

**Leistungsstarke IR-Lumineszenzdiode**  
**High Power Infrared Emitter**  
**Lead (Pb) Free Product - RoHS Compliant**

**SFH 4209**



**Nicht für Neuentwicklungen / Not for new designs**

**Wesentliche Merkmale**

- Leistungsstarke GaAs-LED (40mW)
- Hoher Wirkungsgrad bei kleinen Strömen
- Typische Peakwellenlänge 950nm

**Features**

- High Power GaAs-LED (40mW)
- High Efficiency at low currents
- Typical peak wavelength 950nm

**Anwendungen**

- Schnelle Datenübertragung mit Übertragungsraten bis 100 Mbaud (IR Tastatur, Joystick, Multimedia)
- Analoge und digitale Hi-Fi Audio- und Videosignalübertragung
- Batteriebetriebene Geräte (geringe Stromaufnahme)
- Anwendungen mit hohen Zuverlässigkeitsansprüchen bzw. erhöhten Anforderungen
- Alarm- und Sicherungssysteme
- IR Freiraumübertragung

**Applications**

- High data transmission rate up to 100 Mbaud (IR keyboard, Joystick, Multimedia)
- Analog and digital Hi-Fi audio and video signal transmission
- Low power consumption (battery) equipment
- Suitable for professional and high-reliability applications
- Alarm and safety equipment
- IR free air transmission

| Typ<br>Type | Bestellnummer<br>Ordering Code | Strahlstärkegruppierung <sup>1)</sup> ( $I_F = 100\text{mA}$ , $t_p = 20\text{ ms}$ )<br>Radiant Intensity Grouping <sup>1)</sup><br>$I_e$ (mW/sr) |
|-------------|--------------------------------|--|
| SFH 4209    | Q65110A2501                    | 24 (> 10)  |

<sup>1)</sup> gemessen bei einem Raumwinkel  $\Omega = 0.01$  / measured at a solid angle of  $\Omega = 0.01$  sr

Grenzwerte ( $T_A = 25\text{ °C}$ )

## 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  | $V_R$             | 3              | V               |
| Durchlaßstrom<br>Forward current  | $I_F$ (DC)        | 100            | mA              |
| Stoßstrom, $t_p = 10\ \mu\text{s}$ , $D = 0$<br>Surge current   | $I_{FSM}$         | 2.2            | A               |
| Verlustleistung<br>Power dissipation  | $P_{tot}$         | 180            | mW              |
| Wärmewiderstand Sperrschicht - Umgebung bei<br>Montage auf FR4 Platine, Padgröße je $16\ \text{mm}^2$<br>Thermal resistance junction - ambient mounted<br>on PC-board (FR4), padsize $16\ \text{mm}^2$ each | $R_{thJA}$        | 450            | K/W             |
| Wärmewiderstand Sperrschicht - Lötstelle bei<br>Montage auf Metall-Block<br>Thermal resistance junction - soldering point,<br>mounted on metal block  | $R_{thJS}$        | 200            | K/W             |

Kennwerte ( $T_A = 25\text{ °C}$ )

## Characteristics

| Bezeichnung<br>Parameter  | Symbol<br>Symbol             | Wert<br>Value                            | Einheit<br>Unit |
|---|------------------------------|--|-----------------|
| Wellenlänge der Strahlung<br>Wavelength at peak emission<br>$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$  | $\lambda_{\text{peak}}$      | 950                                      | nm              |
| Spektrale Bandbreite bei 50% von $I_{\text{max}}$<br>Spectral bandwidth at 50% of $I_{\text{max}}$<br>$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$  | $\Delta\lambda$              | 40                                       | nm              |
| Abstrahlwinkel<br>Half angle  | $\varphi$                    | $\pm 25$                                 | Grad<br>deg.    |
| Aktive Chipfläche<br>Active chip area   | $A$                          | 0.09                                     | mm <sup>2</sup> |
| Abmessungen der aktiven Chipfläche<br>Dimensions of the active chip area  | $L \times B$<br>$L \times W$ | $0.3 \times 0.3$                         | mm <sup>2</sup> |
| Schaltzeiten, $I_e$ von 10% auf 90% und von 90%<br>auf 10%, bei $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$ , $R_L = 50\ \Omega$<br>Switching times, $I_e$ from 10% to 90% and from<br>90% to 10%, $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$ , $R_L = 50\ \Omega$ | $t_r$ , $t_f$                | 10                                       | ns              |
| Durchlassspannung,<br>Forward voltage<br>$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$<br>$I_F = 1\text{ A}$ , $t_p = 100\ \mu\text{s}$  | $V_F$<br>$V_F$               | 1.5 ( $\leq 1.8$ )<br>3.2 ( $\leq 4.3$ ) | V<br>V          |
| Sperrstrom<br>Reverse current<br>$V_R = 3\text{ V}$   | $I_R$                        | 0.01 ( $\leq 10$ )                       | $\mu\text{A}$   |
| Gesamtstrahlungsfluss<br>Total radiant flux<br>$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$   | $\Phi_e$                     | 40                                       | mW              |
| Temperaturkoeffizient von $I_e$ bzw. $\Phi_e$ ,<br>$I_F = 100\text{ mA}$<br>Temperature coefficient of $I_e$ or $\Phi_e$ , $I_F = 100\text{ mA}$  | $TC_I$                       | - 0.44                                   | %/K             |
| Temperaturkoeffizient von $V_F$ , $I_F = 100\text{ mA}$<br>Temperature coefficient of $V_F$ , $I_F = 100\text{ mA}$   | $TC_V$                       | - 1.5                                    | mV/K            |
| Temperaturkoeffizient von $\lambda$ , $I_F = 100\text{ mA}$<br>Temperature coefficient of $\lambda$ , $I_F = 100\text{ mA}$   | $TC_\lambda$                 | + 0.2                                    | nm/K            |

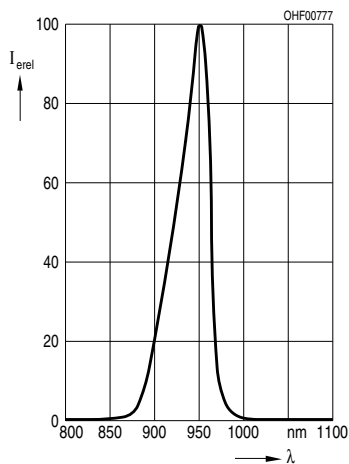
**Strahlstärke  $I_e$  in Achsrichtung<sup>1)</sup>**gemessen bei einem Raumwinkel  $\Omega = 0.01$  sr**Radiant Intensity  $I_e$  in Axial Direction**at a solid angle of  $\Omega = 0.01$  sr

| Bezeichnung<br>Parameter  | Symbol                                     | Werte<br>Values |            |            | Einheit<br>Unit |
|---|--|-----------------|------------|------------|-----------------|
|   |  | SFH 4209-R      | SFH 4209-S | SFH 4209-T |                 |
| Strahlstärke<br>Radiant intensity<br>$I_F = 100$ mA, $t_p = 20$ ms    | $I_{e \text{ min}}$<br>$I_{e \text{ max}}$ | 10<br>20        | 16<br>32   | 25<br>50   | mW/sr<br>mW/sr  |
| Strahlstärke<br>Radiant intensity<br>$I_F = 1$ A, $t_p = 100$ $\mu$ s | $I_{e \text{ typ.}}$                       | 100             | 140        | 180        | mW/sr           |

<sup>1)</sup> Nur eine Gruppe in einer Verpackungseinheit (Streuung kleiner 2:1)<sup>1)</sup> Only one group in one packing unit, (variation lower 2:1)

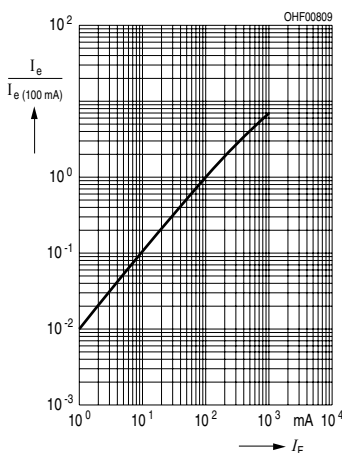
**Relative Spectral Emission**

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



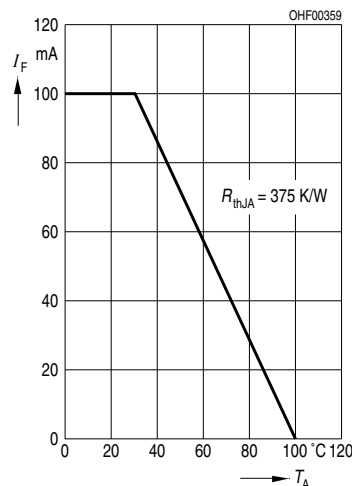
**Radiant Intensity**  $\frac{I_e}{I_e 100 \text{ mA}} = f(I_F)$

Single pulse,  $t_p = 20 \mu\text{s}$



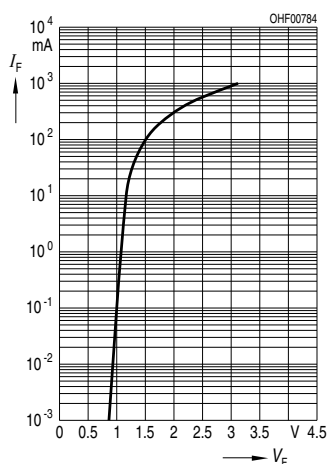
**Max. Permissible Forward Current**

$I_F = f(T_A, R_{thJA})^1$



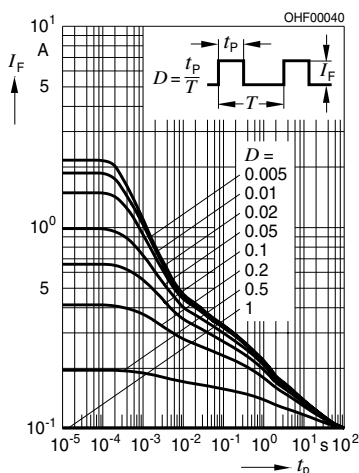
**Forward Current**  $I_F = f(V_F)$

single pulse,  $t_p = 20 \mu\text{s}$

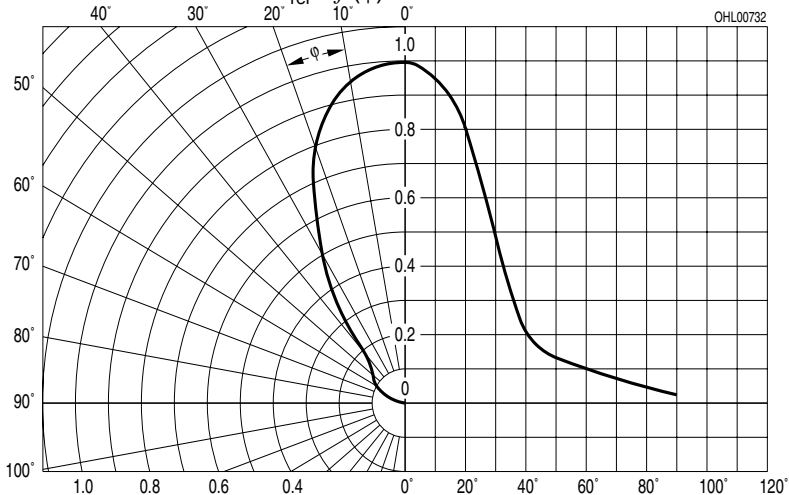


**Permissible Pulse Handling Capability**

$I_F = f(\tau, T_A = 25 \text{ }^\circ\text{C}, \text{duty cycle } D = \text{parameter})$

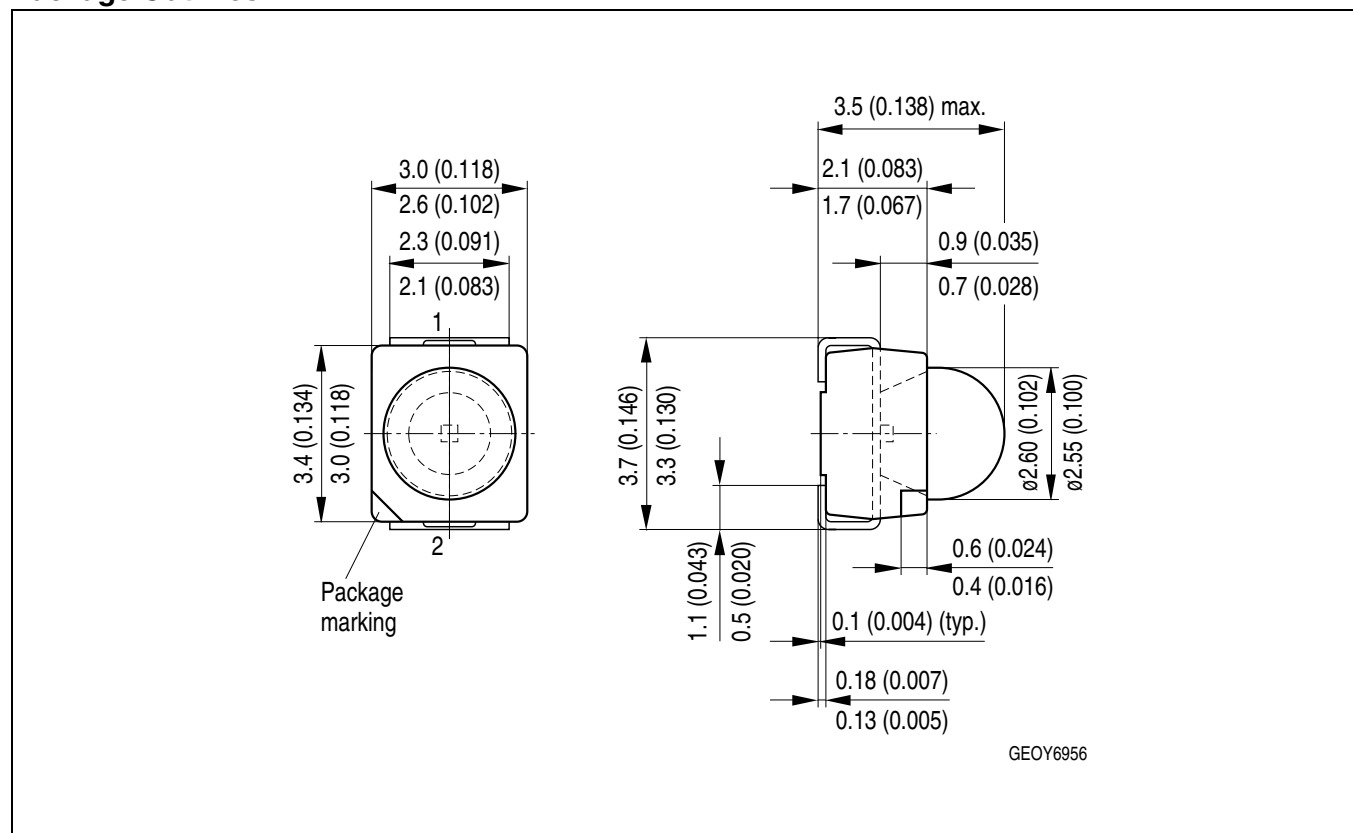


**Radiation Characteristics**  $I_{rel} = f(\varphi)$



<sup>1)</sup> Thermal resistance junction - ambient mounted on PC-board (FR4), pad size 16 mm<sup>2</sup> (each).

## Maßzeichnung Package Outlines

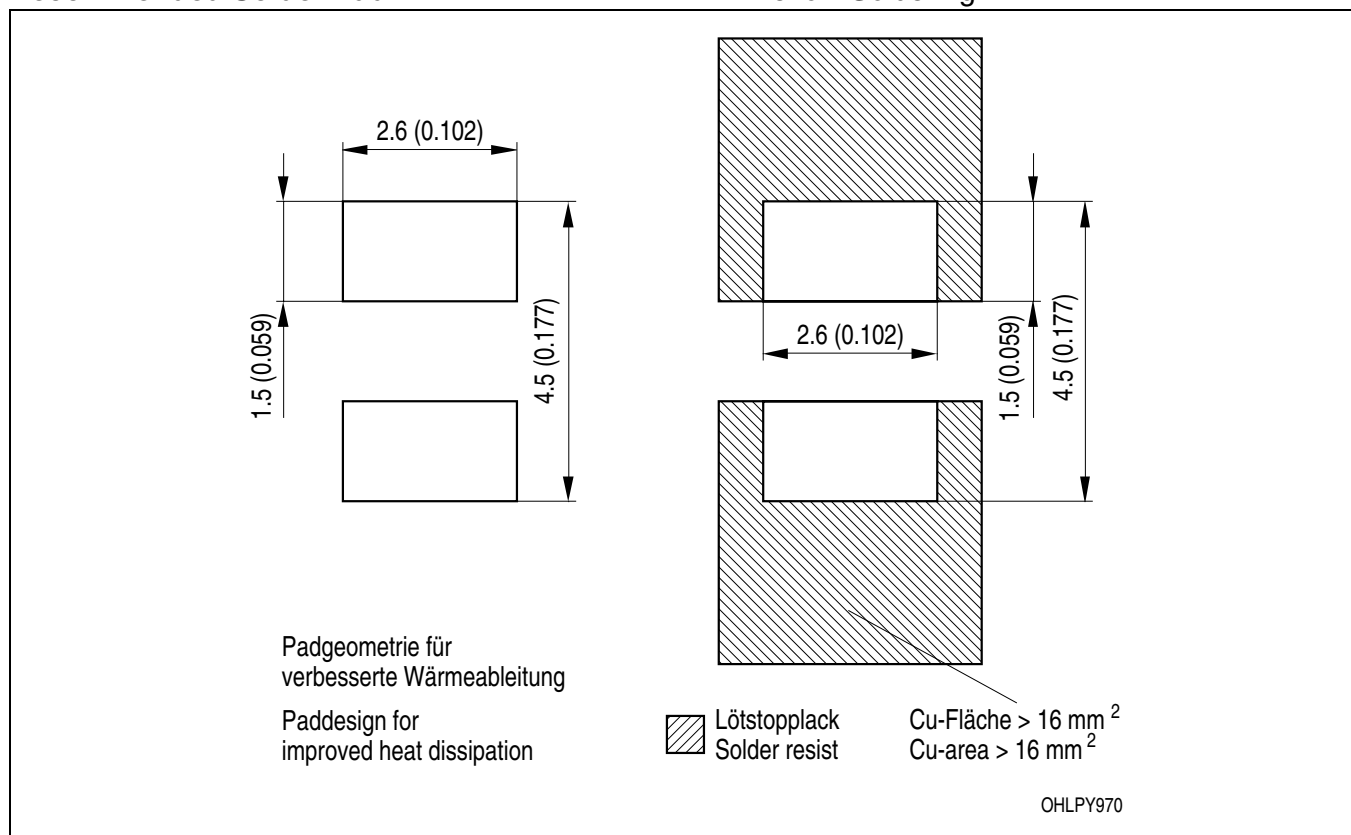


Maße in mm (inch) / Dimensions in mm (inch).

|  |   |
|--|---|
| Gehäuse / Package                      | TOPLED <sup>®</sup> mit Linse (P-LCC-2) / TOPLED <sup>®</sup> with lens (P-LCC-2) |
| Anschlussbelegung<br>pin configuration | 1 = Anode / anode<br>2 = Kathode / cathode  |
| Farbe<br>Color                         | weiß<br>white   |

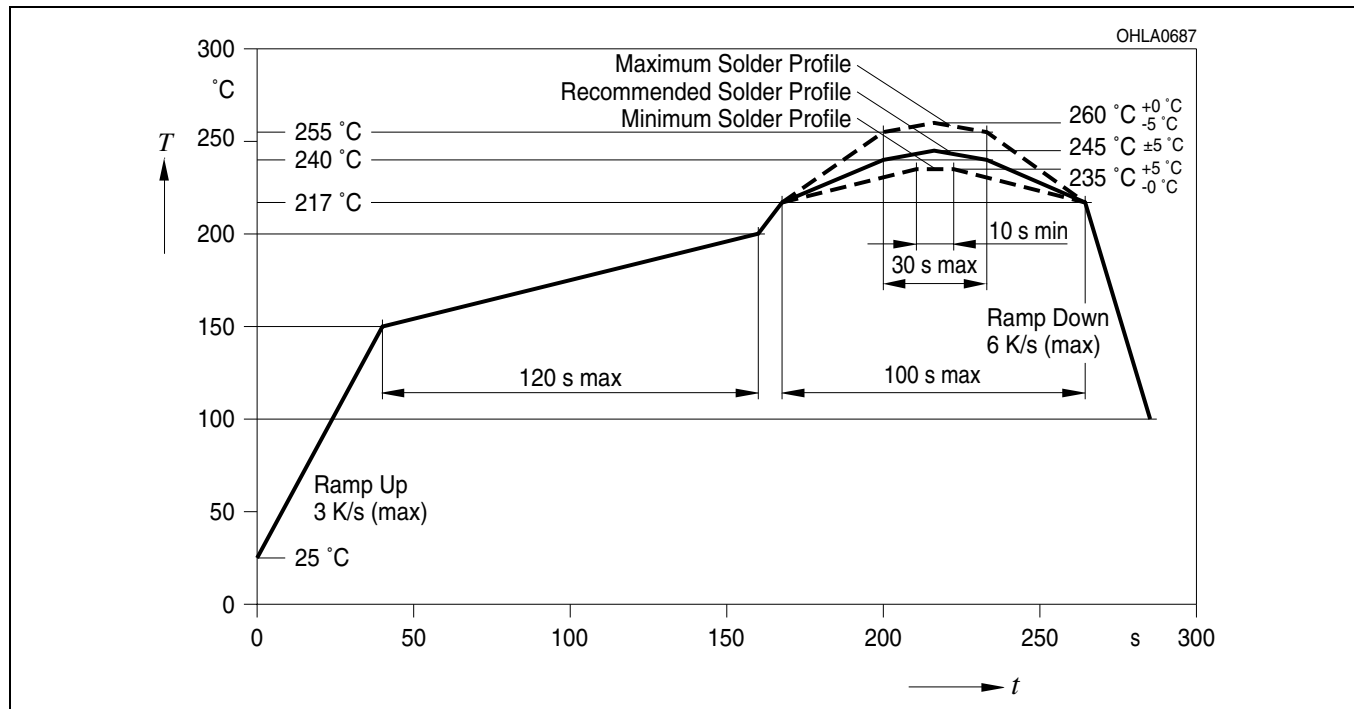
**Empfohlenes Lötpad-Design**  
**Recommended Solder Pad**

**Reflow Lötten**  
**Reflow Soldering**



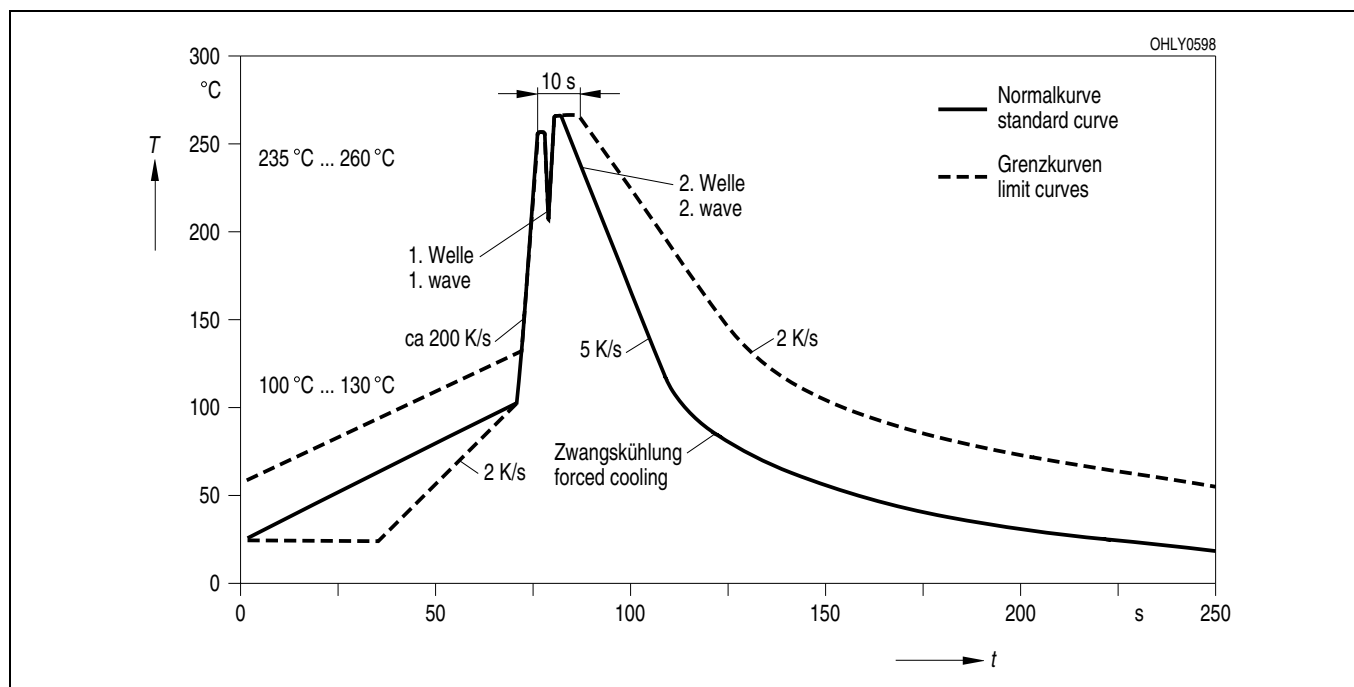
**Lötbedingungen**  
**Soldering Conditions**  
**Reflow Lötprofil für bleifreies Löt**  
**Reflow Soldering Profile for lead free soldering**

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



**Wellenlöt (TTW)**  
**TTW Soldering**

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





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