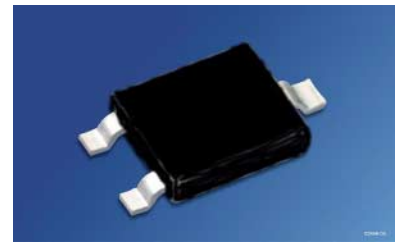


# IR-Empfänger für Fernbedienungen IR-Receiver for Remote Control Systems

## SFH 5410



### Beschreibung

Der SFH 5410 ist ein Infrarot-Empfänger für die Erkennung von Signalen aus Infrarot-Fernbedienungssystemen und bestehen aus Fotodiode, Vorverstärker, automatischer Verstärkungsregelung, Bandpaß-Filter und Demodulator. Das Gehäuse ist zur Unterdrückung des Tageslichteinflusses schwarz eingefärbt.

### Wesentliche Merkmale

- IC mit monolithisch integrierter Fotodiode (Ein-Chip Lösung)
- Speziell geeignet für Anwendungen bei 940 nm
- Hohe Empfindlichkeit
- Verschiedene Trägerfrequenzen erhältlich
- TTL und CMOS kompatibel
- Ausgang: aktiv „Low“
- Keine externe Beschaltung nötig

### Anwendungen

- Empfänger in Fernbedienungen für TV, Videorecorder, HiFi, Satellitenempfänger und CD-Spieler
- Optischer Schalter

### Description

The SFH 5410 is a IR receivers to detect light from infrared remote control systems. The IC includes photodiode, preamplifier, automatic gain control, bandpass and demodulator. The black-colored package is designed as daylight-cutoff filter.

### Features

- IC with monolithic integrated photodiode (single chip solution)
- Especially suitable for applications of 940 nm
- High sensitivity
- Various carrier frequencies available
- TTL and CMOS compatibility
- Output: active Low
- No external components necessary

### Applications

- Remote control module for TV sets, VCRs, hi-fi audio receivers, SAT receivers and compact disk players
- Optical Switch

Typ Type	Trägerfrequenz Carrier Frequency kHz	Bestellnr. Ordering Code	Gehäuse Package
SFH 5410-38	38	Q65110A151	SMT Gehäuse, Tageslichtsperrfilter SMT package, Daylight cut-off filter

**Grenzwerte** ( $T_A = 25\text{ °C}$ )**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Lagertemperatur Storage temperature range	$T_{stg}$	- 40 ... + 85	°C
Betriebsspannung Supply voltage	$V_{CC}$	6.3	V
Ausgangsspannung Output voltage	$V_{OUT}$	6.3	V
Ausgangsstrom Output current	$I_{OUT}$	3	mA
Verlustleistung Total power dissipation, $T_A \leq 85\text{ °C}$	$P_{tot}$	50	mW

**Empfohlener Arbeitsbereich****Recommended Operating Conditions**

Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Betriebstemperatur <sup>1)</sup> Operating temperature <sup>1)</sup>	$T_{op}$	- 40	-	85	°C
Betriebsspannung Supply Voltage	$V_{cc}$	4.5	5.0	5.5	V

<sup>1)</sup> Für einige Teile kann bei niedrigen Temperaturen eine Totzone in der Empfindlichkeit auftreten.  
A sensitivity deadzone can occur for some units at low temperatures.

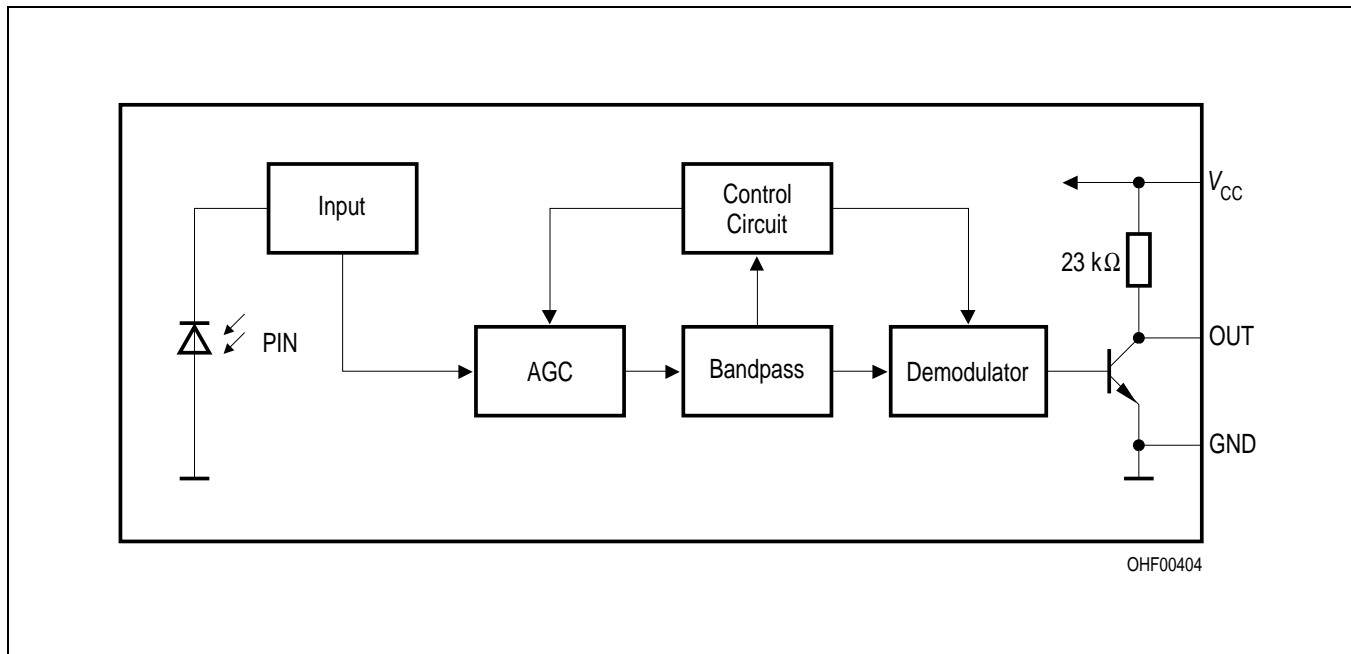
Kennwerte ( $T_A = 25\text{ °C}$ )

## Characteristics

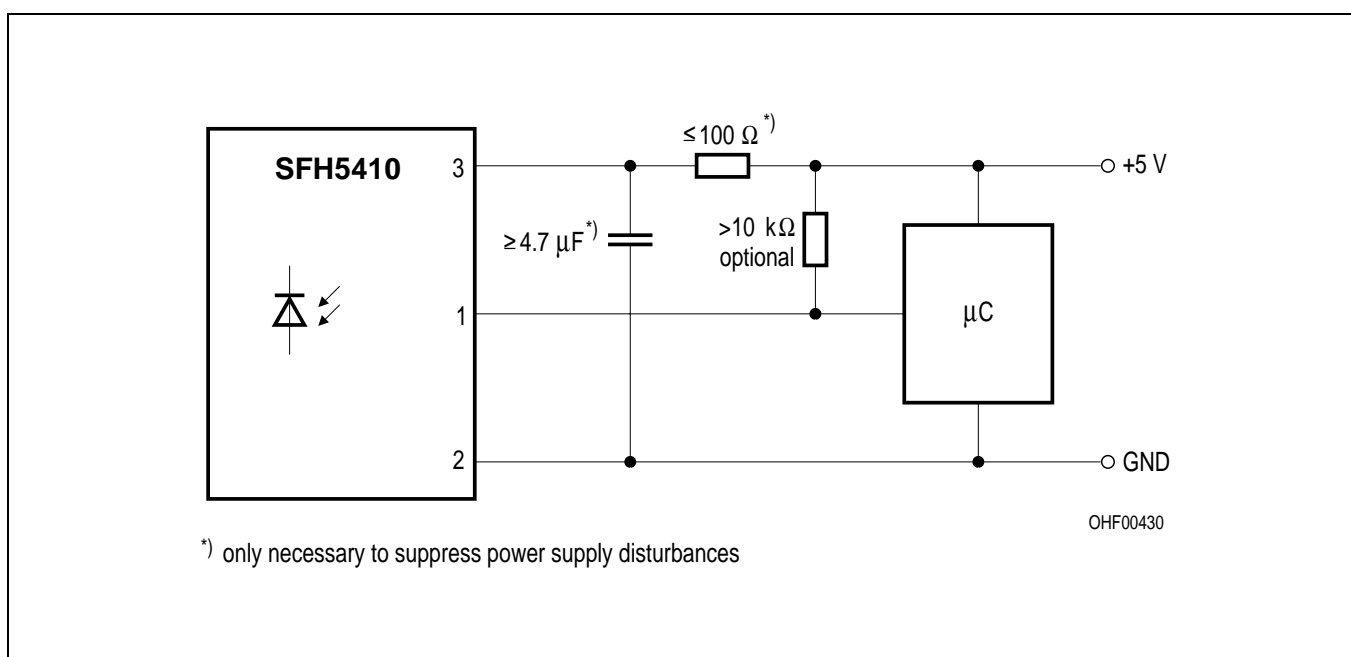
Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Stromaufnahme, $V_{CC} = 5\text{ V}$ , $E = 0$ Current consumption	$I_{CC}$	–	1.3	–	mA
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{s\text{ max}}$	–	940	–	nm
Spektraler Bereich der Fotoempfindlichkeit Spectral range of sensitivity	$\lambda$	830	–	1100	nm
Ausgangsspannung Output voltage					V
Output "High" - ( $I_q = 10\text{ }\mu\text{A}$ )	$V_{OUT\text{ high}}$	$V_S - 0.5$	–	–	
Output "Low" - ( $I_q = 500\text{ }\mu\text{A}$ )	$V_{OUT\text{ low}}$	–	–	0.5	
Trägerfrequenz Carrier frequency	$f_0$	–	38	–	kHz
Min. Bestrahlungsstärke (Testsignal, s. <b>Fig. 3</b> ) Min. Threshold irradiance (test signal, see <b>Fig. 3</b> ) $f = f_0$ , $t_{p,I} = 600\text{ }\mu\text{s}$	$E_{e\text{ min}}$	–	1.4	–	mW/m <sup>2</sup>
Min. Eingangspulsbreite „ON“ (Testsignal, s. <b>Fig. 3</b> ) <sup>1)</sup> Min. Input pulse width "ON" (test signal, see <b>Fig. 3</b> ) <sup>1)</sup>	$t_{p,I}$	$6/f_0$	–	–	$\mu\text{s}$
Ausgangspulsbreite „ON“ (Testsignal, s. <b>Fig. 3</b> ) Output pulse width "ON" (test signal, see <b>Fig. 3</b> , $E_e = 4\text{ mW/m}^2$ )	$t_{p,O}$	$t_{p,I} - 6/f_0$	–	$t_{p,I} + 6/f_0$	$\mu\text{s}$
50%-Filterbandbreite, $f = f_0$ , $E_V = 0$ , $V_{CC} = 5\text{ V}$ 50%-Filter bandwidth	$\Delta f_{50\%}$	3	–	6	kHz

<sup>1)</sup> Die volle Empfindlichkeit wird bei einer Burstlänge von mindestens 6 Pulsen erreicht. Die Reichweite bei Verwendung eines typischen Senders (SFH 4510/SFH 4515,  $I_F = 500\text{ mA}$ ) beträgt etwa 15 m.

<sup>1)</sup> A minimum burst length of 6 pulses is necessary for full sensitivity. The transmission distance with a typical transmitter (SFH 4510/SFH 4515,  $I_F = 500\text{ mA}$ ) is about 15 m.

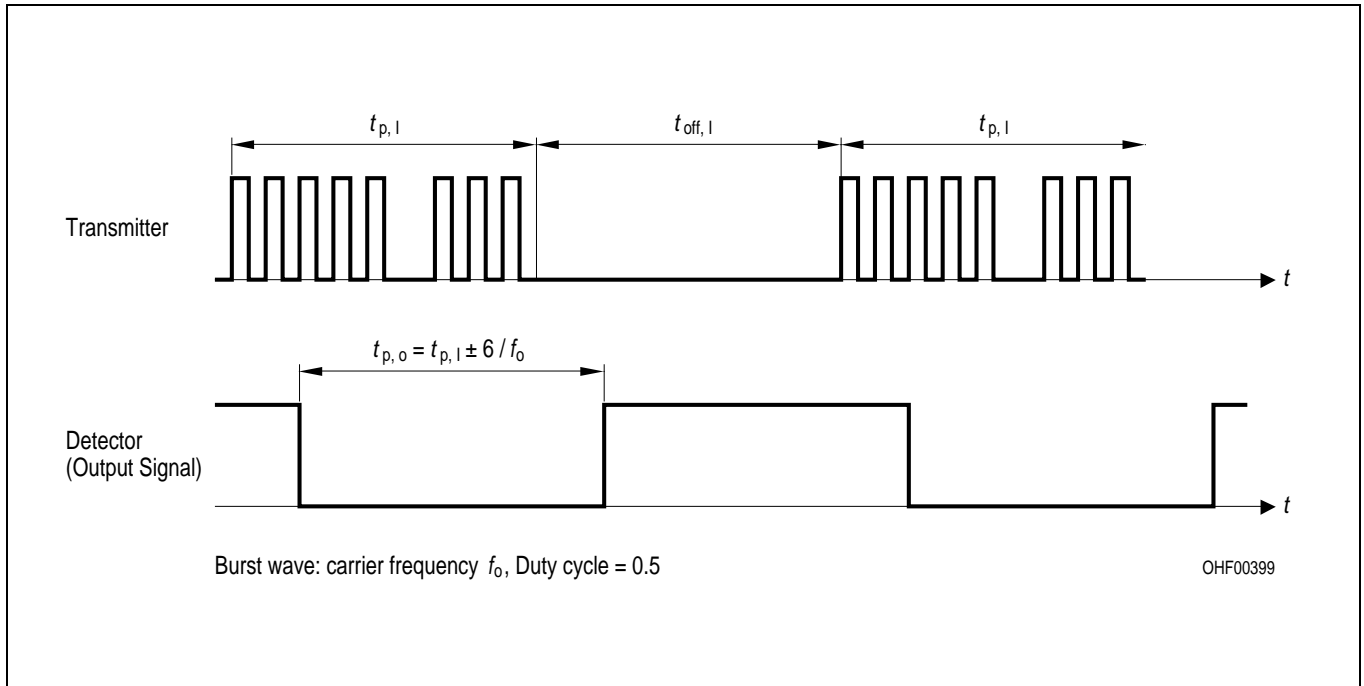


**Figure 1**      **Blockschaltbild**  
**Block Diagram**



**Figure 2**      **Externe Beschaltung**  
**External Circuit**

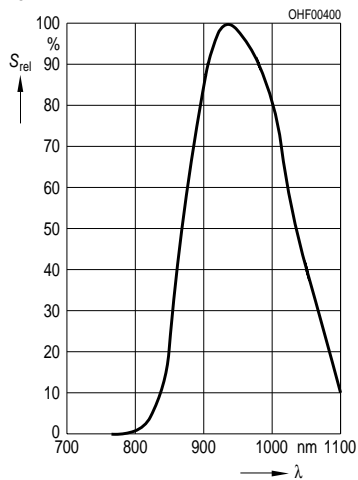
<b>Anschlussbelegung</b>	Pin 1 = OUT
<b>Pin configuration</b>	Pin 2 = GND
	Pin 3 = V <sub>cc</sub>



**Figure 3**      **Optisches Testsignal**  
**Optical Test Signal**

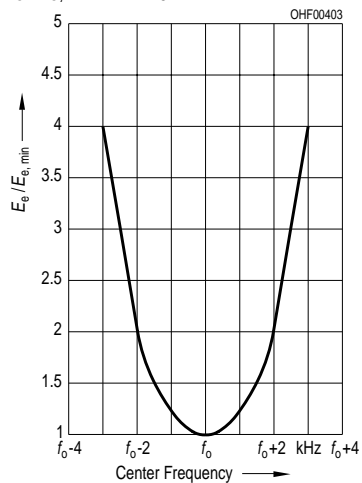
**Relative Spectral Sensitivity**

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



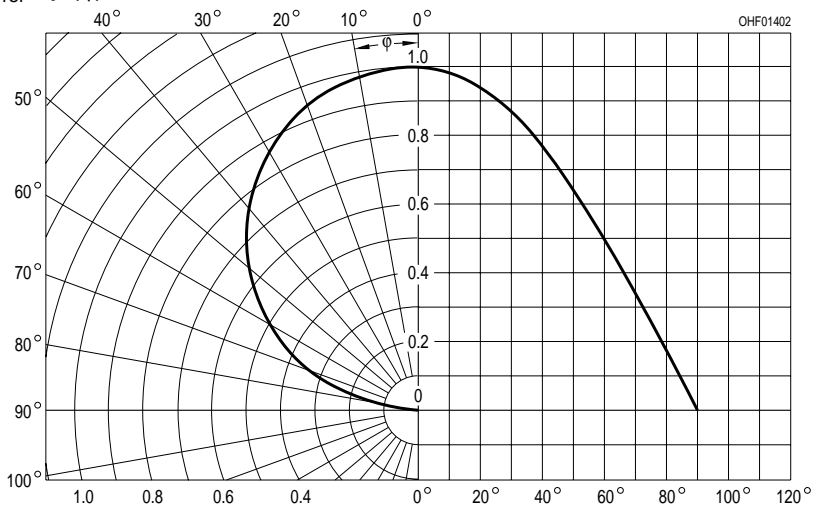
**Relative Sensitivity**

$$E_e/E_{e, min} = f(f_0)$$

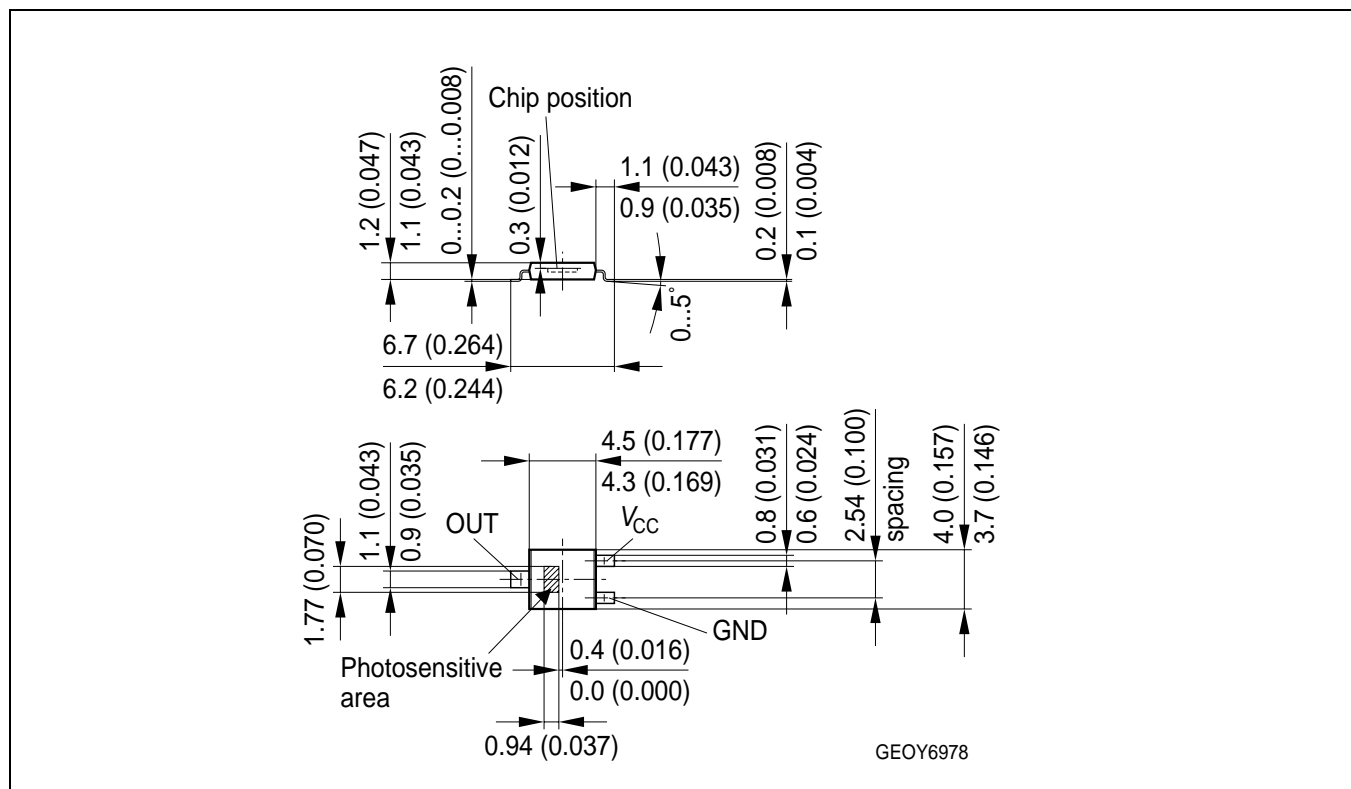


**Directional Characteristics**

$$S_{rel} = f(\varphi)$$



## Maßzeichnung Package Outlines



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

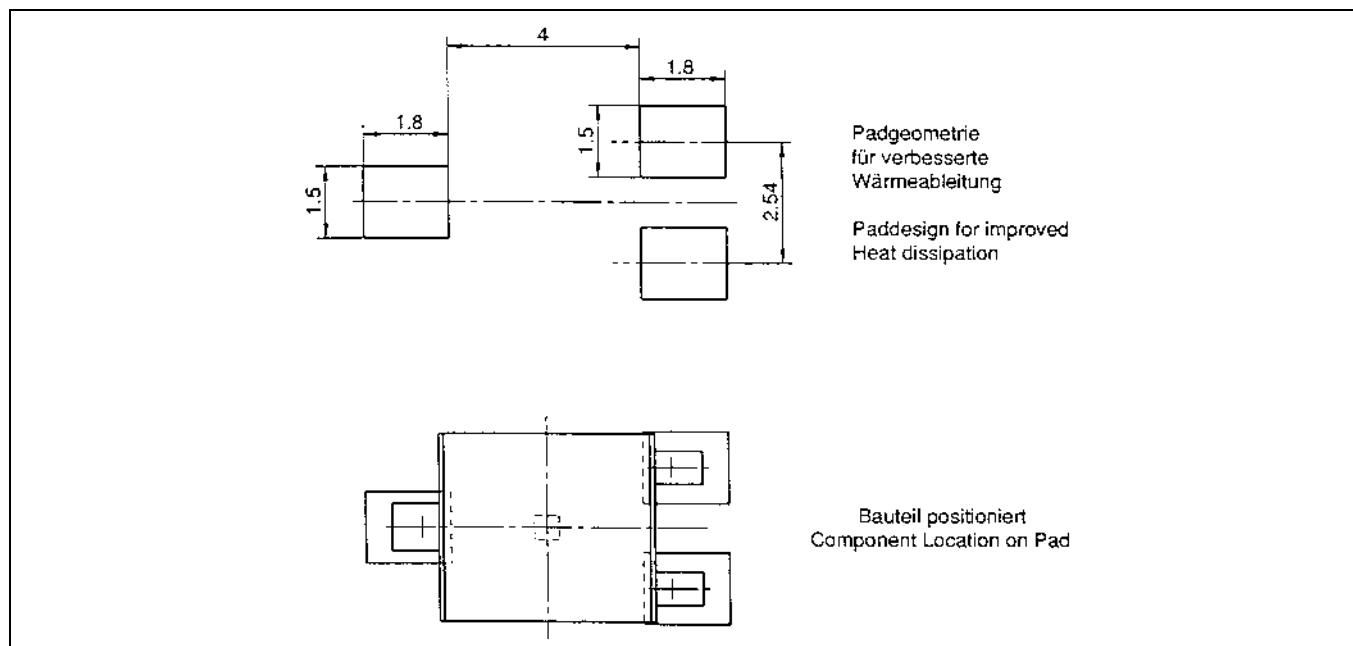
## Löthinweise Soldering Conditions

Type	Tauch-, Schwall- und Schlepplötlung Dip, Wave and Drag Soldering			Reflowlötlung Reflow Soldering	
	Lötbad- temperatur  Temperature of the Soldering Bath	Maximal zulässige Lötzeit  Max. Perm. Soldering Time	Abstand Lötstelle - Gehäuse  Distance between Solder Joints and Package	Lötzonen- temperatur  Temperature of Soldering Zone	Maximale Durchlaufzeit  Max. Transit Time
SFH 5410	–	–	–	245 °C	10 s

Zusätzliche Informationen über allgemeine Lötbedingungen erhalten Sie auf Anfrage.

For additional information on general soldering conditions please contact us.

## Empfohlenes Lötpaddesign Recommended Solderpad Design



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

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The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances. For information on the types in question please contact our Sales Organization.

### 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.

<sup>1</sup> A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

<sup>2</sup> Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.