

# NPN-Silizium-Fototransistor

## Silicon NPN Phototransistor

### Lead (Pb) Free Product - RoHS Compliant

#### SFH 310 SFH 310 FA



SFH 310



SFH 310 FA

#### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm (SFH 310) und bei 880 nm (SFH 310 FA)
- Hohe Linearität
- 3 mm-Plastikbauform

#### Anwendungen

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

#### Features

- Especially suitable for applications from 400 nm to 1100 nm (SFH 310) and of 880 nm (SFH 310 FA)
- High linearity
- 3 mm plastic package

#### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Typ Type	Bestellnummer Ordering Code
SFH 310	Q62702P0874
SFH 310-2/3	Q62702P3595
SFH 310 FA	Q62702P1673
SFH 310 FA-2/3	Q62702P3596

**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	$V_{CE}$	70	V
Kollektorstrom Collector current	$I_C$	50	mA
Kollektorspitzenstrom, $\tau < 10 \mu s$ Collector surge current	$I_{CS}$	100	mA
Verlustleistung, $T_A = 25 \text{ °C}$ 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 310	SFH 310 FA	
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\max}$	780	880	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\max}$ Spectral range of sensitivity $S = 10\%$ of $S_{\max}$	$\lambda$	470 ... 1070	740 ... 1070	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	0.19	0.19	mm <sup>2</sup>
Abmessung der Chipfläche Dimensions of chip area	$L \times B$ $L \times W$	$0.65 \times 0.65$	$0.65 \times 0.65$	mm × mm
Halbwinkel Half angle	$\varphi$	$\pm 25$	$\pm 25$	Grad deg.
Kapazität, $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{CE}$	10	10	pF
Dunkelstrom Dark current $V_{CE} = 10\text{ V}$ , $E = 0$	$I_{CEO}$	5 ( $\leq 50$ )	5 ( $\leq 50$ )	nA
Fotostrom Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $E_v = 1000\text{ lx}$ , Normlicht/standard light A, $V_{CE} = 5\text{ V}$	$I_{PCE}$ $I_{PCE}$	$\geq 0.4$ 4	$\geq 0.4$ –	mA mA

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.

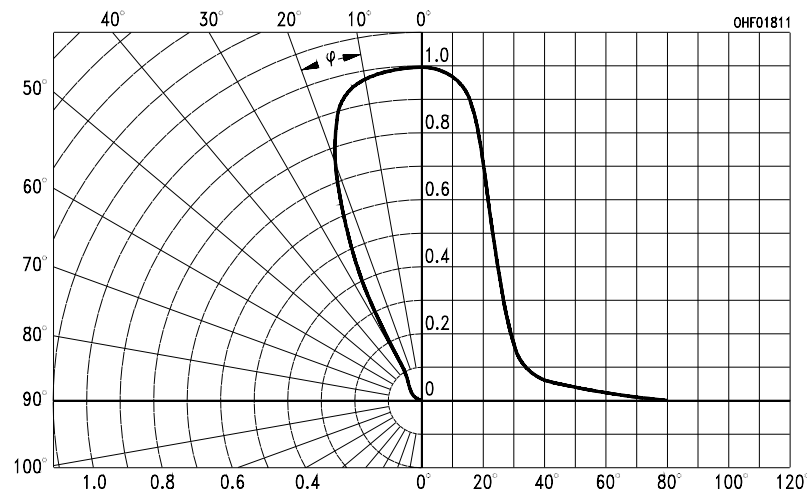
Bezeichnung Parameter	Symbol Symbol	Wert Value				Einheit Unit
		-1	-2	-3	-4	
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ <b>SFH 310:</b> $E_v = 1000 \text{ lx, Normlicht/}$ standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE}$	0.4 ... 0.8	0.63 ... 1.25	1.0 ... 2.0	1.6 ... 3.2	mA
	$I_{PCE}$	2.1	3.4	5.4	8.6	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	7	8	12	$\mu\text{s}$
Kollektor-Emitter- Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCEmin}^{1)} \times 0.3,$ $E_e = 0.5 \text{ mW/cm}^2$	$V_{CEsat}$	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.

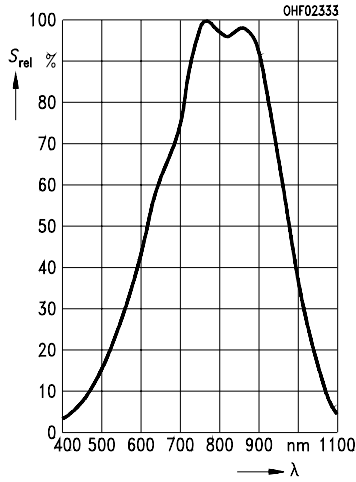
### Directional Characteristics

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

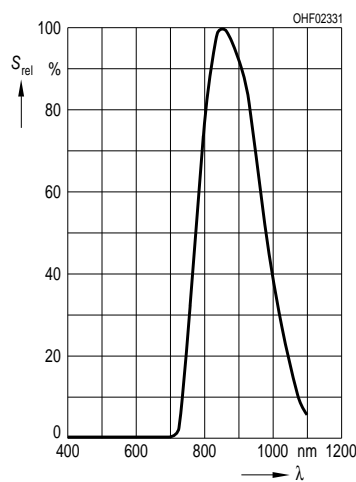


$T_A = 25\text{ }^\circ\text{C}$ ,  $\lambda = 950\text{ nm}$

Relative Spectral Sensitivity,  
SFH 310  $S_{rel} = f(\lambda)$

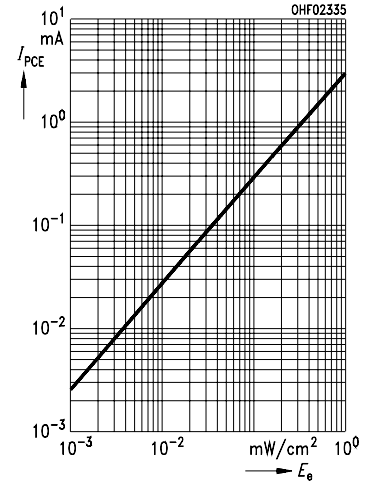


Relative Spectral Sensitivity,  
SFH 310 FA  $S_{rel} = f(\lambda)$



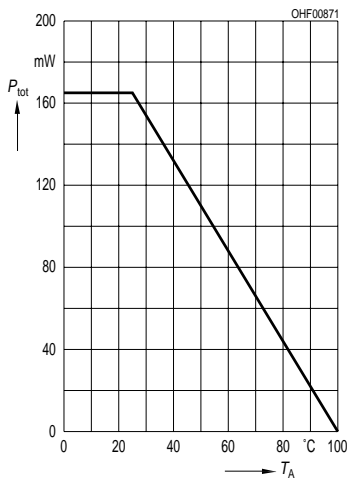
Photocurrent

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



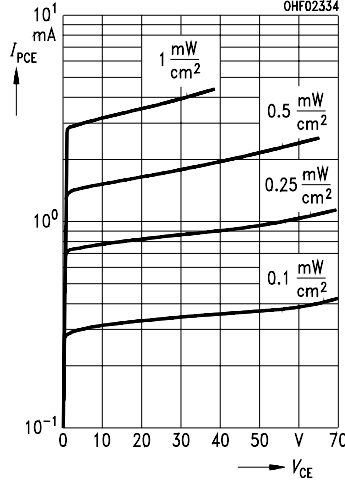
Total Power Dissipation

$P_{tot} = f(T_A)$



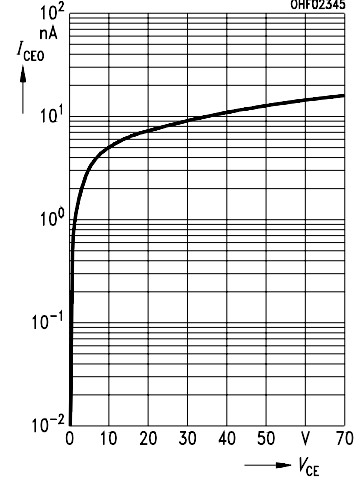
Photocurrent

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



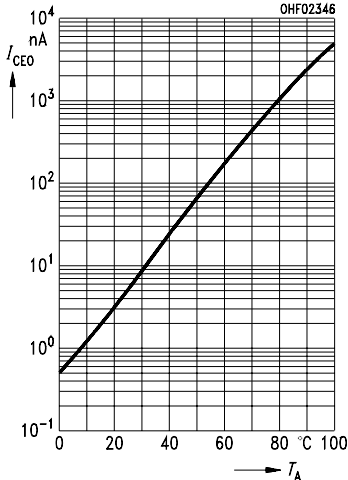
Dark Current

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



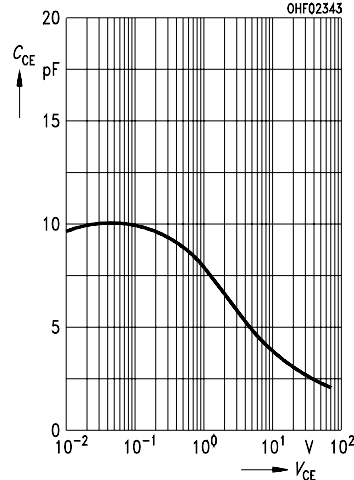
Dark Current

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



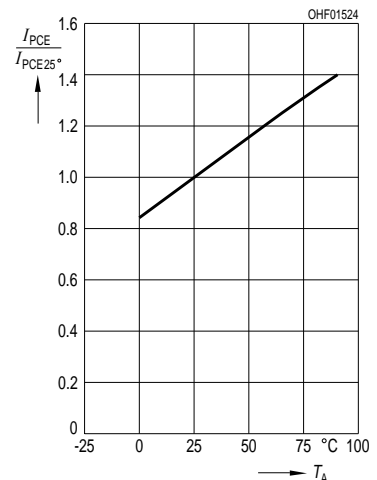
Capacitance

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

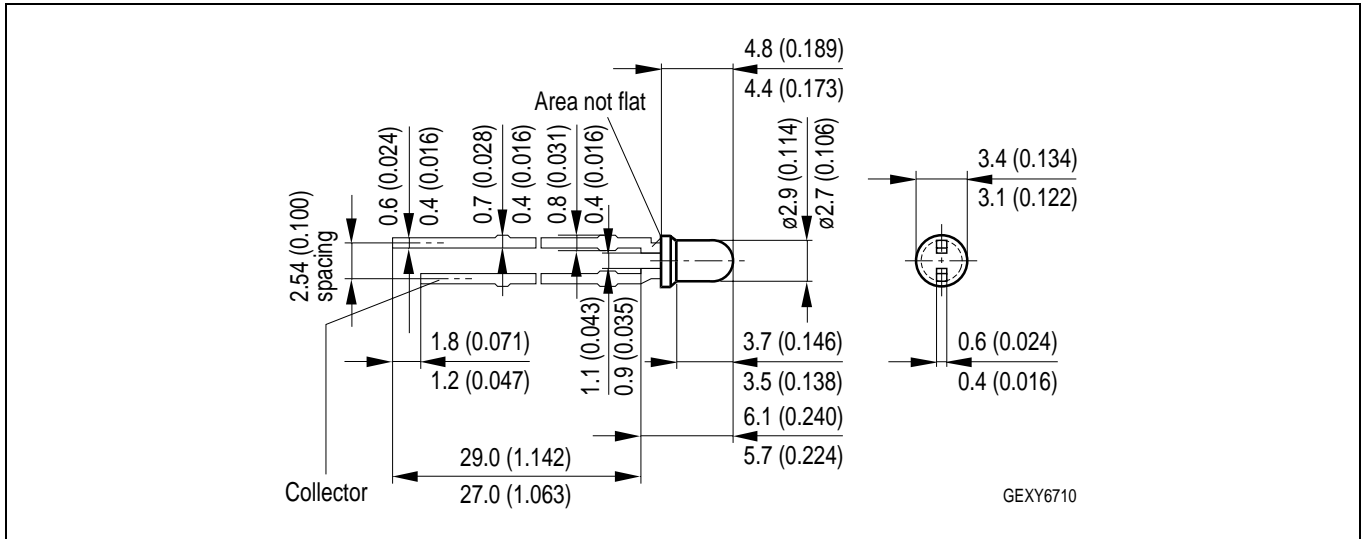


Photocurrent  $I_{PCE} = f(T_A)$ ,

$V_{CE} = 5\text{ V}$ , normalized to  $25\text{ }^\circ\text{C}$



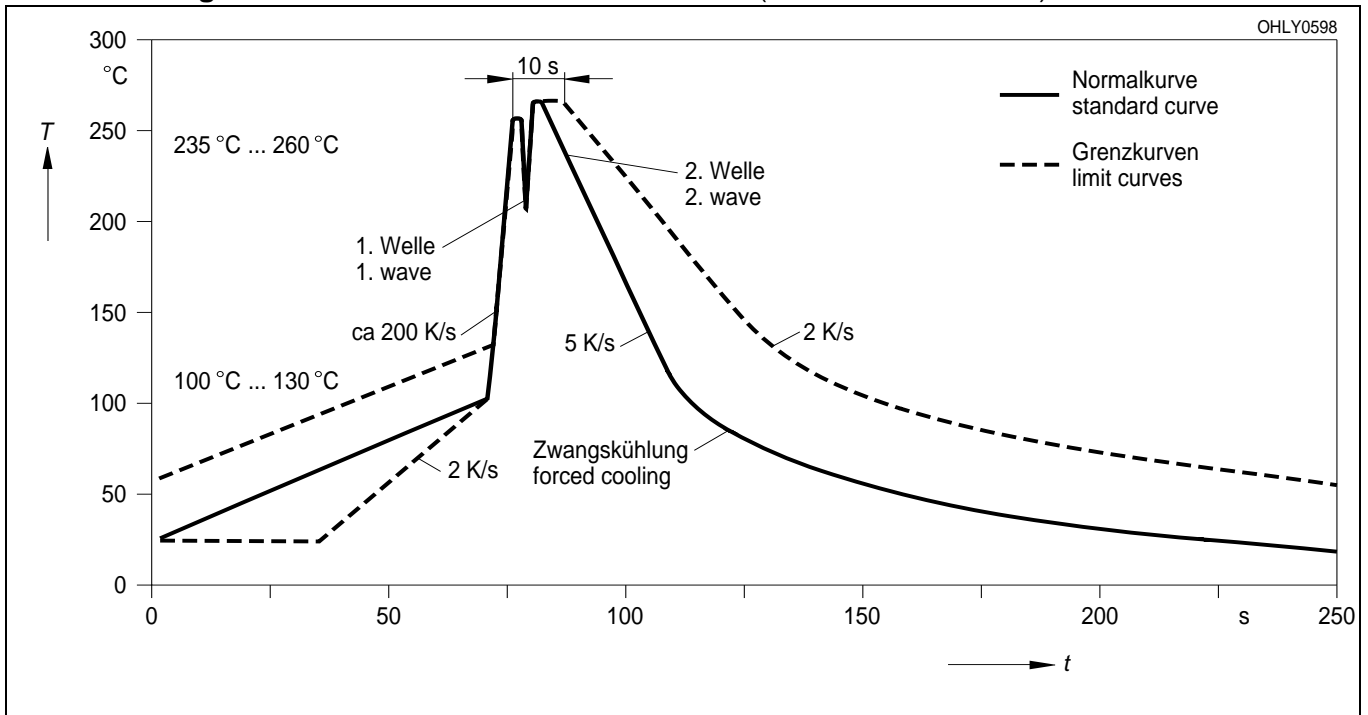
**Maßzeichnung  
Package Outlines**



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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