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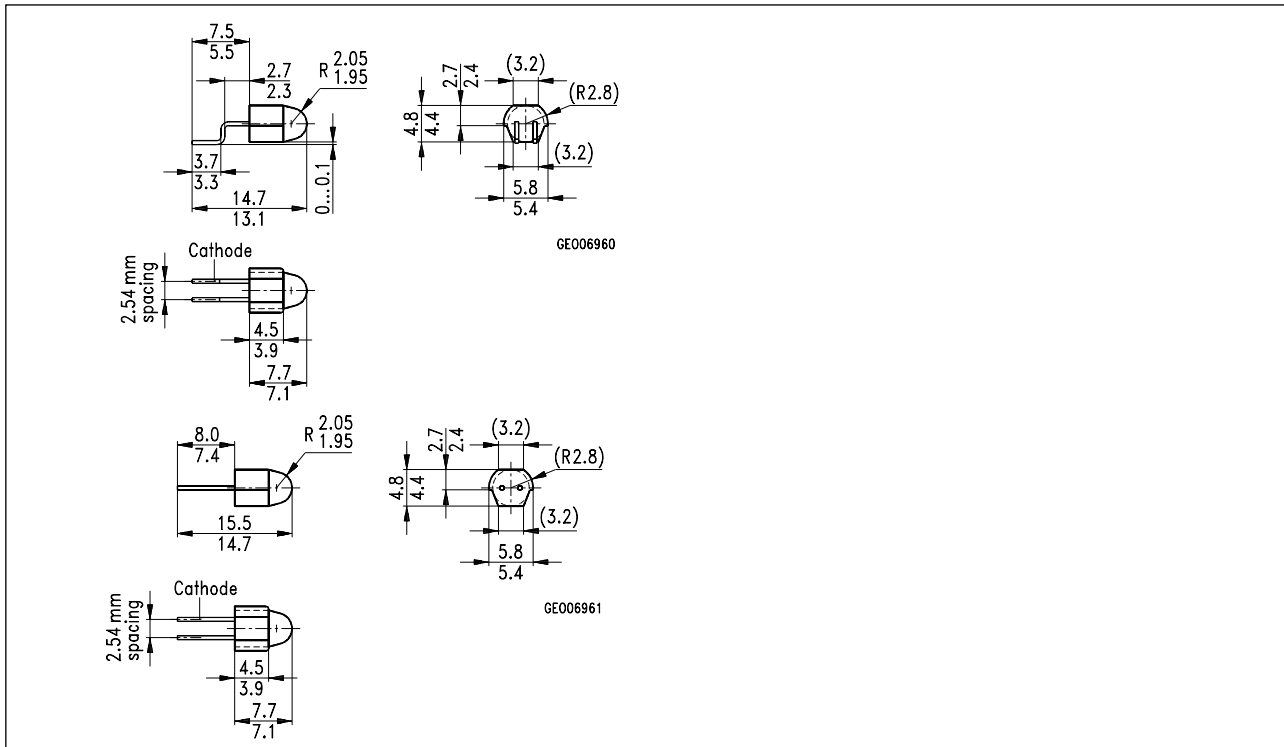
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Silizium-PIN-Fotodiode mit sehr kurzer Schaltzeit Silicon PIN Photodiode with Very Short Switching Time

SFH 2540/FA
SFH 2545/FA



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

Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 400 nm bis 1100 nm (SFH 2540/2545) und bei 880 nm (SFH 2540 FA/2545 FA)
- Kurze Schaltzeit (typ. 5 ns)
- 5 mm-Plastikbauform im LED-Gehäuse
- Auch gegurtet lieferbar
- Für Oberflächenmontage geeignet

Anwendungen

- Industrieelektronik
- "Messen/Steuern/Regeln"
- Schnelle Lichtschranken für Gleich- und Wechsellichtbetrieb

Features

- Especially suitable for applications from 400 nm to 1100 nm (SFH 2540/2545) and of 880 nm (SFH 2540 FA/2545 FA)
- Short switching time (typ. 5 ns)
- 5 mm LED plastic package
- Also available on tape
- Suitable for surface mounting

Applications

- Industrial electronics
- For control and drive circuits
- Photointerrupters

Typ Type	Bestellnummer Ordering Code	Typ Type	Bestellnummer Ordering Code
SFH 2540	Q	SFH 2540 FA	Q62702-P1795
SFH 2545	Q	SFH 2545 FA	Q

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	50	V
Verlustleistung Total power dissipation	P_{tot}	100	mW

Kennwerte ($T_A = 25$ °C) Characteristics

Bezeichnung Description	Symbol Symbol	Wert Value		Einheit Unit
		SFH 2540 SFH 2545	SFH 2540 FA SFH 2545 FA	
Fotoempfindlichkeit Spectral sensitivity $V_R = 5$ V, Normlicht/standard light A, $T = 2856$ K, $V_R = 5$ V, $\lambda = 870$ nm, $E_e = 1$ mW/cm ²	S S	100 (> 75) –	– 70 (> 50)	nA/lx 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	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	mm×mm
Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface	H	3.9 ... 4.4	3.9 ... 4.4	mm

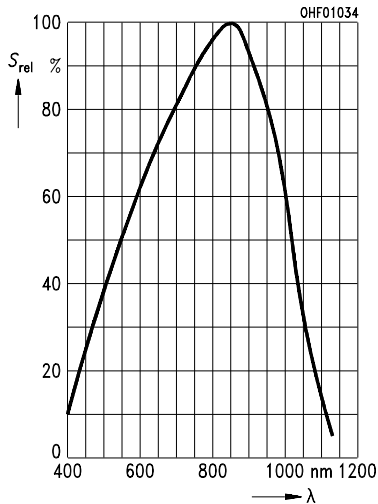
Kennwerte ($T_A = 25\text{ °C}$) Characteristics (cont'd)

Bezeichnung Description	Symbol Symbol	Wert Value		Einheit Unit
		SFH 2540 SFH 2545	SFH 2540 FA SFH 2545 FA	
Halbwinkel Half angle	φ	± 15	± 15	Grad deg.
Dunkelstrom, $V_R = 10\text{ V}$ 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> Photons
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 (> 360) –	– 390 (> 320)	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}	100 –	– 35	μA μA
Anstiegs- und Abfallzeit des Fotostromes Rise and fall time of the photocurrent $R_L = 50\text{ }\Omega$; $V_R = 5\text{ V}$; $\lambda = 850\text{ nm}$; $I_p = 800\text{ }\mu\text{A}$	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
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 $V_R = 20\text{ V}$, $\lambda = 850\text{ nm}$	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}	$\frac{\text{cm} \cdot \sqrt{\text{Hz}}}{\text{W}}$

Relative spectral sensitivity

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

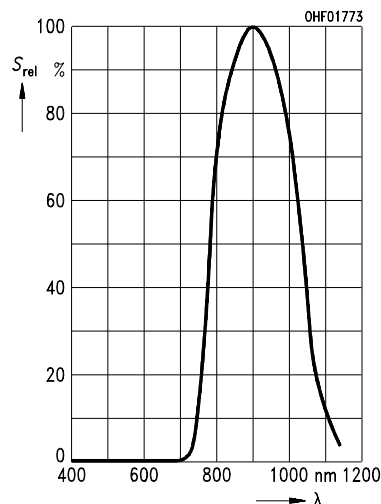
SFH 2540/2545



Relative spectral sensitivity

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

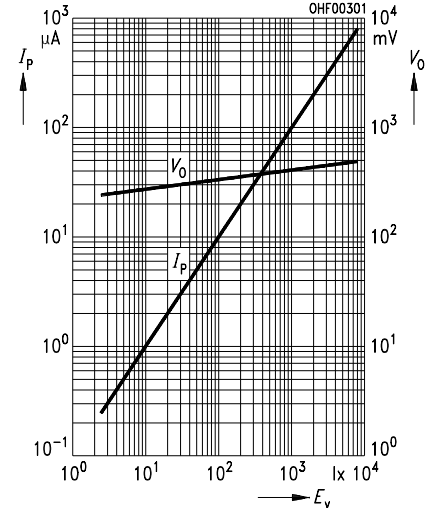
SFH 2540 FA/2545 FA



Photocurrent $I_P = f(E_v)$, $V_R = 5 \text{ V}$

Open-circuit voltage $V_O = f(E_v)$

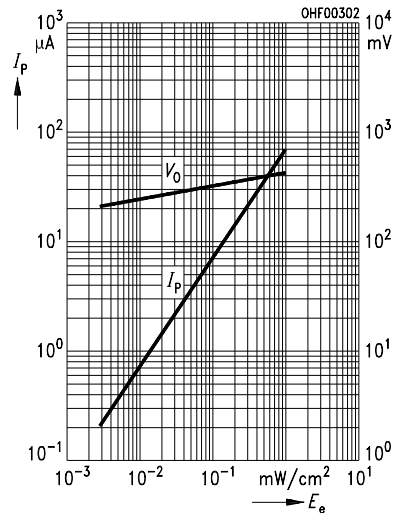
SFH 2540/2545



Photocurrent $I_P = f(E_e)$, $V_R = 5 \text{ V}$

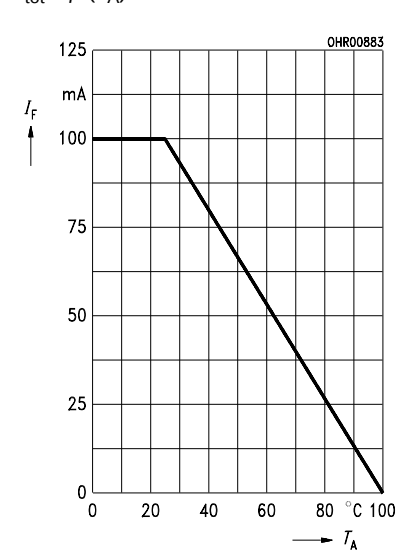
Open-circuit voltage $V_O = f(E_e)$

SFH 2540 FA/2545 FA



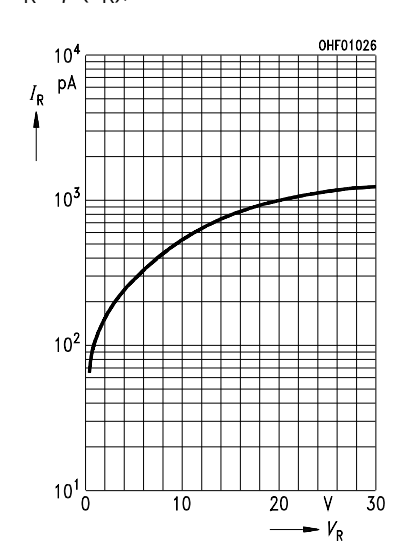
Total power dissipation

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



Dark current

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



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

