

IR-Lumineszenzdiode (940 nm) mit hoher Ausgangsleistung
High Power Infrared Emitter (940 nm)
Lead (Pb) Free Product - RoHS Compliant
SFH 4231



Wesentliche Merkmale

- IR-Lichtquelle mit hohem Wirkungsgrad
- Chipgröße (emittierende Fläche) $1 \times 1 \text{ mm}^2$
- max. Gleichstrom 1 A
- niedriger Wärmewiderstand (15 K/W)
- Schwerpunktwellenlänge 940 nm
- ESD-sicher bis 2 kV nach JESD22-A114-E

Anwendungen

- Infrarotbeleuchtung für Kameras
- Überwachungssysteme
- IR-Datenübertragung
- Fahrer-Assistenz Systeme
- Maschinensicherheit

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

- IR lightsource with high efficiency
- die-size (emitting area) $1 \times 1 \text{ mm}^2$
- max. DC-current 1 A
- Low thermal resistance (15 K/W)
- Center of spectral emission at 940 nm
- ESD safe up to 2 kV acc. to JESD22-A114-E

Applications

- Infrared Illumination for cameras
- Surveillance systems
- IR Data Transmission
- Driver assistance systems
- Machine security

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	Gesamtstrahlungsfluss ¹⁾ ($I_F = 1 \text{ A}$, $t_p = 100 \mu\text{s}$) Total Radiant Flux ¹⁾ Φ_e (mW)
SFH 4231	Q65110A4808	≥ 320 (typ. 500)

¹⁾ gemessen mit Ulbrichtkugel / measured with integrating sphere

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
Sperrschichttemperatur Junction temperature	T_J	+ 125	°C
Sperrspannung Reverse voltage	V_R	1	V
Vorwärtsgleichstrom Forward current	I_F	1	A
Stoßstrom, $t_p < 1\text{ ms}$, $D = 0.2$ Surge current	I_{FSM}	2	A
Leistungsaufnahme Power consumption	P_{tot}	2.4	W
Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block	R_{thJS}	15	K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	λ_{peak}	950	nm
Centroid-Wellenlänge der Strahlung Centroid wavelength $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	$\lambda_{centroid}$	940	nm
Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	$\Delta\lambda$	45	nm
Abstrahlwinkel Half angle	φ	± 60	Grad deg.
Aktive Chipfläche Active chip area	A	1	mm ²
Abmessungen der aktiven Chipfläche Dimension of the active chip area	$L \times B$ $L \times W$	1×1	mm ²

Kennwerte ($T_A = 25\text{ °C}$)

Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10%, $I_F = 1\text{ A}$, $R_L = 50\text{ }\Omega$ Switching times, I_e from 10% to 90% and from 90% to 10%, $I_F = 1\text{ A}$, $R_L = 50\text{ }\Omega$	t_r, t_f	20	ns
Durchlassspannung Forward voltage $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F	1.8 (< 2.4)	V
Strahlstärke Radiant intensity $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	$I_{e\text{ typ}}$	170	mW/sr
Temperaturkoeffizient von I_e bzw. Φ_e Temperature coefficient of I_e or Φ_e $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	TC_I	- 0.5	%/K
Temperaturkoeffizient von V_F Temperature coefficient of V_F $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	TC_V	- 1	mV/K
Temperaturkoeffizient von λ Temperature coefficient of λ $I_F = 1\text{ A}$, $t_p = 10\text{ ms}$	$TC_{\lambda, \text{centroid}}$	+ 0.3	nm/K

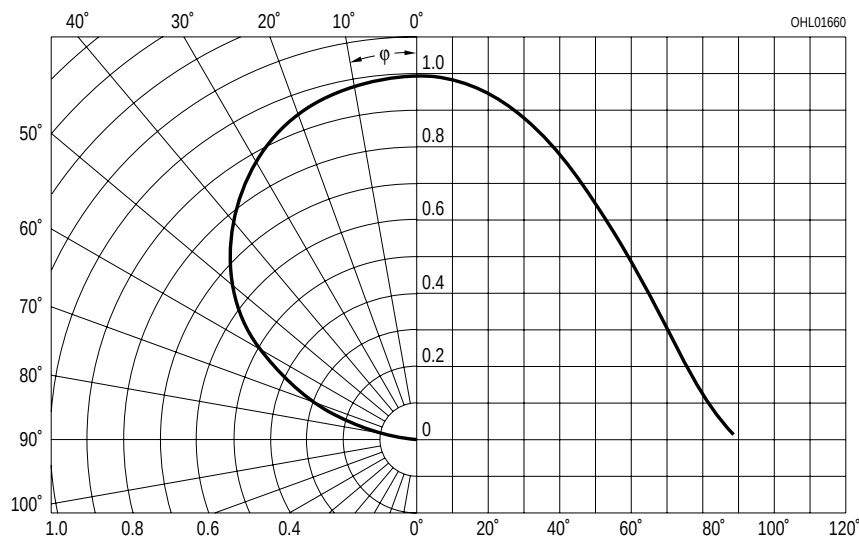
Gesamtstrahlungsfluss¹⁾ Φ_e
Total Radiant Flux¹⁾ Φ_e

Bezeichnung Parameter	Symbol	Werte Values		Einheit Unit
		SFH 4231-CX	SFH 4231-DX	
Gesamtstrahlungsfluss Total Radiant Flux $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$	$\Phi_{e \text{ min}}$ $\Phi_{e \text{ max}}$	320 630	500 1000	mW mW

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

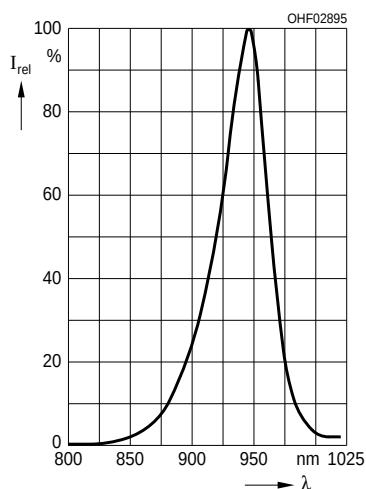
Abstrahlcharakteristik

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



Relative spektrale Emission Relative Spectral Emission

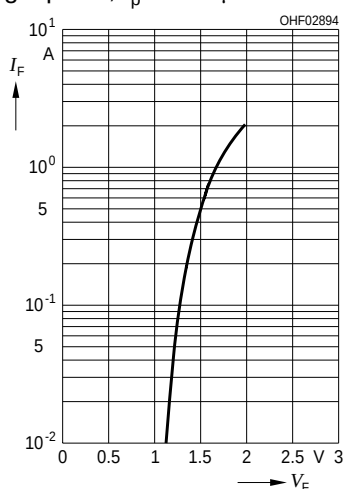
$$I_{\text{rel}} = f(\lambda)$$



Durchlassstrom Forward Current

$$I_F = f(V_F)$$

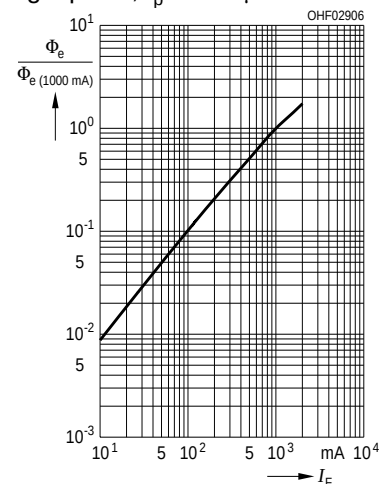
Single pulse, $t_p = 100 \mu\text{s}$



Relativer Gesamtstrahlungsfluss Relative Total Radiant Flux

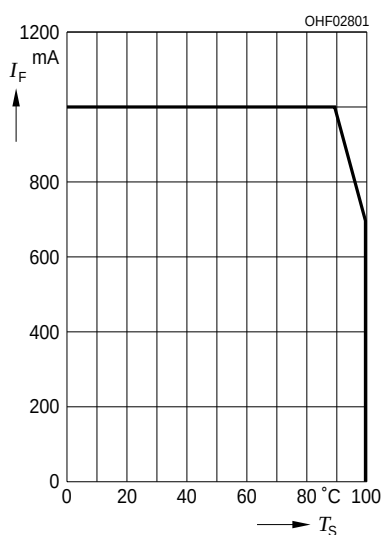
$$\Phi_e / \Phi_e(1000\text{mA}) = f(I_F)$$

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



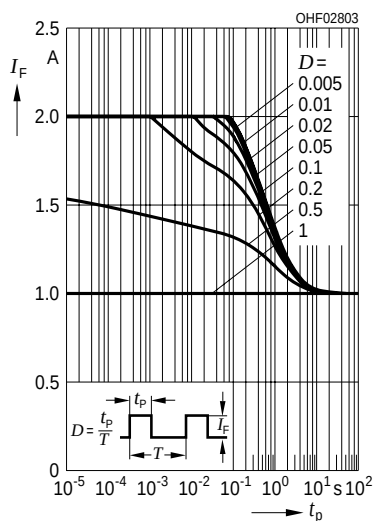
Max. zulässiger Durchlassstrom Max. Permissible Forward Current

$$I_F = f(T_A), R_{\text{thJS}} = 15 \text{ K/W}$$

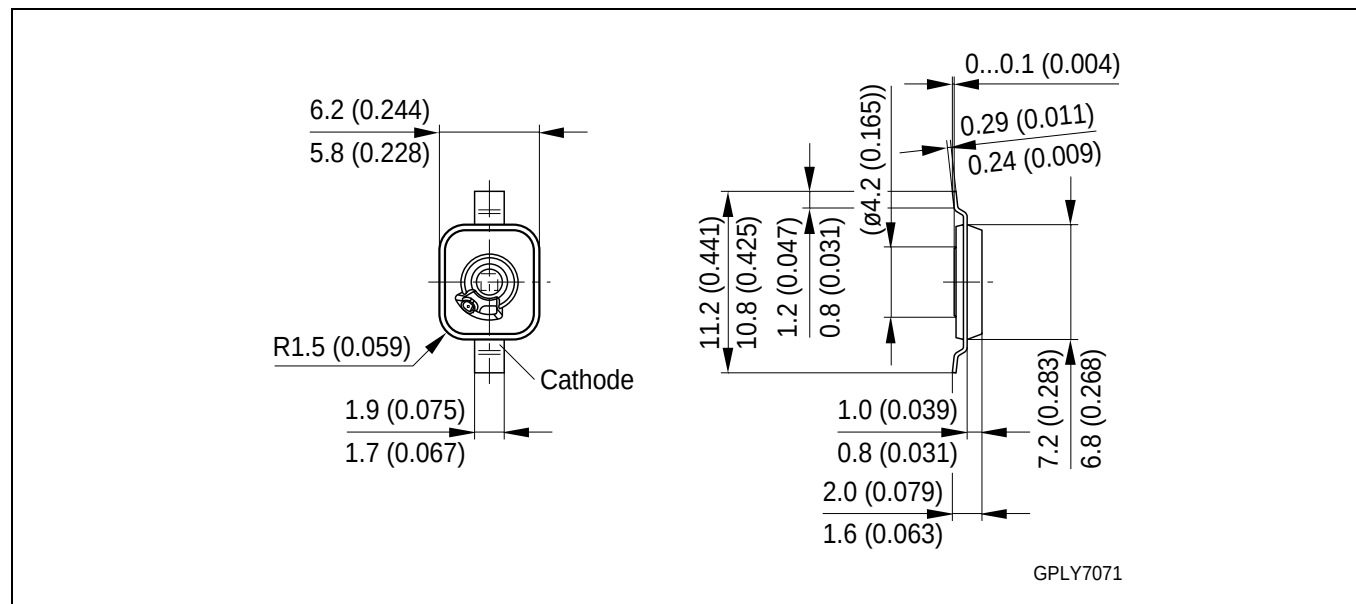


Zulässige Impulsbelastbarkeit Permissible Pulse Handling

Capability $I_F = f(t_p)$, $T_A = 85^\circ\text{C}$,
Duty cycle $D = \text{parameter}$



Maßzeichnung¹⁾ Package Outlines

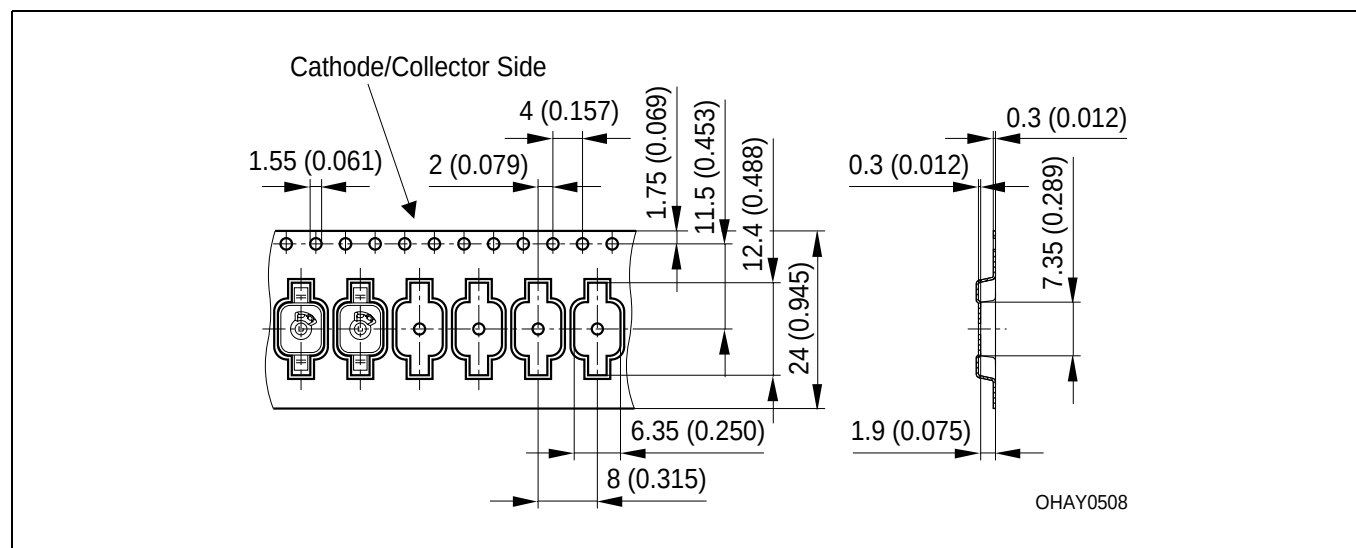


Kathodenkennung:
Cathode mark:
Gewicht / Approx. weight:

Markierung
mark
0.2 g

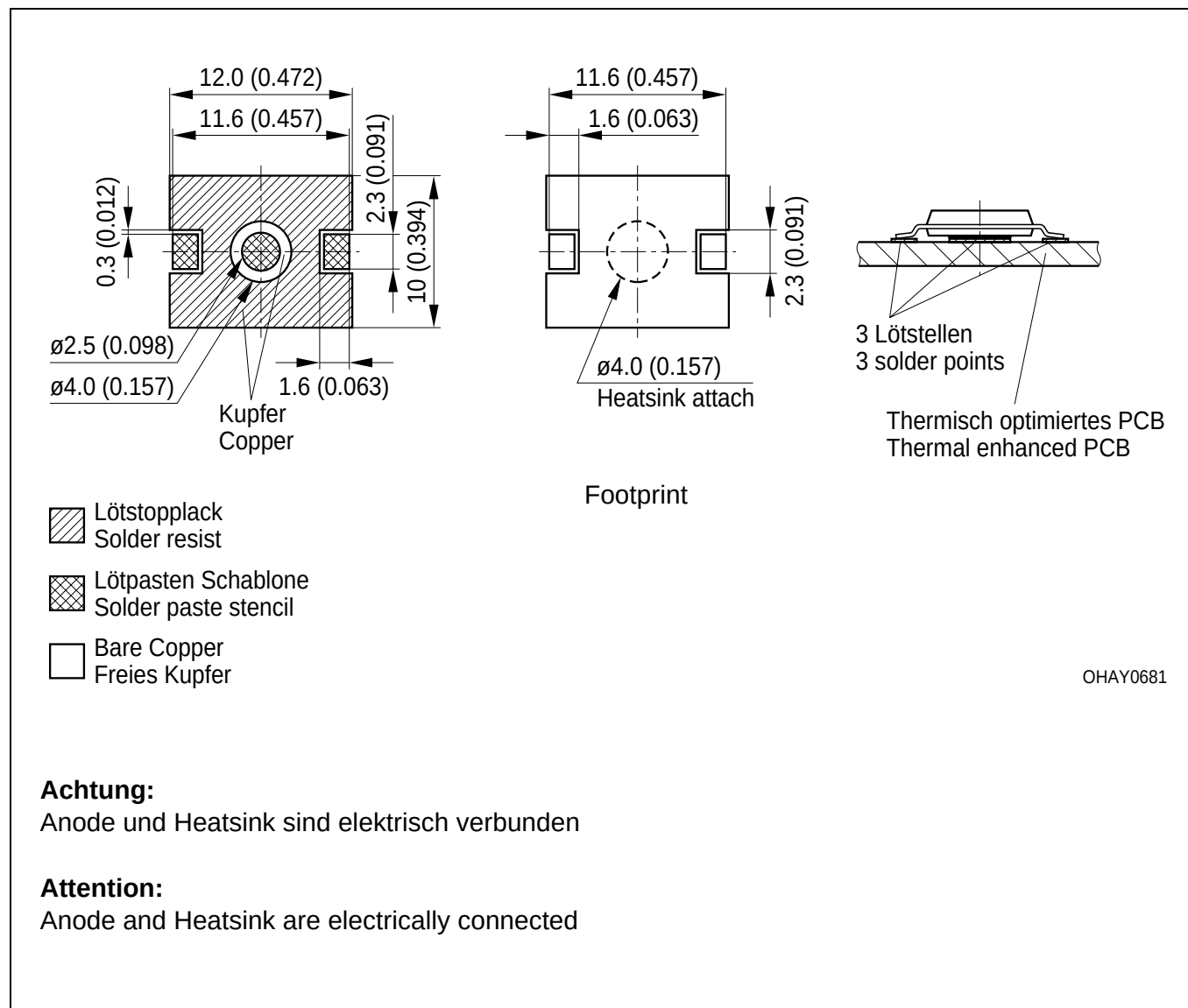
Gurtung / Polarität und Lage
Method of Taping / Polarity and Orientation

Verpackungseinheit 800/Rolle, $\varnothing 180$ mm
Packing unit 800/reel, $\varnothing 180$ mm



¹⁾ Maße in mm (inch) / Dimensions in mm (inch)

Empfohlenes Lötpaddesign Recommended Solder Pad Design



Lötbedingungen Soldering Conditions

Reflow Lötprofil für bleifreies Löten

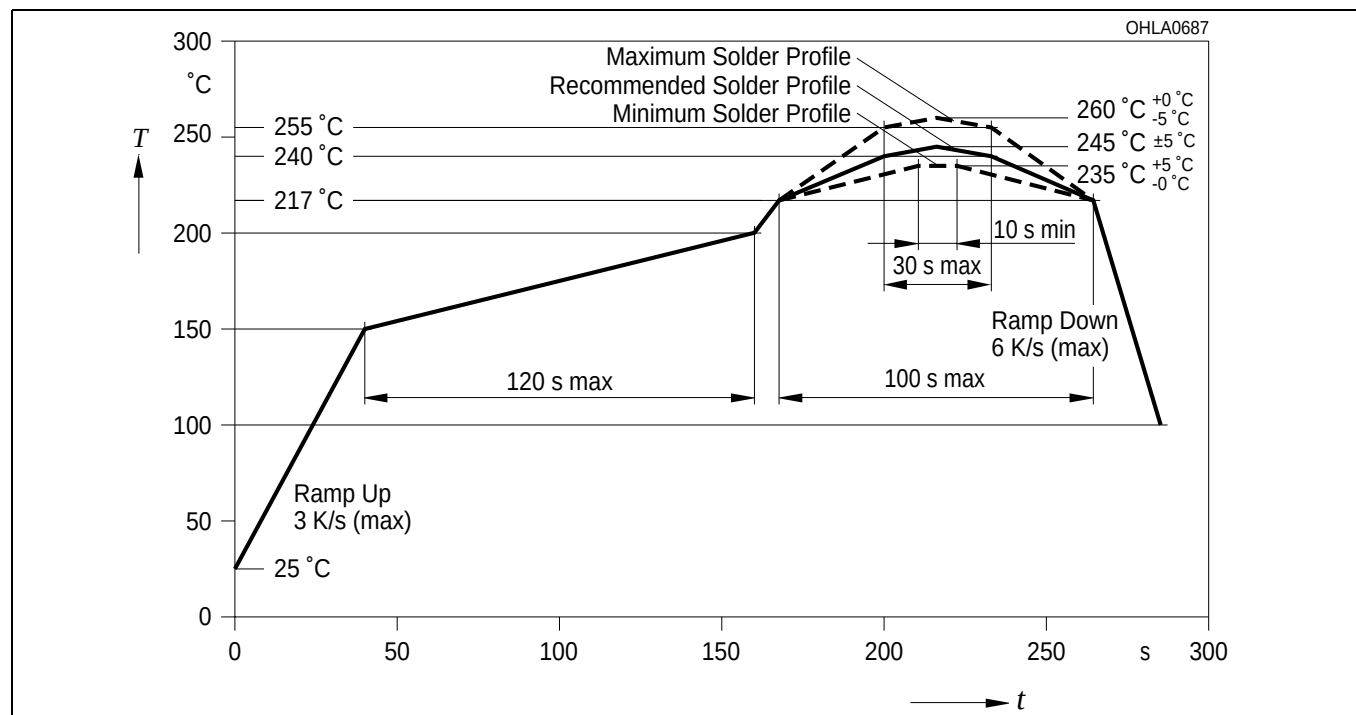
Reflow Soldering Profile for lead free soldering

Vorbehandlung nach JEDEC Level 4

Preconditioning acc. to JEDEC Level 4

(nach J-STD-020C)

(acc. to J-STD-020C)



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