

# Silizium-PIN-Fotodiode mit sehr kurzer Schaltzeit in SMR<sup>®</sup> Gehäuse Silicon PIN Photodiode with Very Short Switching Time in SMR<sup>®</sup> Package Lead (Pb) Free Product - RoHS Compliant

## SFH 2500/FA SFH 2505/FA



SFH 2500



SFH 2500FA



SFH 2505



SFH 2505FA

### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm (SFH 2500/2505) und bei 880 nm (SFH 2500 FA/2505 FA)
- SMR<sup>®</sup> (Surface Mount Radial) Gehäuse
- Kurze Schaltzeit (typ. 5 ns)
- Passend zu IRED SFH 451x, SFH 458x, SFH 450x
- Für Oberflächenmontage (SMT) geeignet
- Gegurtet lieferbar

### Anwendungen

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

### Features

- Especially suitable for applications from 400 nm to 1100 nm (SFH 2500/2505) and of 880 nm (SFH 2500 FA/2505 FA)
- SMR<sup>®</sup> (Surface Mount Radial) package
- Short switching time (typ. 5 ns)
- Matches IRED SFH 451x, SFH 458x, SFH 450x
- Suitable for surface mounting (SMT)
- Available on tape and reel

### Applications

- Industrial electronics
- For control and drive circuits
- Photointerrupters
- Data transmission

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 2500	Q65110A1201	5-mm-SMR <sup>®</sup> -Gehäuse (T 1 3/4), klares (SFH 2500/2505) und schwarz eingefärbtes (SFH 2500 FA/2505 FA) Epoxy-Gießharz, Anschlüsse (SFH 2500/2500 FA gebogen, SFH 2505/2505 FA gerade) im 2.54-mm-Raster (1/10"), Kathodenkennzeichnung: siehe Maßzeichnung. 5 mm SMR <sup>®</sup> package (T 1 3/4), clear (SFH 2500/2505) and black-colored (SFH 2500 FA/2505 FA) epoxy resin, solder tabs (SFH 2500/2500 FA bent, SFH 2505/2505 FA straight) lead spacing 2.54 mm (1/10"), cathode marking: see package outline.
SFH 2505	Q65110A1203	
SFH 2500 FA	Q65110A1202	
SFH 2505 FA	Q65110A1204	

**Grenzwerte  
Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating and storage temperature range	$T_{op}; T_{stg}$	- 40 ... + 85	°C
Sperrspannung Reverse voltage	$V_R$	50	V
Verlustleistung Total power dissipation	$P_{tot}$	100	mW

Kennwerte ( $T_A = 25\text{ °C}$ )

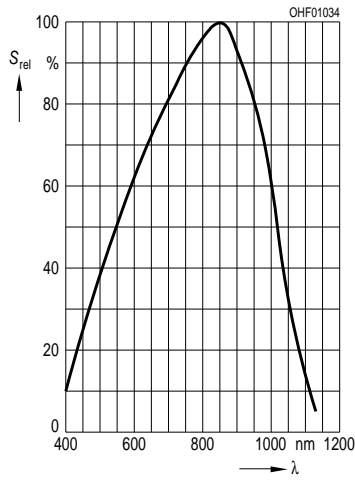
## Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 2500 SFH 2505	SFH 2500 FA SFH 2505 FA	
Fotostrom Photocurrent $V_R = 5\text{ V}$ , Normlicht/standard light A, $T = 2856\text{ K}$ , $E_V = 1000\text{ lx}$ $V_R = 5\text{ V}$ , $\lambda = 870\text{ nm}$ , $E_e = 1\text{ mW/cm}^2$	$I_P$  $I_P$	100  70 (> 50)	–  70 (> 50)	$\mu\text{A}$  $\mu\text{A}$
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	850	900	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	400 ... 1100	750 ... 1100	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	1	1	$\text{mm}^2$
Abmessung der bestrahlungsempfindlichen Fläche Dimensions of radiant sensitive area	$L \times B$ $L \times W$	$1 \times 1$	$1 \times 1$	mm×mm
Halbwinkel Half angle	$\varphi$	$\pm 15$	$\pm 15$	Grad deg.
Dunkelstrom, $V_R = 20\text{ V}$ Dark current	$I_R$	0.1 ( $\leq 5$ )	0.1 ( $\leq 5$ )	nA
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  390 (> 320)	–  390 (> 320)	mV  mV
Kurzschlussstrom Short-circuit current $E_V = 1000\text{ lx}$ , Normlicht/standard light A, $T = 2856\text{ K}$ $E_e = 1.0\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$	$I_{SC}$  $I_{SC}$	100  70	–  70	$\mu\text{A}$  $\mu\text{A}$
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
Kapazität, $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_0$	11	11	pF

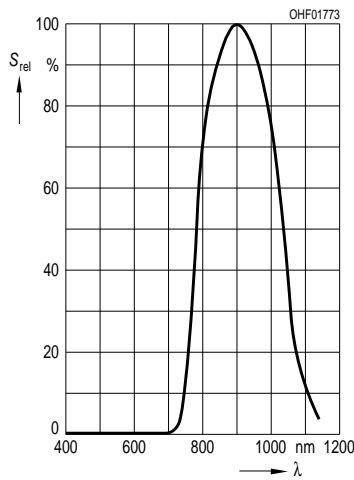
**Kennwerte** ( $T_A = 25\text{ °C}$ )  
**Characteristics** (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 2500 SFH 2505	SFH 2500 FA SFH 2505 FA	
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	- 0.1	%/K
Rauschäquivalente Strahlungsleistung Noise equivalent power $V_R = 20\text{ V}$ , $\lambda = 850\text{ nm}$	$NEP$	$2.9 \times 10^{-14}$	$2.9 \times 10^{-14}$	$\frac{W}{\sqrt{Hz}}$
Nachweisgrenze, $V_R = 20\text{ V}$ , $\lambda = 850\text{ nm}$ Detection limit	$D^*$	$3.5 \times 10^{12}$	$3.5 \times 10^{12}$	$\frac{cm \times \sqrt{Hz}}{W}$

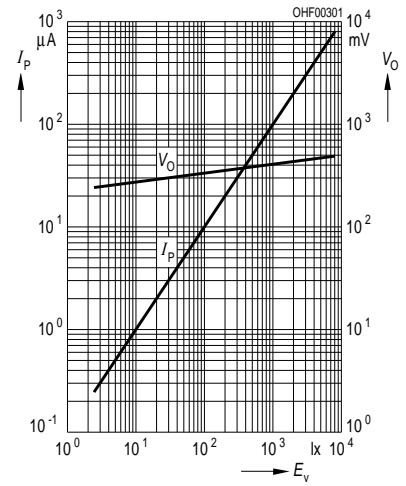
**Relative Spectral Sensitivity**  
 $S_{rel} = f(\lambda)$   
**SFH 2500/2505**



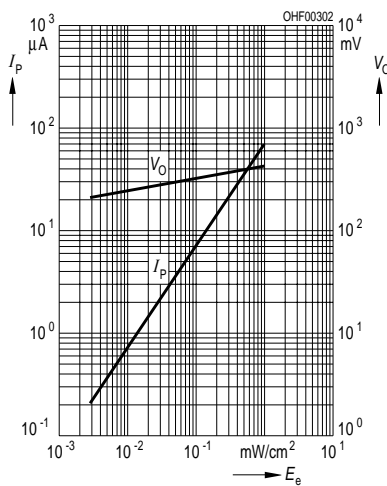
**Relative Spectral Sensitivity**  
 $S_{rel} = f(\lambda)$   
**SFH 2500 FA/2505 FA**



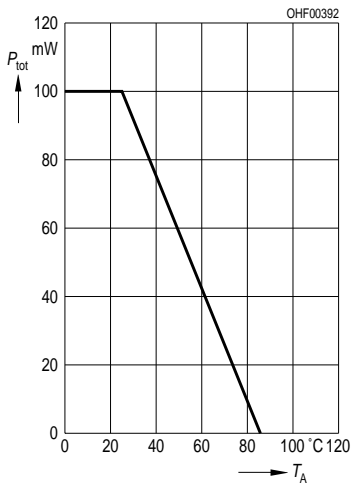
**Photocurrent  $I_P = f(E_v)$ ,  $V_R = 5 V$**   
**Open-Circuit Voltage  $V_O = f(E_v)$**   
**SFH 2500/2505**



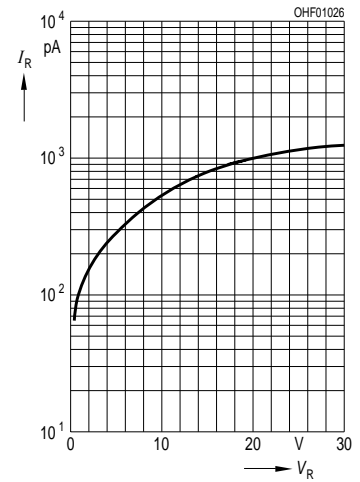
**Photocurrent  $I_P = f(E_e)$ ,  $V_R = 5 V$**   
**Open-Circuit-Voltage  $V_O = f(E_e)$**   
**SFH 2500 FA/2505 FA**



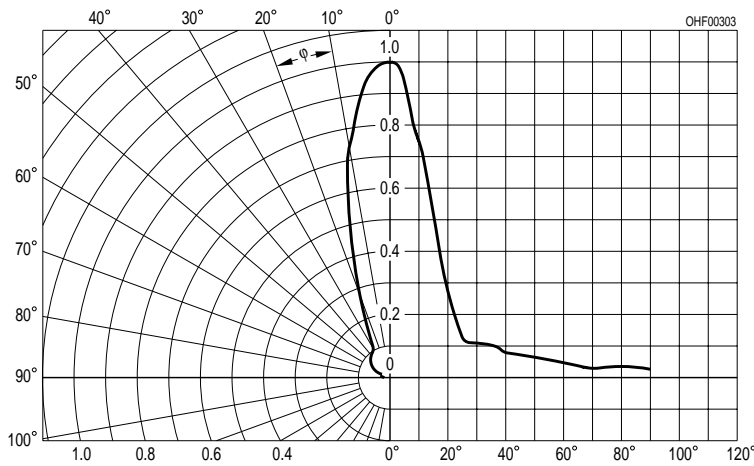
**Total Power Dissipation**  
 $P_{tot} = f(T_A)$



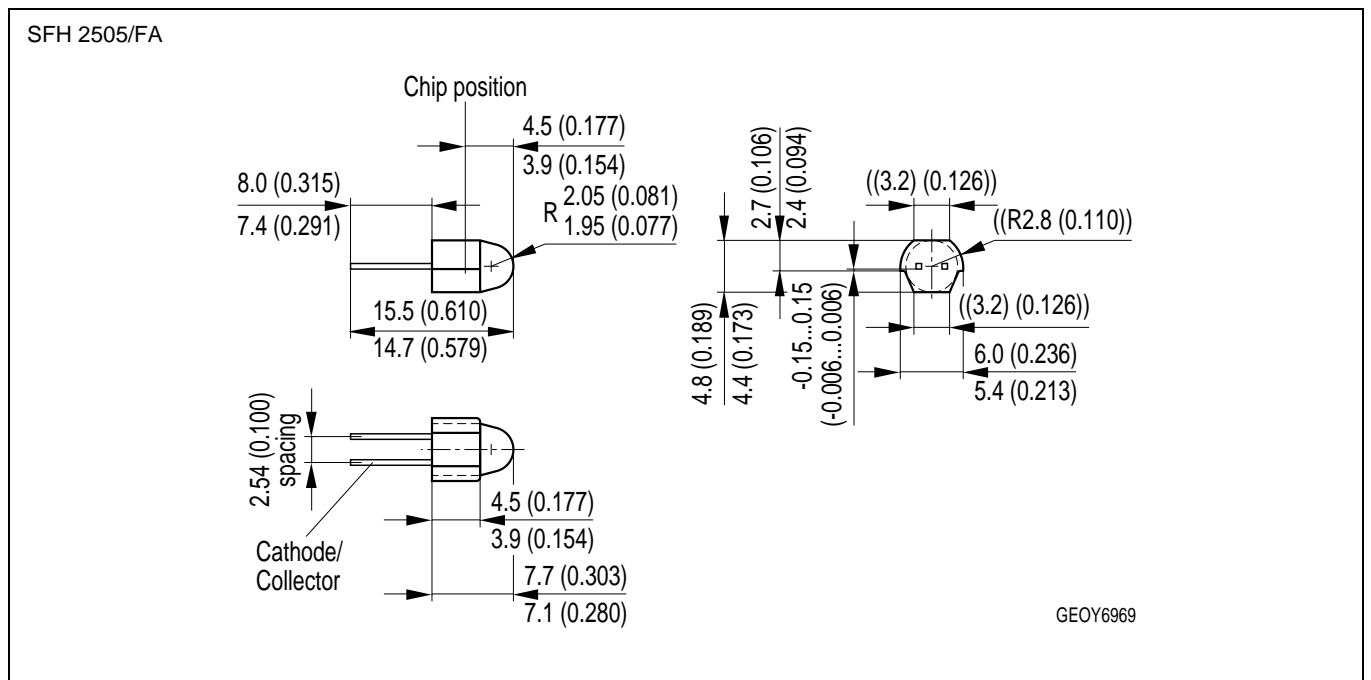
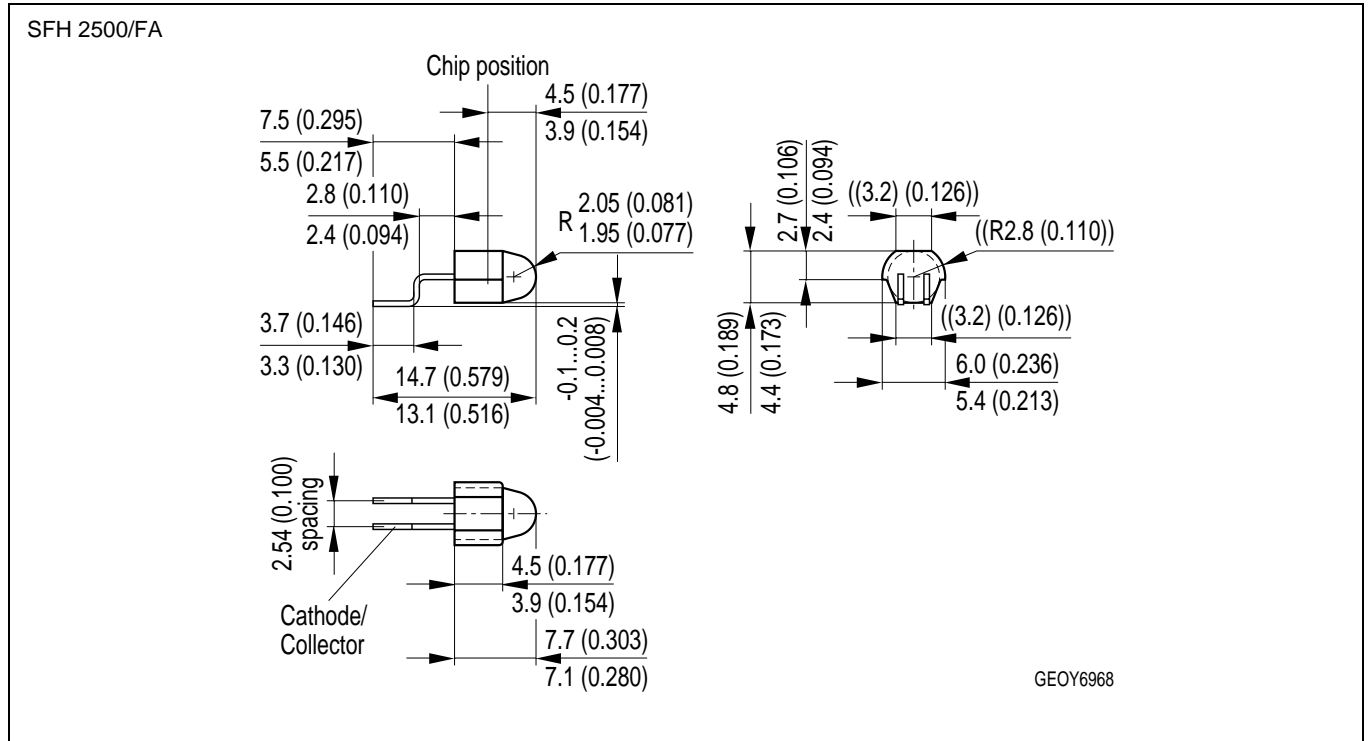
**Dark Current**  
 $I_R = f(V_R), E = 0$



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



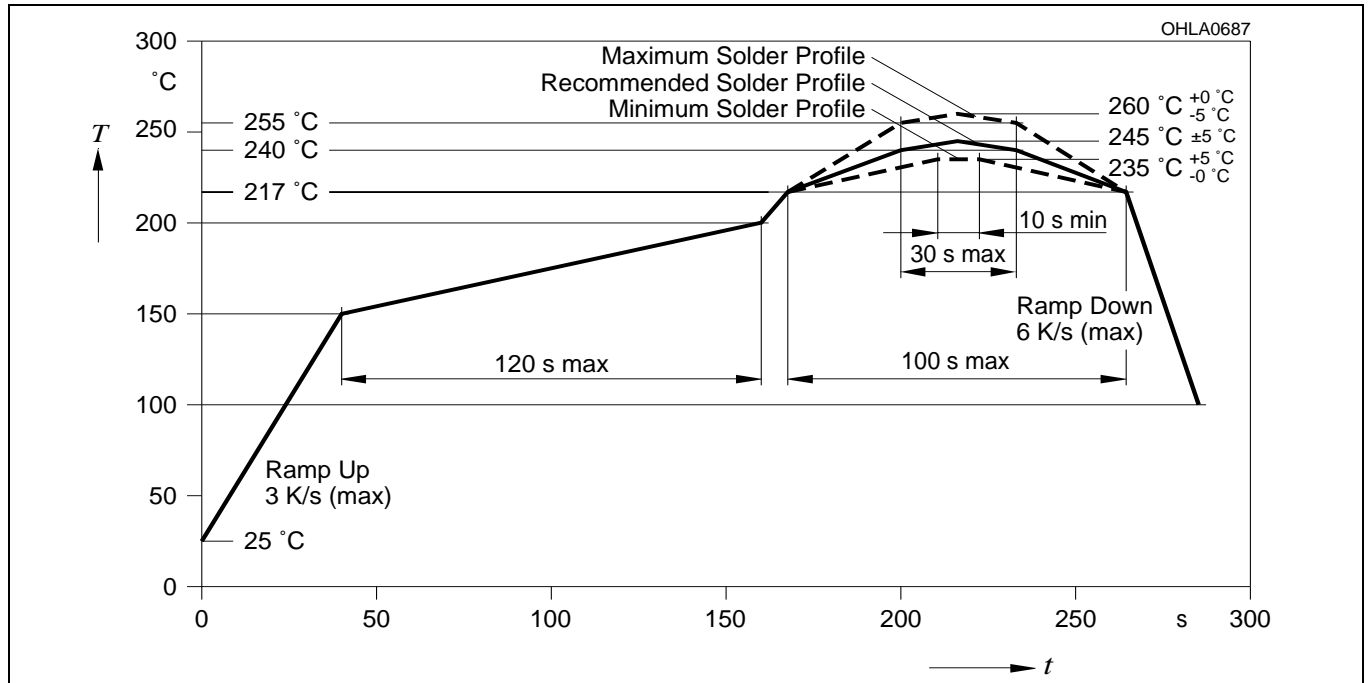
Maßzeichnung  
Package Outlines



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

**Lötbedingungen**  
**Soldering Conditions**  
**Reflow Lötprofil für bleifreies Löten**  
**Reflow Soldering Profile for lead free soldering**

Vorbehandlung nach JEDEC Level 3  
 Preconditioning acc. to JEDEC Level 3  
 (nach J-STD-020C)  
 (acc. to J-STD-020C)



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EU RoHS and China RoHS compliant product



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