

**NPN-Silizium-Fototransistor in SMR<sup>®</sup> Gehäuse**  
**Silicon NPN Phototransistor in SMR<sup>®</sup> Package**  
**Lead (Pb) Free Product - RoHS Compliant**

**SFH 3500**



**Wesentliche Merkmale**

- **Spektraler Bereich der Fotoempfindlichkeit:**  
450 nm ...1060 nm
- **Gehäuse:** SMR<sup>®</sup> (Surface Mount Radial), Harz
- **Besonderheit des Bauteils:**  
hohe Fotoempfindlichkeit
- **Gehäusegleich:** IRED SFH 4500, SFH 4515

**Anwendungen**

- Fertigungs- und Kontrollanwendungen der Industrie
- „Messen/Steuern/Regeln“
- Lichtschranken

**Features**

- **Spectral Range of Sensitivity:**  
450 nm ...1060 nm
- **Package:** SMR<sup>®</sup> (Surface Mount Radial), Epoxy
- **Feature of the device:**  
high photosensitivity
- **Package Match:** IR emitter SFH 4500, SFH 4515

**Applications**

- A variety of manufacturing and monitoring applications
- For control and drive circuits
- Photointerrupters

Typ Type	Bestellnummer Ordering Code	Fotostrom , $E_e = 0.5 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_{CE} = 5 \text{ V}$ Photocurrent $I_{PCE} \text{ (mA)}$
SFH 3500	Q65110A2636	4.0...20.0

**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
Kollektor-Emitterspannung Collector-emitter voltage	$V_{CE}$ $V_{CE} (t < 2 \text{ min})$	35 70	V V
Kollektorstrom Collector current	$I_C$	50	mA
Kollektorspitzenstrom, $\tau < 10 \mu\text{s}$ Collector surge current	$I_{CS}$	100	mA
Emitter-Kollektorspannung Emitter-collector voltage	$V_{EC}$	7	V
Verlustleistung, $T_A = 25 \text{ °C}$ Total power dissipation	$P_{tot}$	150	mW
Wärmewiderstand Thermal resistance	$R_{thJA}$	400	K/W

**Kennwerte** ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	830	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	450 ... 1060	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	0.55	mm <sup>2</sup>
Abmessungen der Chip-Fläche Dimension of chip area	$L \times B$ $L \times W$	1.00 × 1.00	mm × mm
Halbwinkel Half angle	$\varphi$	± 13	Grad deg.
Kapazität, $V_{\text{CE}} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{\text{CE}}$	10	pF
Dunkelstrom, $V_{\text{CE}} = 20$ Dark current	$I_{\text{CEO}}$	3 (< 200)	nA

Die Fototransistoren werden nach ihrer Fotoempfindlichkeit gruppiert und mit arabischen Ziffern gekennzeichnet.

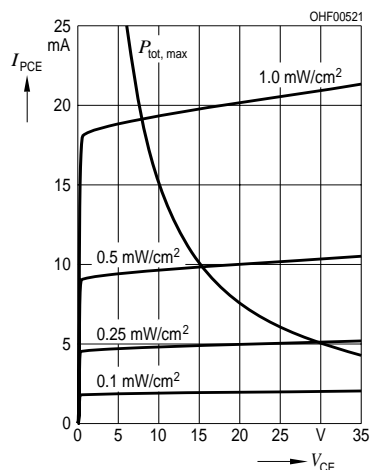
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		-4	-5	-6	
Fotostrom Photocurrent $E_e = 0.5 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CE} = 5 \text{ V}$	$I_{PCE}$	4.0 ... 8.0	6.3 ... 12.5	10.0 ... 20.0	mA
Anstiegszeit/Abfallzeit Rise and fall time $R_L = 1 \text{ k}\Omega, V_{CC} = 5 \text{ V},$ $\lambda = 950 \text{ nm}, I_C = 1 \text{ mA}$	$t_r, t_f$	17	20	24	$\mu\text{s}$
Kollektor-Emitter- Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCEmin}^{1)} \times 0.3,$ $E_e = 0.5 \text{ mW/cm}^2$	$V_{CEsat}$	150 ( $< 200$ )	150 ( $< 200$ )	150 ( $< 200$ )	mV

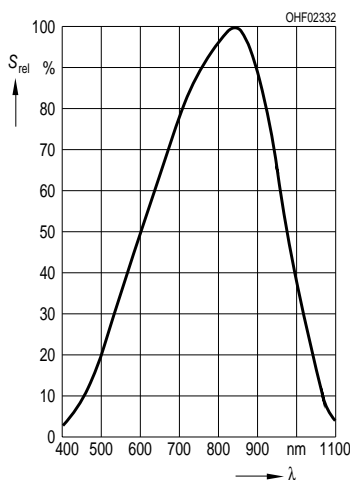
<sup>1)</sup>  $I_{PCEmin}$  ist der minimale Fotostrom der jeweiligen Gruppe.

<sup>1)</sup>  $I_{PCEmin}$  is the min. photocurrent of the specified group.

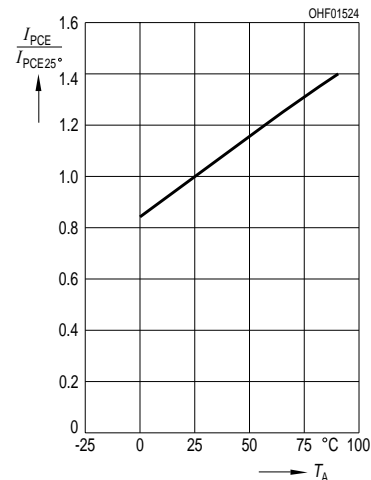
**Photocurrent**  $I_{PCE} = f(V_{CE})$ ,  $E_e = \text{Parameter}$



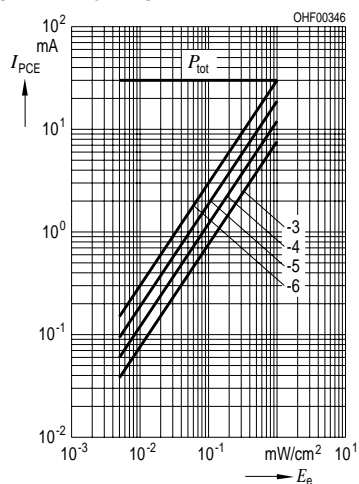
**Relative Spectral Sensitivity**,  $S_{rel} = f(\lambda)$



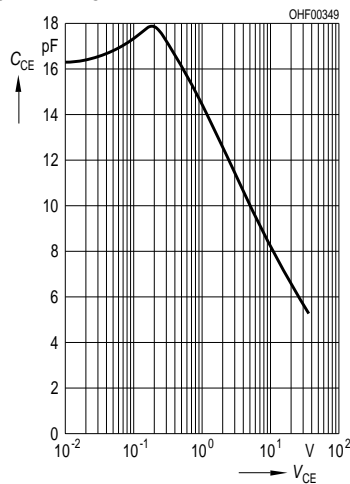
**Photocurrent**  $I_{PCE} / I_{PCE25^\circ} = f(T_A)$ ,  $V_{CE} = 5 \text{ V}$



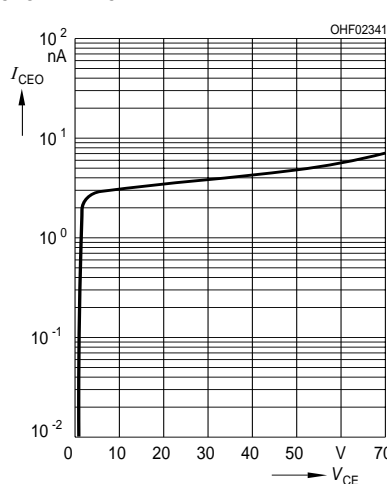
**Photocurrent**  $I_{PCE} = f(E_e)$ ,  $V_{CE} = 5 \text{ V}$



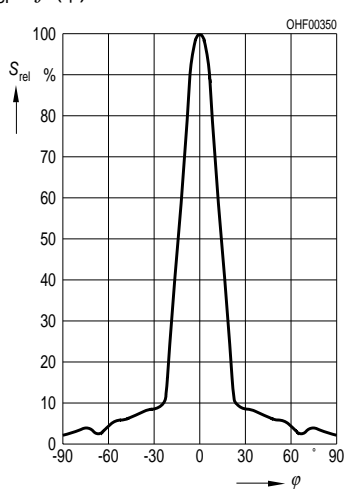
**Capacitance**  $C_{CE} = f(V_{CE})$ ,  $f = 1 \text{ MHz}$ ,  $E = 0$



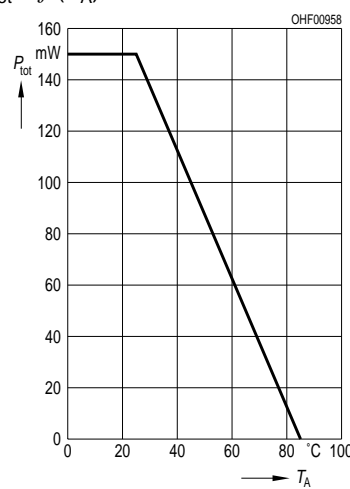
**Dark Current**  $I_{CEO} = f(V_{CE})$ ,  $E = 0$



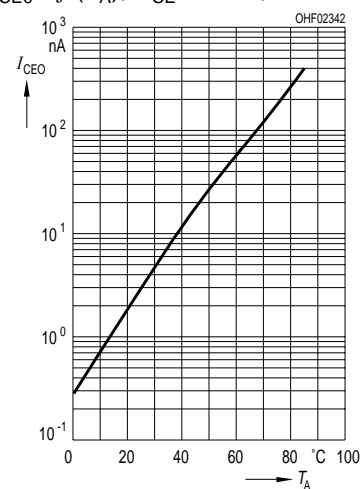
**Directional Characteristics**  $S_{rel} = f(\varphi)$



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



**Dark Current**  $I_{CEO} = f(T_A)$ ,  $V_{CE} = 20 \text{ V}$ ,  $E = 0$

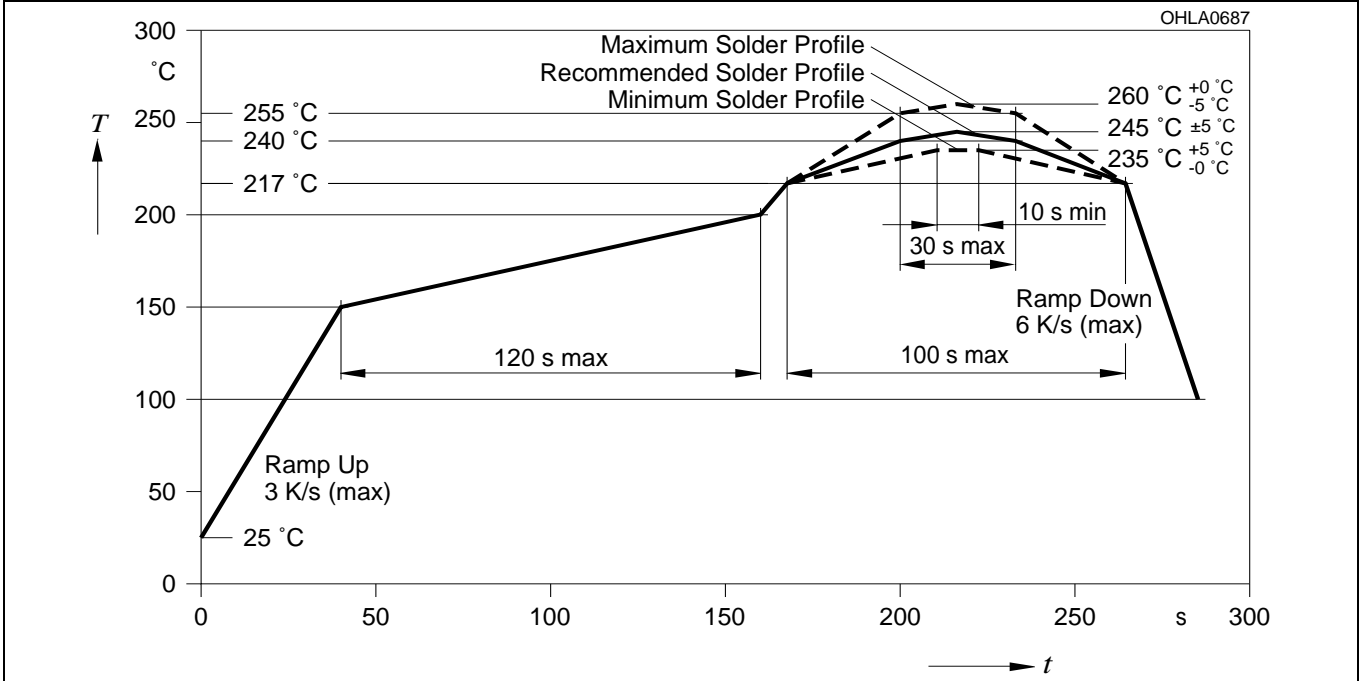


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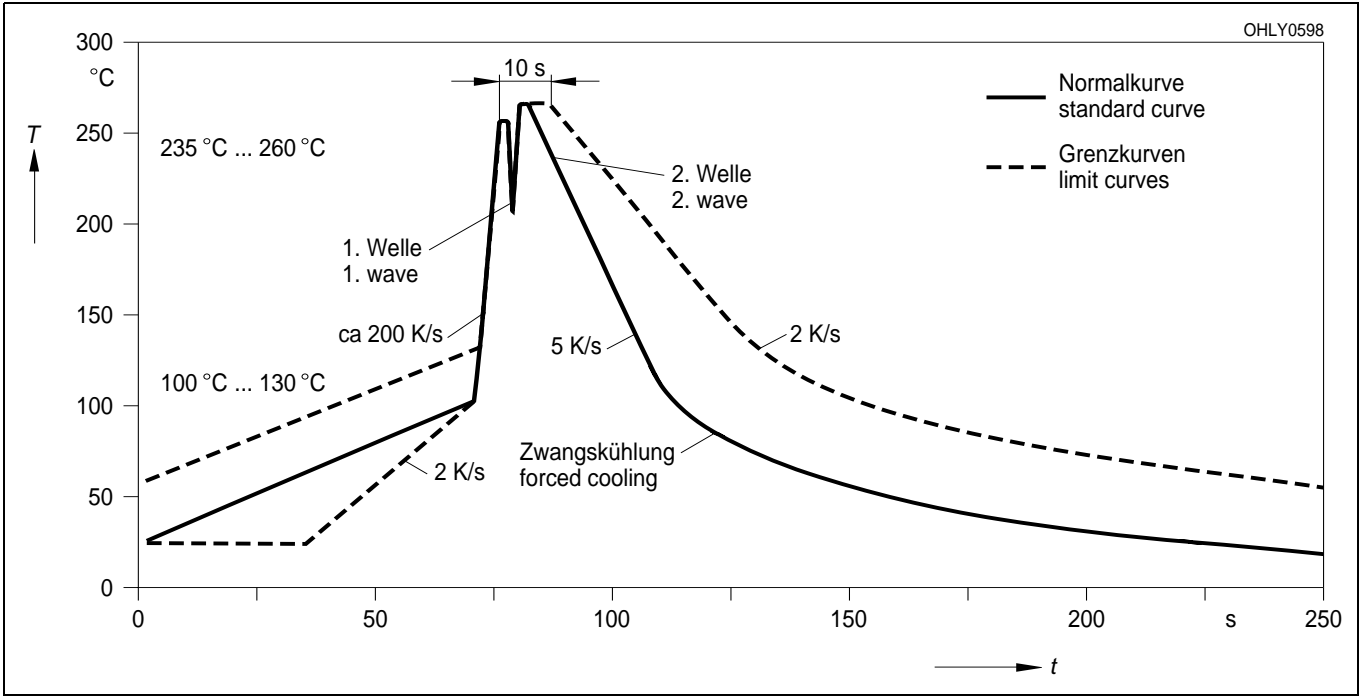
**Lötbedingungen**  
**Soldering Conditions**  
**Reflow Lötprofil für bleifreies Löten**  
**Reflow Soldering Profile for lead free soldering**

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



**Wellenlöten (TTW)**  
**TTW Soldering**

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



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