

# NPN-Silizium-Fototransistor Silicon NPN Phototransistor

## SFH 313 SFH 313 FA



SFH 313



SFH 313 FA

### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 460 nm bis 1080 nm (SFH 313) und bei 880 nm (SFH 313 FA)
- Hohe Linearität
- 5 mm-Plastikbauform

### Anwendungen

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

### Features

- Especially suitable for applications from 460 nm to 1080 nm (SFH 313) and of 880 nm (SFH 313 FA)
- High linearity
- 5 mm plastic package

### Applications

- Computer-controlled flashes
- Photointerrupters
- Industrial electronics
- For control and drive circuits

| Typ<br>Type    | Bestellnummer<br>Ordering Code |
|----------------|--------------------------------|
| SFH 313        | Q62702-P1667                   |
| SFH 313-2/3    | Q62702-P3598                   |
| SFH 313 FA     | Q62702-P1674                   |
| SFH 313 FA-2/3 | Q62702-P3597                   |
| SFH 313 FA-3/4 | Q62702-P5196                   |

**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 ... + 100 | °C              |
| Löttemperatur bei Tauchlötung<br>Lötstelle $\geq 2$ mm vom Gehäuse, Lötzeit $t \leq 5$ s<br>Dip soldering temperature $\geq 2$ mm distance<br>from case bottom, soldering time $t \leq 5$ s   | $T_S$             | 260            | °C              |
| Löttemperatur bei Kolbenlötung<br>Lötstelle $\geq 2$ mm vom Gehäuse, Lötzeit $t \leq 3$ s<br>Iron soldering temperature $\geq 2$ mm distance<br>from case bottom, soldering time $t \leq 3$ s | $T_S$             | 300            | °C              |
| Kollektor-Emitterspannung<br>Collector-emitter voltage  | $V_{CE}$          | 70             | V               |
| Kollektorstrom<br>Collector current   | $I_C$             | 50             | mA              |
| Kollektorspitzenstrom, $\tau < 10 \mu s$<br>Collector surge current   | $I_{CS}$          | 100            | mA              |
| Emitter-Kollektorspannung<br>Emitter-collector voltage  | $V_{EC}$          | 7              | V               |
| Verlustleistung, $T_A = 25 \text{ °C}$<br>Total power dissipation   | $P_{tot}$         | 200            | mW              |
| Wärmewiderstand<br>Thermal resistance   | $R_{thJA}$        | 375            | K/W             |

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

## Characteristics

| Bezeichnung<br>Parameter   | Symbol<br>Symbol             | Wert<br>Value    |                  | Einheit<br>Unit |
|--|------------------------------|------------------|------------------|-----------------|
|  |                              | SFH 313          | SFH 313 FA       |                 |
| Wellenlänge der max. Fotoempfindlichkeit<br>Wavelength of max. sensitivity   | $\lambda_{S\text{ max}}$     | 850              | 870              | nm              |
| Spektraler Bereich der Fotoempfindlichkeit<br>$S = 10\%$ von $S_{\text{max}}$<br>Spectral range of sensitivity<br>$S = 10\%$ of $S_{\text{max}}$ | $\lambda$                    | 460 ... 1080     | 740 ... 1080     | nm              |
| Bestrahlungsempfindliche Fläche<br>Radiant sensitive area  | $A$                          | 0.55             | 0.55             | mm <sup>2</sup> |
| Abmessungen der Chipfläche<br>Dimensions of chip area  | $L \times B$<br>$L \times W$ | 1 × 1            | 1 × 1            | mm × mm         |
| Abstand Chipoberfläche zu<br>Gehäuseoberfläche<br>Distance chip front to case surface  | $H$                          | 5.1 ... 5.7      | 5.1 ... 5.7      | mm              |
| Halbwinkel<br>Half angle   | $\varphi$                    | ± 10             | ± 10             | Grad<br>deg.    |
| Kapazität, $V_{\text{CE}} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$<br>Capacitance  | $C_{\text{CE}}$              | 10               | 10               | pF              |
| Dunkelstrom<br>Dark current<br>$V_{\text{CE}} = 10\text{ V}$ , $E = 0$   | $I_{\text{CEO}}$             | 3 ( $\leq 200$ ) | 3 ( $\leq 200$ ) | 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.

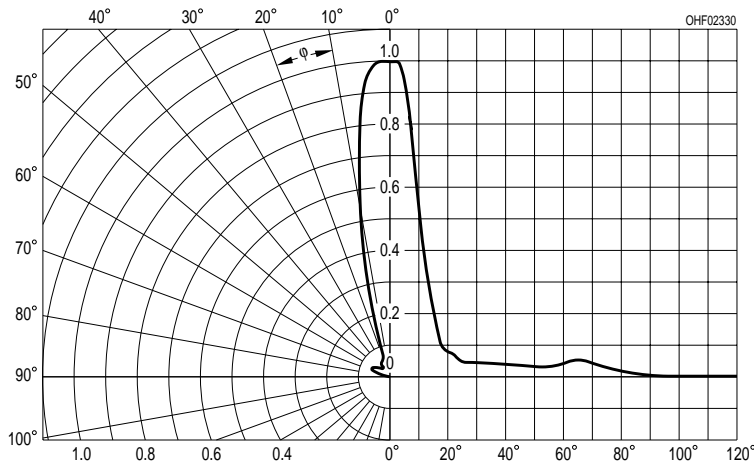
| Bezeichnung<br>Parameter   | Symbol<br>Symbol | Wert<br>Value |         |              |           | Einheit<br>Unit |
|--|------------------|---------------|---------|--------------|-----------|-----------------|
|  |                  | -1            | -2      | -3           | -4        |                 |
| Fotostrom, $\lambda = 950 \text{ nm}$<br>Photocurrent<br>$E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$   | $I_{PCE}$        | 2.5 ... 5     | 4 ... 8 | 6.3 ... 12.5 | $\geq 10$ | mA              |
| Anstiegszeit/Abfallzeit<br>Rise and fall time<br>$I_C = 1 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 1 \text{ k}\Omega$                               | $t_r, t_f$       | 8             | 10      | 12           | 14        | $\mu\text{s}$   |
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage<br>$I_C = I_{PCEmin}^{1)} \times 0.3,$<br>$E_e = 0.5 \text{ mW/cm}^2$ | $V_{CEsat}$      | 150           | 150     | 150          | 150       | mV              |

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

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

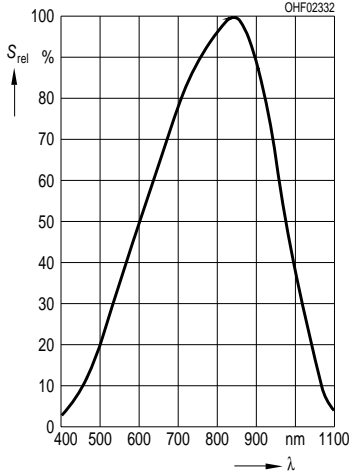
### Directional Characteristics

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

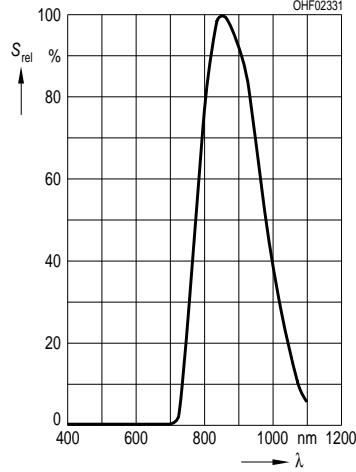


$T_A = 25\text{ }^\circ\text{C}$ ,  $\lambda = 950\text{ nm}$

Relative Spectral Sensitivity,  
SFH 313  $S_{rel} = f(\lambda)$

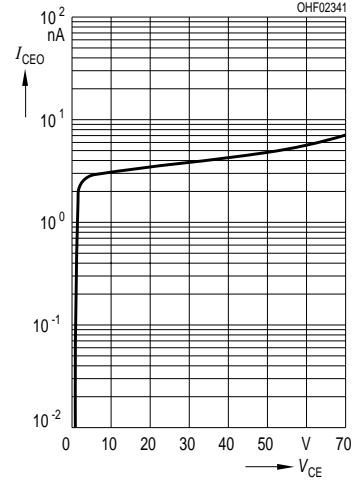


Relative Spectral Sensitivity,  
SFH 313 FA  $S_{rel} = f(\lambda)$

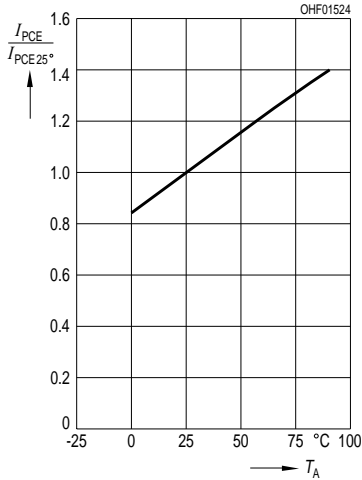


Dark Current

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

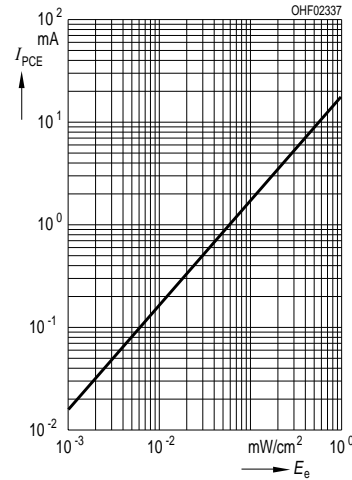


Photocurrent  $I_{PCE} = f(T_A)$ ,  
 $V_{CE} = 5\text{ V}$ , normalized to  $25\text{ }^\circ\text{C}$



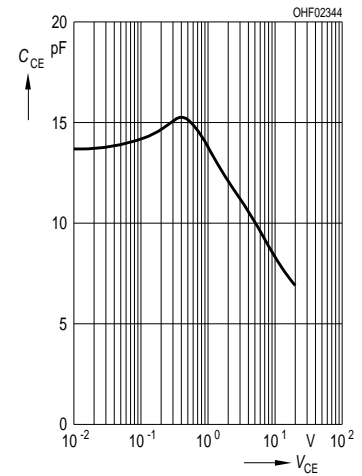
Photocurrent

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



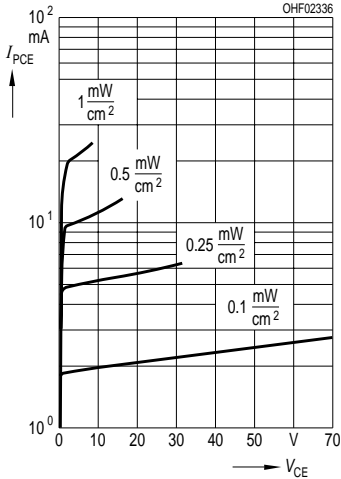
Collector-Emitter Capacitance

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



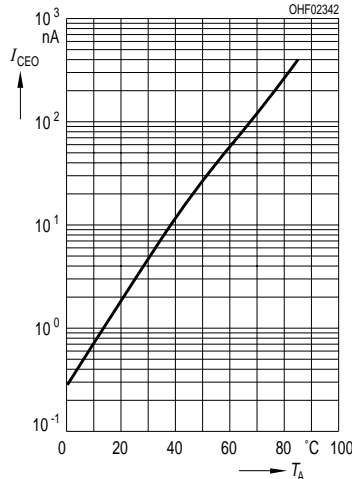
Photocurrent

$I_{PCE} = f(V_{CE}), E = \text{parameter}$



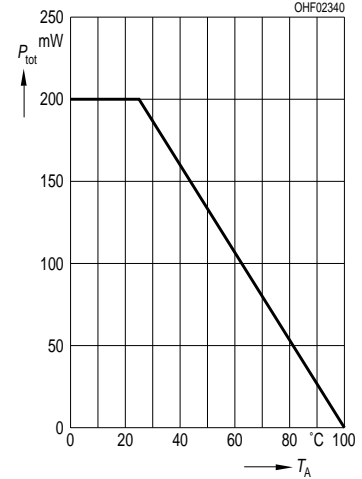
Dark Current

$I_{CEO} = f(T_A), V_{CE} = 10\text{ V}, E = 0$

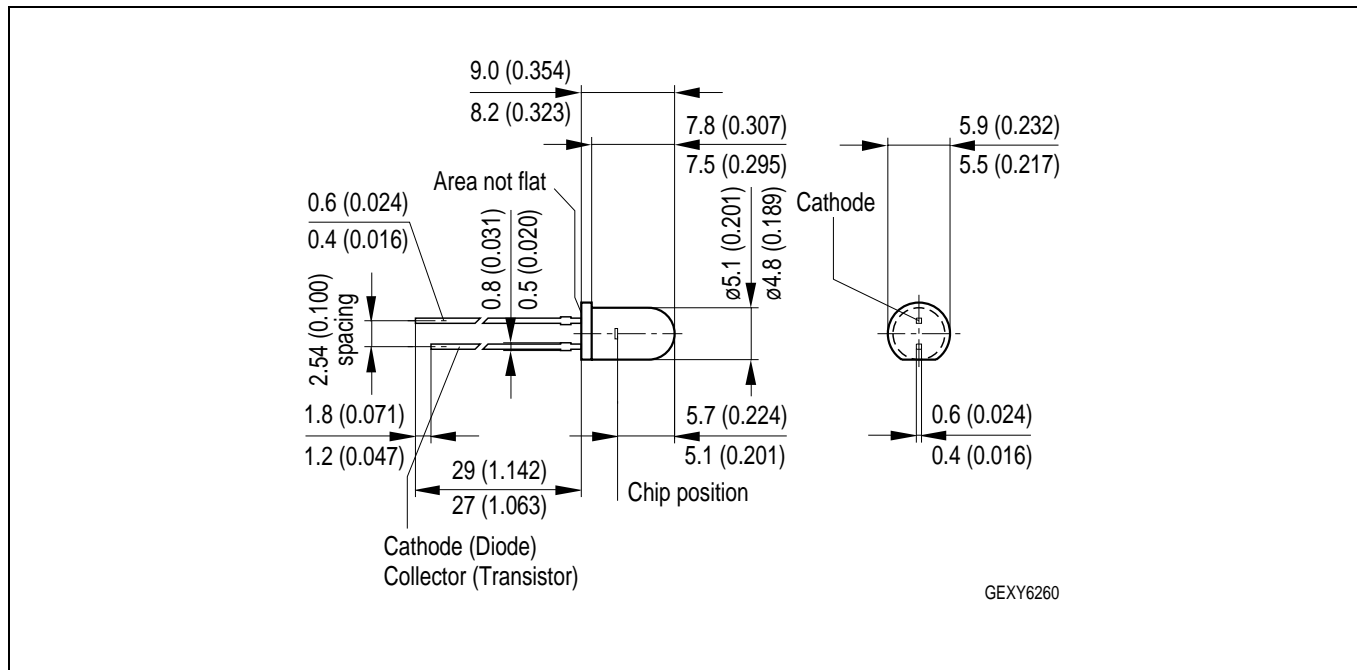


Total Power Dissipation

$P_{tot} = f(T_A)$



## Maßzeichnung Package Outlines



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

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### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

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