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

SFH 229
SFH 229 FA

SFH 229

SFH 229 FA

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 gegurtet lieferbar

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 and reel

Anwendungen

- Lichtschranken für Gleich- und Wechselbetrieb
- Industrieelektronik
- „Messen/Steuern/Regeln“

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Typ Type	Bestellnummer Ordering Code
SFH 229	Q62702-P215
SFH 229 FA	Q62702-P216

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	20	V
Verlustleistung Total power dissipation	P_{tot}	150	mW

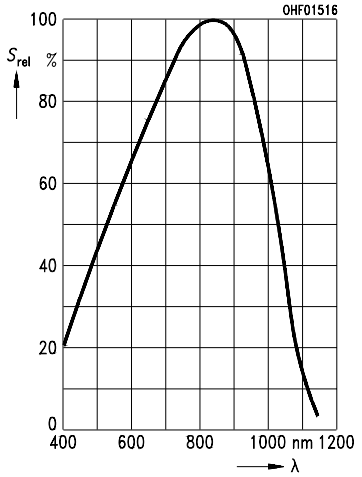
Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**		**Einheit** **Unit**
		SFH 229	**SFH 229 FA**	
Fotostrom Photocurrent V_R = 5 V, Normlicht/standard light A, T = 2856 K, E_V = 1000 lx V_R = 5 V, λ = 950 nm, E_e = 1 mW/cm²	I_P I_P	28 (≥ 18) –	– 20 (≥ 10.8)	µA µA
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\,max}$	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	mm²
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
Halbwinkel Half angle	φ	± 17	± 17	Grad deg.

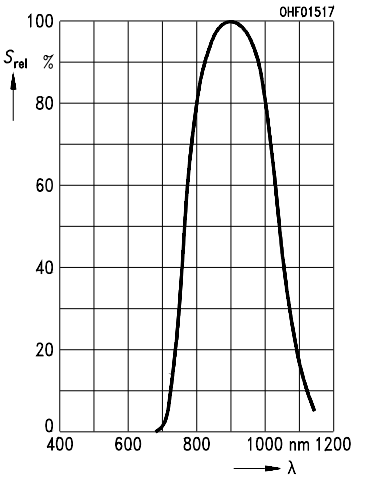
Kennwerte (T_A = 25 °C)
Characteristics (cont'd)

Bezeichnung **Parameter**	**Symbol** **Symbol**	**Wert** **Value**		**Einheit** **Unit**
		SFH 229	**SFH 229 FA**	
Dunkelstrom, V_R = 10 V Dark current	I_R	50 (≤ 5000)	50 (≤ 5000)	pA
Spektrale Fotoempfindlichkeit, λ = 850 nm Spectral sensitivity	S_λ	0.62	0.60	A/W
Quantenausbeute, λ = 850 nm Quantum yield	η	0.90	0.88	Electrons Photon
Leerlaufspannung Open-circuit voltage E_v = 1000 lx, Normlicht/standard light A, T = 2856 K E_e = 0.5 mW/cm², λ = 950 nm	V_O V_O	450 (≥ 400) –	– 420 (≥ 370)	mV mV
Kurzschlußstrom Short-circuit current E_v = 1000 lx, Normlicht/standard light A, T = 2856 K E_e = 0.5 mW/cm², λ = 950 nm	I_{SC} I_{SC}	27 –	– 9	µA µA
Anstiegs- und Abfallzeit des Fotostromes Rise and fall time of the photocurrent R_L = 50 Ω; V_R = 10 V; λ = 850 nm; I_p = 800 µA	t_r, t_f	10	10	ns
Durchlaßspannung, I_F = 100 mA, E = 0 Forward voltage	V_F	1.3	1.3	V
Kapazität, V_R = 0 V, f = 1 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 λ = 950 nm	TC_I	 0.18 –	 – 0.2	%/K
Rauschäquivalente Strahlungsleistung Noise equivalent power V_R = 10 V, λ = 850 nm	NEP	6.5×10^{-15}	6.5×10^{-15}	$\frac{W}{\sqrt{Hz}}$
Nachweisgrenze, V_R = 10 V, λ = 850 nm Detection limit	D*	8.4×10^{12}	8.4×10^{12}	$\frac{cm \times \sqrt{Hz}}{W}$

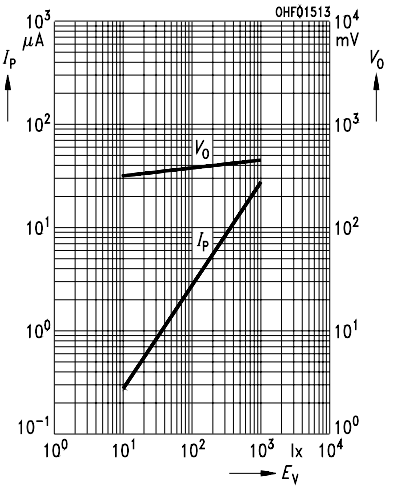
Relative Spectral Sensitivity
$S_{rel} = f(\lambda)$
SFH 229



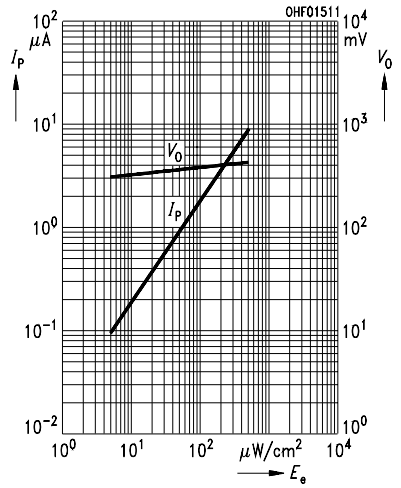
Relative Spectral Sensitivity
$S_{rel} = f(\lambda)$
SFH 229 FA



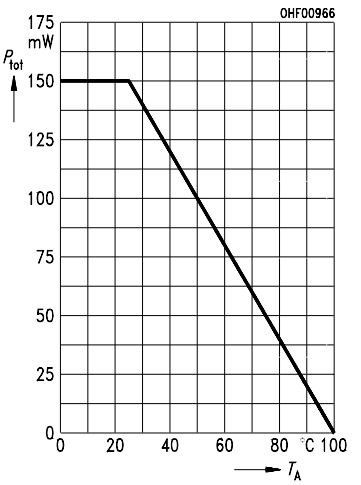
Photocurrent $I_P = f(E_v)$, V_R = 5 V
Open-Circuit Voltage $V_O = f(E_v)$
SFH 229



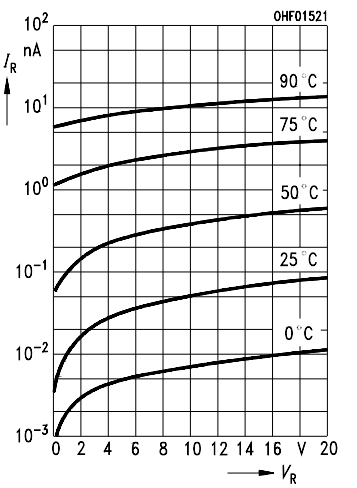
Photocurrent $I_P = f(E_e)$, V_R = 5 V
Open-Circuit Voltage $V_O = f(E_e)$
SFH 229 FA



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

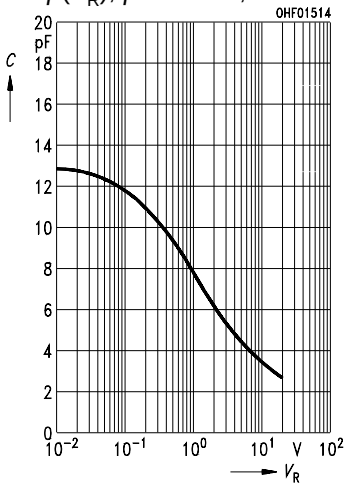


Dark Current
$I_R = f(V_R)$, E = 0



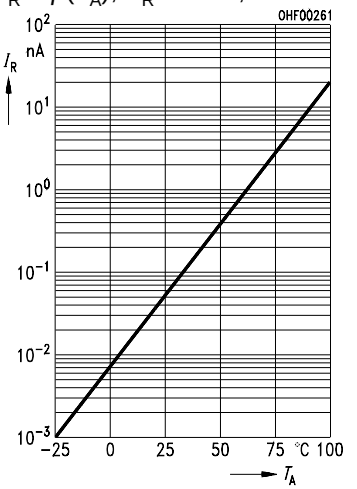
Capacitance

$C = f(V_R)$, f = 1 MHZ, E = 0



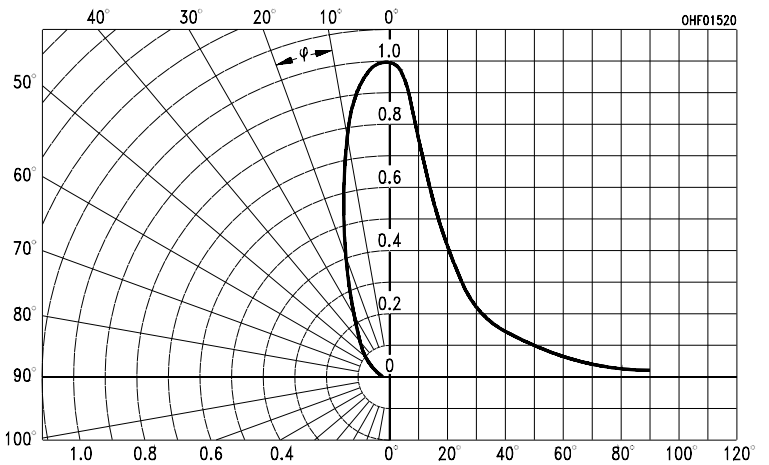
Dark Current

$I_R = f(T_A)$, V_R = 10 V, E = 0

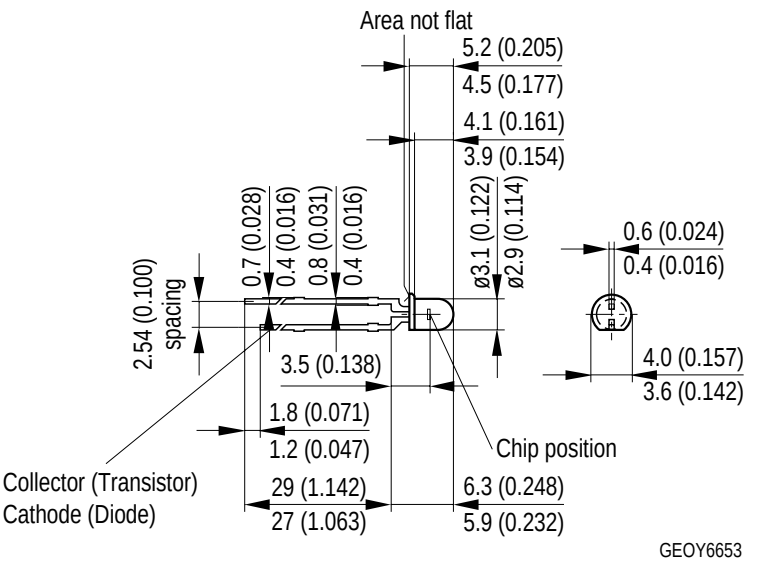


Directional Characteristics

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



Maßzeichnung
Package Outlines



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

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