

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

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 gegurtet 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 | Q62702-P955 |
| SFH 203 FA | Q62702-P956 |

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 | 230 | °C |
| Sperrspannung Reverse voltage | V_R | 50 | V |
| Verlustleistung Total power dissipation | P_{tot} | 100 | mW |

Kennwerte ($T_A = 25$ °C)
Characteristics

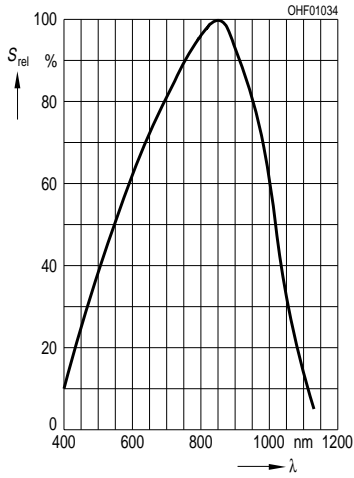
| Bezeichnung Parameter | Symbol Symbol | Wert Value | | Einheit Unit |
|---|------------------------------|------------------|------------------|-----------------|
| | | SFH 203 | SFH 203 FA | |
| Fotostrom Photocurrent $V_R = 5$ V, Normlicht/standard light A, $T = 2856$ K, $E_V = 1000$ lx $V_R = 5$ V, $\lambda = 950$ nm, $E_e = 1$ mW/cm ² | I_P | 80 (≥ 50) | – | μ A |
| | I_P | – | 50 (≥ 30) | μ 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} | λ | 400 ... 1100 | 800 ... 1100 | nm |
| Bestrahlungsempfindliche Fläche Radiant sensitive area | A | 1 | 1 | mm ² |
| Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area | $L \times B$ $L \times W$ | 1 × 1 | 1 × 1 | mm × mm |
| Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface | H | 4.0 ... 4.6 | 4.0 ... 4.6 | mm |
| Halbwinkel Half angle | φ | ± 20 | ± 20 | Grad deg. |

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | | Einheit Unit |
|---|--------------------------|-------------------------|-------------------------|--|
| | | SFH 203 | SFH 203 FA | |
| Dunkelstrom, $V_R = 20\text{ V}$ Dark current | I_R | 1 (≤ 5) | 1 (≤ 5) | nA |
| Spektrale Fotoempfindlichkeit, $\lambda = 850\text{ nm}$ Spectral sensitivity | S_λ | 0.62 | 0.59 | A/W |
| Quantenausbeute, $\lambda = 850\text{ nm}$ Quantum yield | η | 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 | 420 (≥ 350) – | – 370 (≥ 300) | 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} | 80 – | – 25 | μA μA |
| 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 | 2.9×10^{-14} | 2.9×10^{-14} | $\frac{\text{W}}{\sqrt{\text{Hz}}}$ |
| Nachweisgrenze, $V_R = 20\text{ V}$, $\lambda = 850\text{ nm}$ Detection limit | D^* | 3.5×10^{12} | 3.5×10^{12} | $\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$ |

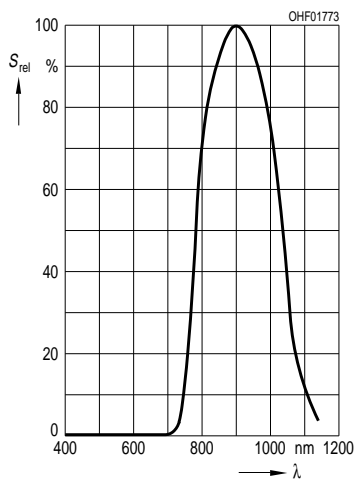
Relative Spectral Sensitivity SFH 203

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

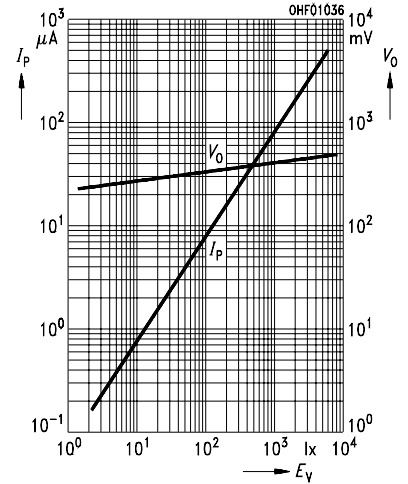


Relative Spectral Sensitivity SFH 203 FA

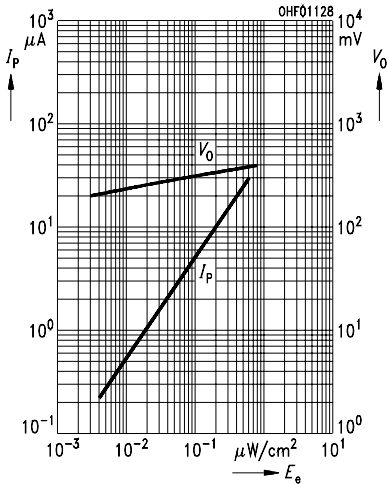
$S_{rel} = f(\lambda)$



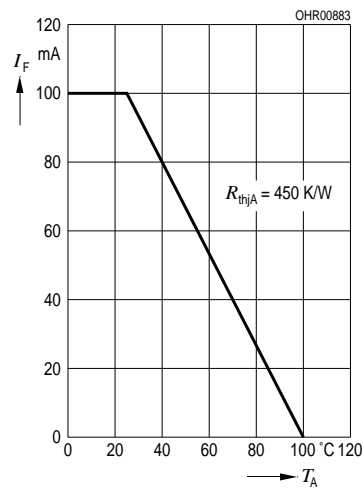
**Photocurrent $I_P = f(E_V)$, $V_R = 5 V$
Open-Circuit Voltage $V_O = f(E_V)$
SFH 203**



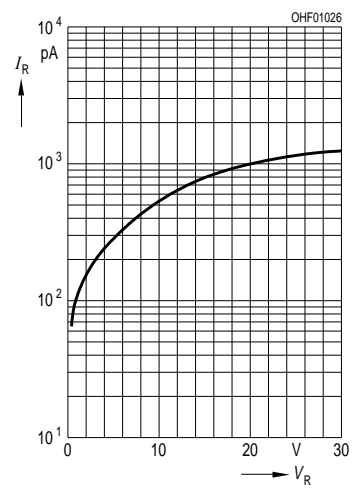
**Photocurrent $I_P = f(E_e)$, $V_R = 5 V$
Open-Circuit-Voltage $V_O = f(E_e)$
SFH 203 FA**



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

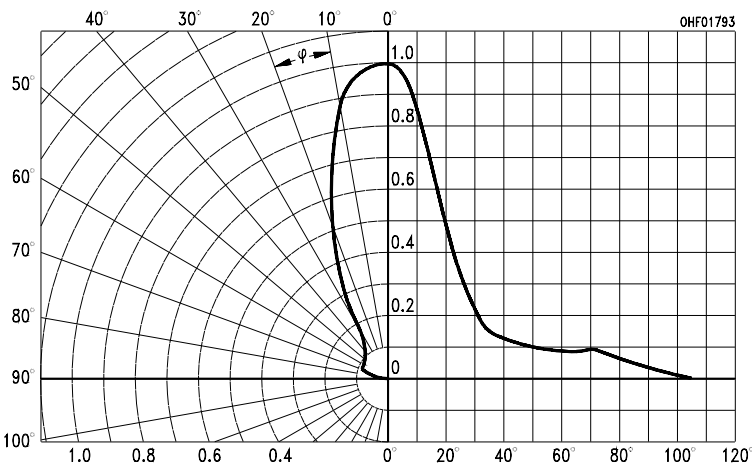


Dark Current $I_R = f(V_R)$, $E = 0$

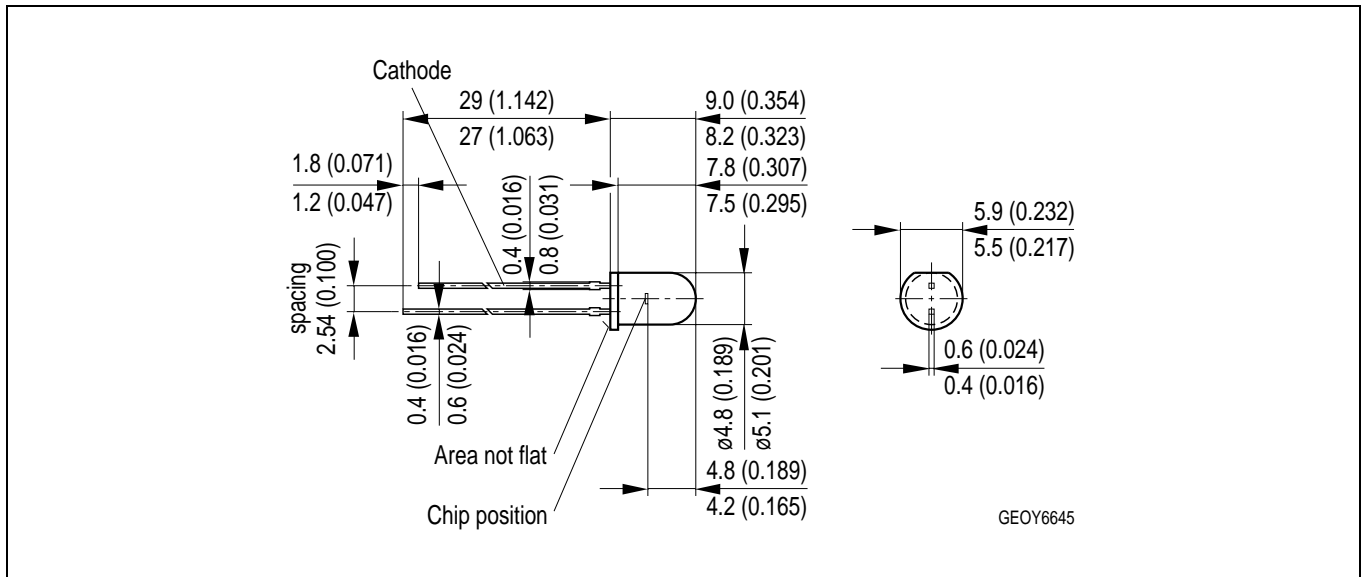


Directional Characteristics

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



Maßzeichnung Package Outlines



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

Published by OSRAM Opto Semiconductors GmbH & Co. OHG
Wernerwerkstrasse 2, D-93049 Regensburg

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