

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

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

Anwendungen

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

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 ($\varnothing 220\text{ }\mu\text{m}$) 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	mm $\times$ 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.

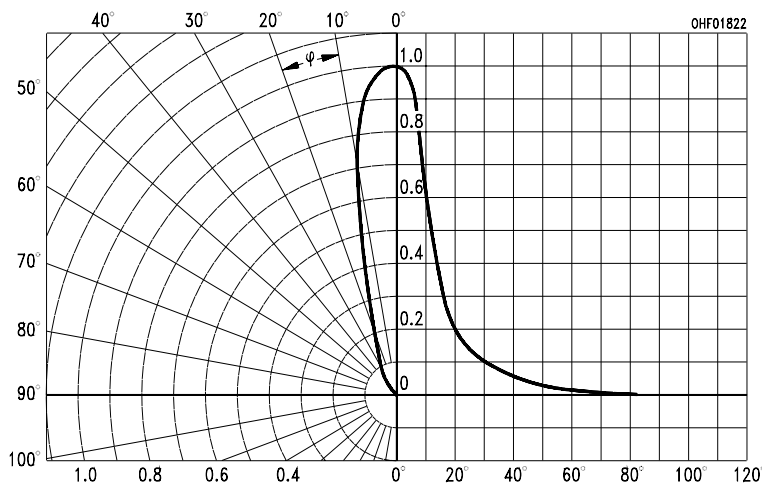
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

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 1.5	1.25 2.8	2.0 4.5	3.2 7.2	5.0 11.2	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

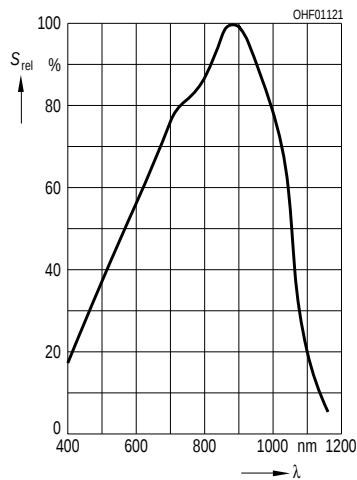
¹⁾ I_{PCEmin} ist der minimale Fotostrom der jeweiligen Gruppe.

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

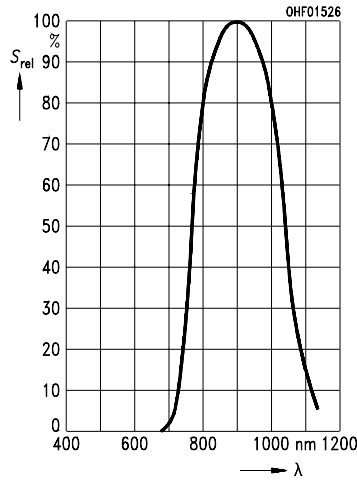
Directional Characteristics $S_{rel} = f(\varphi)$



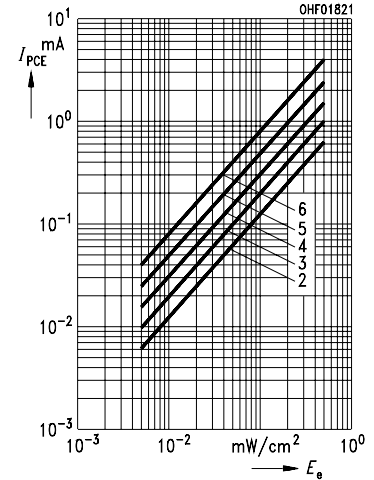
Relative Spectral Sensitivity,
SFH 309 $S_{rel} = f(\lambda)$



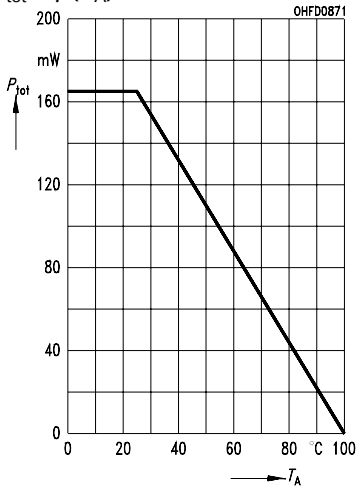
Relative Spectral Sensitivity,
SFH 309 FA $S_{rel} = f(\lambda)$



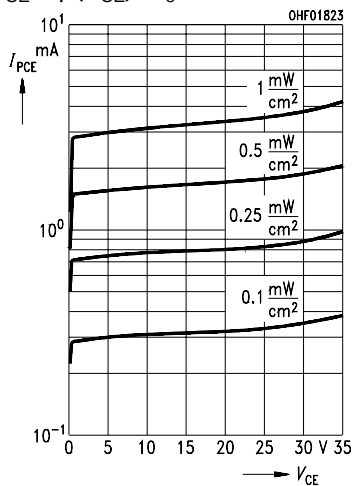
Photocurrent
 $I_{PCE} = f(E_e), V_{CE} = 5 V$



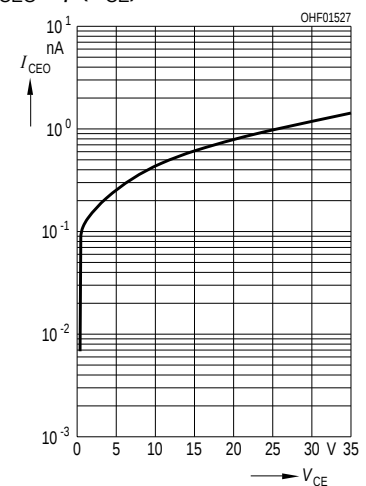
Total Power Dissipation
 $P_{tot} = f(T_A)$



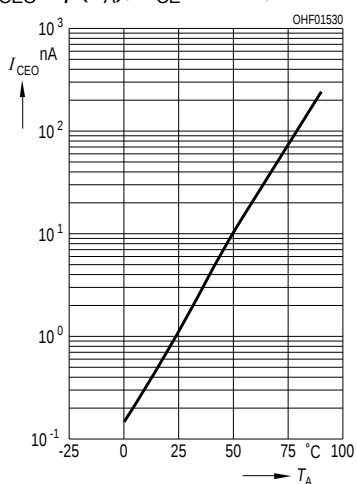
Photocurrent
 $I_{PCE} = f(V_{CE}), E_e = \text{Parameter}$



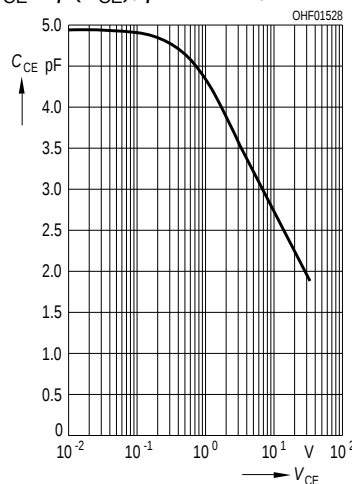
Dark Current
 $I_{CEO} = f(V_{CE}), E = 0$



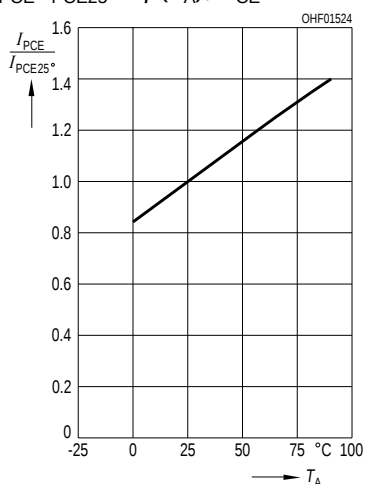
Dark Current
 $I_{CEO} = f(T_A), V_{CE} = 25 V, E = 0$



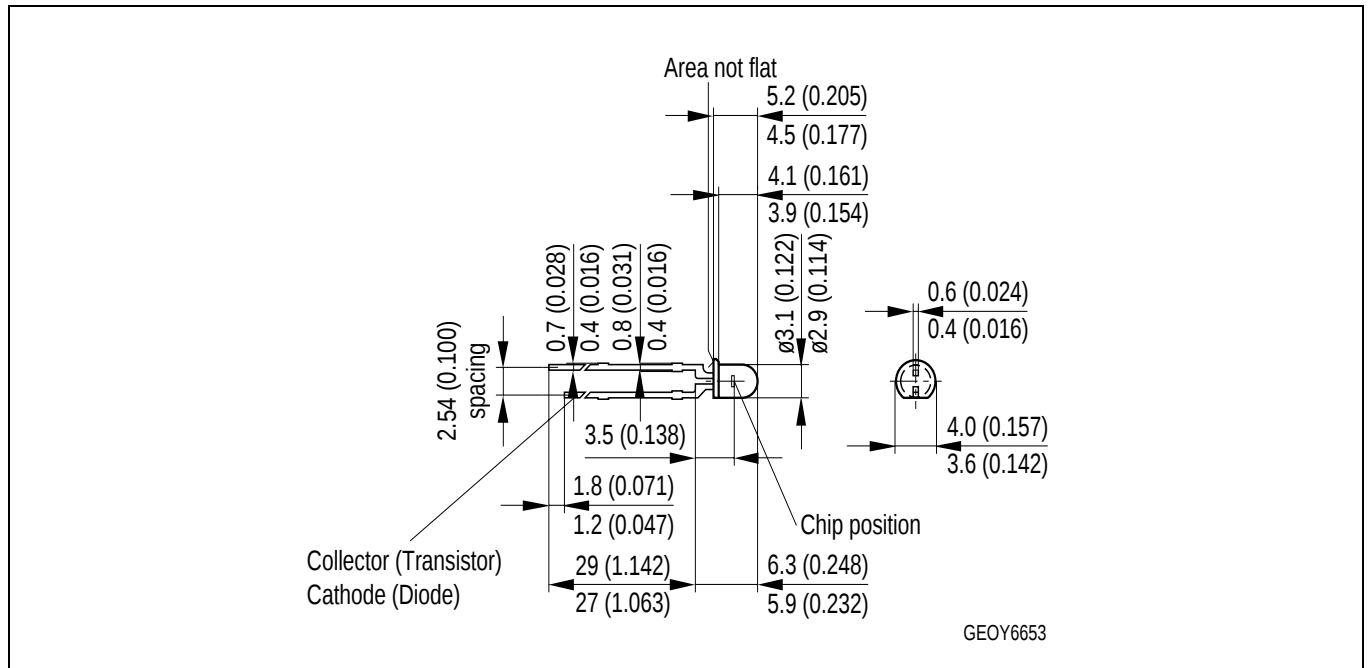
Capacitance
 $C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$



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



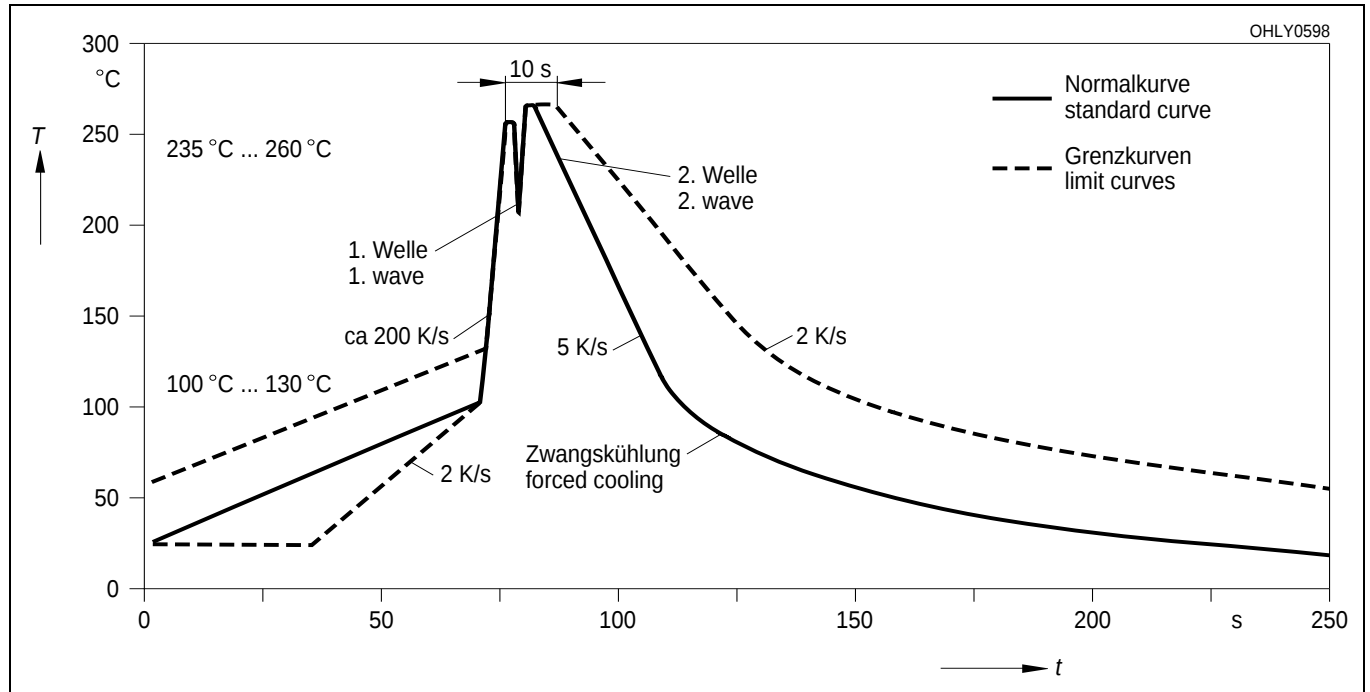
Maßzeichnung **Package Outlines**



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

Lötbedingungen
Soldering Conditions
Wellenlöten (TTW)
TTW Soldering

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



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¹ A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

² Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.