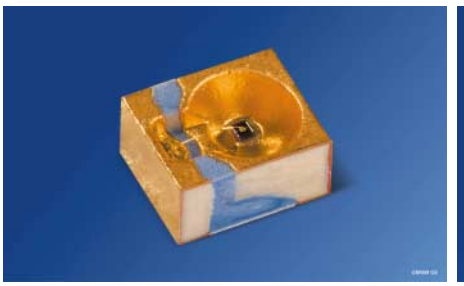
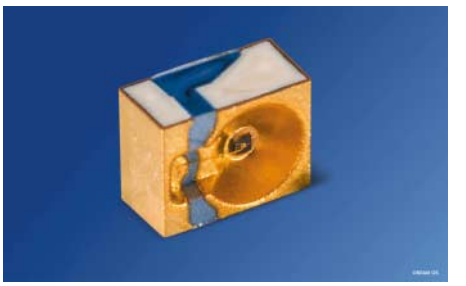
# Engwinklige LED im MIDLED-Gehäuse (940 nm)
# Narrow beam LED in MIDLED package (940 nm)
## Lead (Pb) Free Product - RoHS Compliant

## SFH 4641
## SFH 4646



SFH 4641



SFH 4646

### Wesentliche Merkmale

- Infrarot LED mit hoher Ausgangsleistung
- Kurze Schaltzeiten
- Enger Abstrahlwinkel (± 15°)
- Geringe Bauhöhe
- Als Toplooker und Sidelooker einsetzbar
- SFH 4641: Gurtung als Toplooker
  SFH 4646: Gurtung als Sidelooker

### Features

- High Power Infrared LED
- Short switching times
- Narrow halfangle (± 15°)
- Low profile component
- Usable as top-looking and side-looking device
- SFH 4641: Taping as Toplooker
  SFH 4646: Taping as Sidelooker

### Anwendungen

- Infrarotbeleuchtung für Kameras
- IR-Datenübertragung
- Sensorik in der Automobiltechnik
- Fernsteuerung

### Applications

- Infrared Illumination for cameras
- IR Data Transmission
- Automotive sensors
- Remote controls

### Sicherheitshinweise

Je nach Betriebsart emittieren diese Bauteile hochkonzentrierte, nicht sichtbare Infrarot-Strahlung, die gefährlich für das menschliche Auge sein kann. Produkte, die diese Bauteile enthalten, müssen gemäß den Sicherheits-richtlinien der IEC-Normen 60825-1 und 62471 behandelt werden.

### Safety Advices

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 and IEC 62471.

| **Typ**<br>**Type** | **Bestellnummer**<br>**Ordering Code** | **Strahlstärkegruppierung**[1] ($I_F$ = 70 mA, $t_p$ = 20 ms)<br>**Radiant Intensity Grouping**[1]<br>$I_e$ (mW/sr) |
|---|---|---|
| SFH 4641 | Q65110A8098 | ≥ 16 (typ. 40) |
| SFH 4646 | Q65110A8099 | ≥ 16 (typ. 40) |

[1] gemessen bei einem Raumwinkel Ω = 0.01 sr / measured at a solid angle of Ω = 0.01 sr

**Grenzwerte** ($T_A$ = 25 °C)
**Maximum Ratings**

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|---|---|---|---|
| Betriebs- und Lagertemperatur<br>Operating and storage temperature range | $T_{op}$ , $T_{stg}$ | – 40 … + 100 | °C |
| Sperrspannung<br>Reverse voltage | $V_R$ | 5 | V |
| Vorwärtsgleichstrom<br>Forward current | $I_F$ | 70 | mA |
| Stoßstrom, $t_p$ = 25 µs, $D$ = 0<br>Surge current | $I_{FSM}$ | 700 | mA |
| Verlustleistung<br>Power dissipation | $P_{tot}$ | 140 | mW |
| Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je 16 mm²<br>Thermal resistance junction - ambient mounted on PC-board (FR4), padsize 16 mm² each | $R_{thJA}$ | 380 | K/W |
| Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block<br>Thermal resistance junction - soldering point, mounted on metal block | $R_{thJS}$ | 220 | K/W |

**Kennwerte** ($T_A$ = 25 °C)
**Characteristics**

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|---|---|---|---|
| Wellenlänge der Strahlung<br>Wavelength at peak emission<br>$I_F$ = 70 mA | $\lambda_{peak}$ | 950 | nm |
| Centroid-Wellenlänge der Strahlung<br>Centroid wavelength<br>$I_F$ = 70 mA | $\lambda_{centroid}$ | 940 | nm |
| Spektrale Bandbreite bei 50% von $I_{max}$<br>Spectral bandwidth at 50% of $I_{max}$<br>$I_F$ = 70 mA | $\Delta\lambda$ | 42 | nm |
| Abstrahlwinkel<br>Half angle | $\varphi$ | ± 15 | Grad<br>deg. |
| Aktive Chipfläche<br>Active chip area | $A$ | 0.04 | mm² |

**Kennwerte** ($T_A$ = 25 °C)
**Characteristics** (cont'd)

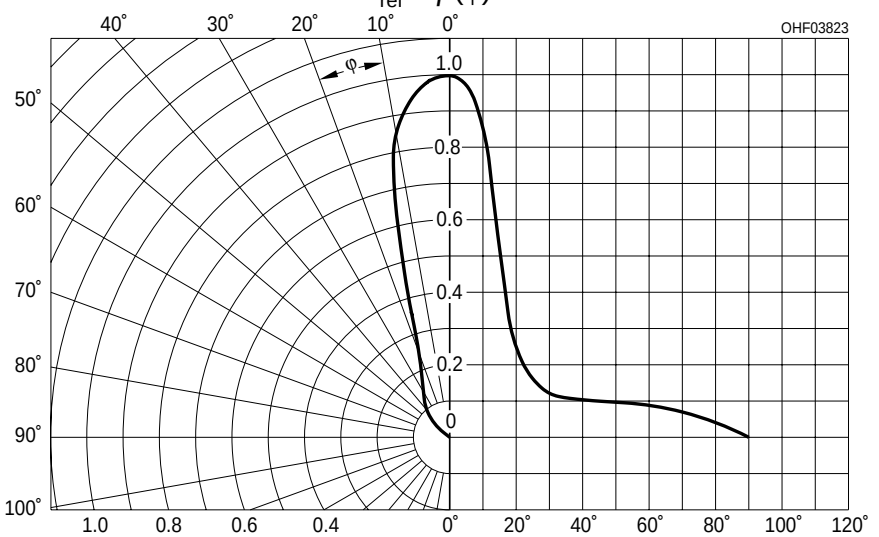
| **Bezeichnung**<br>**Parameter** | **Symbol**<br>**Symbol** | **Wert**<br>**Value** | **Einheit**<br>**Unit** |
|---|---|---|---|
| Abmessungen der aktiven Chipfläche<br>Dimension of the active chip area | $L \times B$<br>$L \times W$ | 0.2 × 0.2 | mm² |
| Schaltzeiten, $I_e$ von 10% auf 90% und von 90% auf 10%, bei $I_F$ = 70 mA, $R_L$ = 50 Ω<br>Switching times, $I_e$ from 10% to 90% and from 90% to 10%, $I_F$ = 70 mA, $R_L$ = 50 Ω | $t_r$, $t_f$ | 11 | ns |
| Durchlassspannung<br>Forward voltage<br>$I_F$ = 70 mA, $t_p$ = 20 ms<br>$I_F$ = 500 mA, $t_p$ = 100 µs | <br><br>$V_F$<br>$V_F$ | <br><br>1.6 (< 2.0)<br>2.4 (< 3.0) | <br><br>V<br>V |
| Sperrstrom<br>Reverse current | $I_R$ | not designed for reverse operation | µA |
| Gesamtstrahlungsfluss<br>Total radiant flux<br>$I_F$ = 70 mA, $t_p$ = 20 ms | $\Phi_{e\ typ}$ | 33 | mW |
| Temperaturkoeffizient von $I_e$ bzw. $\Phi_e$, $I_F$ = 70 mA<br>Temperature coefficient of $I_e$ or $\Phi_e$, $I_F$ = 70 mA | $TC_I$ | – 0.5 | %/K |
| Temperaturkoeffizient von $V_F$, $I_F$ = 70 mA<br>Temperature coefficient of $V_F$, $I_F$ = 70 mA | $TC_V$ | – 3.5 | mV/K |
| Temperaturkoeffizient von λ, $I_F$ = 70 mA<br>Temperature coefficient of λ, $I_F$ = 70 mA | $TC_\lambda$ | + 0.3 | nm/K |

**Strahlstärke $I_e$ in Achsrichtung**[1)]
gemessen bei einem Raumwinkel $\Omega$ = 0.01 sr
**Radiant Intensity $I_e$ in Axial Direction**
at a solid angle of $\Omega$ = 0.01 sr

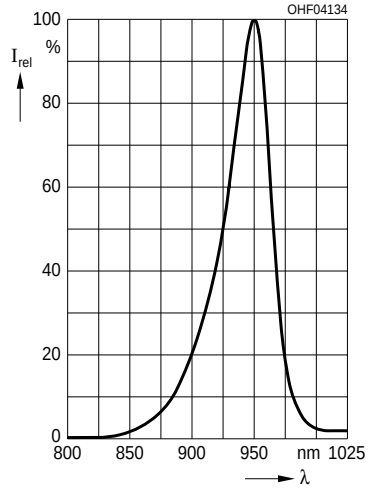
| Bezeichnung<br>Parameter | Symbol | Werte<br>Values | | | | Einheit<br>Unit |
|---|---|---|---|---|---|---|
| | | -S | -T | -U | -V | |
| Strahlstärke<br>Radiant intensity<br>$I_F$ = 70 mA, $t_p$ = 20 ms | $I_{e\ min}$<br>$I_{e\ max}$ | 16<br>32 | 25<br>50 | 40<br>80 | 63<br>125 | mW/sr<br>mW/sr |
| Strahlstärke<br>Radiant intensity<br>$I_F$ = 500 mA, $t_p$ = 25 µs | $I_{e\ typ}$ | 120 | 185 | 295 | 465 | mW/sr |

1) Nur eine Gruppe in einer Verpackungseinheit (Streuung kleiner 2:1) /
Only one bin in one packing unit (variation lower 2:1)

**Abstrahlcharakteristik**
**Radiation Characteristics $I_{rel} = f(\varphi)$**

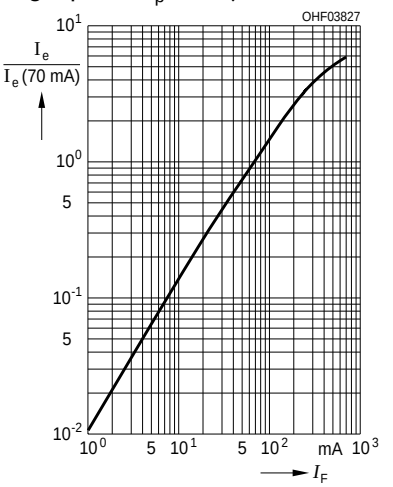


**Relative Spectral Emission**
$I_{rel} = f(\lambda)$

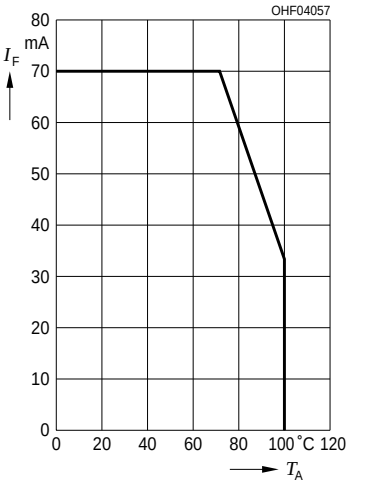



**Radiant Intensity** $\frac{I_e}{I_e\ 70\ mA} = f(I_F)$

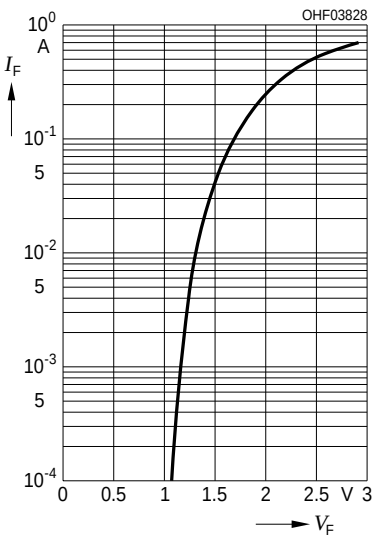
Single pulse, $t_p$ = 25 µs



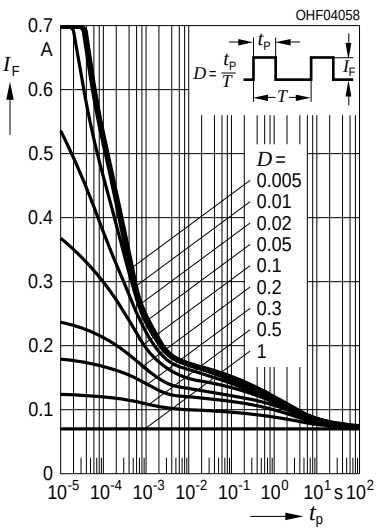

**Max. Permissible Forward Current**
$I_F = f(T_A)$, $R_{thJA}$ = 380 K/W



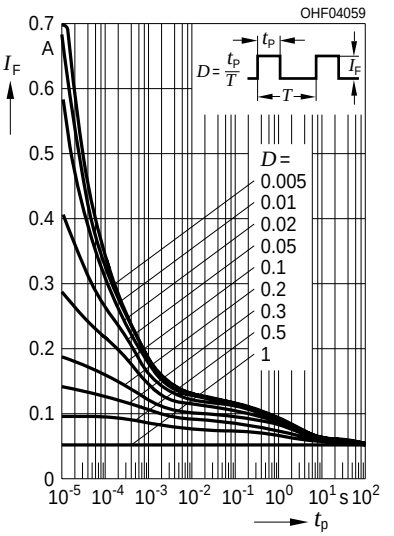

**Forward Current** $I_F = f(V_F)$
Single pulse, $t_p$ = 100 µs



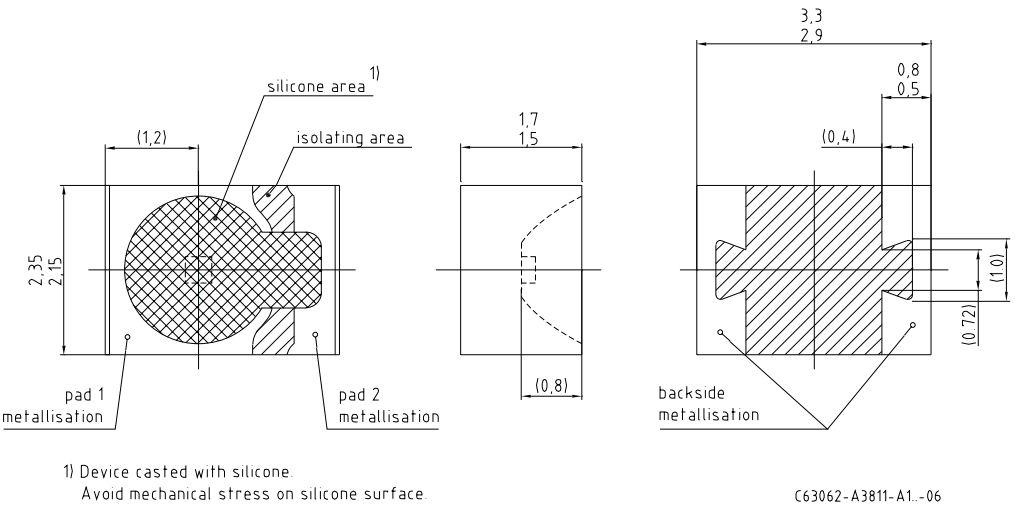

**Permissible Pulse Handling Capability** $I_F = f(\tau)$, $T_A$ = 25 °C, duty cycle $D$ = parameter




**Permissible Pulse Handling Capability** $I_F = f(\tau)$, $T_A$ = 85 °C, duty cycle $D$ = parameter



## Maßzeichnung
## Package Outlines




Maße in mm / Dimensions in mm.

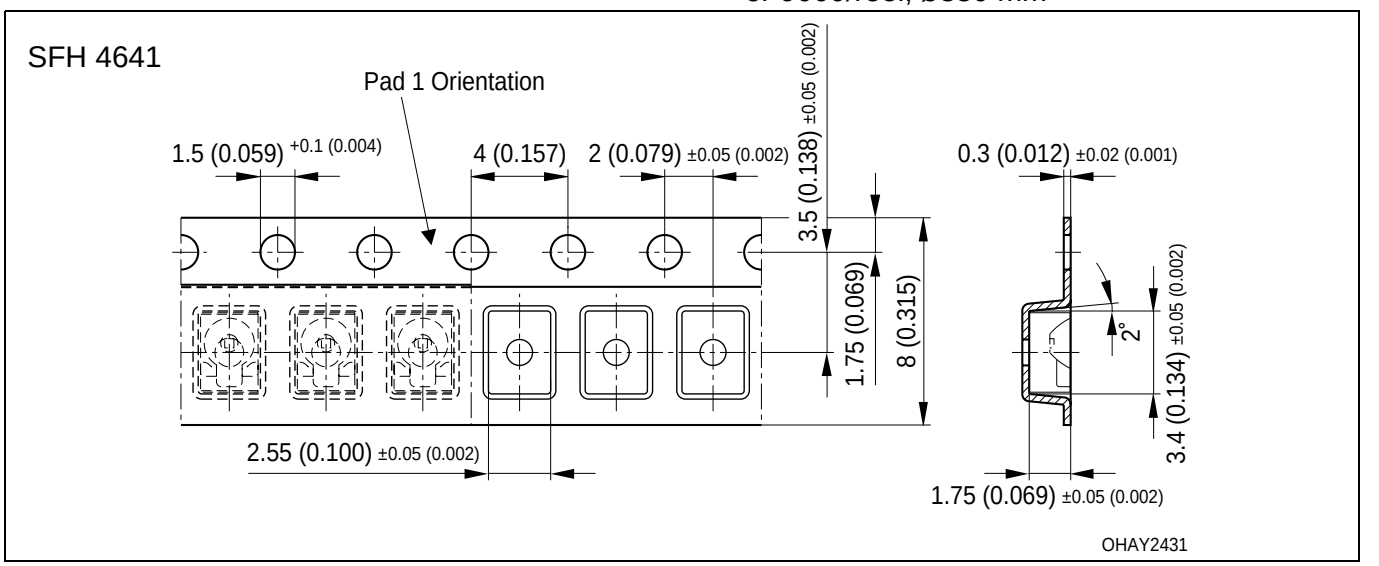
| | |
|---|---|
| Gehäuse / Package | MID mit klarem Silikonverguss / MID casted with clear Silicone |
| Anschlussbelegung<br>Pin configuration | Pad 1 = Anode / anode<br>Pad 2 = Kathode / cathode |

**Gurtung / Polarität und Lage**

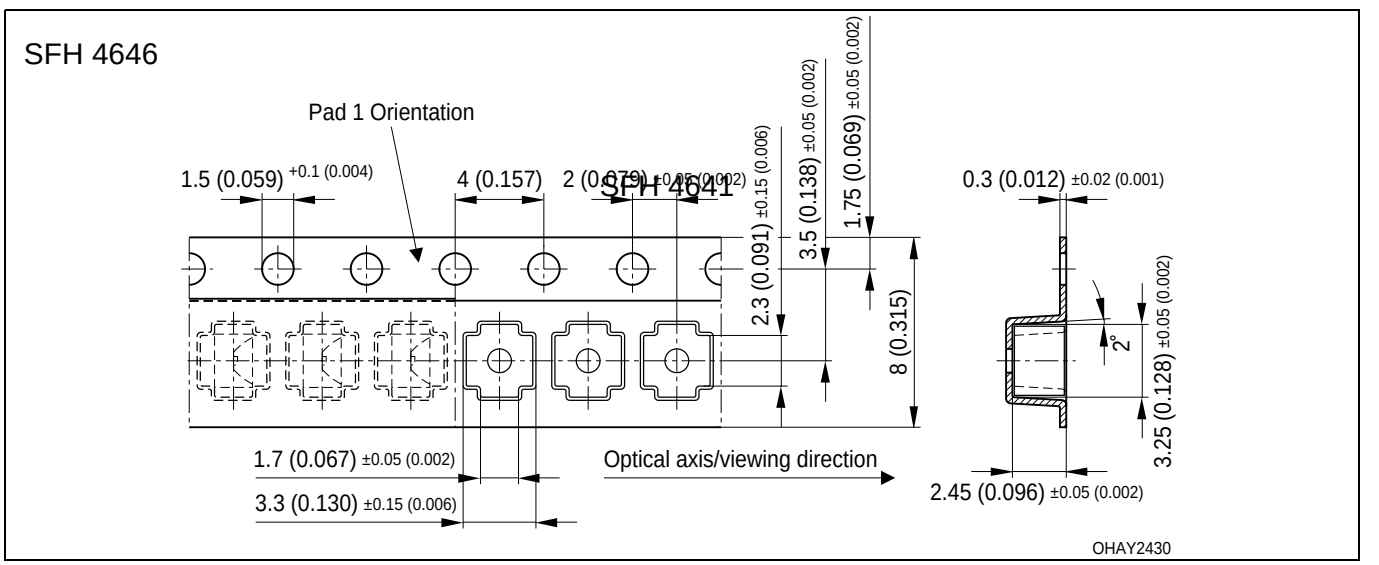
Verpackungseinheit 2000/Rolle, ø180 mm
oder 9000/Rolle, ø330 mm

**Method of Taping / Polarity and Orientation**

Packing unit 2000/reel, ø180 mm
or 9000/reel, ø330 mm




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




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

**Empfohlenes Lötpaddesign**
**Recommended Solder Pad Design**

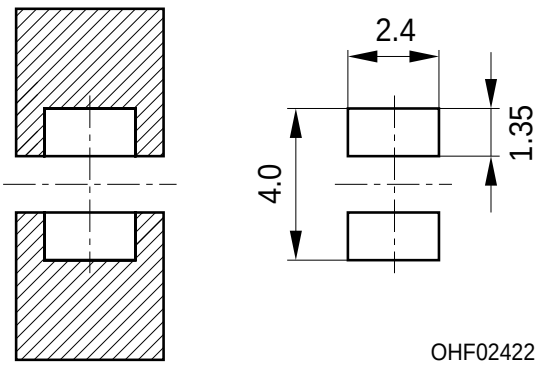
SFH 4641

Padgeometrie für
verbesserte Wärmeableitung

Paddesign for improved
heat dissipation

Cu-Fläche > 16 mm$^2$
Cu-area

Lötstopplack
Solder resist

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Paddesign for improved
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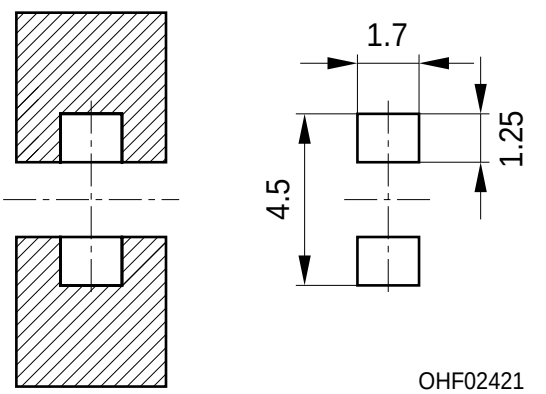
Solder resist



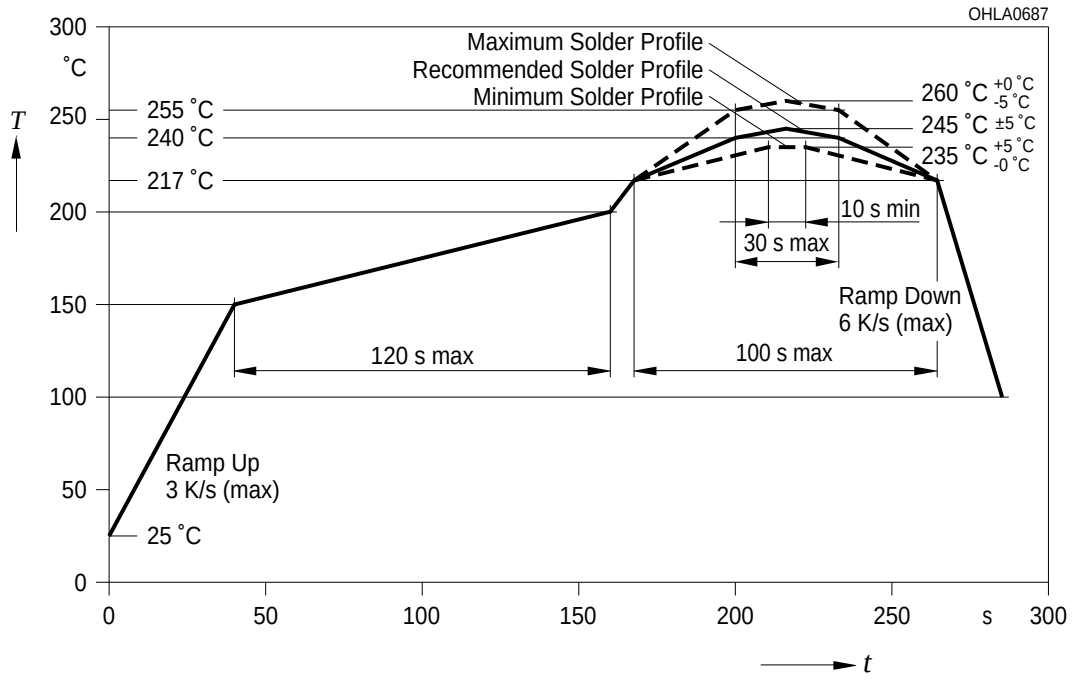

Maße in mm / Dimensions in mm.

**Verarbeitungshinweis:** **Das Gehäuse ist mit Silikon vergossen. Mechanischer Stress auf der Bauteiloberfläche sollte so gering wie möglich gehalten werden.**

**Handling indication:** **The package is casted with silicone. Mechanical stress at the surface of the unit should be as low as possible.**

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

Vorbehandlung nach JEDEC Level 2
Preconditioning acc. to JEDEC Level 2
(nach J-STD-020C)
(acc. to J-STD-020C)

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