

# IR-Empfänger für Fernbedienungen

## IR-Receiver for Remote Control Systems

### Lead (Pb) Free Product - RoHS Compliant

#### SFH 5110



#### Beschreibung

SFH 5110 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 von 940 nm
- Hohe Empfindlichkeit
- Verschiedene Trägerfrequenzen erhältlich
- TTL und CMOS kompatibel
- Ausgang: aktiv „Low“

#### Anwendungen

- Empfänger in Fernbedienungen für TV, Videorecorder, HiFi, Satellitenempfänger und CD-Spieler
- Um hohe Sicherheit bei der Datenübertragung zu erreichen, sind fehlerkorrigierende Codes einzusetzen

#### Description

SFH 5110 is a IR receiver 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

#### Applications

- Remote control module for TV sets, VCRs, hi-fi audio receivers, SAT receivers and compact disk players
- For safe data transmission error tolerant codes have to be used

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<b>Typ</b>	<b>Trägerfrequ.</b>	<b>Bestellnr.</b>
<b>Type</b>	<b>Carrier Frequency kHz</b>	<b>Ordering Code</b>
SFH 5110-30 <sup>1)</sup>	30	Q62702P5088
SFH 5110-33 <sup>1)</sup>	33	Q62702P5089
SFH 5110-36	36	Q62702P5090
SFH 5110-38	38	Q62702P5091
SFH 5110-40 <sup>1)</sup>	40	Q62702P5092

<sup>1)</sup> Mindestbestellmenge 80000 Stück / Minimum order quantity 80000 pieces

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operation and storage temperature range	$T_{op}$ $T_{stg}$	- 10 ... + 75 - 30 ... + 100	°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 Operating temperature	$T_{op}$	- 10	-	75	°C
Betriebsspannung Supply Voltage	$V_{cc}$	4.5	5.0	5.5	V

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

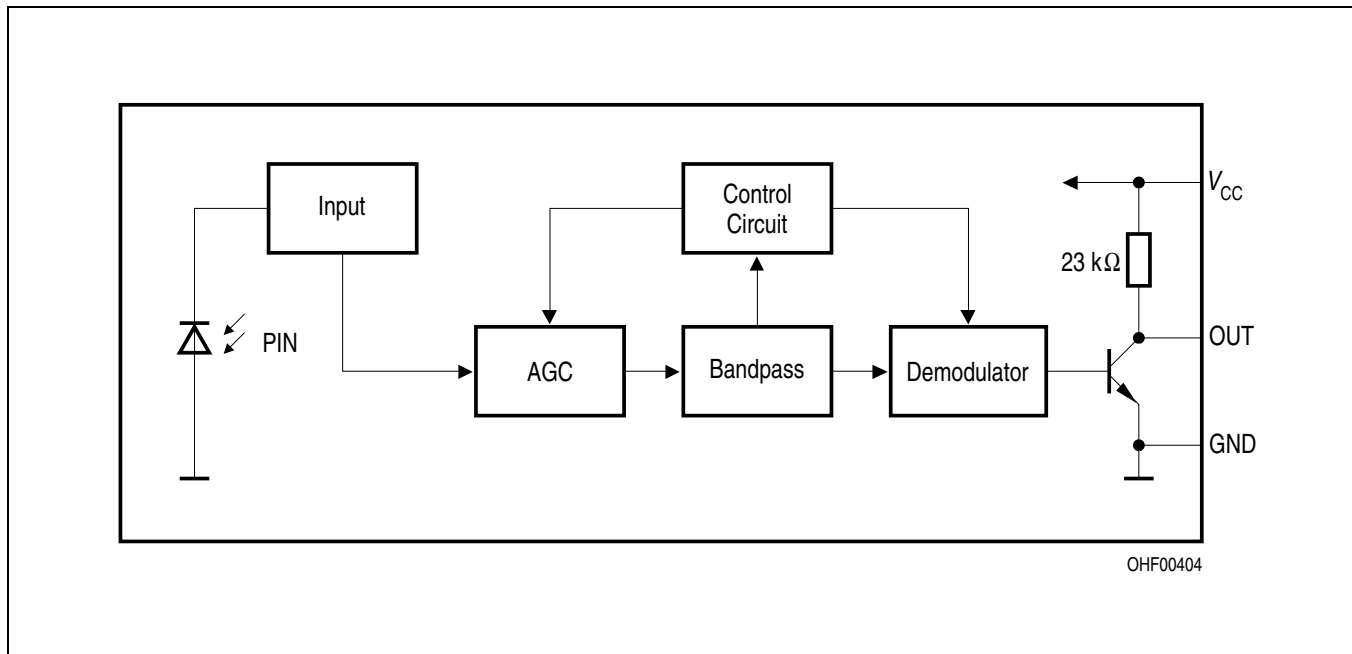
Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Stromaufnahme, $V_{CC} = 5\text{ V}$ , $E = 0$ Current consumption	$I_{CC}$	-	1.3	-	mA
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{s\ max}$	-	940	-	nm
Spektraler Bereich der Fotoempfindlichkeit Spectral range of sensitivity	$\lambda$	830	-	1100	nm

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

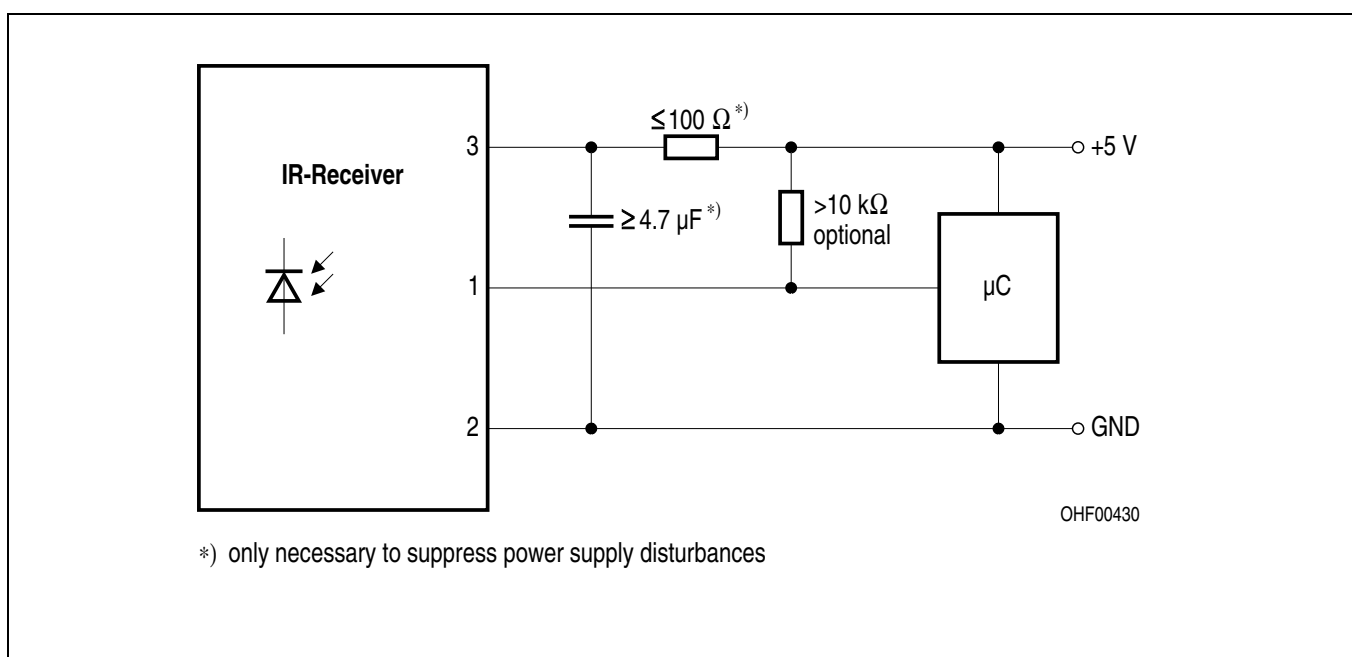
Bezeichnung Parameter	Symbol Symbol	Wert Value			Einheit Unit
		min.	typ.	max.	
Ausgangsspannung Output voltage Output "High" - ( $I_{out} = 10\ \mu\text{A}$ ) Output "Low" - ( $I_{out} = 500\ \mu\text{A}$ )	$V_{OUT\ high}$ $V_{OUT\ low}$	$V_{CC}-0.5$ -	- -	- 0.5	V
Trägerfrequenz Carrier frequency SFH 5110-30 SFH 5110-33 SFH 5110-36 SFH 5110-38 SFH 5110-40	$f_0$	-	30 33 36 38 40	-	kHz
Min. Bestrahlungsstärke (Testsignal, s. <b>Fig. 3</b> ) Min. Threshold irradiance (test signal, see <b>Fig. 3</b> ) $f = f_0$ , $t_{p,I} = 600\ \mu\text{s}$	$E_{e\ min}$	-	0.35	0.5	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> , $E_e = 1\ \text{mW/m}^2$ )	$t_{p,O}$	$t_{p,I}$ $- 6/f_0$	-	$t_{p,I}$ $+ 6/f_0$	$\mu\text{s}$
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 30 m.

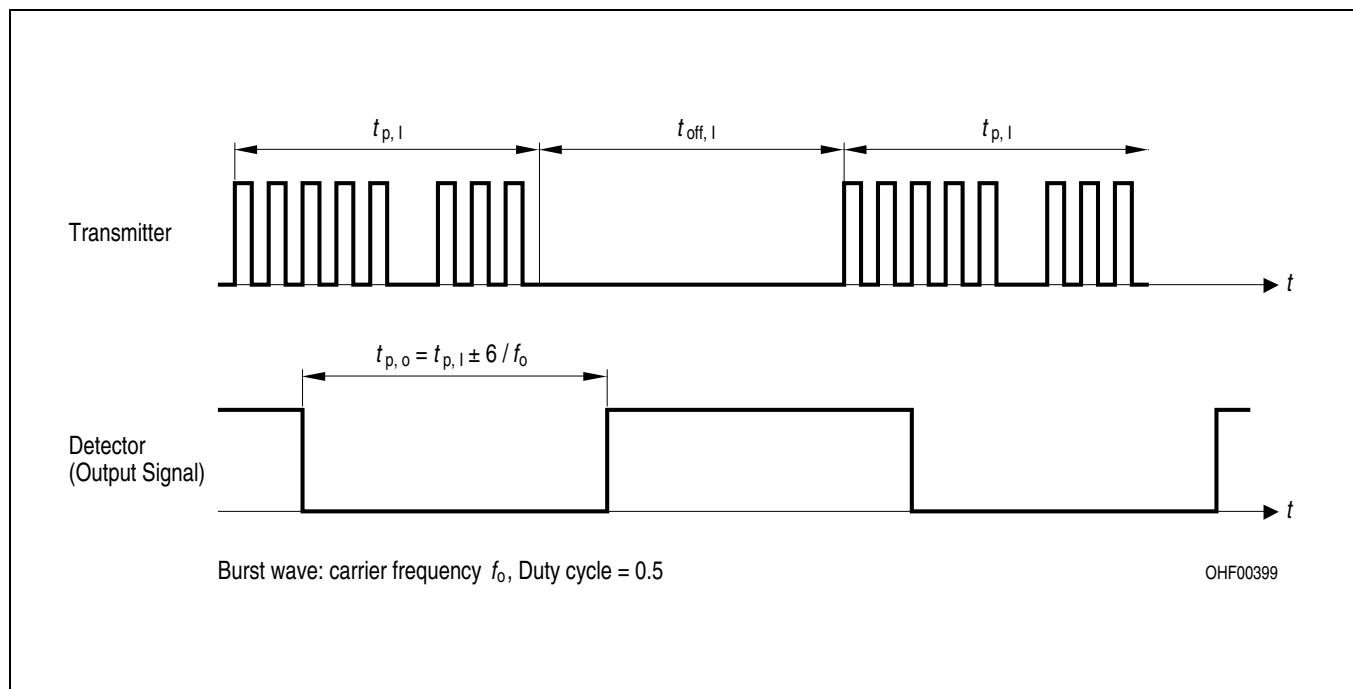
<sup>1)</sup> A minimum burst length of 6 pulses is necessary for full sensitivity. The transmission distance with a typical transmitter (SFH 4510/SFH 4515,  $I_F = 500\ \text{mA}$ ) is about 30 m.



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



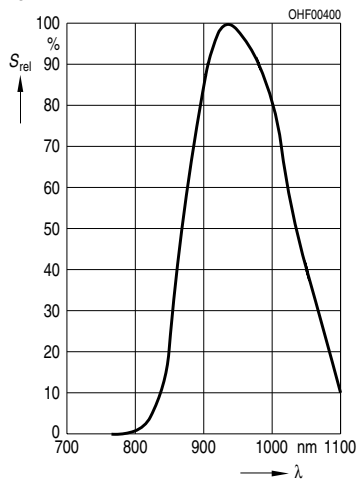
**Figure 2**      **Externe Beschaltung**  
**External Circuit**



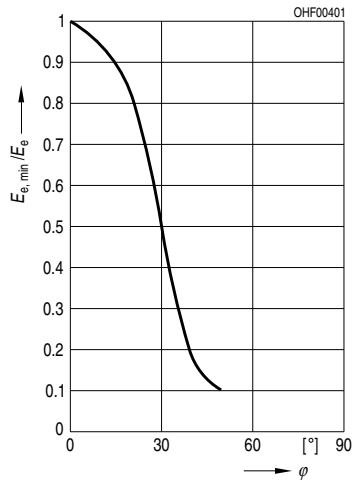
**Figure 3**      **Optisches Testsignal**  
**Optical Test Signal**

**Relative Spectral Sensitivity**

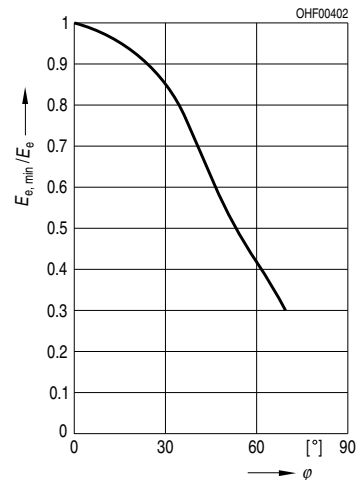
$S_{rel} = f(\lambda)$



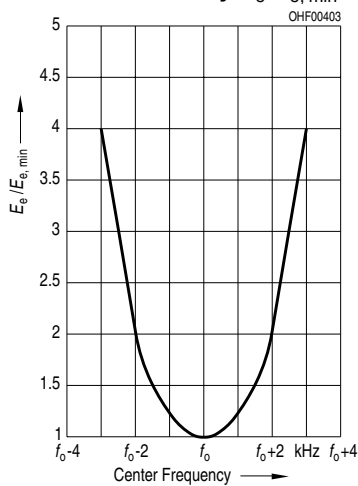
**Vertical Directivity  $\varphi_y$**



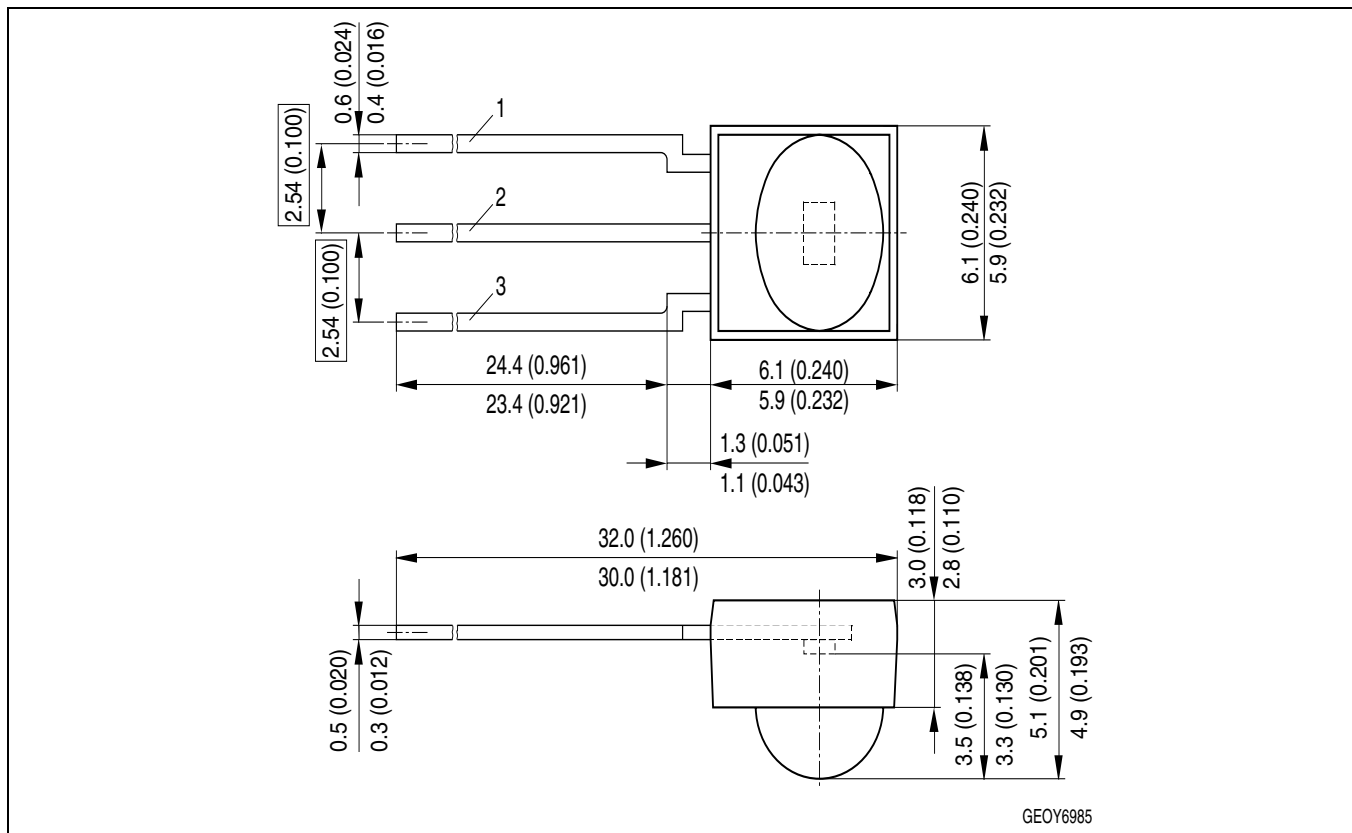
**Horizontal Directivity  $\varphi_x$**



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



Maßzeichnung  
Package Outlines

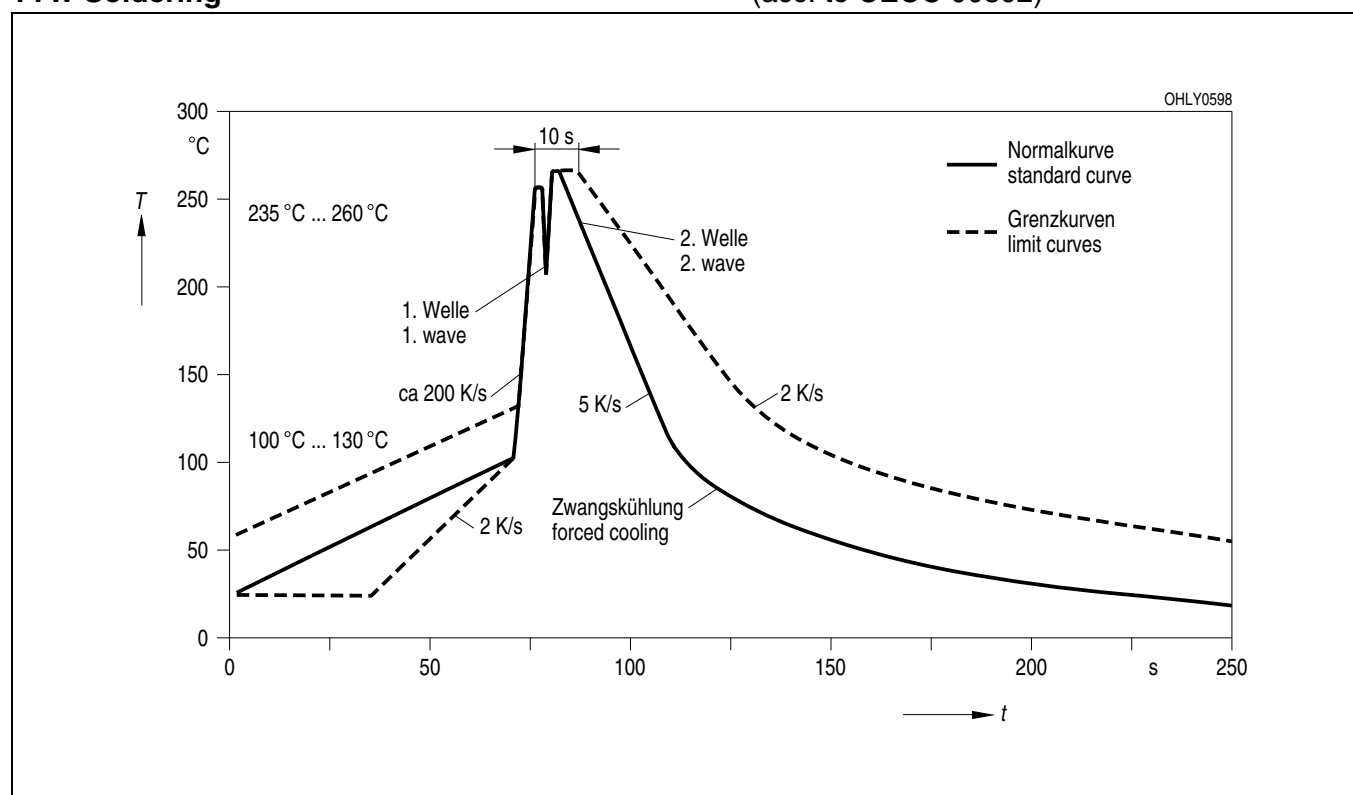


Maße in mm (inch) / Dimensions in mm (inch).



**Lötbedingungen**  
**Soldering Conditions**  
**Wellenlöten (TTW)**  
**TTW Soldering**

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



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