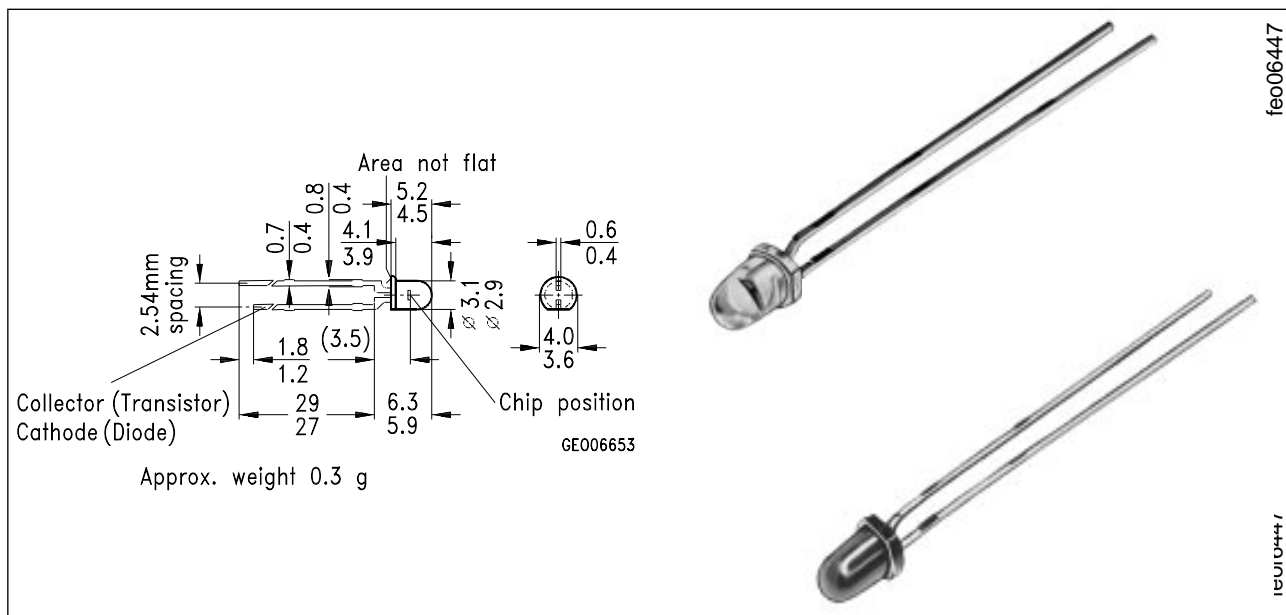


Silizium-PIN-Fotodiode mit sehr kurzer Schaltzeit Silicon PIN Photodiode with Very Short Switching Time

SFH 229
SFH 229 FA



Maße in mm, wenn nicht anders angegeben/Dimensions in mm, unless otherwise specified.

Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 380 nm bis 1100 nm (SFH 229) und bei 880 nm (SFH 229 FA)
- Kurze Schaltzeit (typ. 10 ns)
- 3 mm-Plastikbauform im LED-Gehäuse
- Auch gurgelt lieferbar

Anwendungen

- Lichtschranken für Gleich- und Wechselbetrieb
- Industrieelektronik
- "Messen/Steuern/Regeln"

Features

- Especially suitable for applications from 380 nm to 1100 nm (SFH 229) and of 880 nm (SFH 229 FA)
- Short switching time (typ. 10 ns)
- 3 mm LED plastic package
- Also available on tape

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

| Typ (*vorher) Type (*formerly) | Bestellnummer Ordering Code |
|-----------------------------------|--------------------------------|
| SFH 229 | Q62702-P215 |
| SFH 229 FA (*SFH 229 F) | Q62702-P216 |

Grenzwerte Maximum Ratings

| Bezeichnung Description | Symbol Symbol | Wert Value | Einheit Unit |
|---|-------------------|----------------|-----------------|
| Betriebs- und Lagertemperatur Operating and storage temperature range | $T_{op}; T_{stg}$ | - 55 ... + 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 | 20 | V |
| Verlustleistung Total power dissipation | P_{tot} | 150 | mW |

Kennwerte ($T_A = 25$ °C) Characteristics

| Bezeichnung Description | Symbol Symbol | Wert Value | | Einheit Unit |
|---|------------------------------|------------------|--------------------|-----------------|
| | | SFH 229 | SFH 229 FA | |
| Fotoempfindlichkeit Spectral sensitivity $V_R = 5$ V, Normlicht/standard light A, $T = 2856$ K, $V_R = 5$ V, $\lambda = 950$ nm, $E_e = 1$ mW/cm ² | S | 28 (≥ 18) | – | nA/lx |
| | S | – | 20 (≥ 10.8) | μ A |
| Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity | λ_{Smax} | 860 | 900 | nm |
| Spektraler Bereich der Fotoempfindlichkeit $S = 10$ % von S_{max} Spectral range of sensitivity $S = 10$ % of S_{max} | λ | 380 ... 1100 | 730 ... 1100 | nm |
| Bestrahlungsempfindliche Fläche Radiant sensitive area | A | 0.3 | 0.3 | mm ² |
| Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area | $L \times B$ $L \times W$ | 0.56 × 0.56 | 0.56 × 0.56 | mm × mm |
| Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface | H | 2.4 ... 2.8 | 2.4 ... 2.8 | mm |

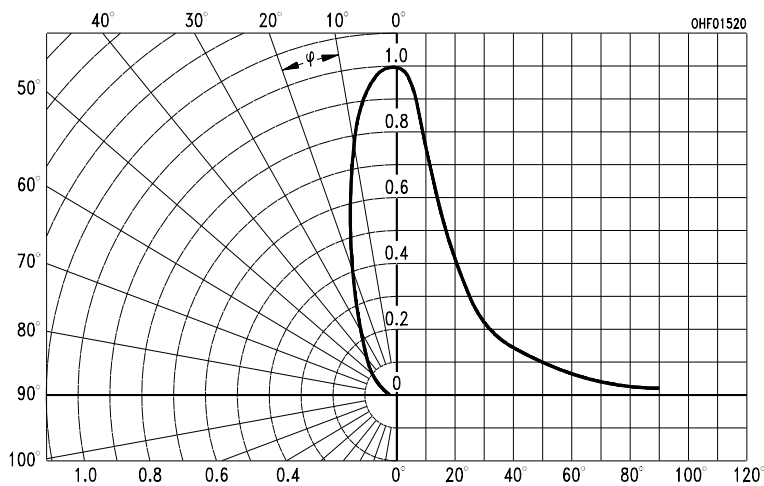
Kennwerte ($T_A = 25\text{ °C}$)
Characteristics (cont'd)

| Bezeichnung Description | Symbol Symbol | Wert Value | | Einheit Unit |
|---|--------------------------|-----------------------------|-----------------------------|------------------------------------|
| | | SFH 229 | SFH 229 FA | |
| Halbwinkel Half angle | φ | ± 17 | ± 17 | Grad deg. |
| Dunkelstrom, $V_R = 10\text{ V}$ Dark current | I_R | 50 (≤ 5000) | 50 (≤ 5000) | pA |
| Spektrale Fotoempfindlichkeit, $\lambda = 850\text{ nm}$ Spectral sensitivity | S_λ | 0.62 | 0.60 | A/W |
| Quantenausbeute, $\lambda = 850\text{ nm}$ Quantum yield | η | 0.90 | 0.88 | <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 | 450 (≥ 400) – | – 420 (≥ 370) | 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} | 27 – | – 9 | μA μA |
| Anstiegs- und Abfallzeit des Fotostromes Rise and fall time of the photocurrent $R_L = 50\ \Omega$; $V_R = 10\text{ V}$; $\lambda = 850\text{ nm}$; $I_p = 800\ \mu\text{A}$ | t_r, t_f | 10 | 10 | ns |
| Durchlaßspannung, $I_F = 100\text{ mA}$, $E = 0$ Forward voltage | V_F | 1.3 | 1.3 | V |
| Kapazität, $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ Capacitance | C_0 | 13 | 13 | 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 |

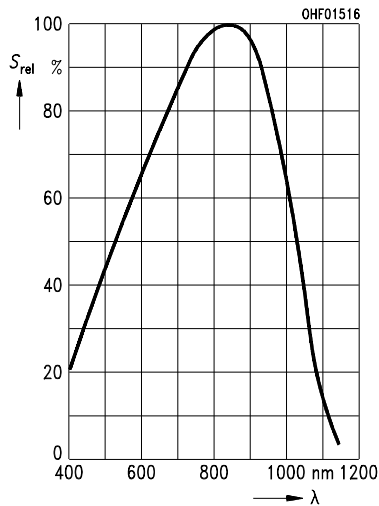
Kennwerte ($T_A = 25\text{ °C}$)
Characteristics (cont'd)

| Bezeichnung Description | Symbol Symbol | Wert Value | | Einheit Unit |
|--|------------------|-----------------------|-----------------------|--------------------------------|
| | | SFH 229 | SFH 229 FA | |
| Rauschäquivalente Strahlungsleistung Noise equivalent power $V_R = 10\text{ V}, \lambda = 850\text{ nm}$ | NEP | 6.5×10^{-15} | 6.5×10^{-15} | $\frac{W}{\sqrt{Hz}}$ |
| Nachweisgrenze, $V_R = 10\text{ V}, \lambda = 850\text{ nm}$ Detection limit | D^* | 8.4×10^{12} | 8.4×10^{12} | $\frac{cm \cdot \sqrt{Hz}}{W}$ |

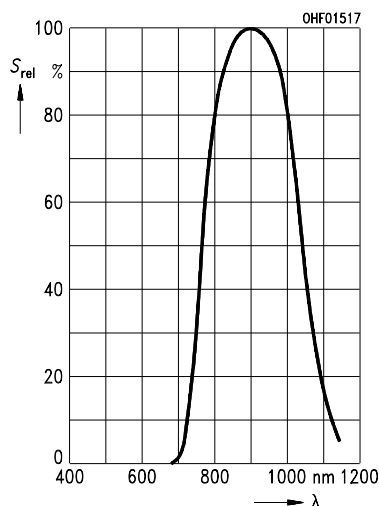
Directional characteristics $S_{rel} = f(\varphi)$



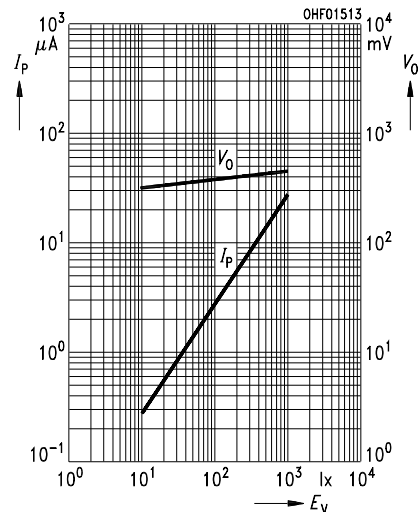
Relative spectral sensitivity $S_{rel} = f(\lambda)$
SFH 229



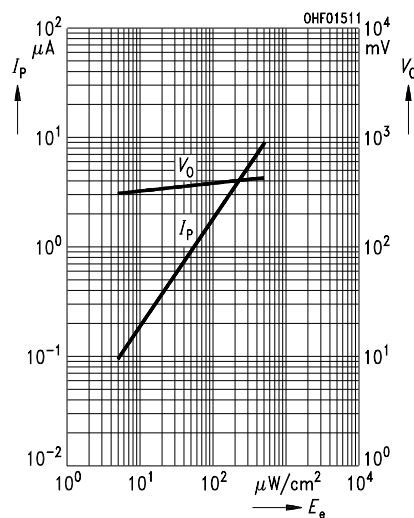
Relative spectral sensitivity $S_{rel} = f(\lambda)$
SFH 229 FA



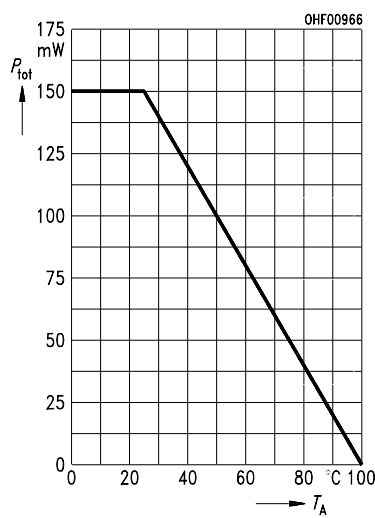
Photocurrent $I_P = f(E_V)$, $V_R = 5\text{ V}$
Open-circuit voltage $V_O = f(E_V)$
SFH 229



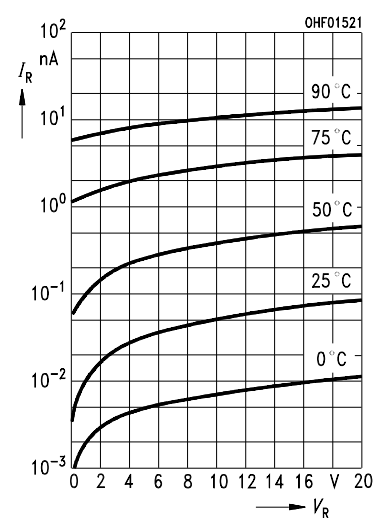
Photocurrent $I_P = f(E_e)$, $V_R = 5\text{ V}$
Open-circuit voltage $V_O = f(E_e)$
SFH 229 FA



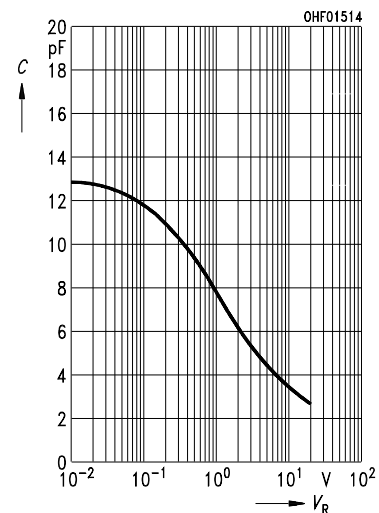
Total power dissipation
 $P_{tot} = f(T_A)$



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



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



Dark current
 $I_R = f(T_A)$, $V_R = 10\text{ V}$, $E = 0$

