

# Silizium-PIN-Fotodiode mit sehr kurzer Schaltzeit Silicon PIN Photodiode with Very Short Switching Time

## SFH 203 P SFH 203 PFA



SFH 203 P



SFH 203 PFA

### Wesentliche Merkmale

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

### 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 P) and of 880 nm (SFH 203 PFA)
- Short switching time (typ. 5 ns)
- 5 mm LED plastic package

### Applications

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

Typ Type	Bestellnummer Ordering Code
SFH 203 P	Q62702-P942
SFH 203 PFA	Q62702-P947

**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
Löttemperatur (Lötstelle 2 mm vom Gehäuse entfernt bei Lötzeit $t \leq 3$ s) Soldering temperature in 2 mm distance from case bottom ( $t \leq 3$ s)	$T_S$	300	°C
Sperrspannung Reverse voltage	$V_R$	50	V
Verlustleistung Total power dissipation	$P_{tot}$	100	mW

**Kennwerte ( $T_A = 25$  °C)**  
**Characteristics**

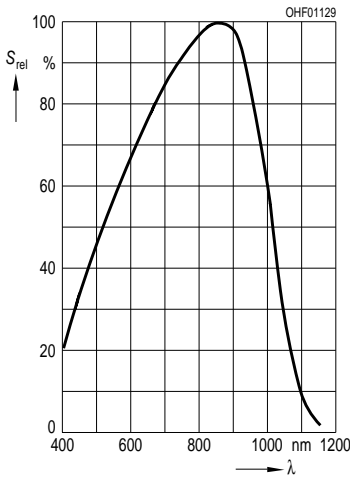
Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 203 P	SFH 203 PFA	
Fotostrom Photocurrent $V_R = 5$ V, Normlicht/standard light A, $T = 2856$ K, $E_V = 1000$ lx $V_R = 5$ V, $\lambda = 950$ nm, $E_e = 1$ mW/cm <sup>2</sup>	$I_P$	9.5 ( $\geq 5$ )	–	$\mu$ A
	$I_P$	–	6.2 ( $\geq 3.6$ )	$\mu$ A
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\ max}$	850	900	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10$ % von $S_{max}$ Spectral range of sensitivity $S = 10$ % of $S_{max}$	$\lambda$	400 ... 1100	750 ... 1100	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	1	1	mm <sup>2</sup>
Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area	$L \times B$ $L \times W$	1 × 1	1 × 1	mm × mm
Halbwinkel Half angle	$\varphi$	$\pm 75$	$\pm 75$	Grad deg.
Dunkelstrom, $V_R = 20$ V Dark current	$I_R$	1 ( $\leq 10$ )	1 ( $\leq 10$ )	nA

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

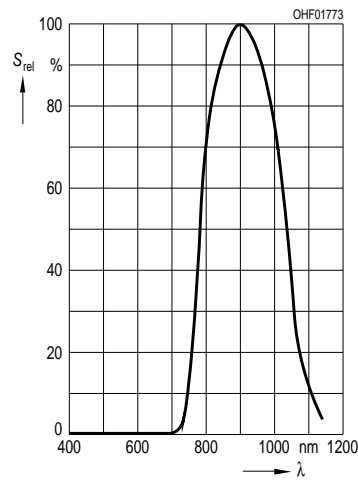
**Characteristics** (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 203 P	SFH 203 PFA	
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
Leerlaufspannung Open-circuit voltage $E_v = 1000\text{ lx}$ , Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_O$  $V_O$	350 ( $\geq 300$ )  –	–  300 ( $\geq 250$ )	mV  mV
Kurzschlußstrom Short-circuit current $E_v = 1000\text{ lx}$ , Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_{SC}$  $I_{SC}$	9.3  –	–  3.0	$\mu\text{A}$  $\mu\text{A}$
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	$D^*$	$3.5 \times 10^{12}$	$3.5 \times 10^{12}$	$\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$

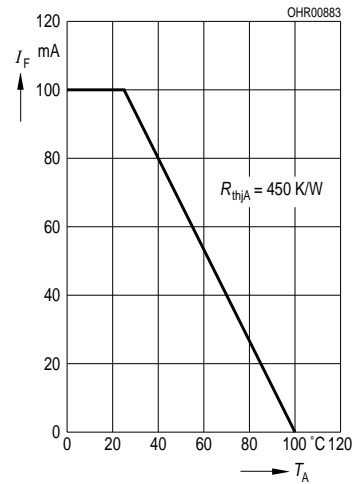
**Relative Spectral Sensitivity**  
SFH 203 P,  $S_{rel} = f(\lambda)$



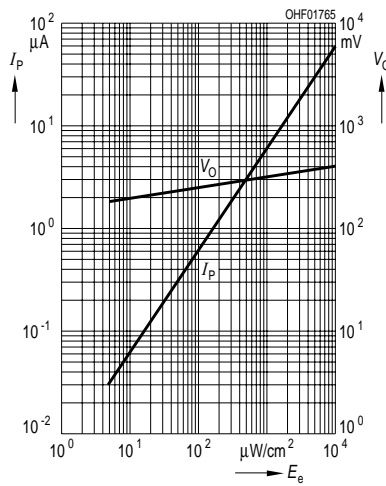
**Relative Spectr. Sensitivity**  
SFH 203 PFA,  $S_{rel} = f(\lambda)$



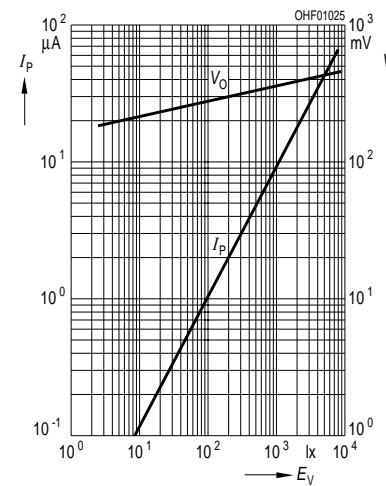
**Total Power Dissipation**  
 $P_{tot} = f(T_A)$



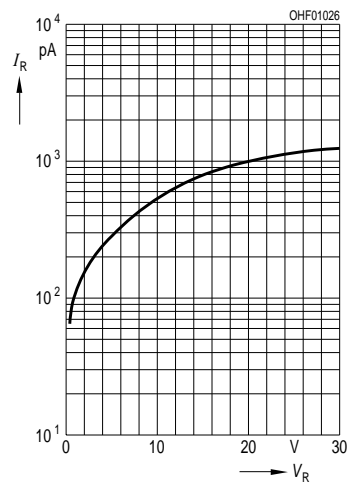
**Photocurrent  $I_P = f(E_e)$ ,  $V_R = 5 V$**   
**Open-Circuit Voltage  $V_O = f(E_e)$**   
SFH 203 PFA



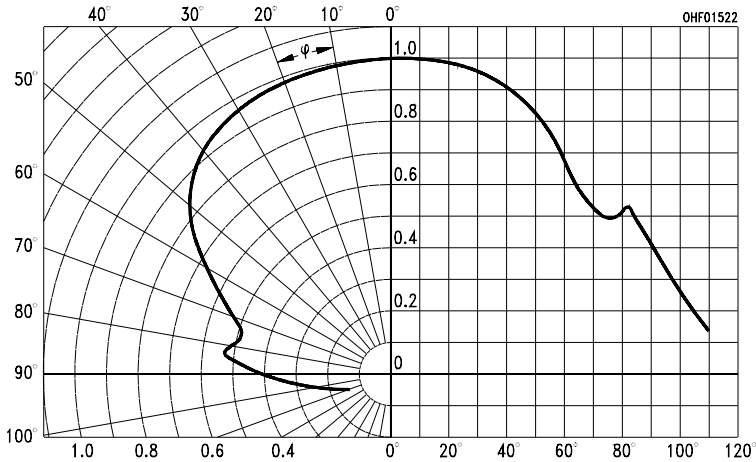
**Photocurrent  $I_P = f(E_v)$ ,  $V_R = 5 V$**   
**Open-Circuit Voltage  $V_O = f(E_v)$**   
SFH 203 P



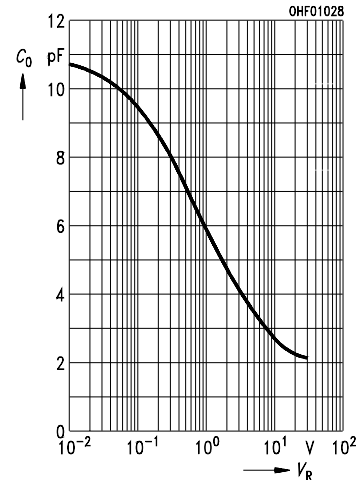
**Dark Current**  
 $I_R = f(V_R), E = 0$



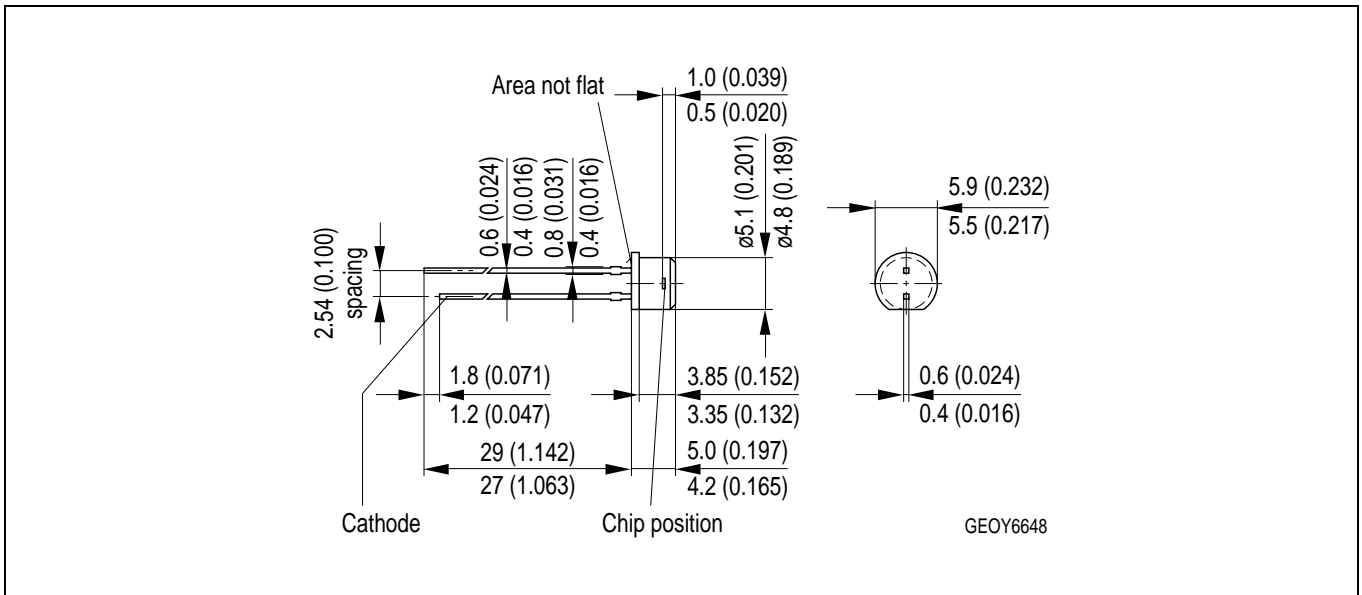
**Directional Characteristics**  
 $S_{rel} = f(\varphi)$



**Capacitance**  
 $C = f(V_R), f = 1 MHz, E = 0$



**Maßzeichnung  
Package Outlines**



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

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