

# NPN-Silizium-Fototransistor Silicon NPN Phototransistor

## SFH 3401



### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 460 nm bis 1080 nm
- Hohe Linearität
- SMT-Bauform mit Basisanschluß, geeignet für Vapor Phase-Löten und IR-Reflow-Löten (JEDEC level 4)
- Nur gegurtet lieferbar

### Anwendungen

- Umgebungslicht-Detektor
- Lichtschranken für Gleich- und Wechsellichtbetrieb
- Industrieelektronik
- „Messen/Steuern/Regeln“

### Features

- Especially suitable for applications from 460 nm to 1080 nm
- High linearity
- SMT package with base connection, suitable for vapor phase and IR reflow soldering (JEDEC level 4)
- Available only on tape and reel

### Applications

- Ambient light detector
- Photointerrupters
- Industrial electronics
- For control and drive circuits

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 3401	Q62702-P5014	Klares Epoxy-Gießharz, Kollektorkennzeichnung: breiter Anschluß Transparent epoxy resin, collector marking: broad lead
SFH 3401-2/3	Q62702-P5200	

**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
Kollektor-Emitterspannung Collector-emitter voltage	$V_{CE}$	20	V
Kollektor-Emitterspannung, $t < 120$ s Collector-emitter voltage	$V_{CE}$	70	V
Kollektorstrom Collector current	$I_C$	50	mA
Kollektorspitzenstrom, $\tau < 10$ $\mu$ s Collector surge current	$I_{CS}$	100	mA
Emitter-Kollektorspannung Emitter-collector voltage	$V_{EC}$	7	V
Verlustleistung, $T_A = 25$ °C Total power dissipation	$P_{tot}$	120	mW
Wärmewiderstand für Montage auf PC-Board Thermal resistance for mounting on pcb	$R_{thJA}$	450	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	$\lambda_{S\text{ max}}$	850	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	460 ... 1080	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	0.55	mm <sup>2</sup>
Abmessungen der Chipfläche Dimensions of chip area	$L \times B$ $L \times W$	1 × 1	mm × mm
Halbwinkel Half angle	$\varphi$	± 60	Grad deg.
Kapazität, $V_{\text{CE}} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{\text{CE}}$	15	pF
Kapazität, $V_{\text{CB}} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{\text{CB}}$	45	pF
Kapazität, $V_{\text{EB}} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ Capacitance	$C_{\text{EB}}$	19	pF
Dunkelstrom Dark current $V_{\text{CE}} = 10\text{ V}$ , $E = 0$	$I_{\text{CEO}}$	3 ( $\leq 200$ )	nA
Fotostrom der Kollektor-Basis Fotodiode Photocurrent of collector-base photodiode $E_e = 0.1\text{ mW/cm}^2$ , $V_{\text{CB}} = 5\text{ V}$ $E_v = 1000\text{ lx}$ , Normlicht/standard light A, $V_{\text{CB}} = 5\text{ V}$	$I_{\text{PCB}}$ $I_{\text{PCB}}$	0.28 4.8	$\mu\text{A}$ $\mu\text{A}$

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

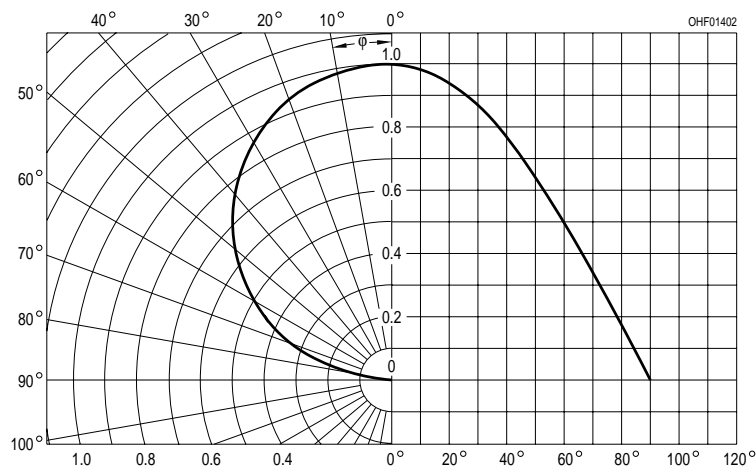
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		-1	-2	-3	
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.1 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$ $E_v = 1000 \text{ lx}$ , Normlicht A/ standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE}$	63 ... 125	100 ... 200	160 ... 320	$\mu\text{A}$
	$I_{PCE}$	1.65	2.6	4.2	mA
Anstiegszeit/Abfallzeit Rise and fall time $I_C = 1 \text{ mA}$ , $V_{CC} = 5 \text{ V}$ , $R_L = 1 \text{ k}\Omega$	$t_r$ , $t_f$	16	24	34	$\mu\text{s}$
Kollektor-Emitter- Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCEmin}^{1)} \times 0.3$ , $E_e = 0.1 \text{ mW/cm}^2$	$V_{CEsat}$	170	170	170	mV
Stromverstärkung Current gain $E_e = 0.1 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$	$I_{PCE}/I_{PCB}$	340	530	860	—

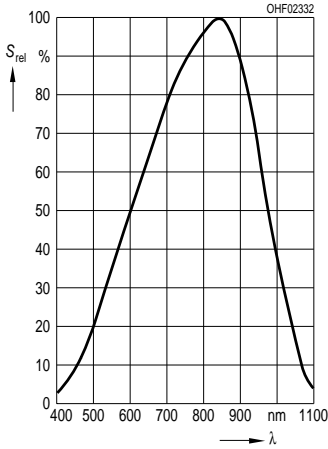
1)  $I_{PCEmin}$  ist der minimale Fotostrom der jeweiligen Gruppe.

1)  $I_{PCEmin}$  is the min. photocurrent of the specified group.

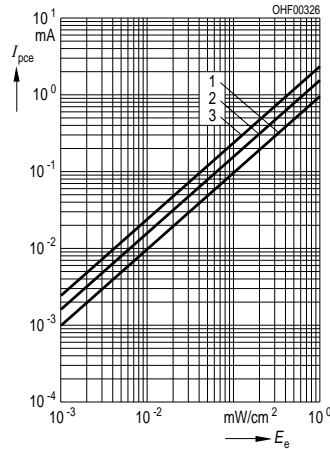
#### Directional Characteristics $S_{rel} = f(\varphi)$



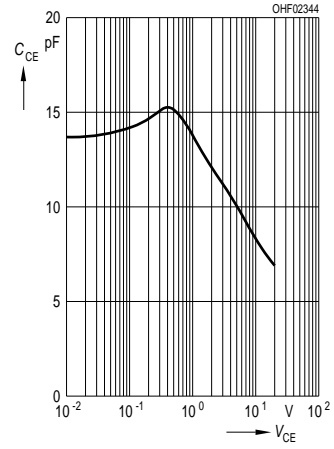
**Rel. Spectral Sensitivity,**  
 $S_{rel} = f(\lambda)$



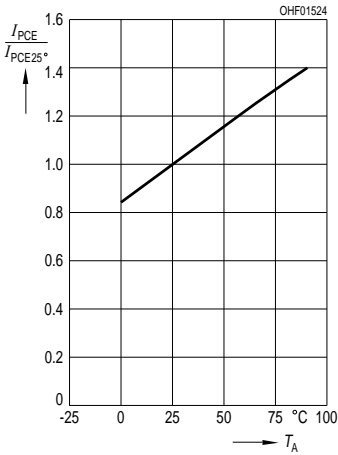
**Photocurrent**  
 $I_{PCE} = f(E_e), V_{CE} = 5 V$



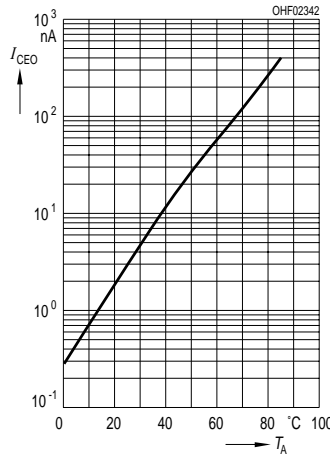
**Collector-Emitter Capacitance**  
 $C_{CE} = f(V_{CE}), f = 1 MHz, E = 0$



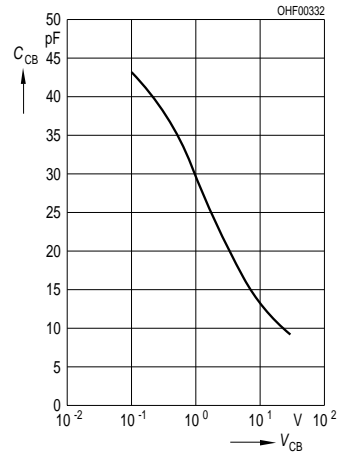
**Photocurrent**  $I_{PCE} = f(T_A)$ ,  
 $V_{CE} = 5 V$ , normalized to 25 °C



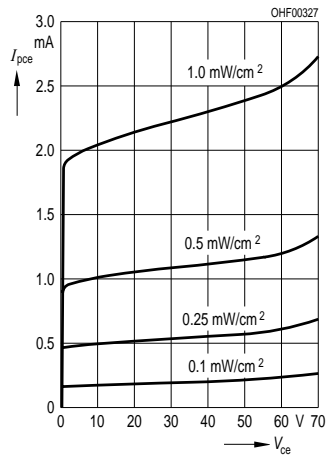
**Dark Current**  
 $I_{CEO} = f(T_A), V_{CE} = 10 V, E = 0$



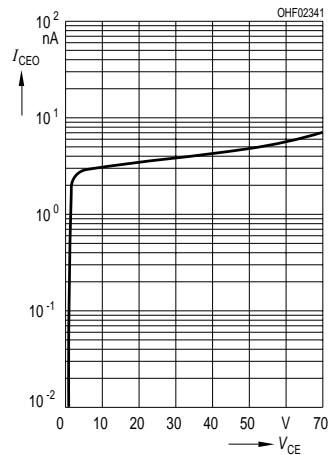
**Collector-Base Capacitance**  
 $C_{CB} = f(V_{CB}), f = 1 MHz, E = 0$



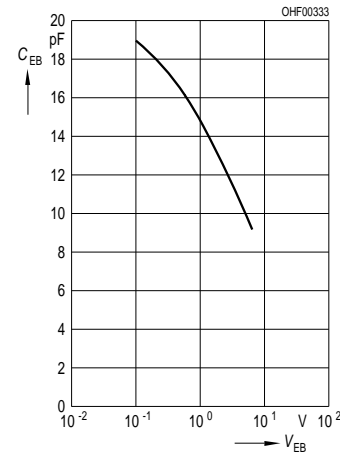
**Photocurrent**  
 $I_{PCE} = f(V_{CE})$  SFH 3401-3



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

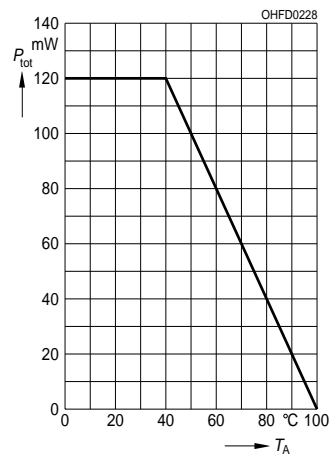


**Emitter-Base Capacitance**  
 $C_{EB} = f(V_{EB}), f = 1 MHz, E = 0$



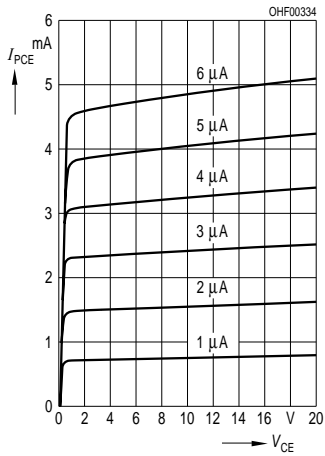
**Total Power Dissipation**

$P_{tot} = f(T_A)$

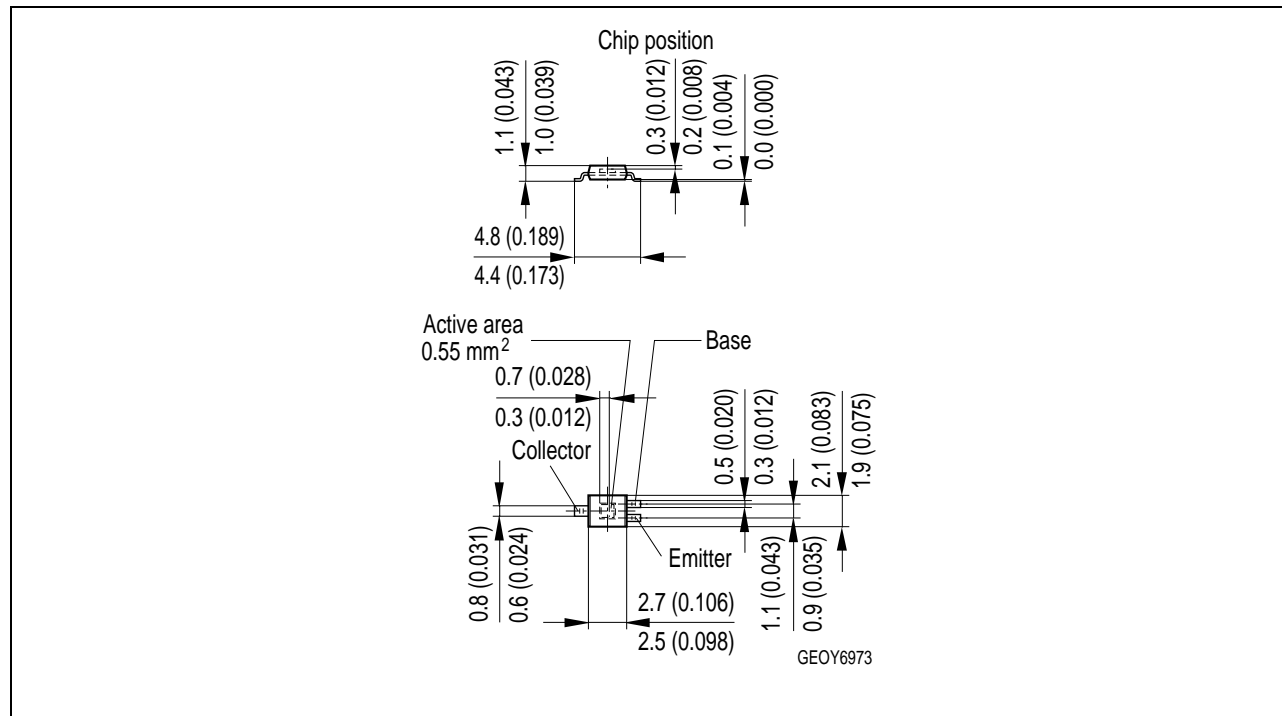


**Photocurrent**

$I_{PCE} = f(V_{CE}), I_B = \text{Parameter}$



## Maßzeichnung Package Outlines



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

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### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

**Components used in life-support devices or systems must be expressly authorized for such purpose!** Critical components <sup>1</sup>, may only be used in life-support devices or systems <sup>2</sup> with the express written approval of OSRAM OS.

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