

# 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

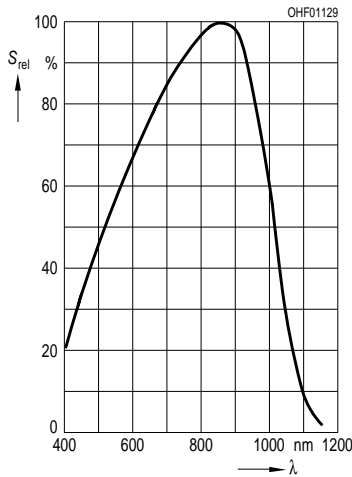
**Kennwerte ( $T_A = 25$  °C)**  
**Characteristics**

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>	$I_P$  $I_P$	9.5 ( $\geq 5$ ) –	– 6.2 ( $\geq 3.6$ )	$\mu$ A  $\mu$ 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	$\varphi$	± 75	± 75	Grad deg.
Dunkelstrom, $V_R = 20$ V Dark current	$I_R$	1 ( $\leq 10$ )	1 ( $\leq 10$ )	nA

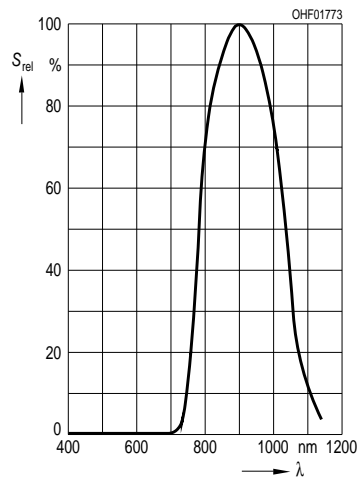
**Kennwerte** ( $T_A = 25\text{ °C}$ )**Characteristics** (cont'd)

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 $R_L = 50\text{ }\Omega$ ; $V_R = 20\text{ V}$ ; $\lambda = 850\text{ nm}$ ; $I_p = 800\text{ }\mu\text{A}$	$t_r, t_f$	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	$D^*$	$3.5 \times 10^{12}$	$3.5 \times 10^{12}$	$\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$

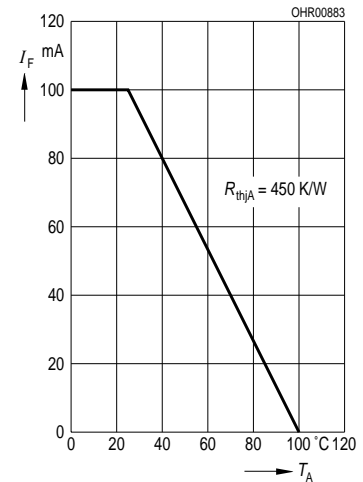
**Relative Spectral Sensitivity**  
SFH 203 P,  $S_{rel} = f(\lambda)$



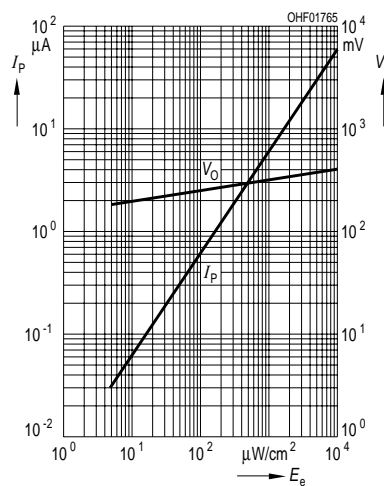
**Relative Spectr. Sensitivity**  
SFH 203 PFA,  $S_{rel} = f(\lambda)$



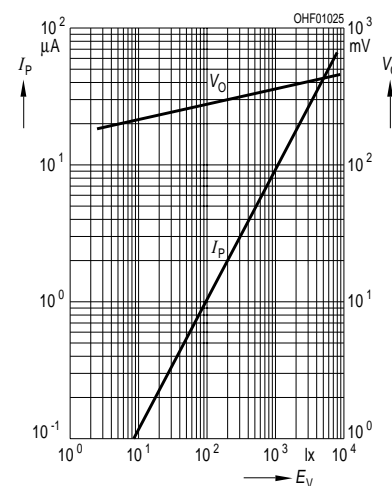
**Total Power Dissipation**  
 $P_{tot} = f(T_A)$



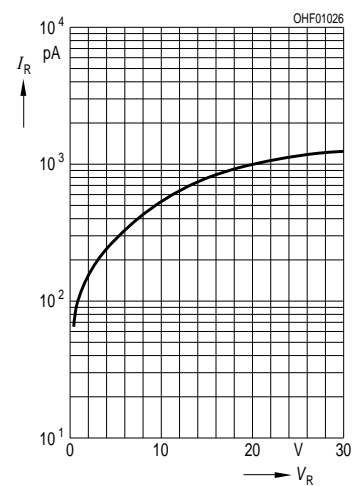
**Photocurrent  $I_P = f(E_e)$ ,  $V_R = 5\text{ V}$**   
**Open-Circuit Voltage  $V_O = f(E_e)$**   
SFH 203 PFA



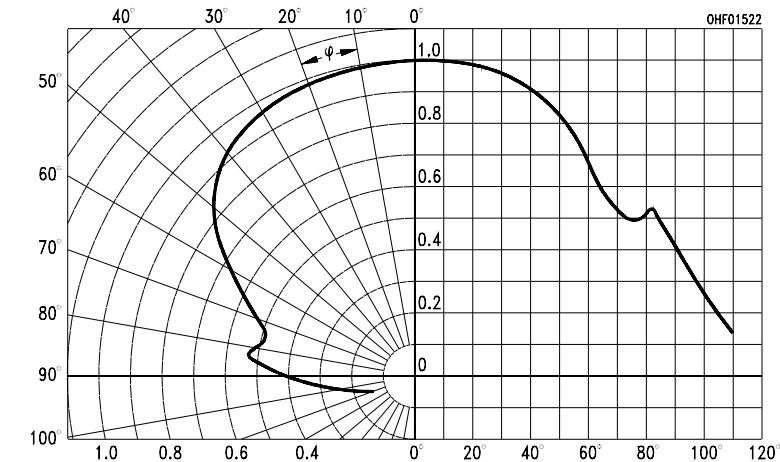
**Photocurrent  $I_P = f(E_v)$ ,  $V_R = 5\text{ V}$**   
**Open-Circuit Voltage  $V_O = f(E_v)$**   
SFH 203 P



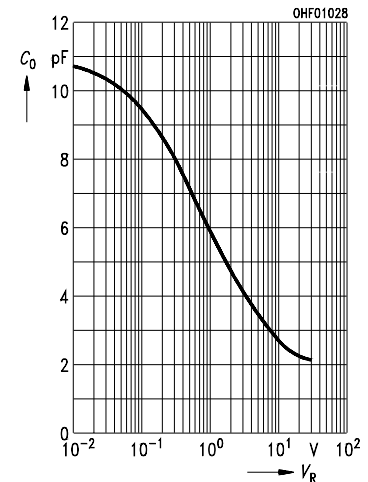
**Dark Current**  
 $I_R = f(V_R), E = 0$



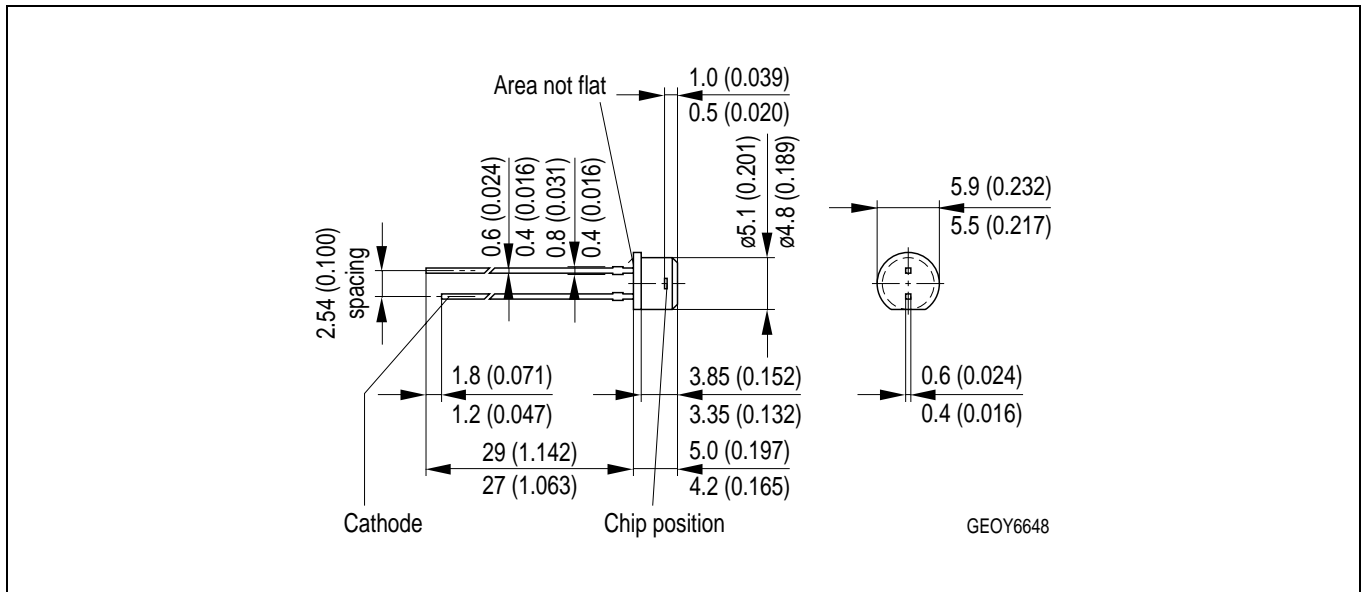
**Directional Characteristics**  
 $S_{rel} = f(\varphi)$



**Capacitance**  
 $C = f(V_R), f = 1\text{ MHz}, E = 0$



## Maßzeichnung Package Outlines



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

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### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

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