

# Silizium-PIN-Fotodiode mit sehr kurzer Schaltzeit

## Silicon PIN Photodiode with Very Short Switching Time

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

#### SFH 203 SFH 203 FA



SFH 203



SFH 203 FA

#### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm (SFH 203) und bei 880 nm (SFH 203 FA)
- Kurze Schaltzeit (typ. 5 ns)
- 5 mm-Plastikbauform im LED-Gehäuse
- Auch gegertet lieferbar

#### Anwendungen

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

#### Features

- Especially suitable for applications from 400 nm to 1100 nm (SFH 203) and of 880 nm (SFH 203 FA)
- Short switching time (typ. 5 ns)
- 5 mm LED plastic package
- Also available on tape and reel

#### Applications

- Industrial electronics
- For control and drive circuits
- Photointerrupters
- Fiber optic transmission systems

Typ Type	Bestellnummer Ordering Code
SFH 203	Q62702P0955
SFH 203 FA	Q62702P0956

**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
Sperrspannung Reverse voltage	$V_R$	50	V
Verlustleistung Total power dissipation	$P_{tot}$	150	mW

**Kennwerte ( $T_A = 25\text{ °C}$ )**  
**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 203	SFH 203 FA	
Fotostrom Photocurrent $V_R = 5\text{ V}$ , Normlicht/standard light A, $T = 2856\text{ K}$ , $E_V = 1000\text{ lx}$ $V_R = 5\text{ V}$ , $\lambda = 950\text{ nm}$ , $E_e = 1\text{ mW/cm}^2$	$I_P$	80 ( $\geq 50$ )	–	$\mu\text{A}$
	$I_P$	–	50 ( $\geq 30$ )	$\mu\text{A}$
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	850	900	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	400 ... 1100	800 ... 1100	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	1	1	$\text{mm}^2$
Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area	$L \times B$ $L \times W$	1 × 1	1 × 1	mm × m m
Halbwinkel Half angle	$\varphi$	$\pm 20$	$\pm 20$	Grad deg.
Dunkelstrom, $V_R = 20\text{ V}$ Dark current	$I_R$	1 ( $\leq 5$ )	1 ( $\leq 5$ )	nA
Spektrale Fotoempfindlichkeit, $\lambda = 850\text{ nm}$ Spectral sensitivity	$S_\lambda$	0.62	0.59	A/W
Quantenausbeute, $\lambda = 850\text{ nm}$ Quantum yield	$\eta$	0.89	0.86	<u>Electrons</u> Photon

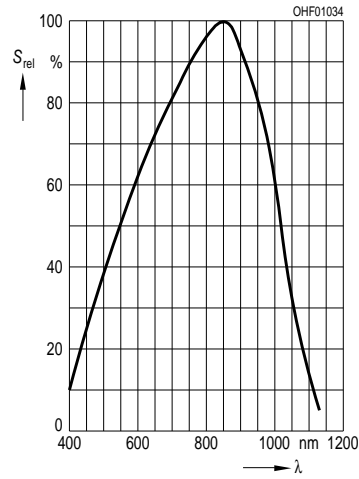
Kennwerte ( $T_A = 25\text{ °C}$ )

Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 203	SFH 203 FA	
Leerlaufspannung Open-circuit voltage $E_V = 1000\text{ lx}$ , Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_O$	420 ( $\geq 350$ )	–	mV
	$V_O$	–	370 ( $\geq 300$ )	mV
Kurzschlußstrom Short-circuit current $E_V = 1000\text{ lx}$ , Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_{SC}$	80	–	$\mu\text{A}$
	$I_{SC}$	–	25	$\mu\text{A}$
Anstiegs- und Abfallzeit des Fotostromes Rise and fall time of the photocurrent $R_L = 50\ \Omega$ ; $V_R = 20\text{ V}$ ; $\lambda = 850\text{ nm}$ ; $I_p = 800\ \mu\text{A}$	$t_r, t_f$	5	5	ns
Durchlaßspannung, $I_F = 80\text{ mA}$ , $E = 0$ Forward voltage	$V_F$	1.3	1.3	V
Kapazität, $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_0$	11	11	pF
Temperaturkoeffizient von $V_O$ Temperature coefficient of $V_O$	$TC_V$	– 2.6	– 2.6	mV/K
Temperaturkoeffizient von $I_{SC}$ Temperature coefficient of $I_{SC}$ Normlicht/standard light A $\lambda = 950\text{ nm}$	$TC_I$	0.18 –	– 0.2	%/K
Rauschäquivalente Strahlungsleistung Noise equivalent power $V_R = 20\text{ V}$ , $\lambda = 850\text{ nm}$	$NEP$	$2.9 \times 10^{-14}$	$2.9 \times 10^{-14}$	$\frac{\text{W}}{\sqrt{\text{Hz}}}$
Nachweisgrenze, $V_R = 20\text{ V}$ , $\lambda = 850\text{ nm}$ Detection limit	$D^*$	$3.5 \times 10^{12}$	$3.5 \times 10^{12}$	$\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$

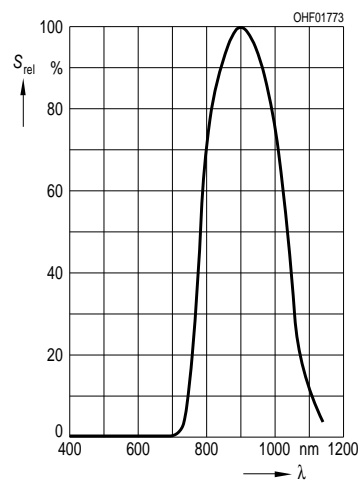
**Relative Spectral Sensitivity SFH 203**

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

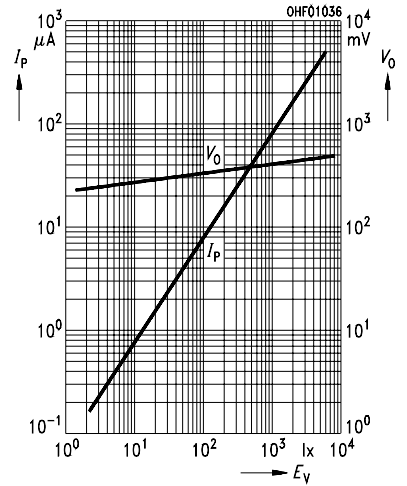


**Relative Spectral Sensitivity SFH 203 FA**

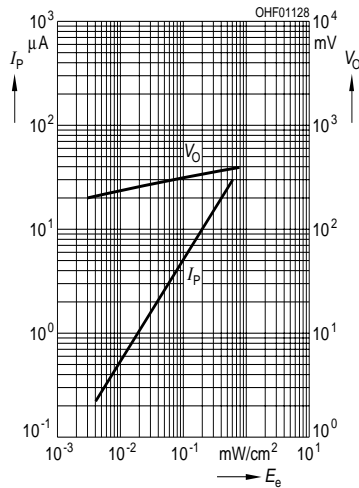
$S_{rel} = f(\lambda)$



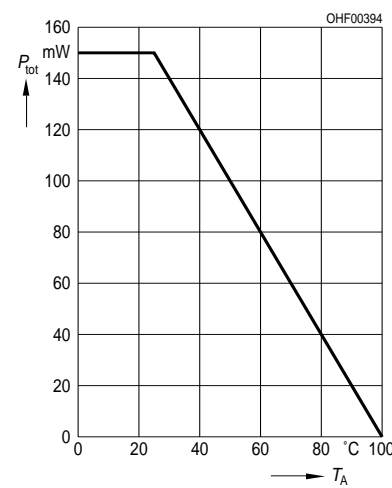
**Photocurrent  $I_P = f(E_V)$ ,  $V_R = 5 V$  Open-Circuit Voltage  $V_O = f(E_V)$  SFH 203**



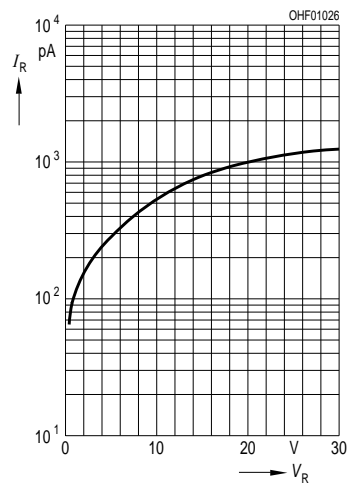
**Photocurrent  $I_P = f(E_e)$ ,  $V_R = 5 V$  Open-Circuit-Voltage  $V_O = f(E_e)$  SFH 203 FA**



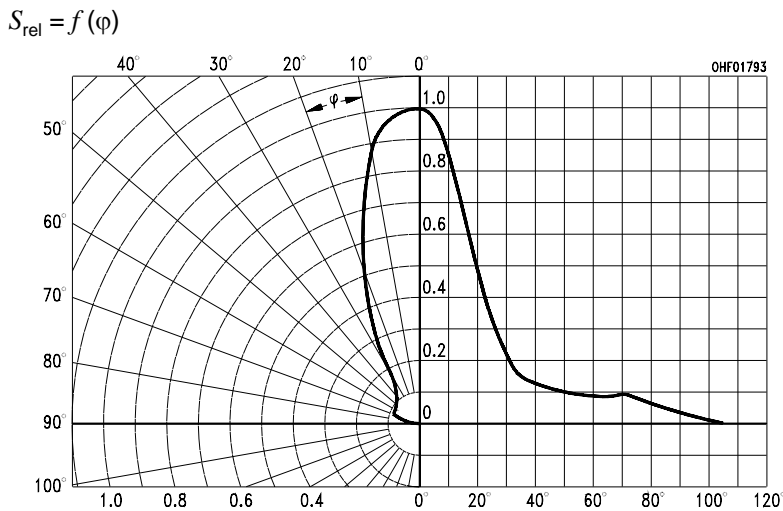
**Total Power Dissipation  $P_{tot} = f(T_A)$**



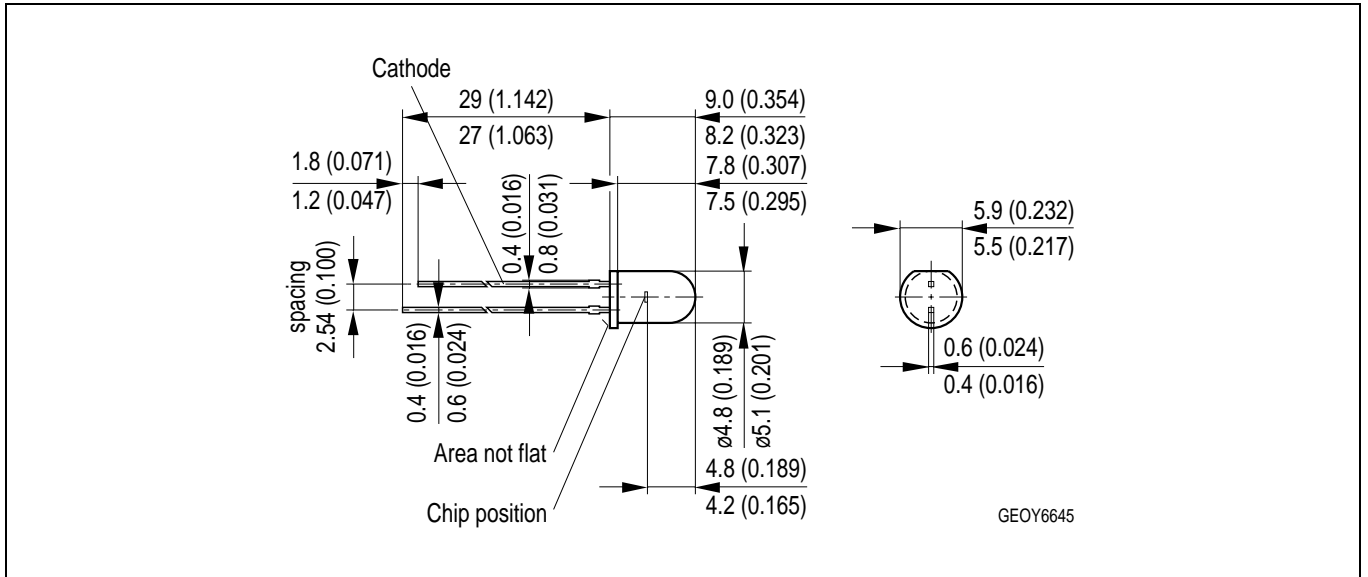
**Dark Current  $I_R = f(V_R)$ ,  $E = 0$**



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



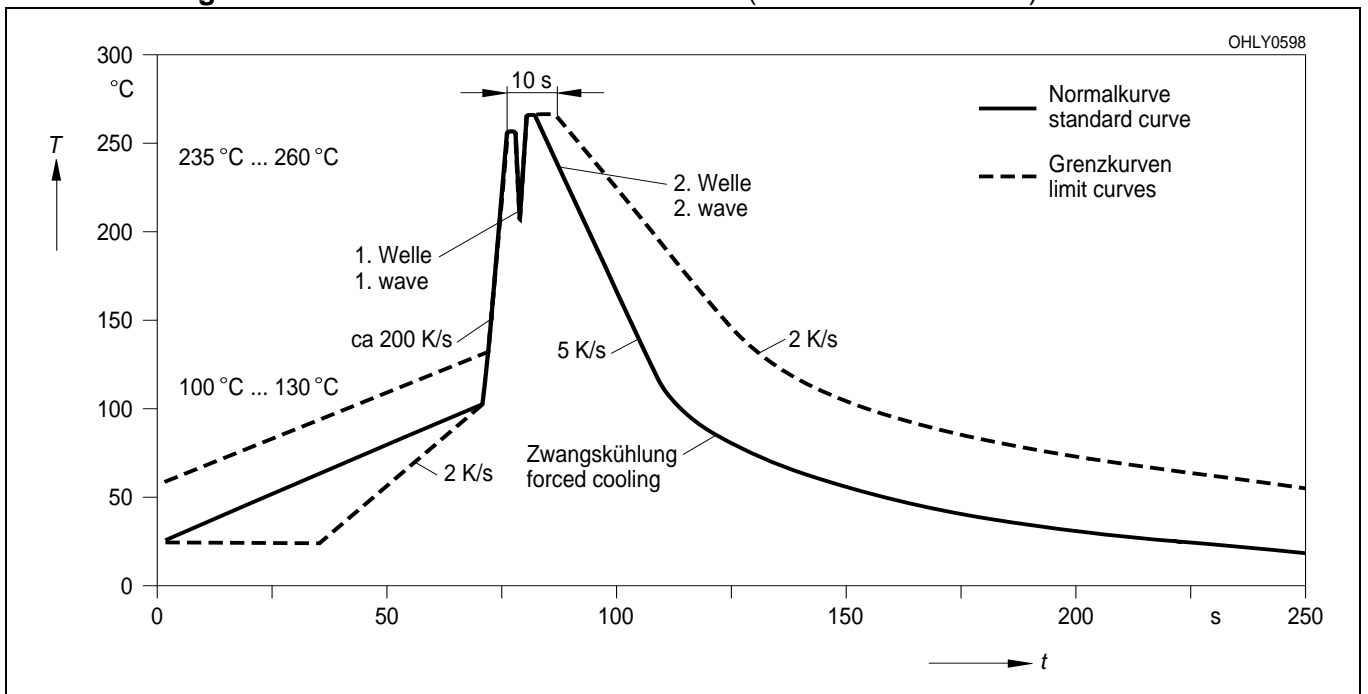
**Maßzeichnung  
Package Outlines**



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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