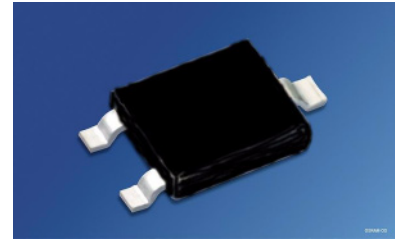


IR-Empfänger für Fernbedienungen
IR-Receiver for Remote Control Systems
Lead (Pb) Free Product - RoHS Compliant
SFH 5410



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“

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

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

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

| Typ Type | Trägerfrequenz Carrier Frequency kHz | Bestellnr. Ordering Code |
|-------------|--|-----------------------------|
| SFH 5410-36 | 36 | Q65110A1727 |
| SFH 5410-38 | 38 | Q65110A3909 |

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|------------------|----------------|-----------------|
| Lagertemperatur Storage temperature range | T_{stg} | - 40 ... + 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} | - 40 | - | 85 | °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 | $\lambda_{s\text{ max}}$ | – | 940 | – | nm |
| Spektraler Bereich der Fotoempfindlichkeit ¹⁾ Spectral range of sensitivity | $\lambda_{10\%}$ | 830 | – | 1100 | nm |
| Ausgangsspannung Output voltage | | | | | V |
| Output "High" - ($I_{out} = 10\text{ }\mu\text{A}$) Output "Low" - ($I_{out} = 500\text{ }\mu\text{A}$) | $V_{OUT\text{ high}}$ $V_{OUT\text{ low}}$ | $V_{CC}-0.5$ – | – – | – 0.5 | |
| Trägerfrequenz Carrier frequency | f_0 | – | | – | kHz |
| SFH 5410-36 SFH 5410-38 | | | 36 38 | | |
| Min. Bestrahlungsstärke (Testsignal, s. Fig. 3) Min. Threshold irradiance (test signal, see Fig. 3) $f = f_0$, $t_{p,I} = 600\text{ }\mu\text{s}$ | $E_{e\text{ min}}$ | – | 1.4 | – | mW/m^2 |
| Min. Eingangspulsbreite „ON“ (Testsignal, s. Fig. 3) ²⁾ Min. Input pulse width "ON" (test signal, see Fig. 3) ²⁾ | $t_{p,I}$ | $6/f_0$ | – | – | μs |
| Ausgangspulsbreite „ON“ (Testsignal, s. Fig. 3) Output pulse width "ON" (test signal, see Fig. 3 , $E_e = 4\text{ mW}/\text{m}^2$) | $t_{p,O}$ | $t_{p,I}$ $- 6/f_0$ | – | $t_{p,I}$ $+ 6/f_0$ | μs |
| 50%-Filterbandbreite, $f = f_0$, $E_V = 0$, $V_{CC} = 5\text{ V}$ 50%-Filter bandwidth | $\Delta f_{50\%}$ | 3 | – | 6 | kHz |

¹⁾ Außerhalb des spezifizierten Bereiches der Fotoempfindlichkeit besitzt der SFH 5410 eine Restempfindlichkeit. D.h. Lichtquellen außerhalb des spezifizierten Wellenlängenbereiches des Sensors können den Baustein beeinflussen und zum Durchschalten führen.

²⁾ Beyond the specified spectral range of sensitivity the SFH 5410 has a strongly reduced, but non-zero sensitivity. Light sources with wavelengths outside the spectral range may influence the device and result in switching.

- 2) 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.
- 2) 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.

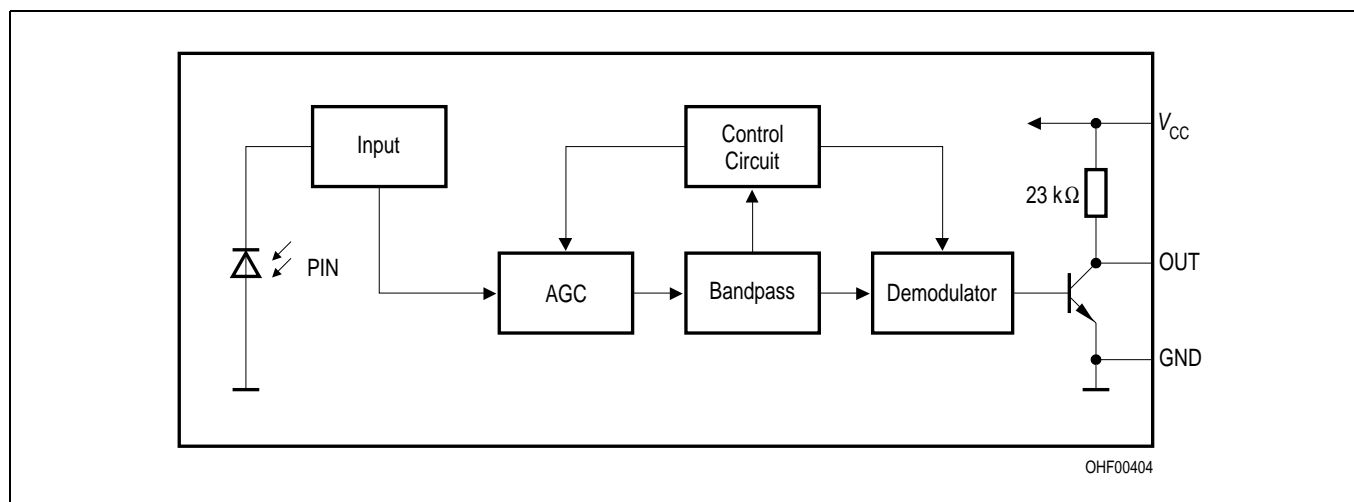


Figure 1 Blockschaltbild / Block Diagram

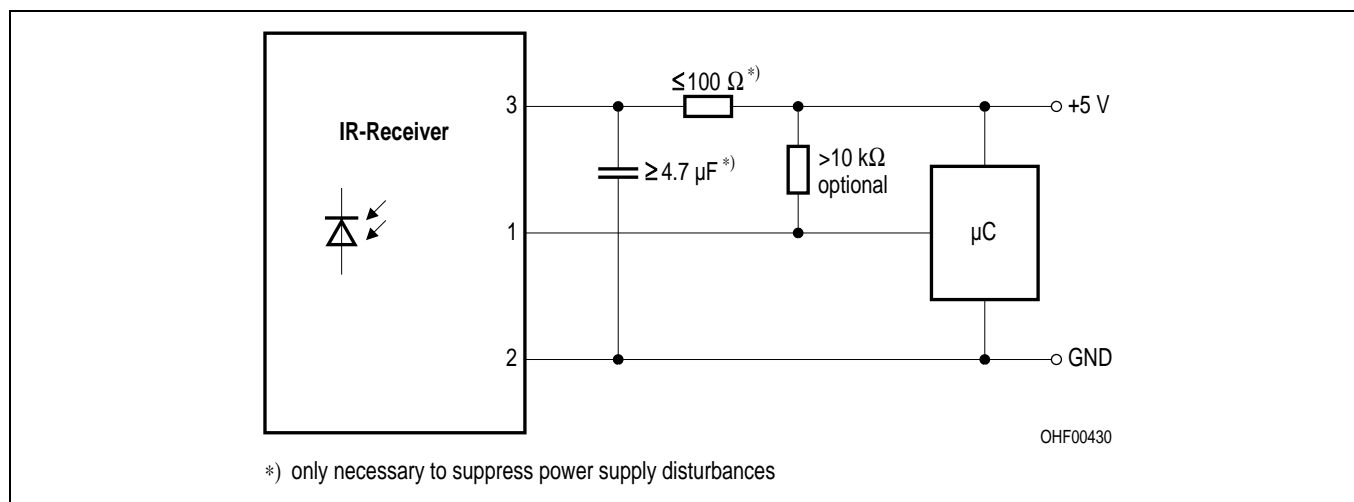


Figure 2 Externe Beschaltung / External Circuit

Anschlußbelegung Pin configuration

| Pin Pin | Beschreibung Description |
|------------|-----------------------------|
| 1 | OUT |
| 2 | GND |
| 3 | V_{CC} |

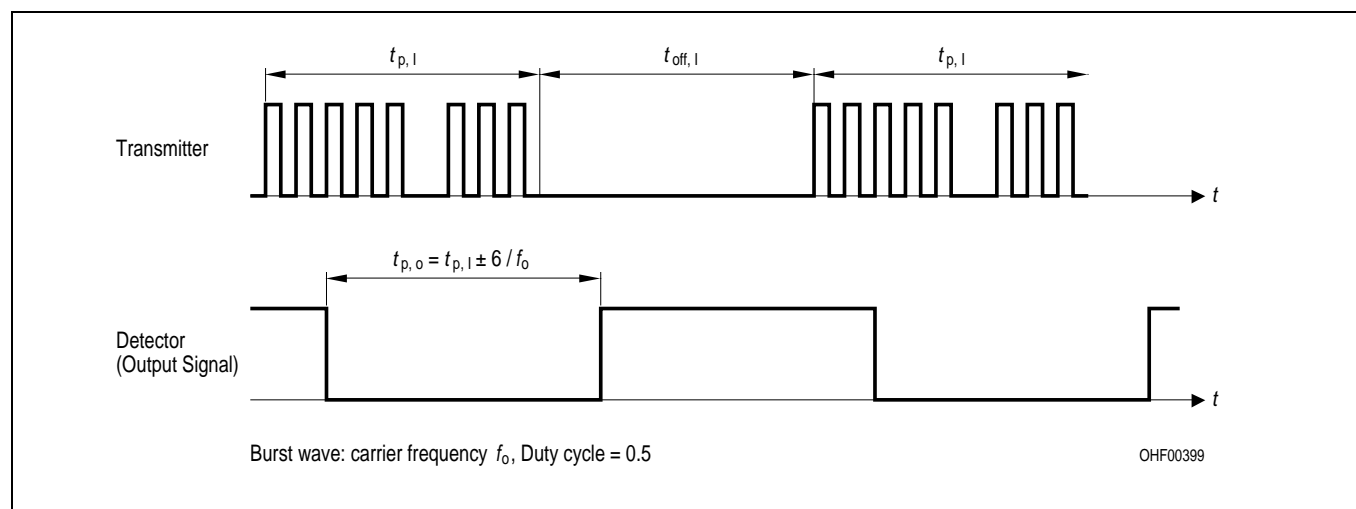


Figure 3 **Optisches Testsignal / Optical Test Signal**

Anmerkungen / Notes

- Abhängig von den Umgebungsbedingungen, z.B in Form von externen Lichtquellen, elektro-magnetischer Strahlung und Rauschen der Versorgungsspannung, kann es zum sporadischen Durchschalten des Ausgang kommen, selbst wenn kein optisches Signal angelegt wird! Um Fehlinterpretationen der übermittelten Daten zu verhindern, sind fehlerkorrigierende Codes einzusetzen.

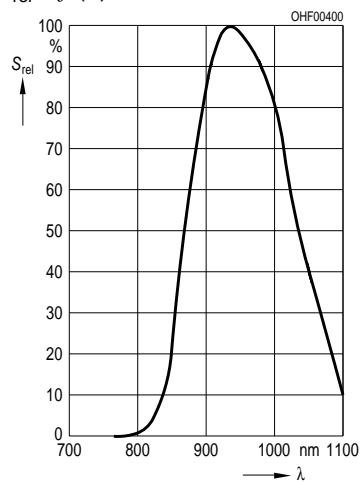
- Environmental conditions, e.g. external light sources, electromagnetic interference and supply voltage noise, may cause sporadic switching at the output, even without an optical input signal! To avoid misinterpretation of the transmitted data, error tolerant codes must be used.

Für weitere Informationen lesen Sie bitte die Application Note des SFH 5110:
For further information please read the application note of the SFH 5110:

[General Application Note for SFH 511X](#)

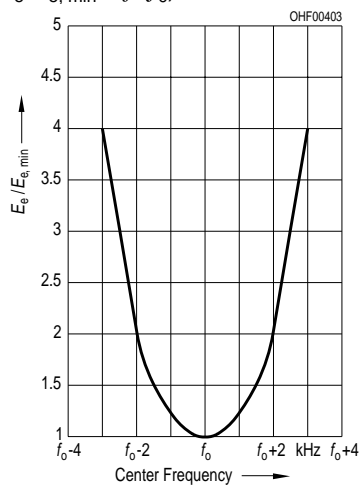
Relative Spectral Sensitivity

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



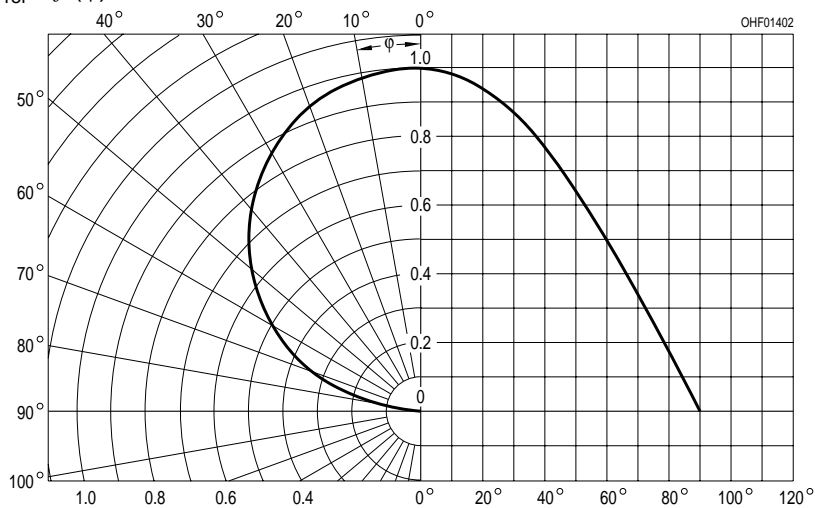
Relative Sensitivity

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

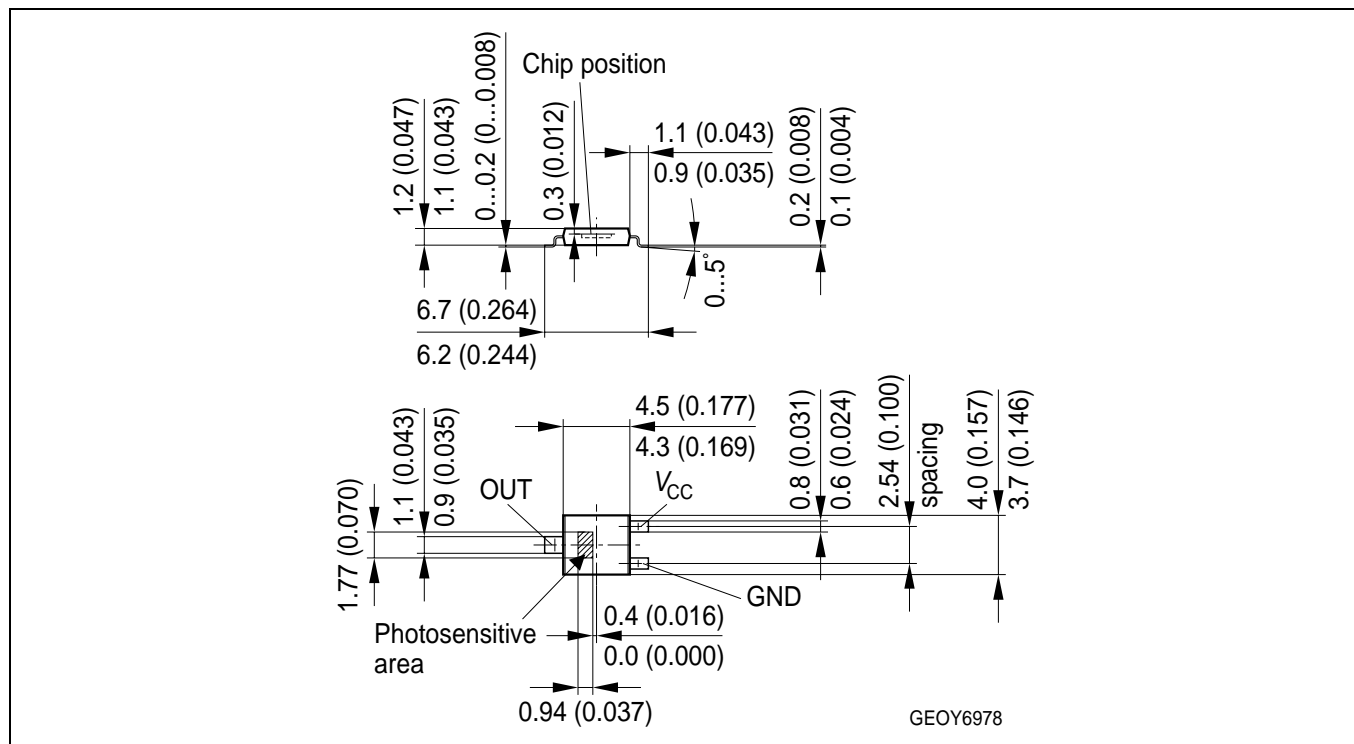


Directional Characteristics

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

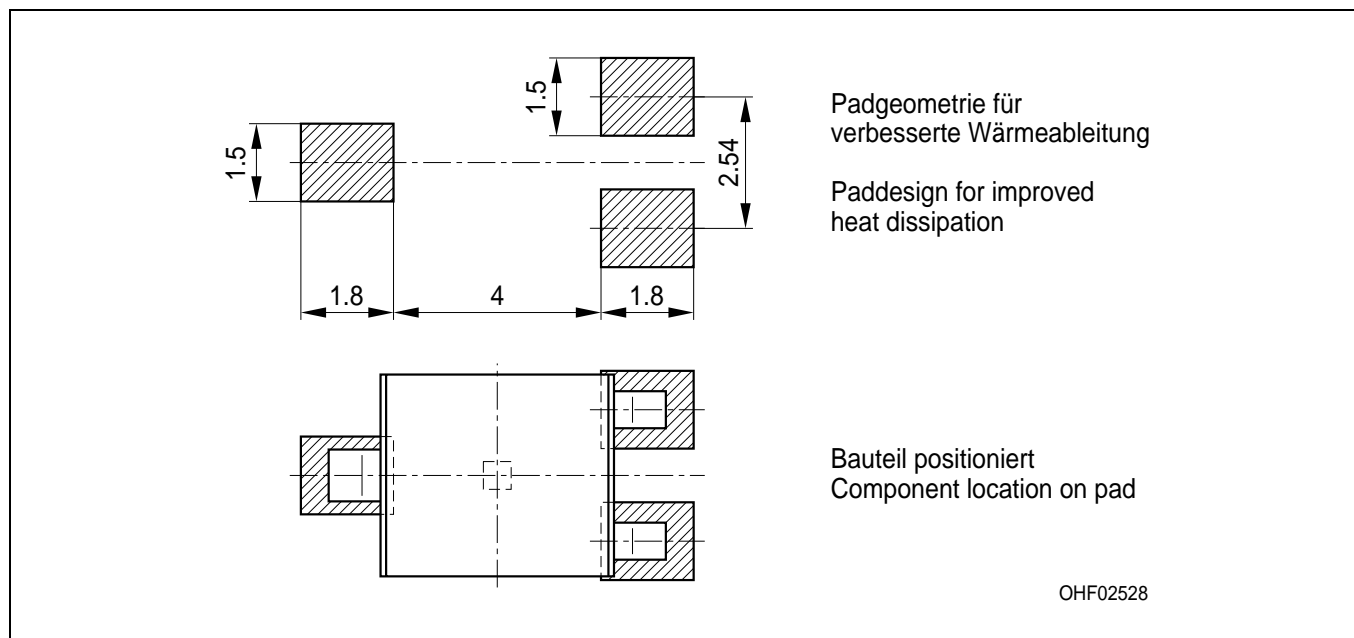


**Maßzeichnung
Package Outlines**



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

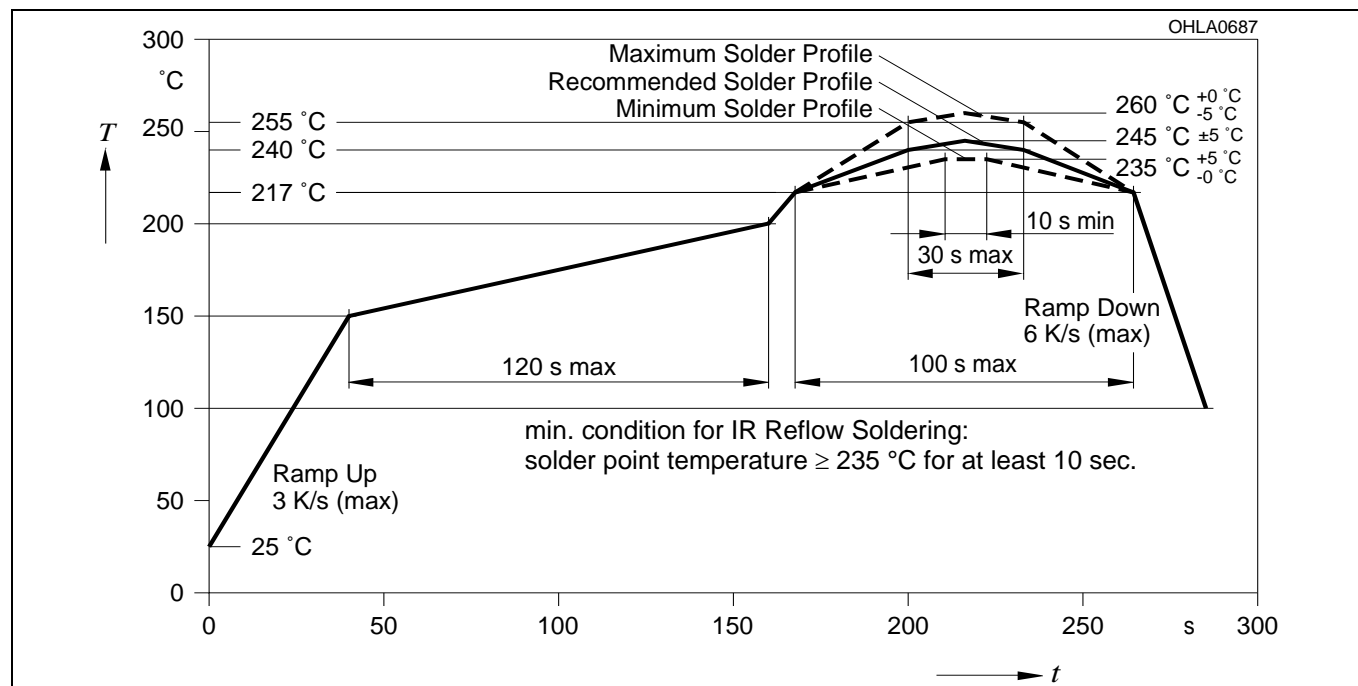
**Empfohlenes Lötpad-Design
Recommended Solderpad Design**



Maße in mm / Dimensions in mm.

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

Vorbehandlung nach JEDEC Level 4
 Preconditioning acc. to JEDEC Level 4
 (nach J-STD-020C)
 (acc. to J-STD-020C)



Published by
OSRAM Opto Semiconductors GmbH
 Wernerwerkstrasse 2, D-93049 Regensburg
www.osram-os.com

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