

# NPN-Silizium-Fototransistor

## Silicon NPN Phototransistor

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

#### SFH 309 P

#### SFH 309 PFA



SFH 309 P



SFH 309 PFA

#### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 380 nm bis 1180 nm (SFH 309 P) und bei 880 nm (SFH 309 PFA)
- Hohe Linearität
- 3 mm plane 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 P) and of 880 nm (SFH 309 PFA)
- High linearity
- 3 mm LED plastic package
- Available in groups

#### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Typ Type	Bestellnummer Ordering Code
SFH 309 P	Q62702P0245
SFH 309 PFA	Q62702P0246

**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, $T_A = 25 \text{ °C}$ Total power dissipation	$P_{tot}$	165	mW
Wärmewiderstand Thermal resistance	$R_{thJA}$	450	K/W

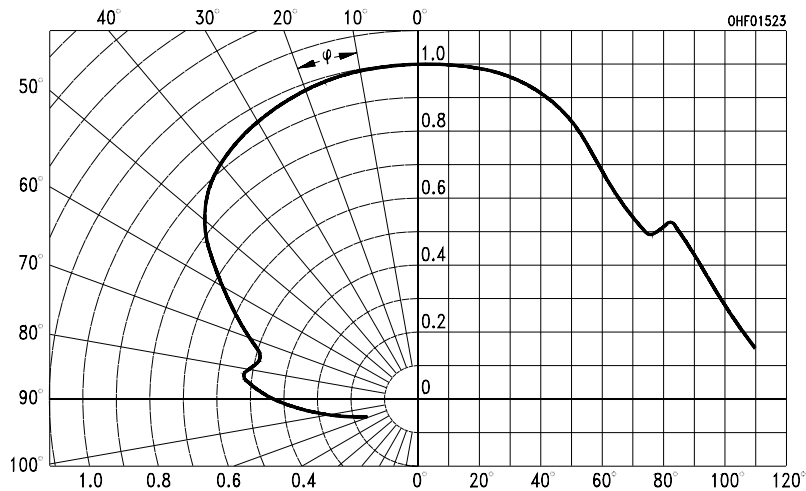
Kennwerte ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

## Characteristics

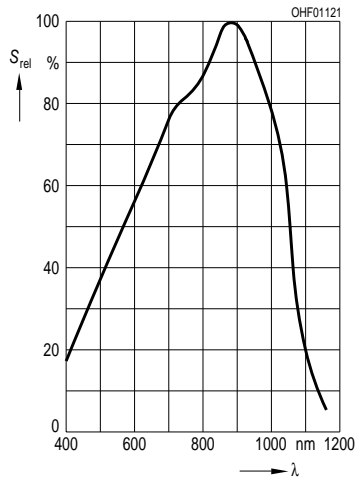
Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 309 P	SFH 309 PFA	
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	860	900	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	380 ... 1180	730 ... 1120	nm
Bestrahlungsempfindliche Fläche ( $\varnothing 220\text{ }\mu\text{m}$ ) Radiant sensitive area	$A$	0.038	0.038	$\text{mm}^2$
Abmessungen der Chipfläche Dimensions of chip area	$L \times B$ $L \times W$	$0.45 \times 0.45$	$0.45 \times 0.45$	$\text{mm} \times \text{mm}$
Halbwinkel Half angle	$\varphi$	$\pm 75$	$\pm 75$	Grad deg.
Kapazität, $V_{\text{CE}} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{\text{CE}}$	5.0	5.0	pF
Dunkelstrom Dark current $V_{\text{CE}} = 25\text{ V}$ , $E = 0$	$I_{\text{CEO}}$	1 ( $\leq 200$ )	1 ( $\leq 200$ )	nA

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$	$I_{PCE}$	$\geq 63$	$\mu\text{A}$
<b>SFH 309 P:</b> $E_v = 1000 \text{ lx}$ , Normlicht/standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE}$	420	$\mu\text{A}$
Anstiegszeit/Abfallzeit Rise and fall time $I_C = 1 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 1 \text{ k}\Omega$	$t_r, t_f$	6	$\mu\text{s}$
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage $I_C = 20 \mu\text{A}, E_e = 0.5 \text{ mW/cm}^2$	$V_{CEsat}$	150	mV

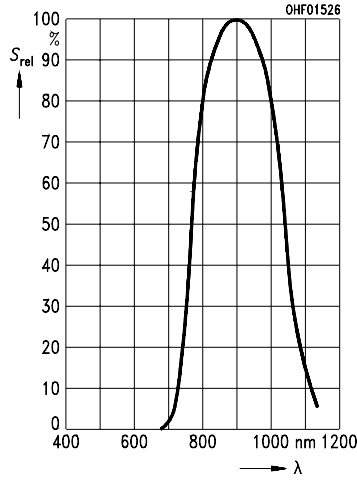
**Directional Characteristics**  $S_{rel} = f(\varphi)$



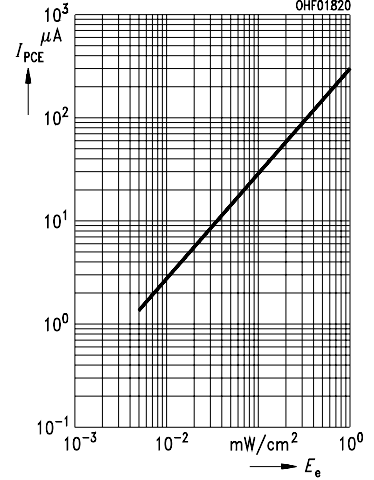
**Relative Spectral Sensitivity, SFH 309 P**  $S_{rel} = f(\lambda)$



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

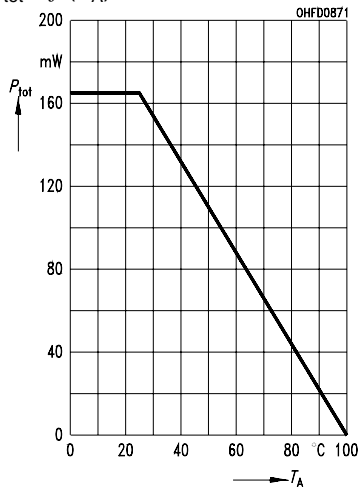


**Photocurrent**  $I_{PCE} = f(E_e), V_{CE} = 5 V$



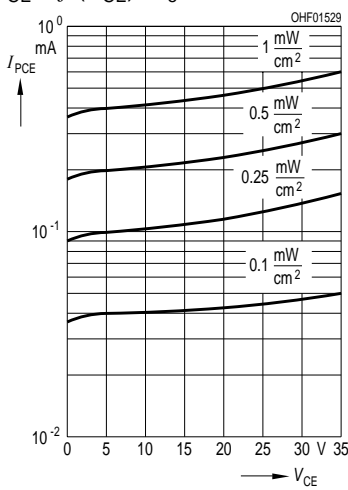
**Total Power Dissipation**

$P_{tot} = f(T_A)$



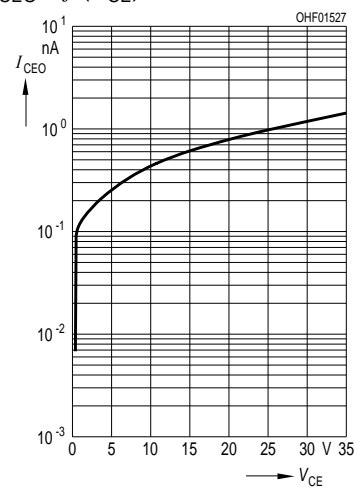
**Photocurrent**

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



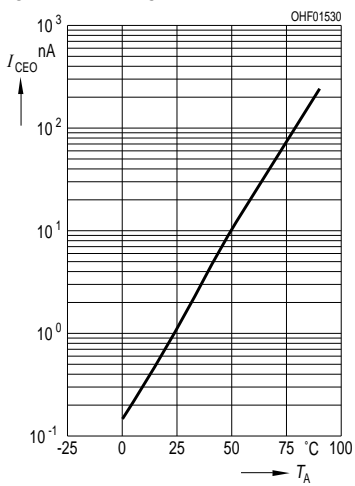
**Dark Current**

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



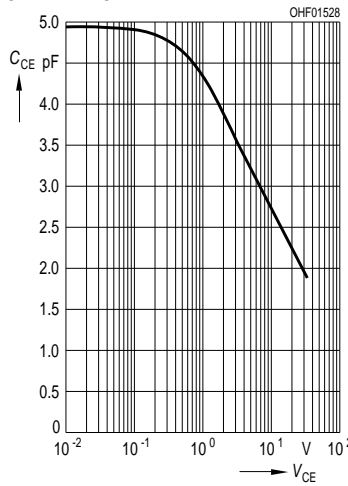
**Dark Current**

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



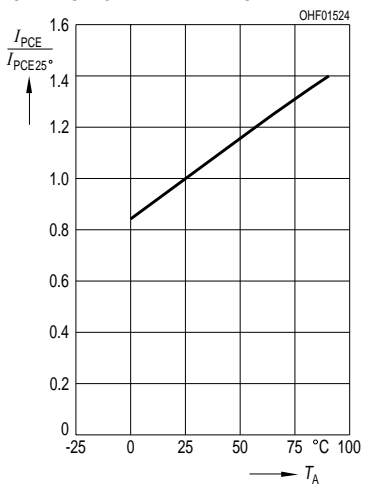
**Capacitance**

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

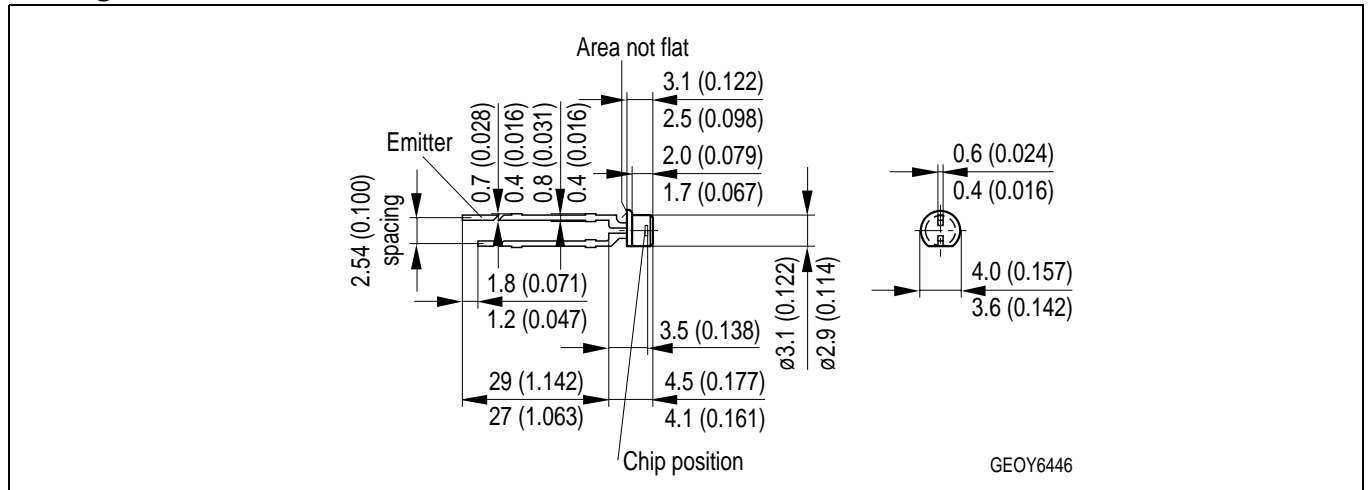


**Photocurrent**

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



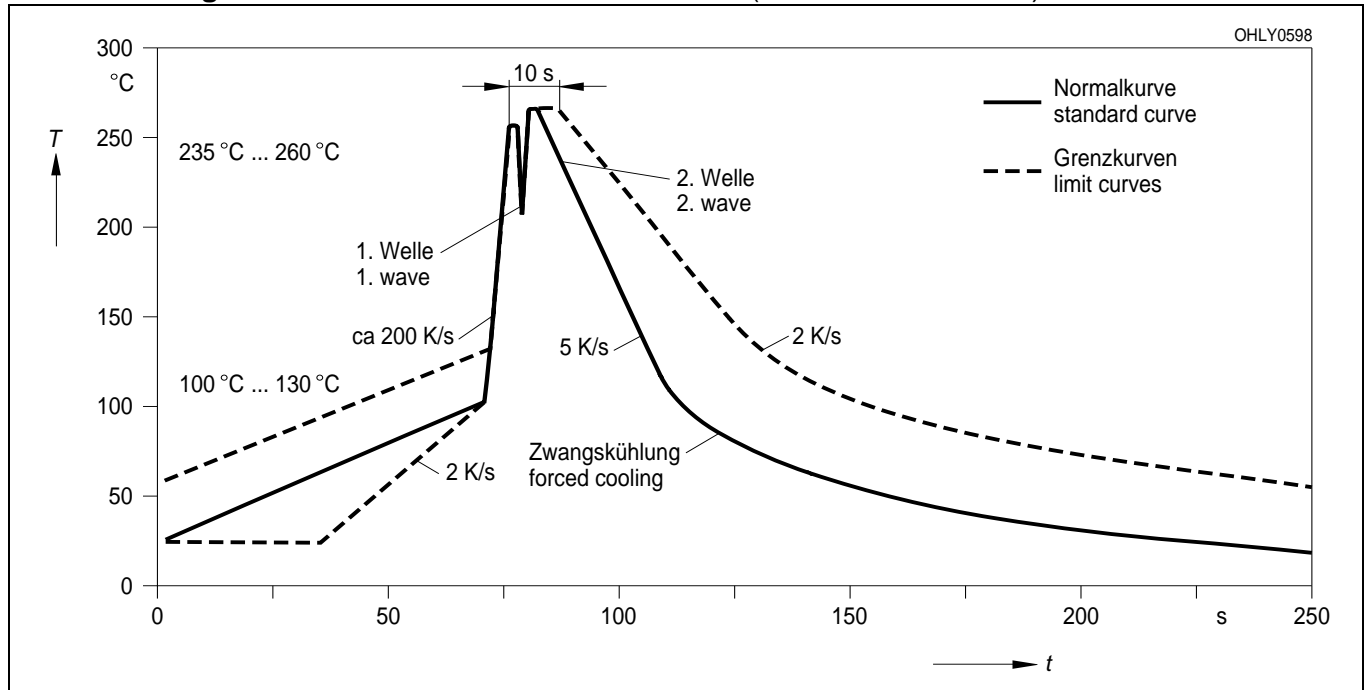
**Maßzeichnung  
Package Outlines**



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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