

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

SFH 4253 R



DRAFT - This design is for reference only. Subject to change without notice.

Wesentliche Merkmale

- Infrarot LED mit hoher Ausgangsleistung
- Kurze Schaltzeiten

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
- Short switching times

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 4253 R	on request	≥ 6.3 (typ. 12)

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	70	mA
Stoßstrom, $t_p = 100\text{ }\mu\text{s}$, $D = 0$ Surge current	I_{FSM}	700	mA
Verlustleistung Power dissipation	P_{tot}	140	mW
Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je 16 mm^2 Thermal resistance junction - ambient mounted on PC-board (FR4), pads size 16 mm^2 each	R_{thJA}	500	K/W
Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block	R_{thJS}	280	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
Schwerpunkts-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	φ	± 60	Grad deg.
Aktive Chipfläche Active chip area	A	0.04	mm^2

Kennwerte ($T_A = 25\text{ °C}$)

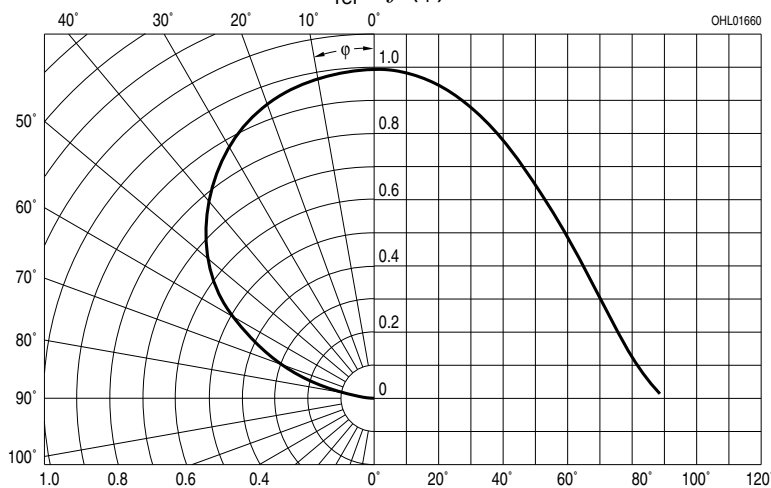
Characteristics (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Abmessungen der aktiven Chipfläche Dimension of the active chip area	$L \times B$ $L \times W$	0.2×0.2	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	12	ns
Durchlassspannung Forward voltage $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ $I_F = 500\text{ mA}$, $t_p = 100\ \mu\text{s}$	V_F V_F	1.6 (< 2.0) 2.4 (< 3.0)	V V
Sperrstrom Reverse current	I_R	not designed for reverse operation	μA
Gesamtstrahlungsfluss Total radiant flux $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$	$\Phi_{e\text{ typ}}$	40	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	- 0.7	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

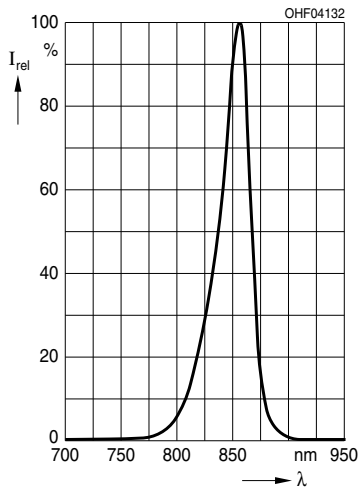
Bezeichnung Parameter	Symbol	Werte Values		Einheit Unit
		SFH 4253 R-Q	SFH 4253 R-R	
Strahlstärke Radiant intensity $I_F = 70$ mA, $t_p = 20$ ms	$I_{e \text{ min}}$ $I_{e \text{ max}}$	6.3 12.5	10 20	mW/sr mW/sr
Strahlstärke Radiant intensity $I_F = 500$ mA, $t_p = 25$ μ s	$I_{e \text{ typ}}$	37	60	mW/sr

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

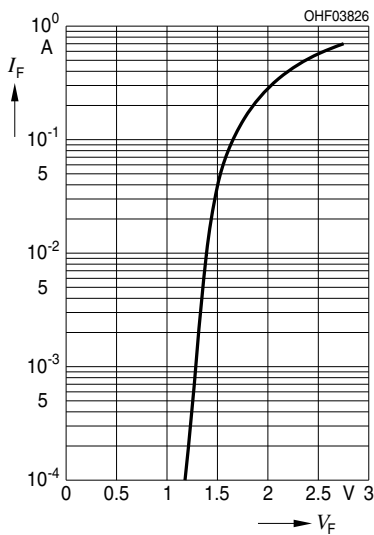
Relative Spectral Emission

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



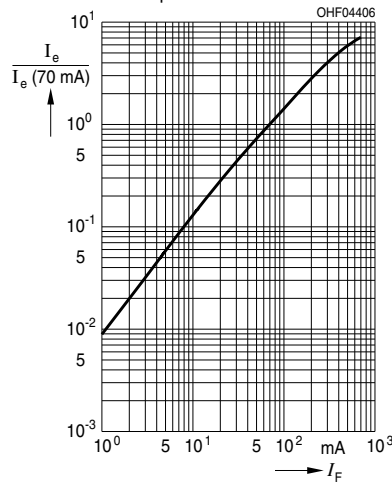
Forward Current $I_F = f(V_F)$

Single pulse, $t_p = 100 \mu s$



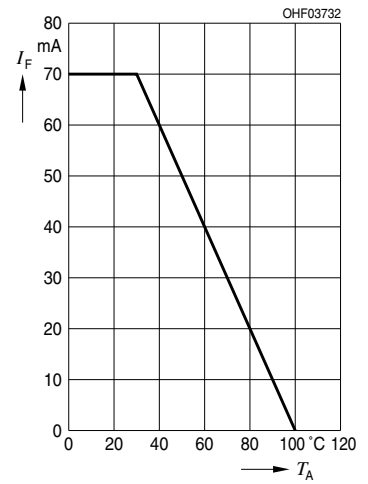
Radiant Intensity $\frac{I_e}{I_e 70 \text{ mA}} = f(I_F)$

Single pulse, $t_p = 25 \mu s$



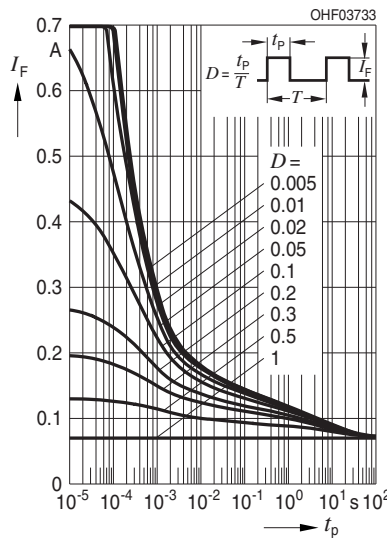
Max. Permissible Forward Current

$I_F = f(T_A), R_{thJA} = 500 \text{ K/W}$



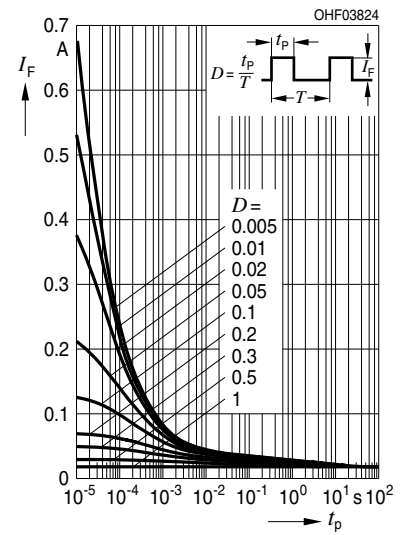
Permissible Pulse Handling Capability $I_F = f(\tau), T_A = 25 \text{ °C}$

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

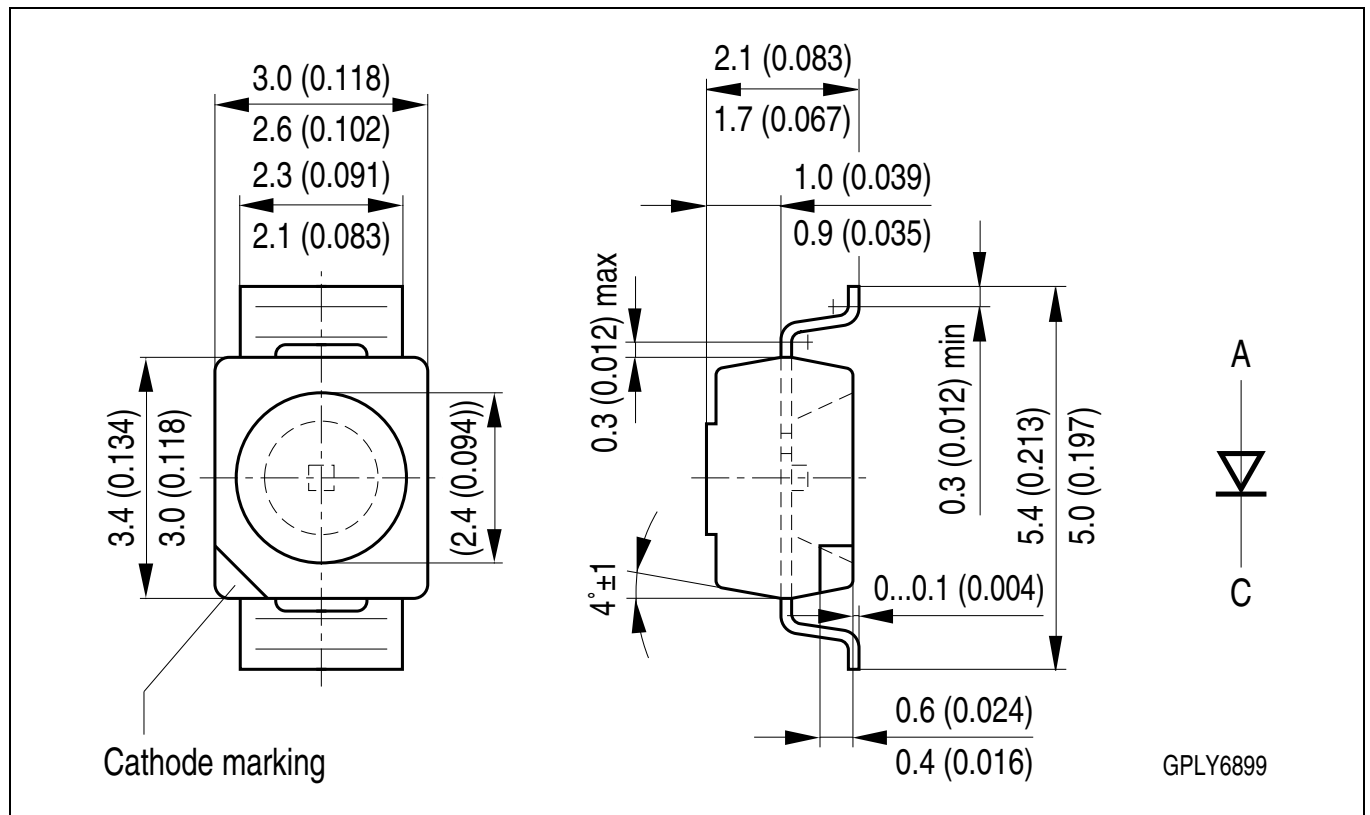


Permissible Pulse Handling Capability $I_F = f(\tau), T_A = 85 \text{ °C}$

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



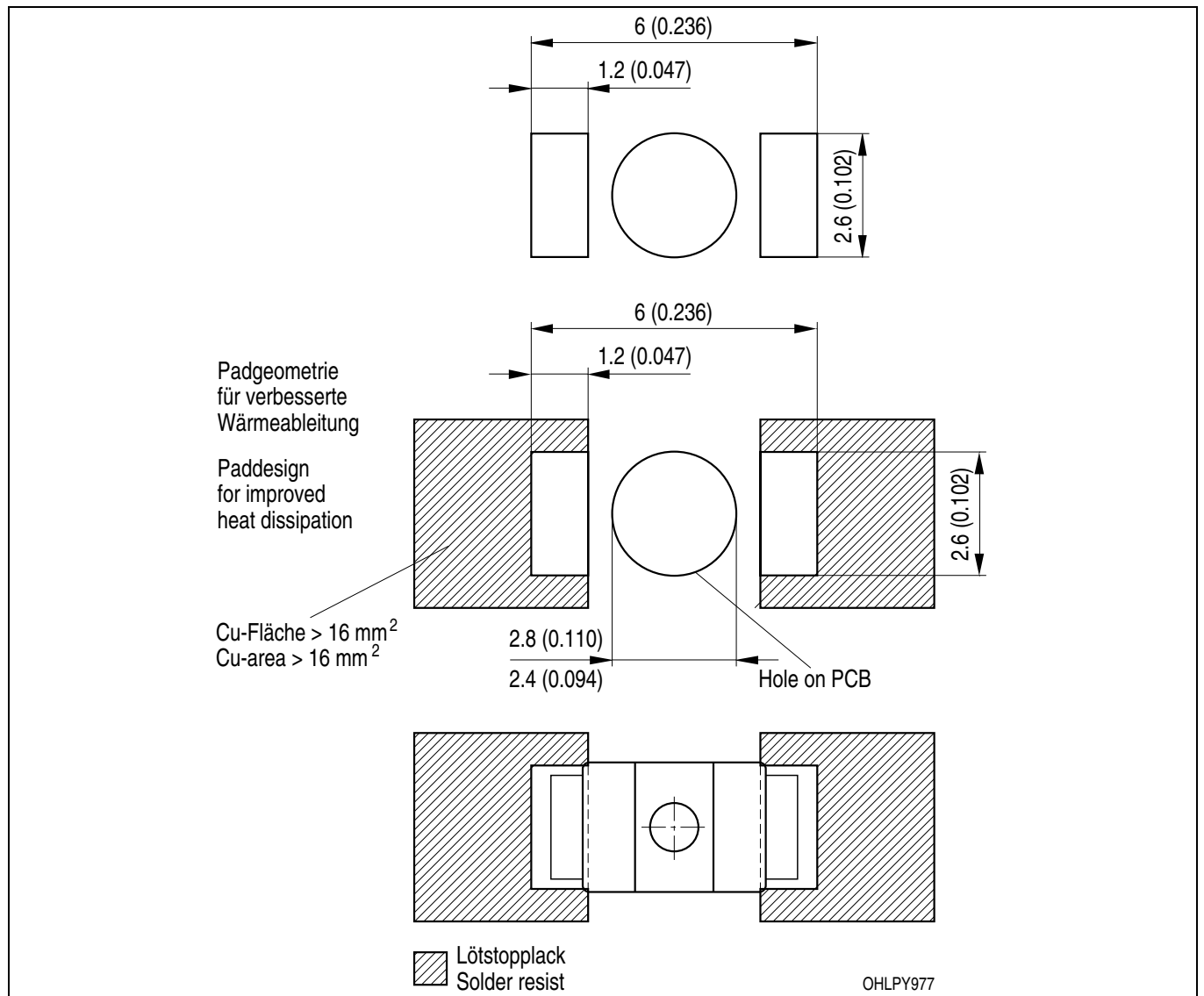
Maßzeichnung
Package Outlines



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

Gehäuse / Package	TOPLED [®] , klarer Verguss / TOPLED [®] Reverse Gullwing, clear resin
Anschlussbelegung Pin configuration	siehe Zeichnung see drawing

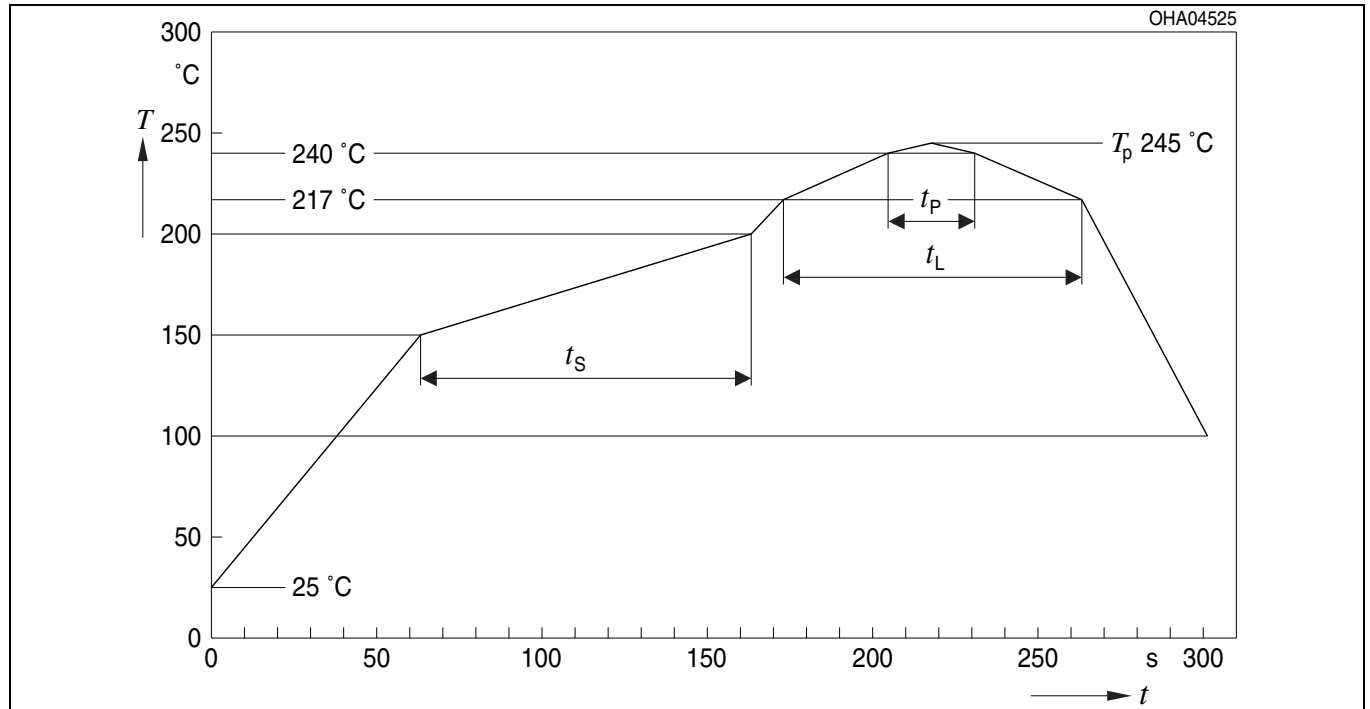
Empfohlenes Lötpaddesign
Recommended Solder Pad Design



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

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)



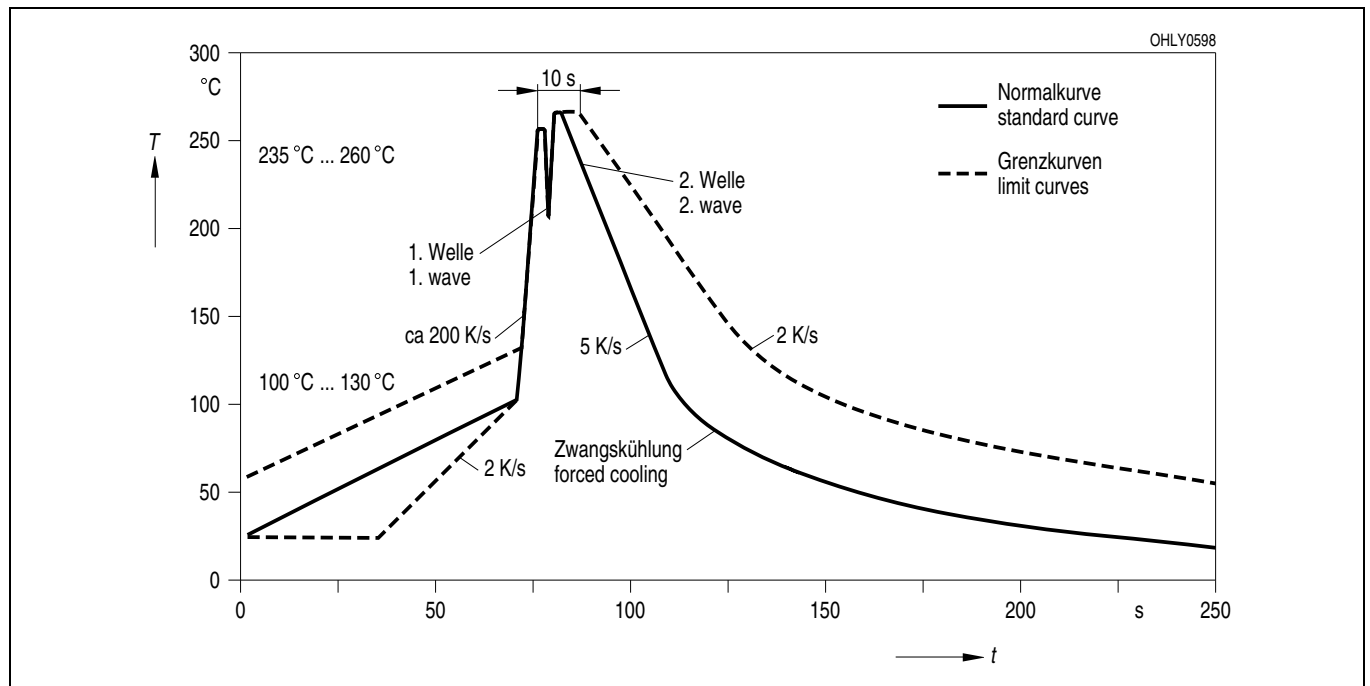
Profileigenschaften Profile Feature	Bleifreier Aufbau / Pb-Free Assembly (SnAgCu)	
	Empfehlung / Recommendation	Grenzwerte / Max. Ratings
Aufheizrate zum Vorwärmen*) / Ramp-up rate to preheat*) 25 °C to 150 °C	2 K / s	3 K / s
Zeit t _s von T _{Smin} bis T _{Smax} / Time t _s from T _{Smin} to T _{Smax} 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

Wellenlöten (TTW) TTW Soldering

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



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