

Silizium-PIN-Fotodiode
Silicon PIN Photodiode
Lead (Pb) Free Product - RoHS Compliant

SFH 213
SFH 213 FA



SFH 213



SFH 213 FA

Wesentliche Merkmale

- Wellenlängenbereich ($S_{10\%}$) 400nm bis 1100nm (SFH 213) und 750nm bis 1100nm (SFH 213 FA)
- Kurze Schaltzeit (typ. 5 ns)
- 5 mm-Plastikbauform im LED-Gehäuse

Features

- Wavelength range ($S_{10\%}$) 400 nm to 1100 nm (SFH 213) and 750nm to 1100nm (SFH 213 FA)
- Short switching time (typ. 5 ns)
- 5 mm LED plastic package

Anwendungen

- Industrieelektronik
- „Messen/Steuern/Regeln“
- Schnelle Lichtschranken

Applications

- Industrial electronics
- For control and drive circuits
- High speed photointerrupters

Typ Type	Bestellnummer Ordering Code	Fotostrom, $E_v=1000$ lx, standard light A, $V_R = 5$ V (SFH 213) Photocurrent, $E_e=1$ mW/cm ² , $\lambda = 870$ nm, $V_R = 5$ V (SFH 213 FA) I_p (μA)
SFH 213	Q62702P0930	135 (≥ 100)
SFH 213 FA	Q62702P1671	90 (≥ 65)

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
Sperrspannung Reverse voltage	V_R $V_R (t < 2 \text{ min})$	20 50	V V
Verlustleistung Total power dissipation	P_{tot}	150	mW

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

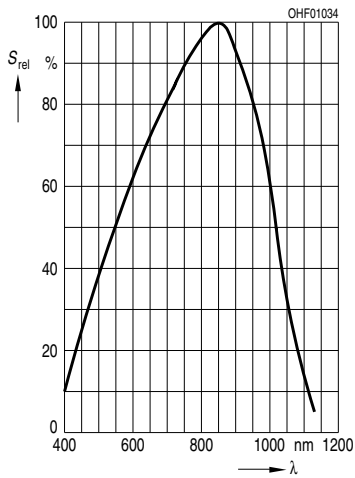
Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 213	SFH 213 FA	
Fotostrom Photocurrent $V_R = 5 \text{ V}$, Normlicht/standard light A, $T = 2856 \text{ K}$, $E_V = 1000 \text{ lx}$ $V_R = 5 \text{ V}$, $\lambda = 870 \text{ nm}$, $E_e = 1 \text{ mW/cm}^2$	I_P I_P	135 (≥ 100) —	— 90 (≥ 65)	μA μA
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S \text{ max}}$	850	900	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von S_{max} Spectral range of sensitivity $S = 10\%$ of S_{max}	λ	400 ... 1100	750 ... 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	$\text{mm} \times \text{mm}$
Halbwinkel Half angle	φ	± 10	± 10	Grad deg.
Dunkelstrom, $V_R = 20 \text{ V}$ Dark current	I_R	$1 (\leq 5)$	$1 (\leq 5)$	nA
Spektrale Fotoempfindlichkeit, $\lambda = 870 \text{ nm}$ Spectral sensitivity	S_λ	0.62	0.59	A/W
Quantenausbeute, $\lambda = 870 \text{ nm}$ Quantum yield	η	0.89	0.86	<u>Electrons</u> Photon

Kennwerte ($T_A = 25\text{ °C}$)

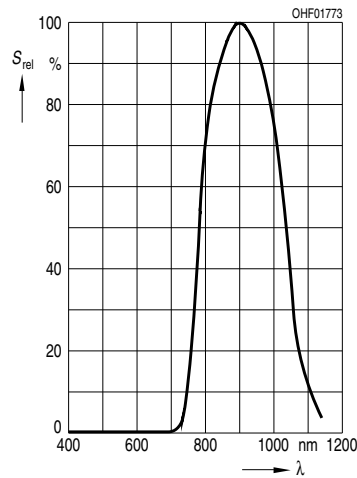
Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 213	SFH 213 FA	
Leerlaufspannung Open-circuit voltage $E_v = 1000\text{ lx}$, Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$	V_O V_O	430 (≥ 350) –	– 380 (≥ 300)	mV mV
Kurzschlußstrom Short-circuit current $E_v = 1000\text{ lx}$, Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 0.5\text{ mW/cm}^2$, $\lambda = 870\text{ nm}$	I_{SC} I_{SC}	125 –	– 42	μA μA
Anstiegs- und Abfallzeit des Fotostromes Rise and fall time of the photocurrent $R_L = 50\text{ }\Omega$; $V_R = 20\text{ V}$; $\lambda = 850\text{ nm}$	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 $\lambda = 870\text{ nm}$	TC_I	0.18 –	– 0.1	%/K
Rauschäquivalente Strahlungsleistung Noise equivalent power $V_R = 10\text{ V}$, $\lambda = 870\text{ nm}$	NEP	2.9×10^{-14}	2.9×10^{-14}	$\frac{\text{W}}{\sqrt{\text{Hz}}}$
Nachweisgrenze, $V_R = 20\text{ V}$, $\lambda = 870\text{ nm}$ Detection limit	D^*	3.5×10^{12}	3.5×10^{12}	$\frac{\text{cm} \times \sqrt{\text{Hz}}}{\text{W}}$

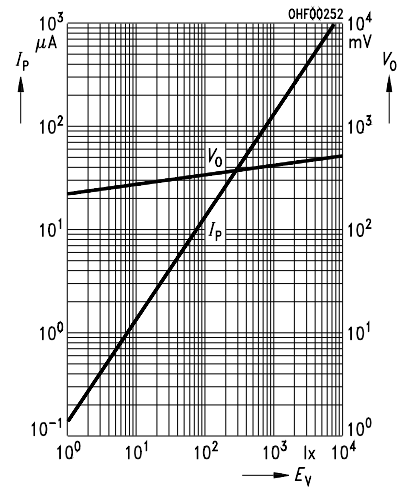
Relative Spectral Sensitivity
SFH 213, $S_{\text{rel}} = f(\lambda)$



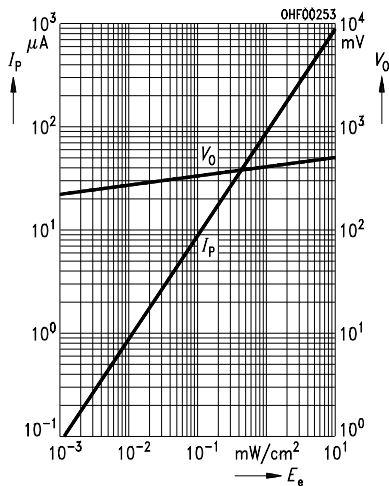
Relative Spectral Sensitivity
SFH 213 FA, $S_{\text{rel}} = f(\lambda)$



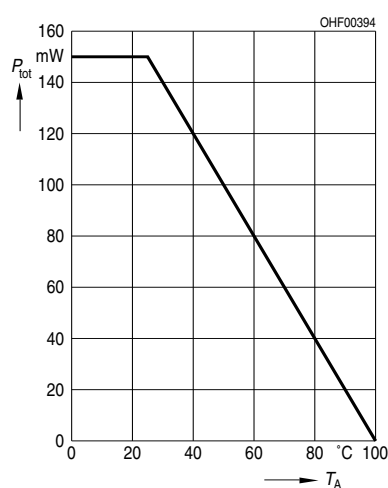
Photocurrent $I_P = f(E_v)$, $V_R = 5 \text{ V}$
Open-Circuit Voltage $V_O = f(E_v)$
SFH 213



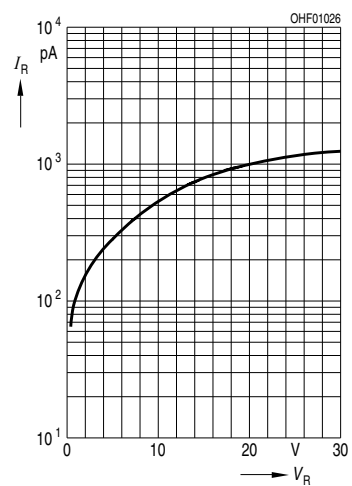
Photocurrent $I_P = f(E_e)$, $V_R = 5 \text{ V}$
Open-Circuit Voltage $V_O = f(E_e)$
SFH 213 FA



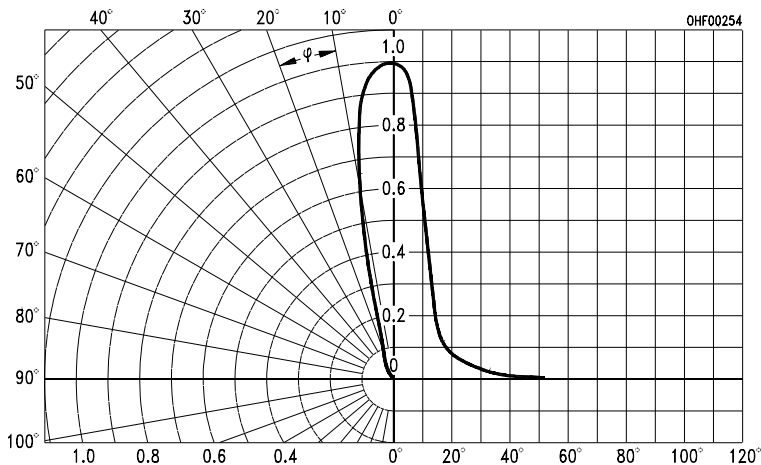
Total Power Dissipation
 $P_{\text{tot}} = f(T_A)$



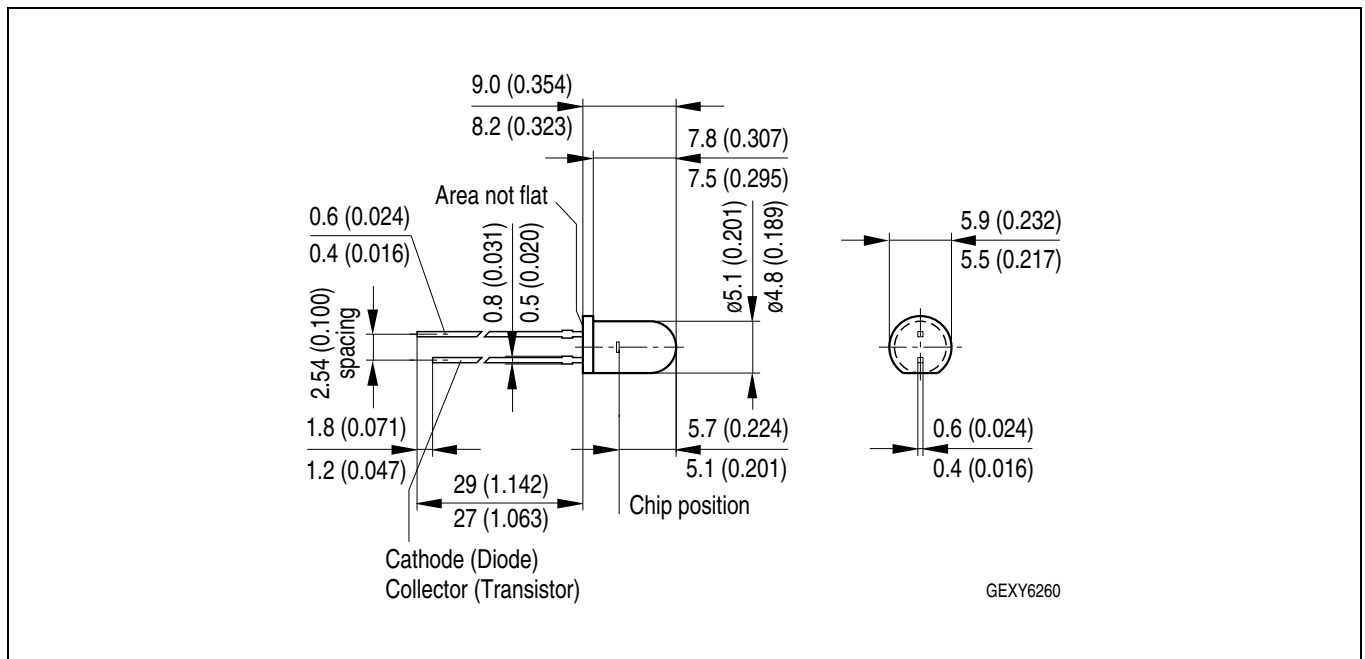
Dark Current
 $I_R = f(V_R), E = 0$



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



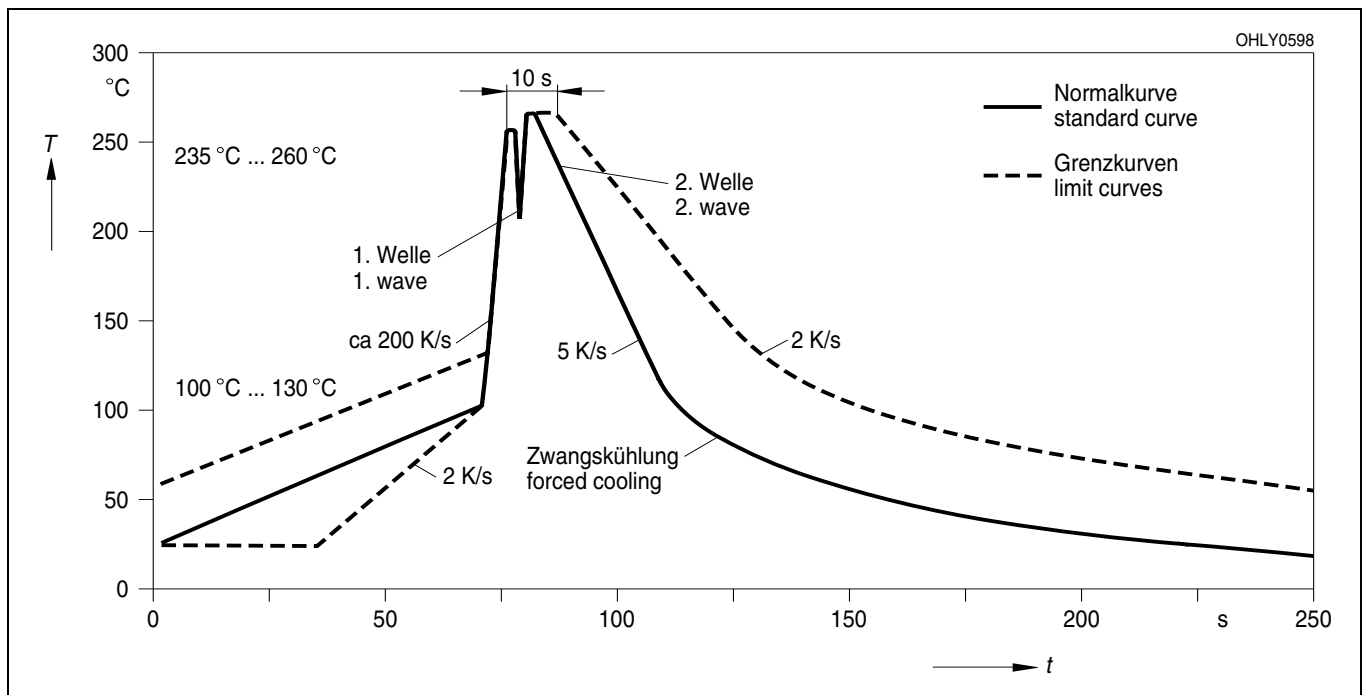
Maßzeichnung Package Outlines



Maße in mm (inch) / Dimensions in mm (inch).

Lötbedingungen Soldering Conditions Wellenlöten (TTW) TTW Soldering

(nach CECC 00802)
(acc. to CECC 00802)



EU RoHS and China RoHS compliant product



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