

IR-Lumineszenzdiode (850 nm) mit hoher Ausgangsleistung
High Power Infrared Emitter (850 nm)
Lead (Pb) Free Product - RoHS Compliant

SFH 4258S
SFH 4259S



Wesentliche Merkmale

- Infrarot LED mit hoher Ausgangsleistung
- Halbwinkel SFH 4258S: $\pm 15^\circ$
- Halbwinkel SFH 4259S: $\pm 25^\circ$
- Hohe Bestromung bei hohen Temperaturen möglich
- Kurze Schaltzeiten

Anwendungen

- Industrie Anwendungen
- Infrarotbeleuchtung für Kameras
- IR-Datenübertragung
- Sensorik

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 Sicherheitsrichtlinien der IEC-Normen 60825-1 und 62471 behandelt werden.

Features

- High Power Infrared LED
- Half angle SFH 4258S: $\pm 15^\circ$
- Half angle SFH 4259S: $\pm 25^\circ$
- High forward current allowed at high temperature
- Short switching times

Applications

- industrial applications
- Infrared Illumination for cameras
- IR Data Transmission
- Optical sensors

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 Type | Bestellnummer Ordering Code | Strahlstärkegruppierung ¹⁾ ($I_F = 70 \text{ mA}$, $t_p = 20 \text{ ms}$) Radiant Intensity Grouping ¹⁾ I_e (mW/sr) |
|-------------|--------------------------------|--|
| SFH 4258S | Q65111A1158 | ≥ 40 (typ. 100) |
| SFH 4259S | Q65111A1159 | ≥ 25 (typ. 60) |

¹⁾ gemessen bei einem Raumwinkel $\Omega = 0.01 \text{ sr}$ / measured at a solid angle of $\Omega = 0.01 \text{ sr}$

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|-------------------|---------------|-----------------|
| Betriebs- und Lagertemperatur Operating and storage temperature range | T_{op}, T_{stg} | - 40 ... + 85 | °C |
| Sperrspannung Reverse voltage | V_R | 5 | V |
| Vorwärtsgleichstrom Forward current | I_F | 70 | mA |
| Stoßstrom, $t_p = 300\ \mu\text{s}$, $D = 0$ Surge current | I_{FSM} | 700 | mA |
| Verlustleistung Power dissipation | P_{tot} | 245 | mW |
| Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je $16\ \text{mm}^2$ Thermal resistance junction - ambient mounted on PC-board (FR4), pads size $16\ \text{mm}^2$ each | R_{thJA} | 300 | K/W |
| Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block | R_{thJS} | 140 | K/W |

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|------------------------|----------------------|-----------------|
| Wellenlänge der Strahlung Wavelength at peak emission $I_F = 70\ \text{mA}$ | λ_{peak} | 860 | nm |
| Centroid-Wellenlänge der Strahlung Centroid wavelength $I_F = 70\ \text{mA}$ | $\lambda_{centroid}$ | 850 | nm |
| Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 70\ \text{mA}$ | $\Delta\lambda$ | 30 | nm |
| Abstrahlwinkel Half angle SFH 4258S SFH 4259S | φ φ | ± 15 ± 25 | Grad deg. |

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

| Bezeichnung Parameter | Symbol Symbol | Wert Value | Einheit Unit |
|---|------------------------------|------------------------------------|-----------------|
| Aktive Chipfläche Active chip area | A | 0.09 | mm ² |
| Abmessungen der aktiven Chipfläche Dimension of the active chip area | $L \times B$ $L \times W$ | 0.3×0.3 | mm ² |
| Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10%, bei $I_F = 70\text{ mA}$, $R_L = 50\ \Omega$ Switching times, I_e from 10% to 90% and from 90% to 10%, $I_F = 70\text{ mA}$, $R_L = 50\ \Omega$ | t_r, t_f | 15 | ns |
| Durchlassspannung Forward voltage $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ $I_F = 700\text{ mA}$, $t_p = 100\ \mu\text{s}$ | V_F V_F | 3 (< 3.5) 4 (< 5.2) | V V |
| Sperrstrom Reverse current | I_R | not designed for reverse operation | μA |
| Gesamtstrahlungsfluss Total radiant flux $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | $\Phi_{e\text{ typ}}$ | 80 | mW |
| Temperaturkoeffizient von I_e bzw. Φ_e , $I_F = 70\text{ mA}$ Temperature coefficient of I_e or Φ_e , $I_F = 70\text{ mA}$ | TC_I | - 0.5 | %/K |
| Temperaturkoeffizient von V_F , $I_F = 70\text{ mA}$ Temperature coefficient of V_F , $I_F = 70\text{ mA}$ | TC_V | - 2 | mV/K |
| Temperaturkoeffizient von λ , $I_F = 70\text{ mA}$ Temperature coefficient of λ , $I_F = 70\text{ mA}$ | TC_λ | + 0.3 | nm/K |

Strahlstärke I_e in Achsrichtung¹⁾

gemessen bei einem Raumwinkel $\Omega = 0.01$ sr

Radiant Intensity I_e in Axial Direction

at a solid angle of $\Omega = 0.01$ sr

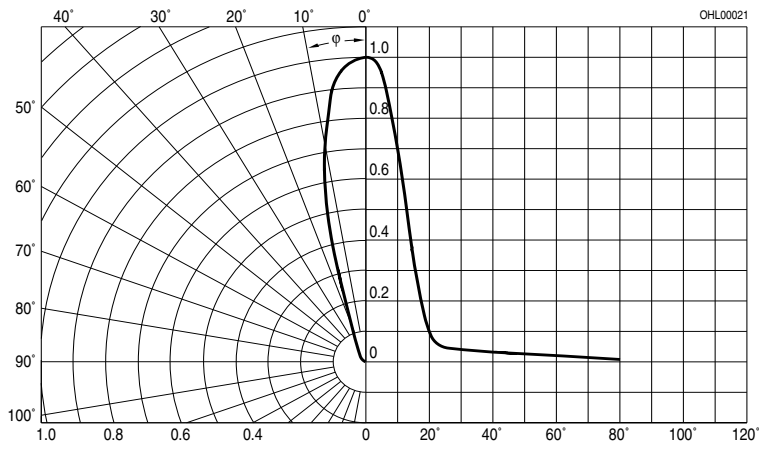
| Bezeichnung Parameter | Symbol | Werte Values | | | Einheit Unit |
|---|---------------------|-----------------|-----------------|------------------|-----------------|
| | | SFH 4258S -U | SFH 4258S -V | SFH 4258S -AW | |
| Strahlstärke Radiant intensity $I_F = 70$ mA, $t_p = 20$ ms | $I_{e \text{ min}}$ | 40 | 63 | 100 | mW/sr |
| | $I_{e \text{ max}}$ | 80 | 125 | 200 | mW/sr |
| Strahlstärke Radiant intensity $I_F = 700$ mA, $t_p = 25$ μ s | $I_{e \text{ typ}}$ | 480 | 750 | 1200 | mW/sr |
| | | SFH 4259S -T | SFH 4259S -U | SFH 4259S -V | |
| Strahlstärke Radiant intensity $I_F = 70$ mA, $t_p = 20$ ms | $I_{e \text{ min}}$ | 25 | 40 | 63 | mW/sr |
| | $I_{e \text{ max}}$ | 50 | 80 | 125 | mW/sr |
| Strahlstärke Radiant intensity $I_F = 700$ mA, $t_p = 25$ μ s | $I_{e \text{ typ}}$ | 300 | 480 | 750 | 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 $I_{rel} = f(\varphi)$

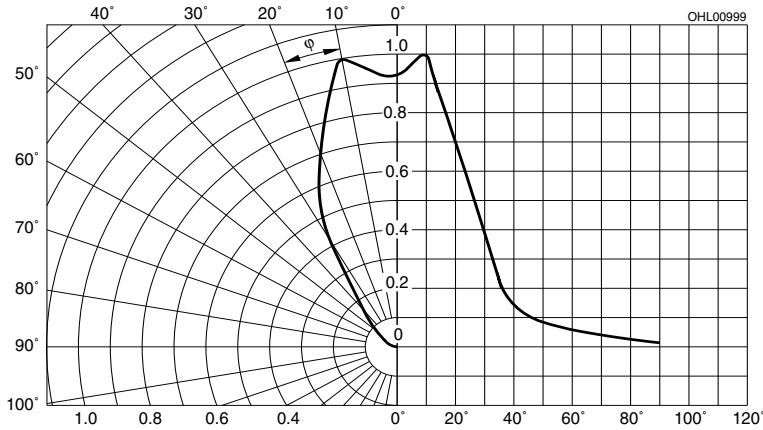
SFH 4258S



Abstrahlcharakteristik

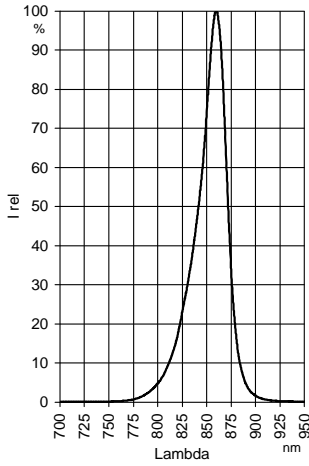
Radiation Characteristics $I_{rel} = f(\varphi)$

SFH 4259S



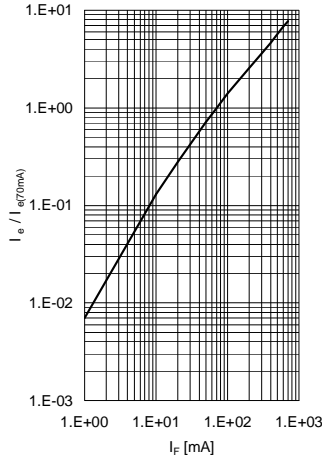
Relative Spectral Emission

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



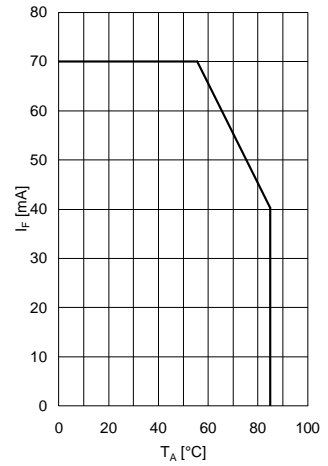
Radiant Intensity $\frac{I_e}{I_e 70 \text{ mA}} = f(I_F)$

Single pulse, $t_p = 25 \mu\text{s}$



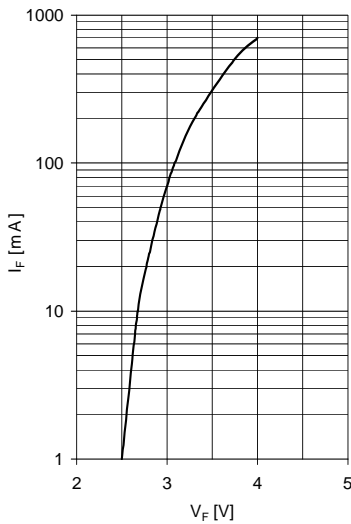
Max. Permissible Forward Current

$I_F = f(T_A), R_{thJA} = 300 \text{ K/W}$



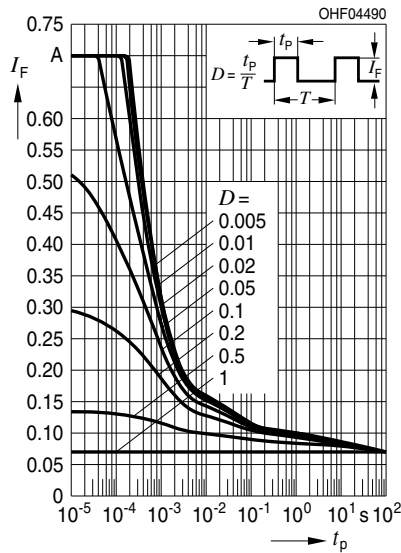
Forward Current $I_F = f(V_F)$

Single pulse, $t_p = 100 \mu\text{s}$



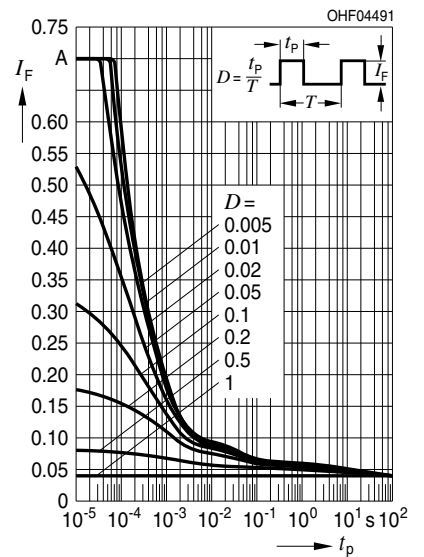
Permissible Pulse Handling Capability

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

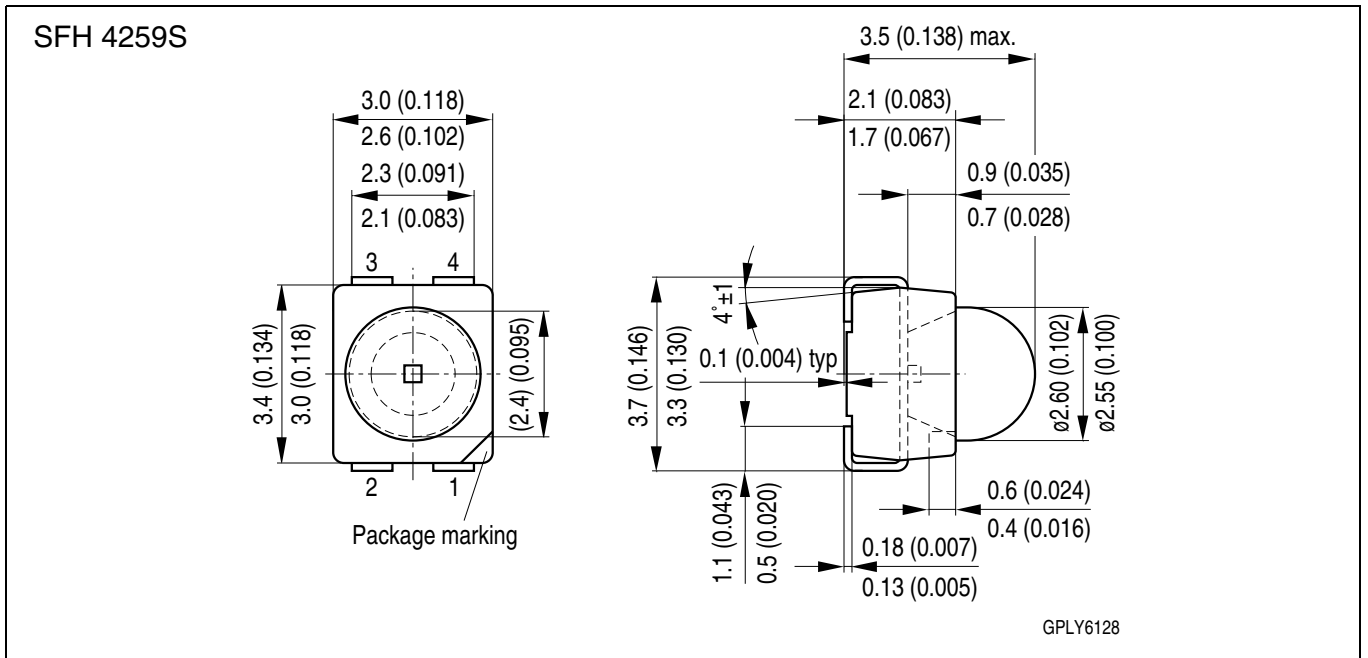
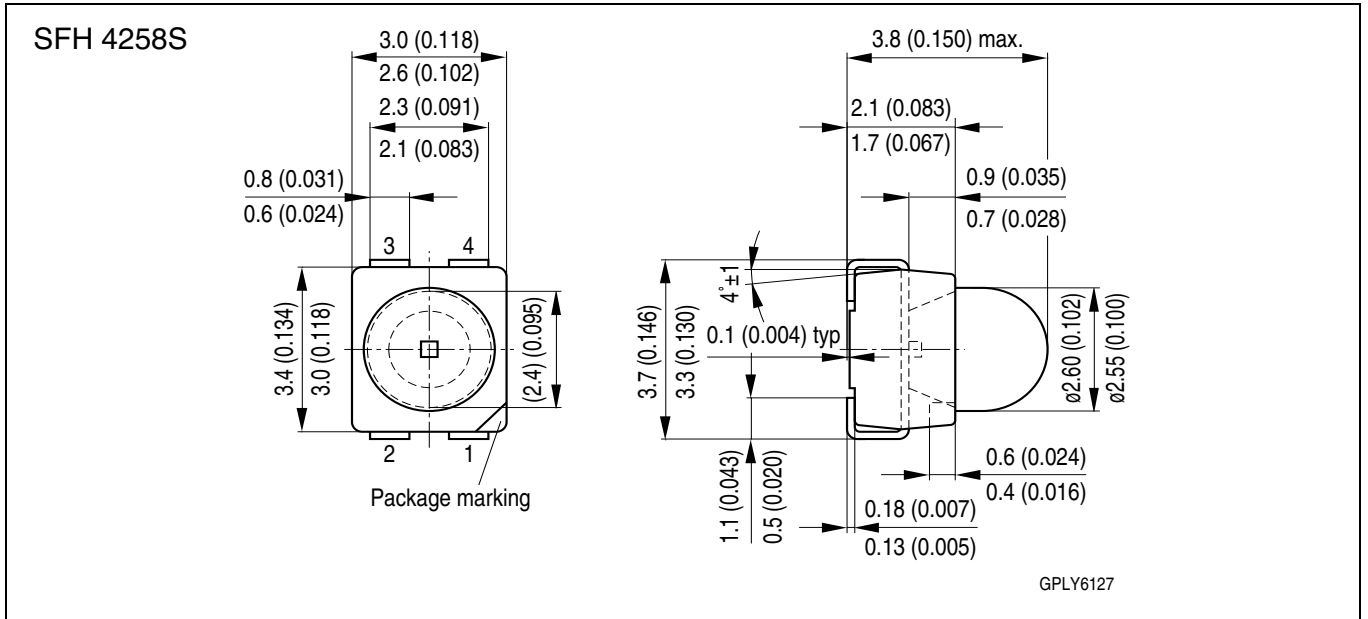


Permissible Pulse Handling Capability

$I_F = f(\tau), T_A = 85^\circ\text{C}$,
duty cycle $D = \text{parameter}$



Maßzeichnung
Package Outlines

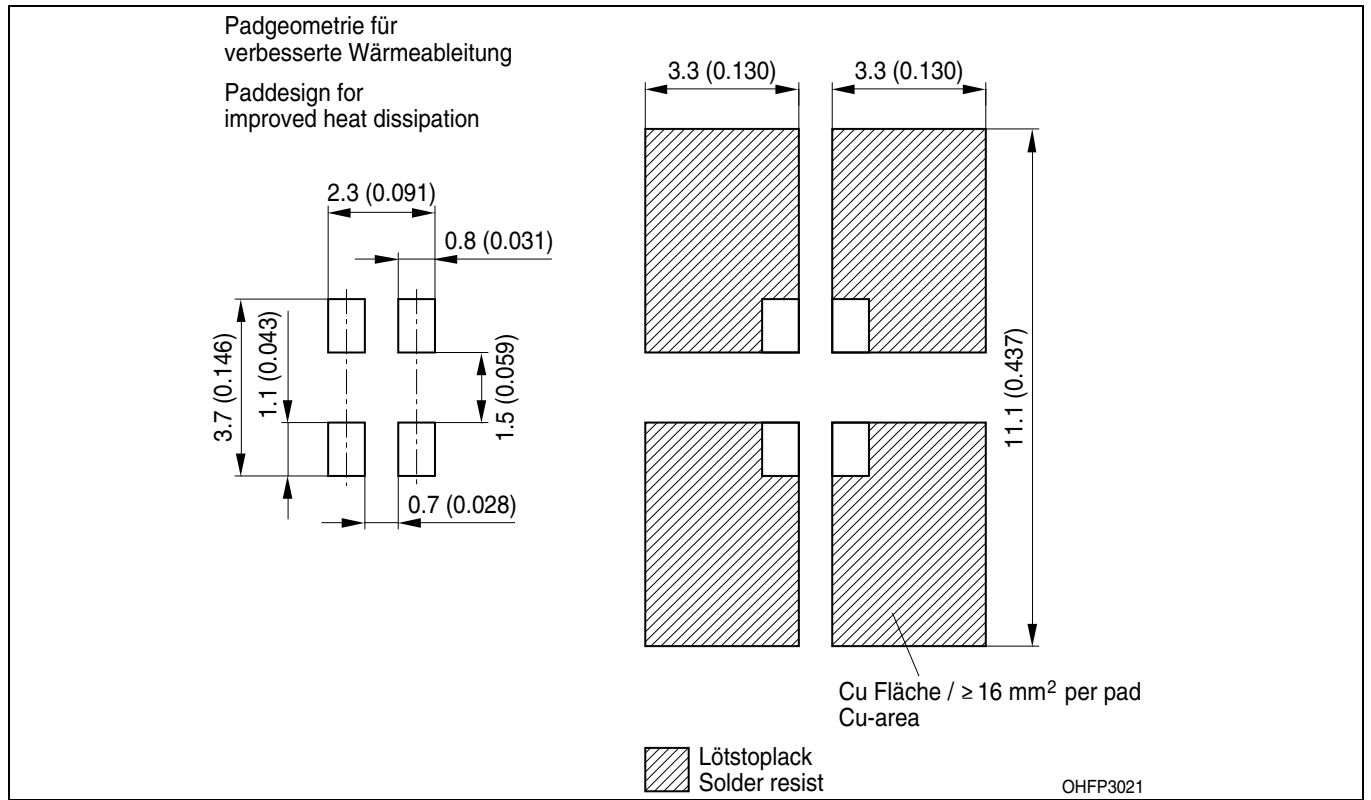


Maße in mm (inch) / Dimensions in mm (inch).

| | |
|--|--|
| Gehäuse / Package | Power TOPLED® mit Linse, klarer Verguss / Power TOPLED® with lens, clear resin |
| Anschlussbelegung pin configuration | 1 = Kathode / cathode 2/3/4 = Anode / anode |

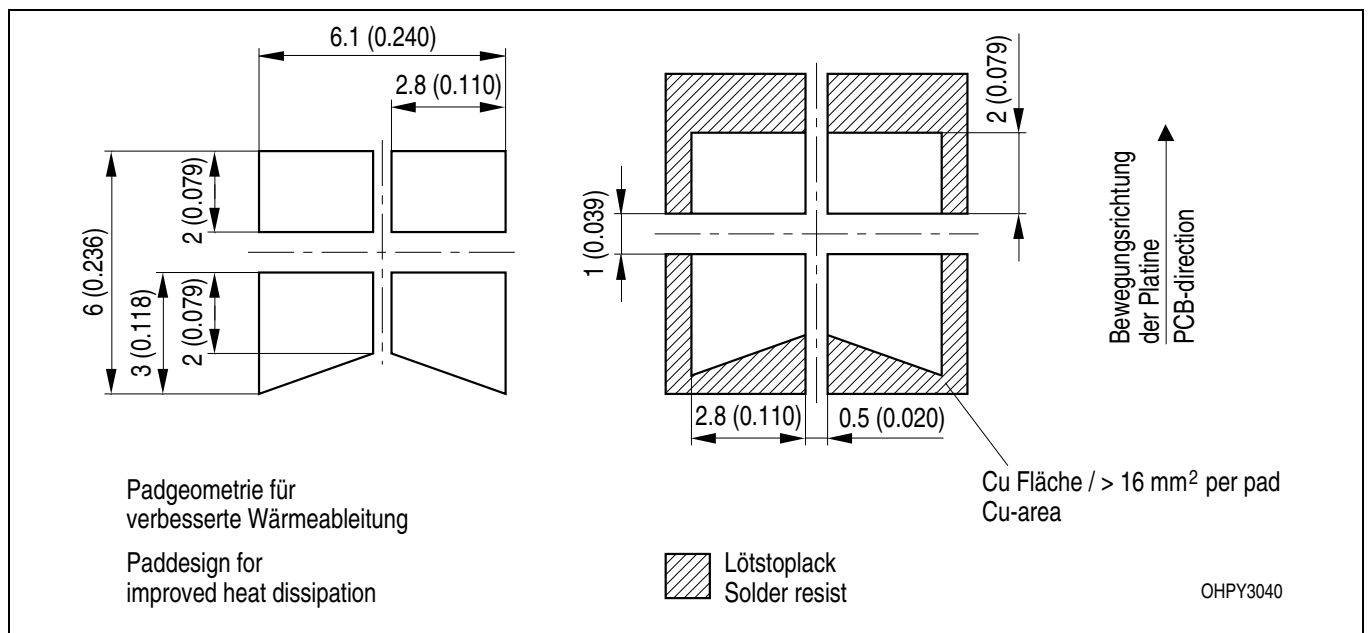
Empfohlenes Lötpaddesign
Recommended Solder Pad Design

Reflow Löten
 Reflow Soldering



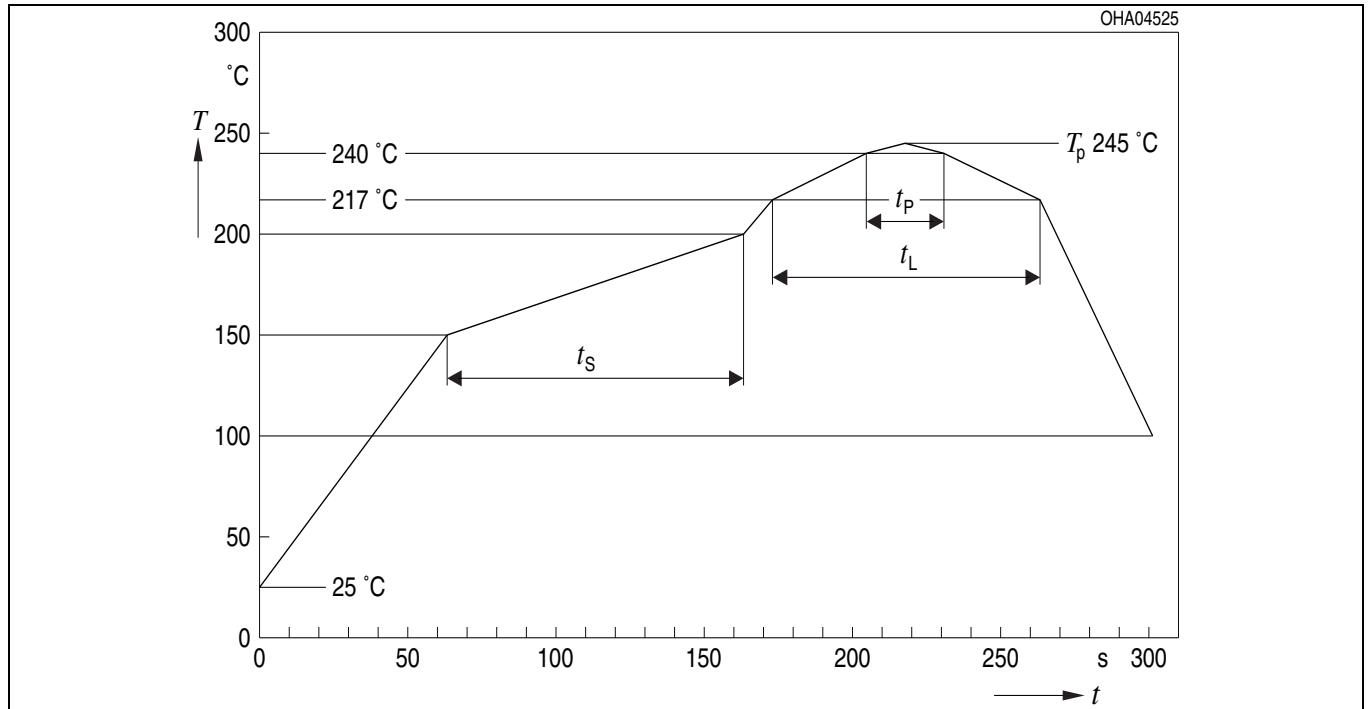
Empfohlenes Lötpaddesign
Recommended Solder Pad Design

Wellenlöten TTW
 TTW Soldering



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-020D.01)
 (acc. to J-STD-020D.01)



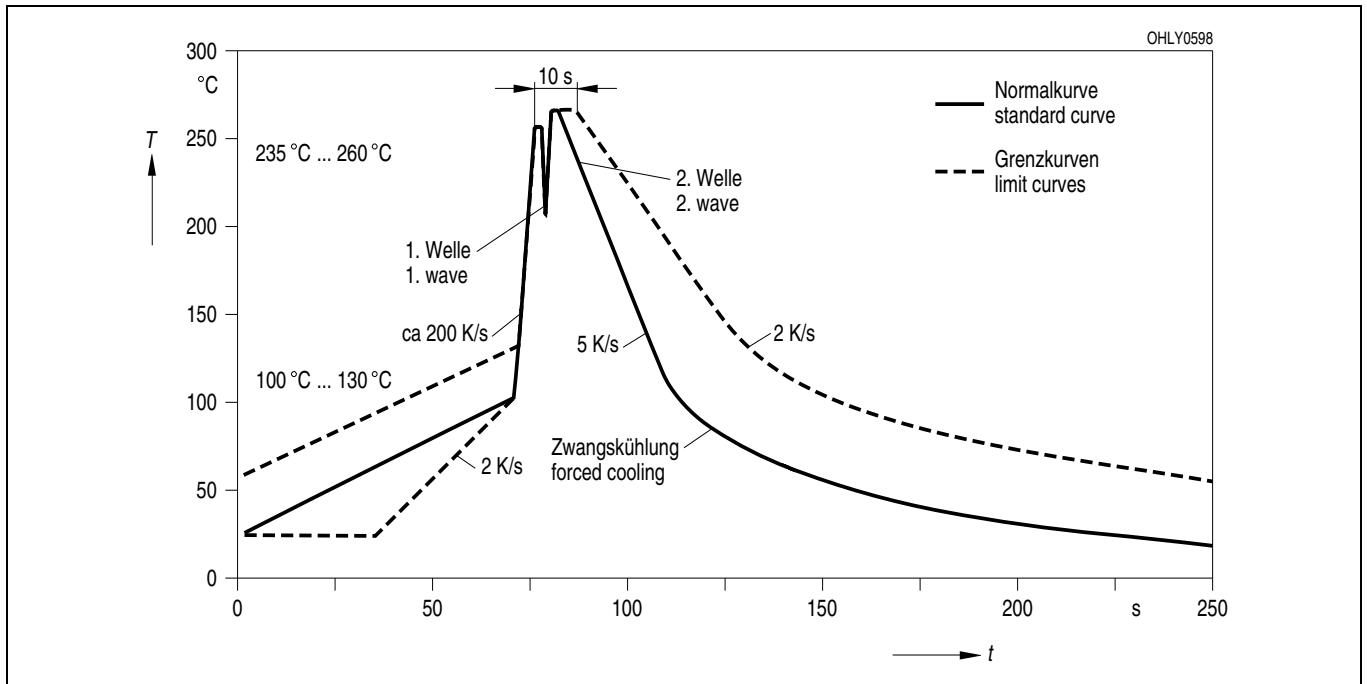
| Profileigenschaften Profile Feature | Bleifreier Aufbau / Pb-Free Assembly (SnAgCu) | |
|---|---|---------------------------|
| | Empfehlung / Recommendation | Grenzwerte / Max. Ratings |
| Aufheizrate zum Vorwärmen*) / Ramp-up rate to preheat*) 25 °C to 150 °C | 2 K / s | 3 K / s |
| Zeit t _s von T _{Smin} bis T _{Smax} / Time t _s from T _{Smin} to T _{Smax} 150 °C to 200 °C | 100 s | min. 60 s max. 120 s |
| Aufheizrate zur Spitzentemperatur*) / Ramp-up rate to peak*) 180 °C to T _p | 2 K / s | 3 K / s |
| Liquidustemperatur T _L / Liquidus temperature T _L | 217 °C | |
| Zeit t _L über T _L / Time t _L above T _L | 80 s | max. 100 s |
| Spitzentemperatur T _p / Peak temperature T _p | 245 °C | max. 250 °C |
| Verweilzeit t _p innerhalb des spezifizierten Spitzentemperaturbereichs T _p - 5 K / Time t _p within the specified peak temperature range T _p - 5 K | 20 s | min. 10 s max. 30 s |
| Abkühlrate*) / Ramp-down rate*) T _p to 100 °C | 3 K / s | 4 K / s maximum |
| Zeitspanne von 25 °C bis zur Spitzentemperatur / Time from 25 °C to peak temperature | | max. 8 min. |

Alle Temperaturen beziehen sich auf die Bauteilmitte, jeweils auf der Bauteiloberseite gemessen / All temperatures refer to the center of the package, measured on the top of the package

* Steigungsberechnung $\Delta T/\Delta t$: Δt max. 5 s; erfüllt über den gesamten Temperaturbereich / slope calculation $\Delta T/\Delta t$: Δt max. 5 s; fulfillment for the whole T-range

Wellenlöten (TTW)
TTW Soldering

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



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