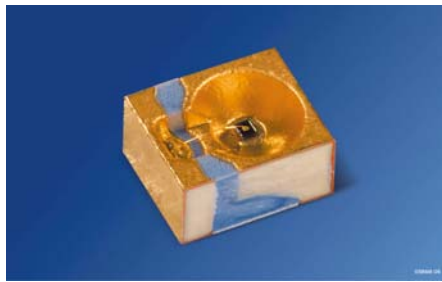
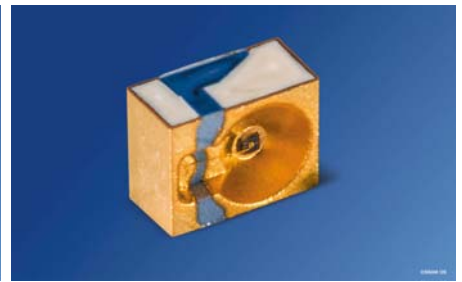


Engwinklige LED im MIDLED-Gehäuse (850 nm)
Narrow beam LED in MIDLED package (850 nm)
Lead (Pb) Free Product - RoHS Compliant

SFH 4650
SFH 4655



SFH 4650



SFH 4655

gemäß OS-PCN-2009-021-A2

acc. to OS-PCN-2009-021-A2
Wesentliche Merkmale

- Infrarot LED mit hoher Ausgangsleistung (60 mW)
- Enger Abstrahlwinkel ($\pm 15^\circ$)
- Kurze Schaltzeiten
- Geringe Bauhöhe
- Als Toplooker und Sidelooker einsetzbar
- SFH 4650: Gurtung als Toplooker
- SFH 4655: Gurtung als Sidelooker

Anwendungen

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

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 (60 mW) Infrared LED
- Narrow halfangle ($\pm 15^\circ$)
- Short switching times
- Low profile component
- Usable as top-looking and side-looking device
- SFH 4650: Taping as Toplooker
- SFH 4655: Taping as Sidelooker

Applications

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

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⁾ ($I_F = 100 \text{ mA}$, $t_p = 20 \text{ ms}$) Radiant Intensity Grouping ¹⁾ $I_e \text{ (mW/sr)}$
SFH 4650	Q65110A1572	$\geq 25 \text{ (typ. 65)}$
SFH 4655	Q65110A1569	$\geq 25 \text{ (typ. 65)}$

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 ... + 100	°C
Sperrspannung Reverse voltage	V_R	5	V
Vorwärtsgleichstrom Forward current	I_F	100	mA
Stoßstrom, $t_p = 300\text{ }\mu\text{s}$, $D = 0$ Surge current	I_{FSM}	1	A
Verlustleistung Power dissipation	P_{tot}	180	mW
Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je 16 mm ² Thermal resistance junction - ambient mounted on PC-board (FR4), padsize 16 mm ² each	R_{thJA}	340	K/W
Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block	R_{thJS}	180	K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 100\text{ mA}$	λ_{peak}	860	nm
Schwerpunkt-Wellenlänge der Strahlung Centroid wavelength $I_F = 100\text{ mA}$	$\lambda_{centroid}$	850	nm
Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 100\text{ mA}$	$\Delta\lambda$	30	nm
Abstrahlwinkel Half angle	φ	± 15	Grad deg.
Aktive Chipfläche Active chip area	A	0.09	mm ²

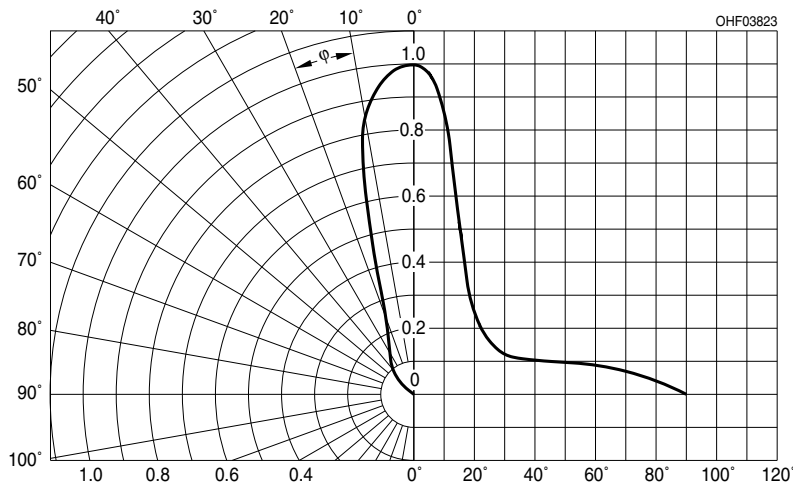
Kennwerte ($T_A = 25\text{ °C}$)**Characteristics** (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
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 $I_F = 100\text{ mA}$, $R_L = 50\text{ }\Omega$ Switching times, I_e from 10% to 90% and from 90% to 10%, $I_F = 100\text{ mA}$, $R_L = 50\text{ }\Omega$	t_r, t_f	12	ns
Durchlassspannung Forward voltage $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F V_F	1.5 (< 1.8) 2.4 (< 3.0)	V V
Sperrstrom Reverse current	I_R	not designed for reverse operation	μA
Gesamtstrahlungsfluss Total radiant flux $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	$\Phi_{e\text{ typ}}$	60	mW
Temperaturkoeffizient von I_e bzw. Φ_e , $I_F = 100\text{ mA}$ Temperature coefficient of I_e or Φ_e , $I_F = 100\text{ mA}$	TC_I	- 0.5	%/K
Temperaturkoeffizient von V_F , $I_F = 100\text{ mA}$ Temperature coefficient of V_F , $I_F = 100\text{ mA}$	TC_V	- 0.7	mV/K
Temperaturkoeffizient von λ , $I_F = 100\text{ mA}$ Temperature coefficient of λ , $I_F = 100\text{ mA}$	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

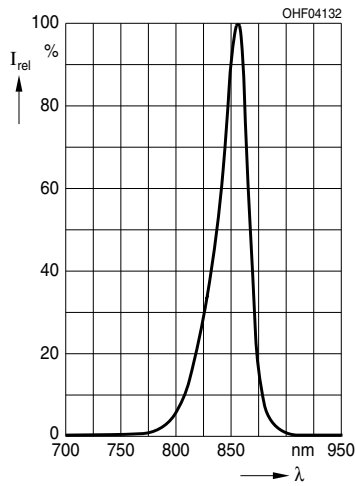
Bezeichnung Parameter	Symbol	Werte Values			Einheit Unit
		-T	-U	-V	
Strahlstärke Radiant intensity $I_F = 100$ mA, $t_p = 20$ ms	$I_{e \min}$ $I_{e \max}$	25 50	40 80	63 125	mW/sr mW/sr
Strahlstärke Radiant intensity $I_F = 1$ A, $t_p = 25$ μ s	$I_{e \text{ typ}}$	300	450	750	mW/sr

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

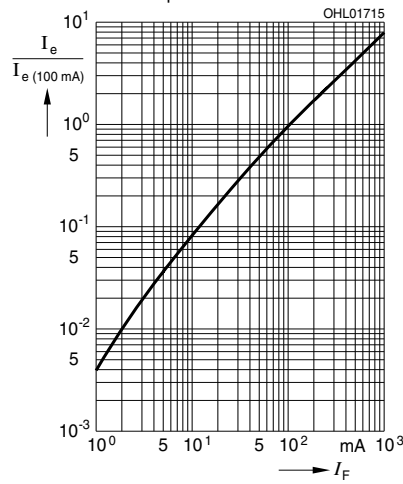
Relative Spectral Emission

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



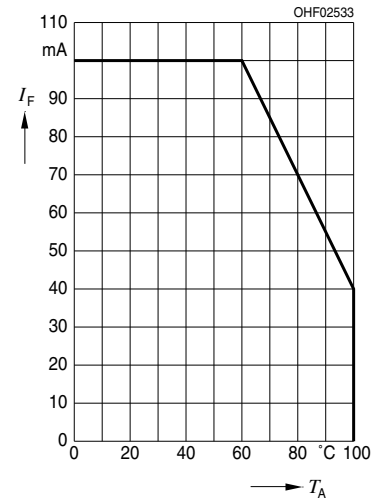
$$\text{Radiant Intensity } \frac{I_e}{I_e(100 \text{ mA})} = f(I_F)$$

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



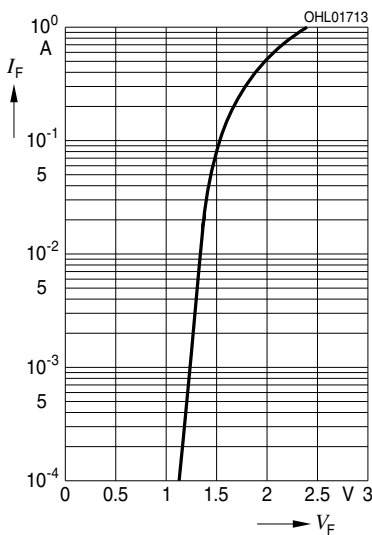
Max. Permissible Forward Current

$$I_F = f(T_A), R_{\text{thJA}} = 340 \text{ K/W}$$



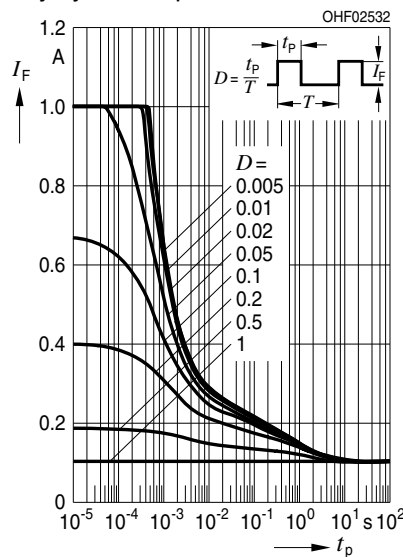
Forward Current $I_F = f(V_F)$

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

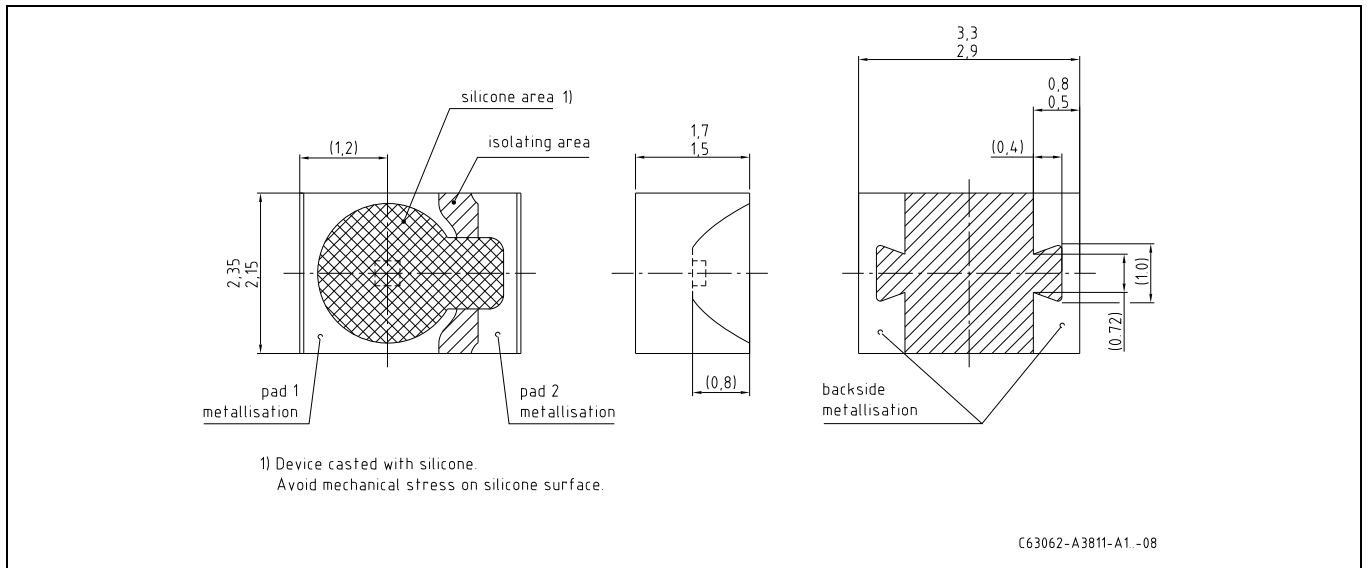


Permissible Pulse Handling

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



Maßzeichnung Package Outlines



Maße in mm / Dimensions in mm.

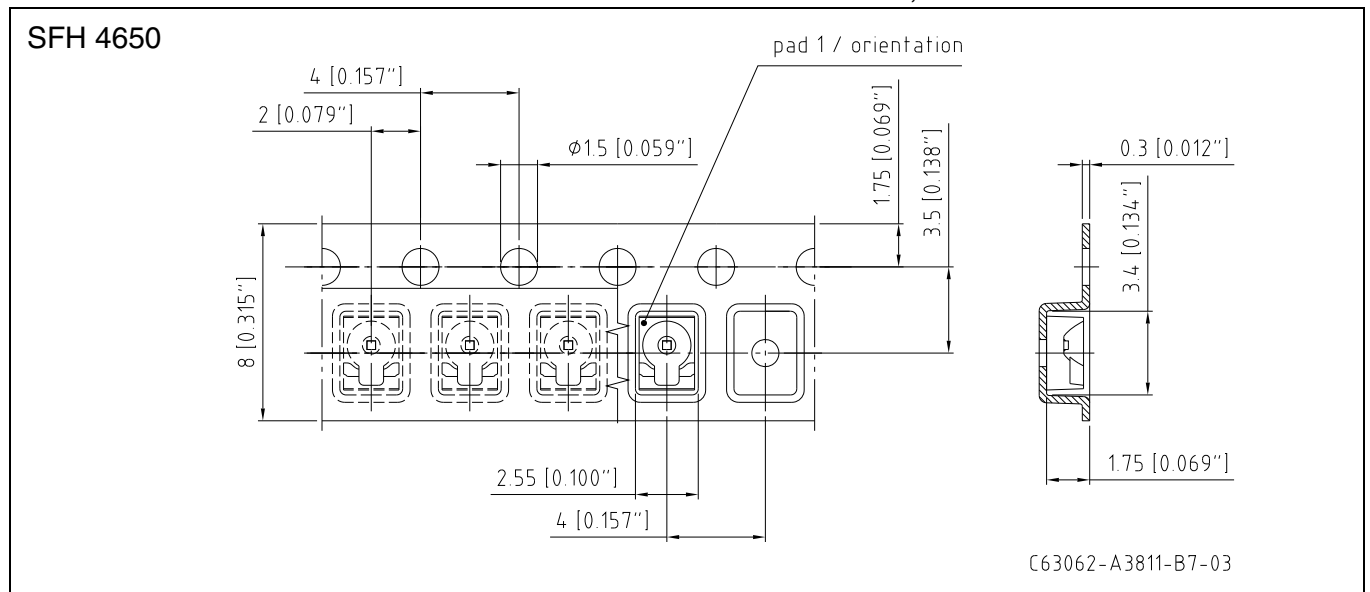
Gehäuse / Package	MID mit klarem Silikonverguss / MID casted with clear Silicone
Anschlussbelegung Pin configuration	Pad 1 = Anode / anode Pad 2 = Kathode / cathode

Gurtung / Polarität und Lage

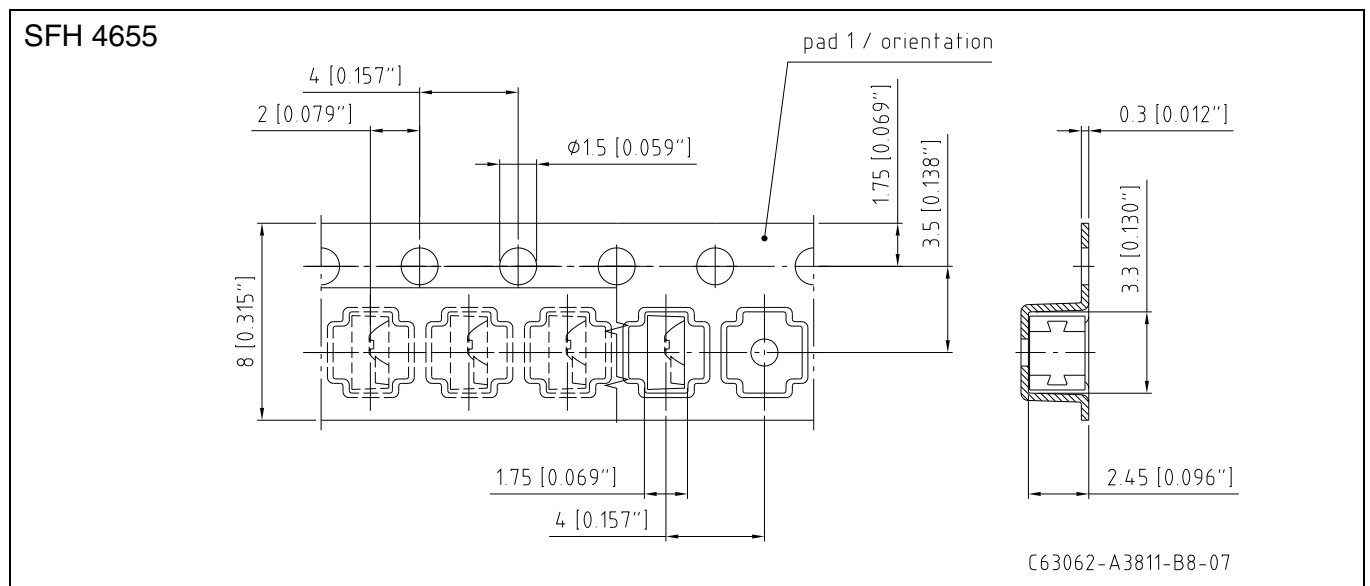
Verpackungseinheit 2000/Rolle, $\varnothing 180$ mm
oder 9000/Rolle, $\varnothing 330$ mm

Method of Taping / Polarity and Orientation

Packing unit 2000/reel, $\varnothing 180$ mm
or 9000/reel, $\varnothing 330$ mm



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



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

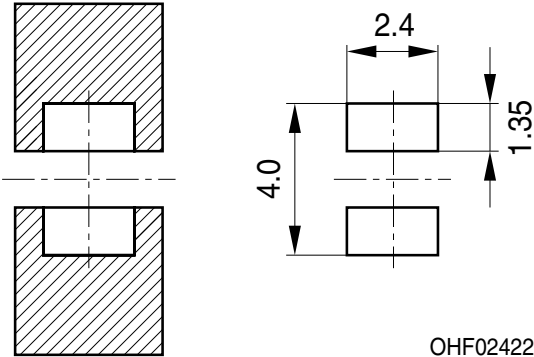
Empfohlenes Lötpaddesign
Recommended Solder Pad Design

SFH 4650

Padgeometrie für verbesserte Wärmeableitung
 Pad design for improved heat dissipation

Cu-Fläche > 16 mm²
 Cu-area

 Lötstopplack
 Solder resist



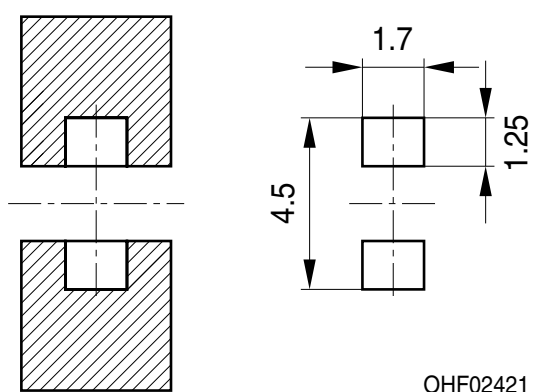
OHF02422

SFH 4655

Padgeometrie für verbesserte Wärmeableitung
 Pad design for improved heat dissipation

Cu-Fläche > 16 mm²
 Cu-area

 Lötstopplack
 Solder resist



OHF02421

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.

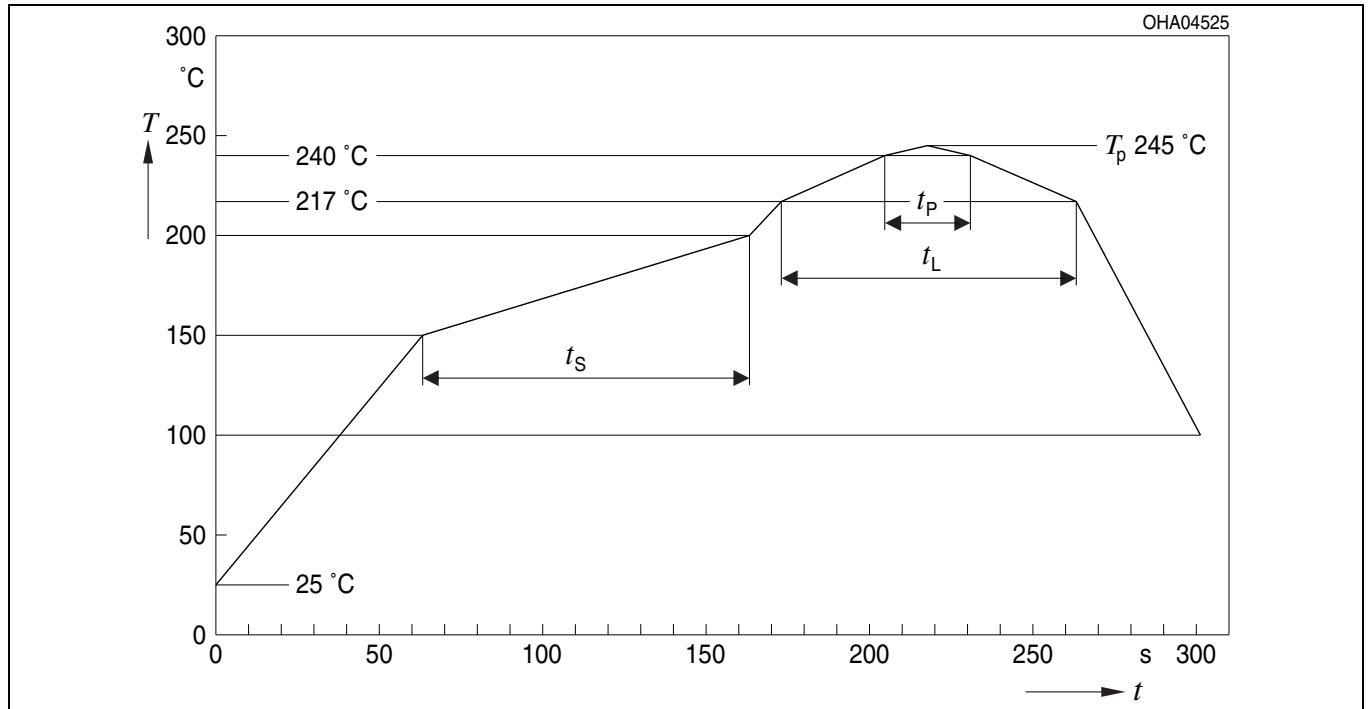
Lötbedingungen**Soldering Conditions****Reflow Lötprofil für bleifreies Löten****Reflow Soldering Profile for lead free soldering**

Vorbehandlung nach JEDEC Level 2

Preconditioning acc. to JEDEC Level 2

(nach J-STD-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. 260 °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	6 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

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