmin} is the min. photocurrent of the specified group.

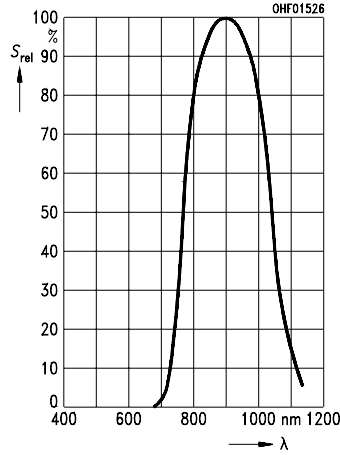
Directional Characteristics $S_{rel} = f(\varphi)$



Relative Spectral Sensitivity, SFH 309
 $S_{rel} = f(\lambda)$

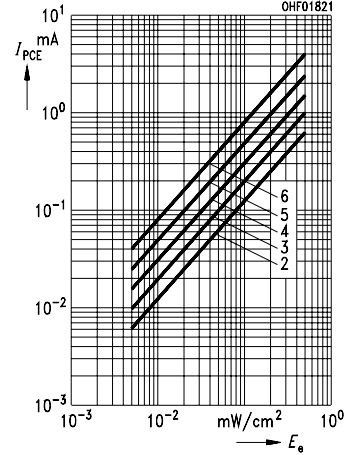


Relative Spectral Sensitivity, SFH 309 FA
 $S_{rel} = f(\lambda)$



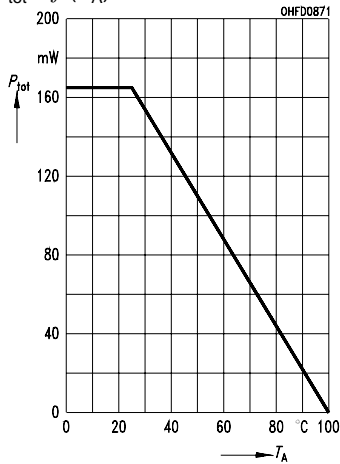
Photocurrent

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



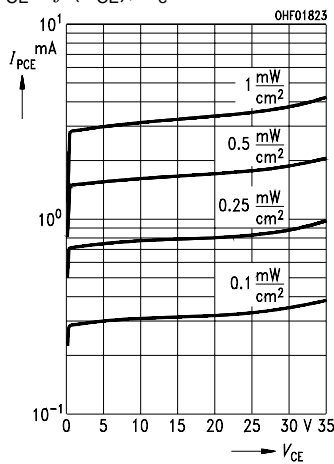
Total Power Dissipation

$P_{tot} = f(T_A)$



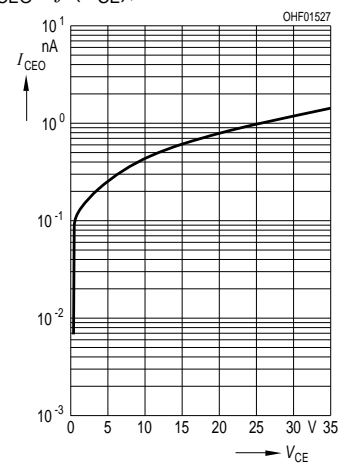
Photocurrent

$I_{PCE} = f(V_{CE}), E_e = \text{Parameter}$



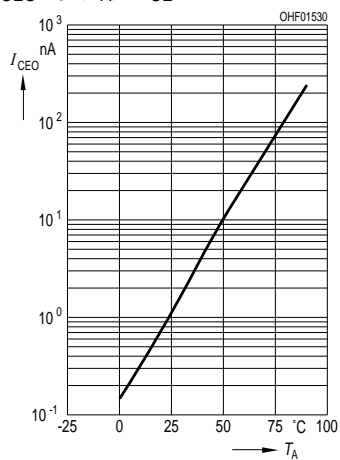
Dark Current

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



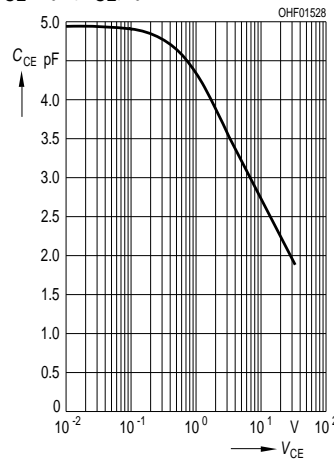
Dark Current

$I_{CEO} = f(T_A), V_{CE} = 25 V, E = 0$



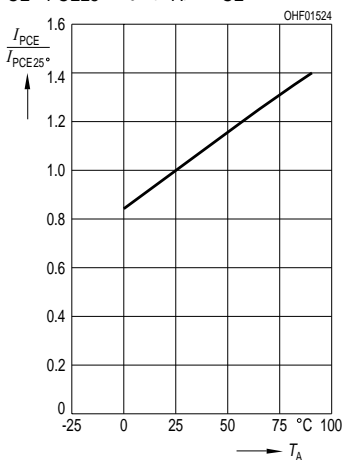
Capacitance

$C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$

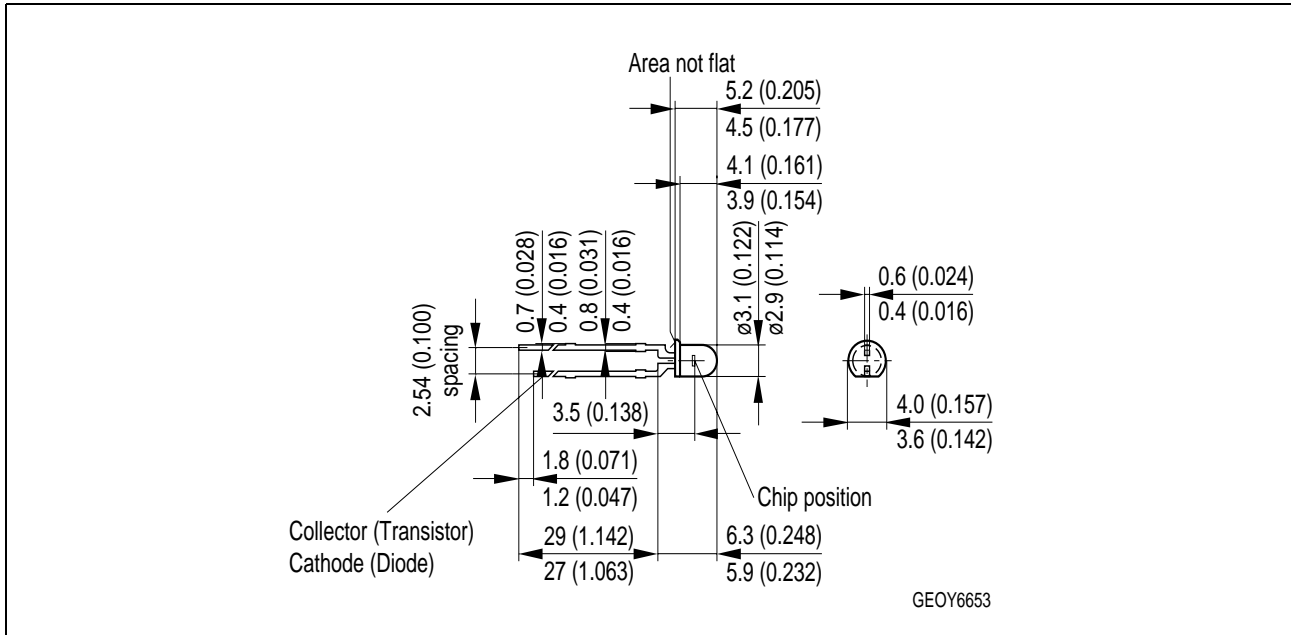


Photocurrent

$I_{PCE}/I_{PCE25^\circ} = f(T_A), V_{CE} = 5 V$



Maßzeichnung
Package Outlines

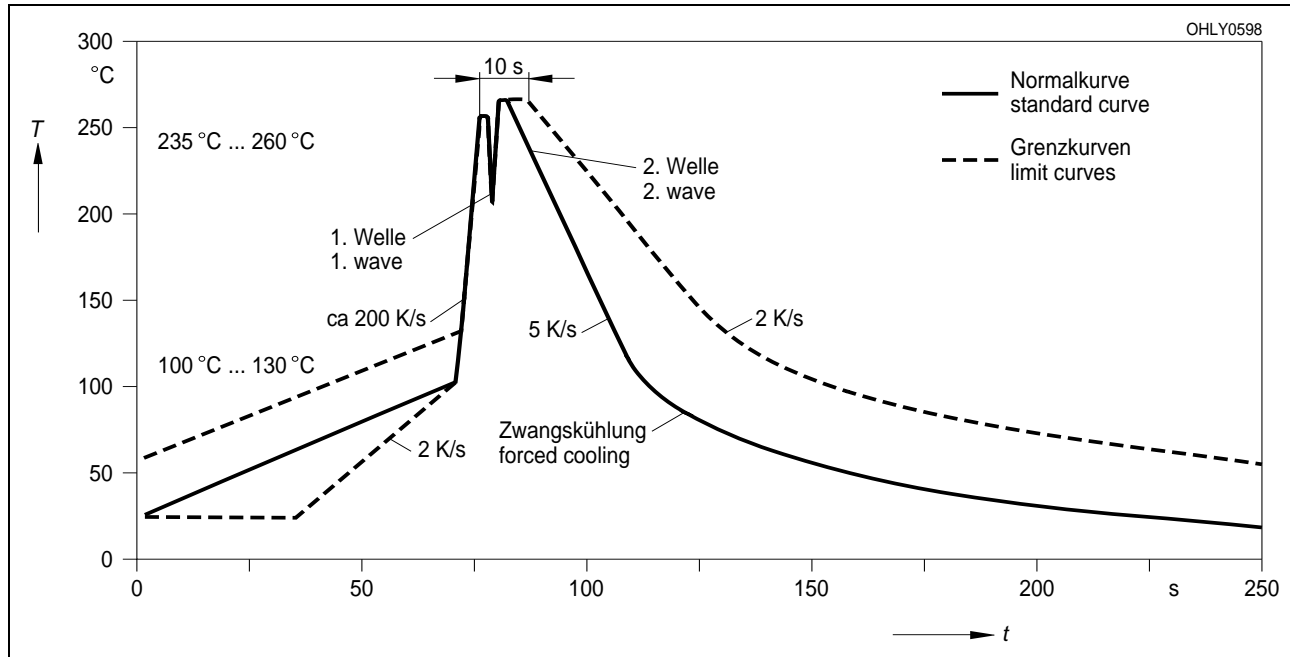


Maße in mm (inch) / Dimensions in mm (inch).

Lötbedingungen Soldering Conditions

Wellenlöten (TTW) TTW Soldering

(nach CECC 00802)
(acc. to CECC 00802)



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