

NPN-Silizium-Fototransistor im SMT SIDELED®-Gehäuse Silicon NPN Phototransistor in SMT SIDELED®-Package Lead (Pb) Free Product - RoHS Compliant

SFH 325 SFH 325 FA



SFH 325



SFH 325 FA

gemäß OS-PCN-2012-008-A/ according to OS-PCN-2012-008-A

Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 450 nm bis 1120 nm (SFH 325) und bei 750 nm bis 1120 nm (SFH 325 FA)
- Hohe Linearität
- P-LCC-2 Gehäuse
- Gruppiert lieferbar

Anwendungen

- Miniaturlichtschranken für Gleich- und Wechsellichtbetrieb
- Industrieelektronik
- „Messen/Steuern/Regeln“

Features

- Especially suitable for applications from 450 nm to 1120 nm (SFH 325) and from 750 nm to 1120 nm (SFH 325 FA)
- High linearity
- P-LCC-2 package
- Available in groups

Applications

- Miniature photointerrupters
- Industrial electronics
- For control and drive circuits

Type Type	Bestellnummer Ordering Code	Fotostrom , ($E_e=0,1\text{mW/cm}^2, \lambda=950\text{nm}$ $V_{CE} = 5\text{ V}$) Photocurrent I_{pce} (μA)
SFH 325 ¹⁾	Q65110A2486	> 16
SFH 325-3 ¹⁾	Q65110A2488	25-50
SFH 325-3/-4 ¹⁾	Q65110A2491	25-80
SFH 325-4 ¹⁾	Q65110A2484	40-80
SFH 325 FA ¹⁾	Q65110A2487	> 16
SFH 325 FA-3 ¹⁾	Q65110A2482	25-50
SFH 325 FA-3/-4 ¹⁾	Q65110A2490	25-80
SFH 325 FA-4 ¹⁾	Q65110A2485	40-80

¹⁾ Gruppierung erfolgt in Halbgruppen (siehe Seite 4), Verpackungseinheit = nur eine Halbgruppe / binning in half groups (see page 4), packing unit = only one half group

Grenzwerte
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
Kollektor-Emitterspannung Collector-emitter voltage	V_{CE}	35	V
Kollektorstrom Collector current	I_C	15	mA
Kollektorspitzenstrom, $\tau < 10 \mu s$ Collector surge current	I_{CS}	75	mA
Verlustleistung, $T_A = 25 \text{ }^\circ\text{C}$ Total power dissipation	P_{tot}	165	mW
Wärmewiderstand für Montage auf PC-Board Thermal resistance for mounting on pcb	R_{thJA}	450	K/W

Kennwerte ($T_A = 25\text{ °C}$, $\lambda = 950\text{ nm}$)

Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		SFH 325	SFH 325 FA	
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	980	980	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von S_{max} Spectral range of sensitivity $S = 10\%$ of S_{max}	λ	450 ... 1120	750 ... 1120	nm
Bestrahlungsempfindliche Fläche ($\varnothing 220\text{ }\mu\text{m}$) Radiant sensitive area	A	0.038	0.038	mm^2
Abmessung der Chipfläche Dimensions of chip area	$L \times B$ $L \times W$	0.45×0.45	0.45×0.45	$\text{mm} \times \text{mm}$
Halbwinkel Half angle	φ	± 60	± 60	Grad deg.
Kapazität, $V_{\text{CE}} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ Capacitance	C_{CE}	5.0	5.0	pF
Dunkelstrom Dark current $V_{\text{CE}} = 20\text{ V}$, $E = 0$	I_{CEO}	1 (≤ 50)	1 (≤ 50)	nA

Die Fototransistoren werden nach ihrer Fotoempfindlichkeit gruppiert und mit arabischen Ziffern gekennzeichnet.

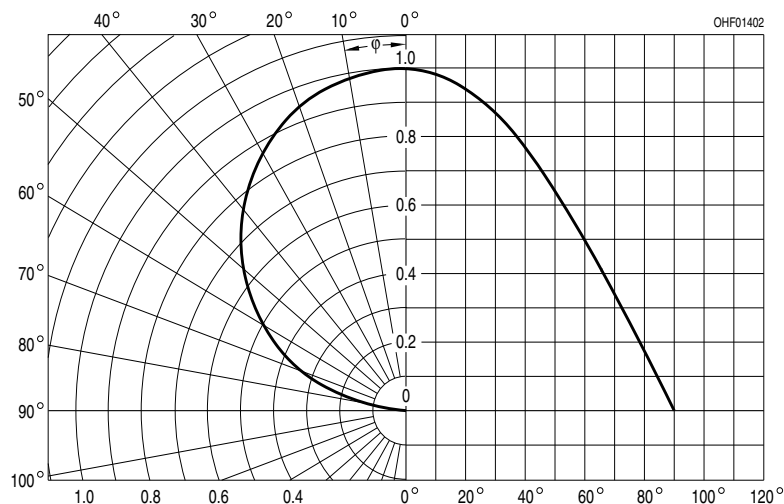
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

Bezeichnung Parameter	Symbol Symbol	Wert Value						Einheit Unit
		-2A	-2B	-3A	-3B	-4A	-4B	
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.1 \text{ mW/cm}^2$, $V_{CE} = 5 \text{ V}$ SFH 325: $E_v = 1000 \text{ lx}$, Normlicht/standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE \text{ min}}$ $I_{PCE \text{ max}}$ I_{PCE}	16 25 360	20 32 450	25 40 570	32 50 720	40 63 900	50 80 1140	μA μA μA
Anstiegszeit/Abfallzeit Rise and fall time $I_C = 1 \text{ mA}$, $V_{CC} = 5 \text{ V}$, $R_L = 1 \text{ k}\Omega$	t_r , t_f	6	6	7	7	8	8	μs
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCE \text{ min}}^{1)} \times 0.3$, $E_e = 0.1 \text{ mW/cm}^2$	$V_{CE \text{ sat}}$	150	150	150	150	150	150	mV

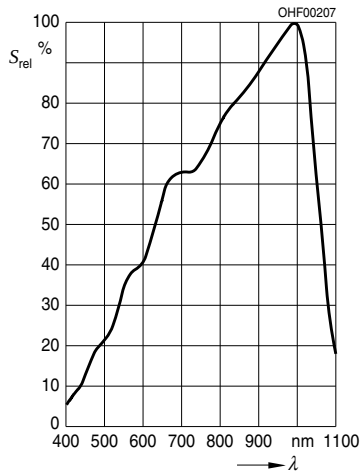
¹⁾ $I_{PCE \text{ min}}$ ist der minimale Fotostrom der jeweiligen Gruppe.

¹⁾ $I_{PCE \text{ min}}$ is the min. photocurrent of the specified group.

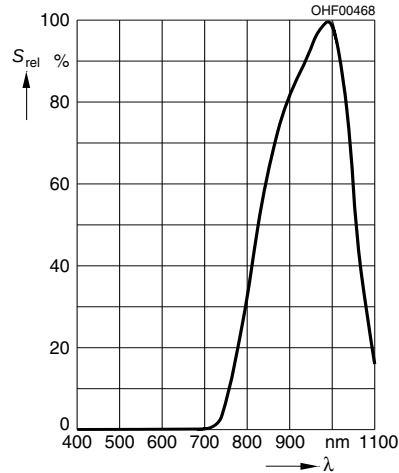
Directional Characteristics $S_{\text{rel}} = f(\varphi)$



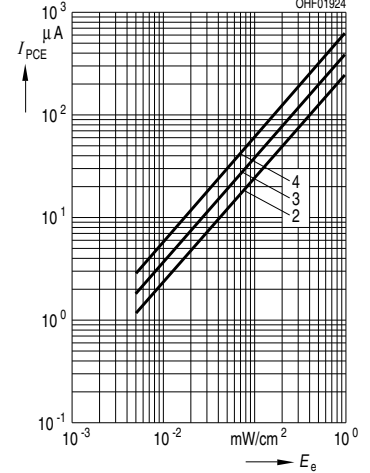
Relative Spectral Sensitivity,
SFH 325 $S_{rel} = f(\lambda)$



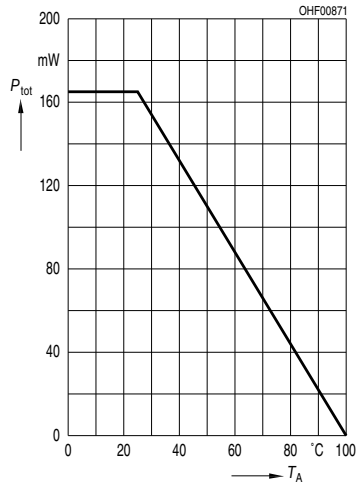
Relative Spectral Sensitivity,
SFH 325 FA $S_{rel} = f(\lambda)$



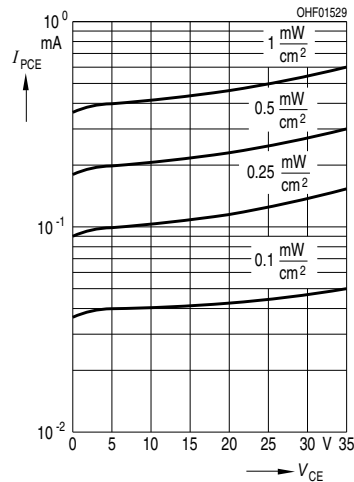
Photocurrent
 $I_{PCE} = f(E_e), V_{CE} = 5 V$



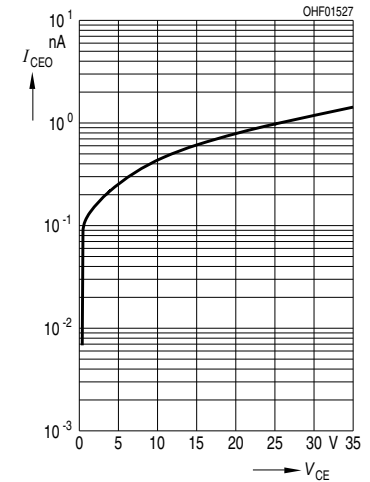
Total Power Dissipation
 $P_{tot} = f(T_A)$



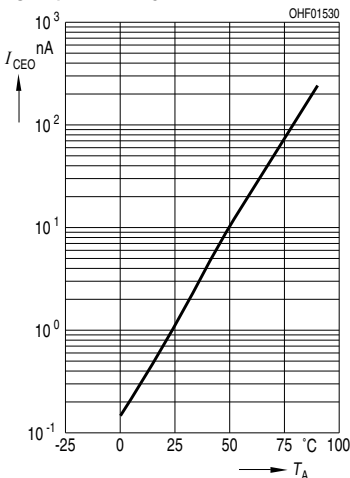
Photocurrent
 $I_{PCE} = f(V_{CE}), E_e = \text{Parameter}$



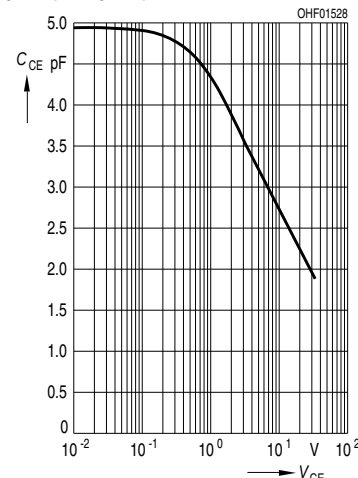
Dark Current
 $I_{CEO} = f(V_{CE}), E = 0$



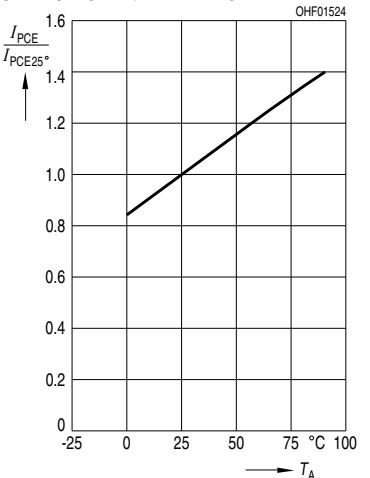
Dark Current
 $I_{CEO} = f(T_A), V_{CE} = 5 V, E = 0$



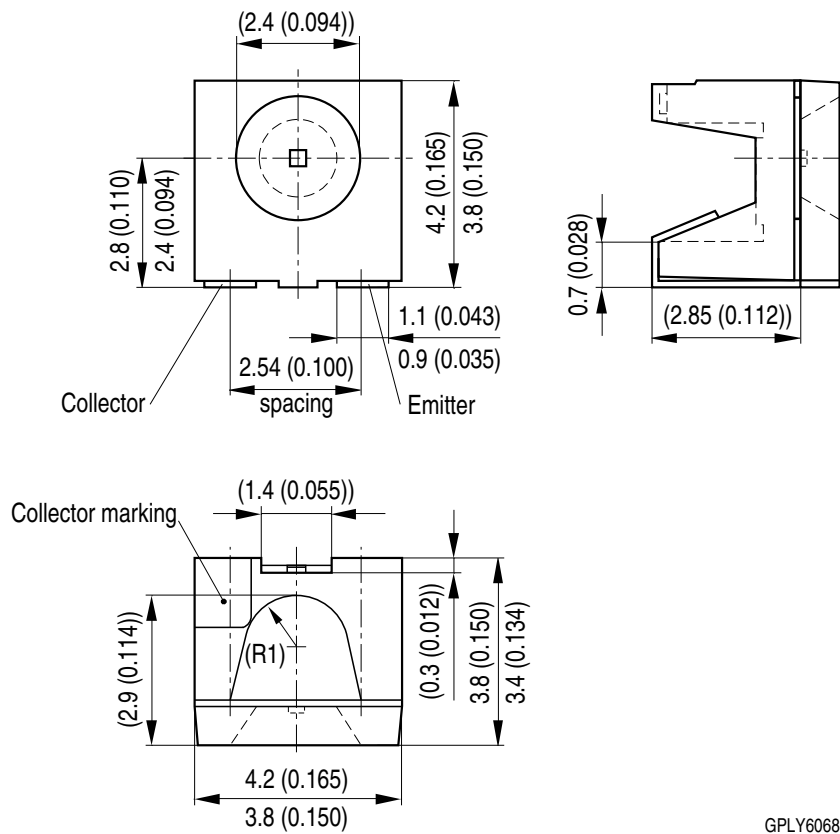
Capacitance
 $C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$



Photocurrent
 $I_{PCE}/I_{PCE25^\circ} = f(T_A), V_{CE} = 5 V$

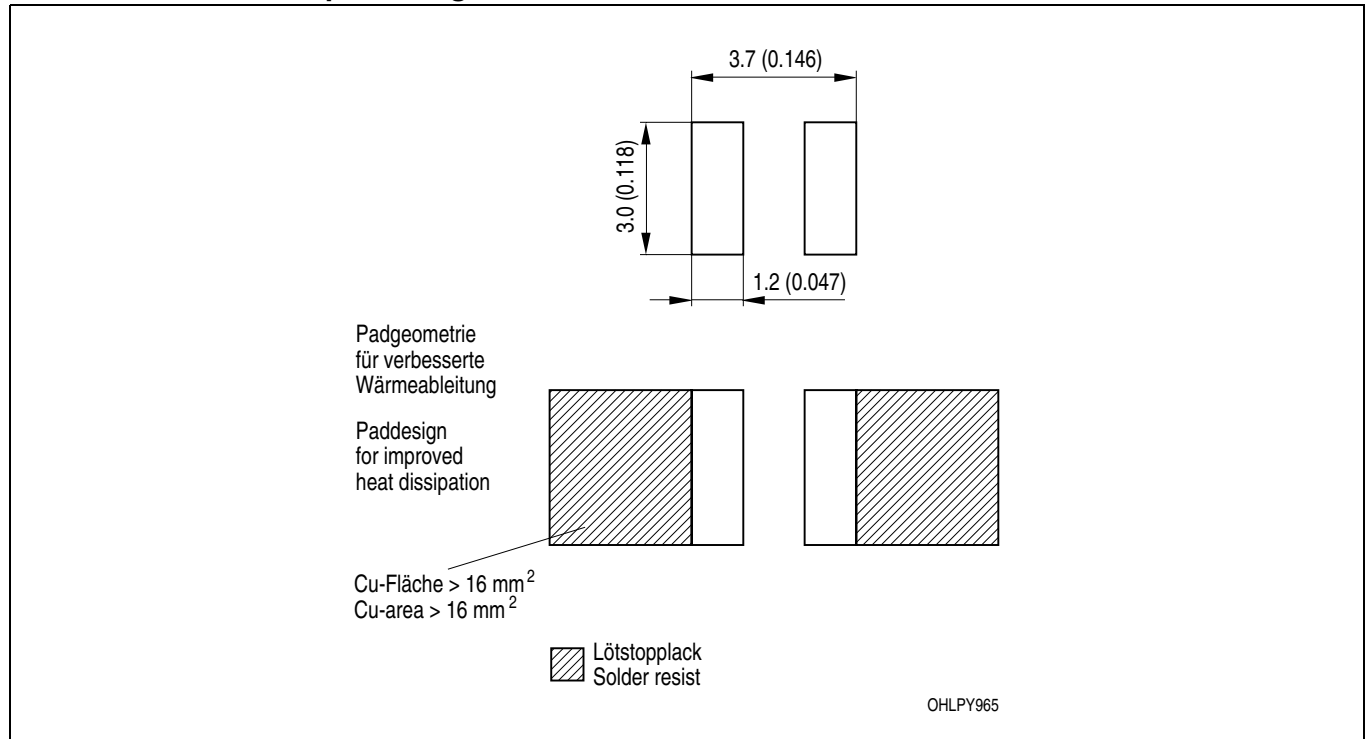


Maßzeichnung Package Outlines



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

Empfohlenes Lötpaddesign Recommended Solderpad Design



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

Lötbedingungen

Soldering Conditions

Reflow Lötprofil für bleifreies Löten

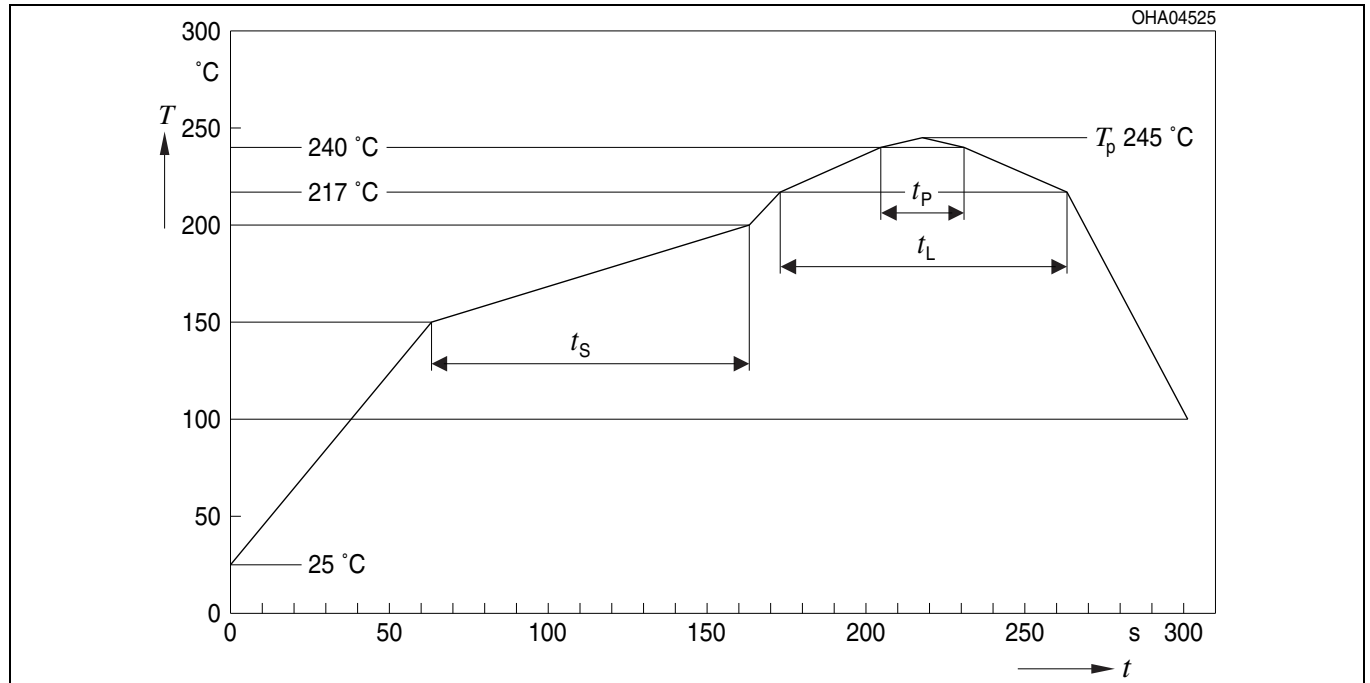
Reflow Soldering Profile for lead free soldering

Vorbehandlung nach JEDEC Level 2

Preconditioning acc. to JEDEC Level 2

(nach J-STD-020D.01)

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



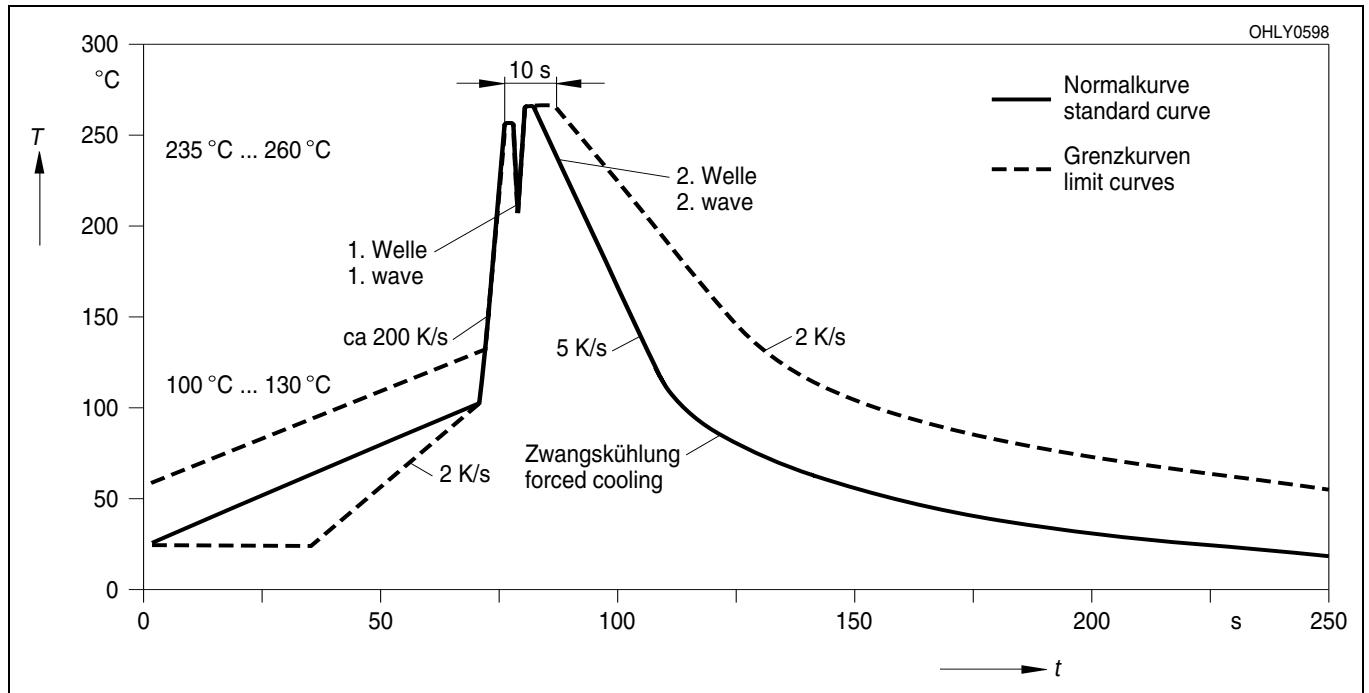
Profileigenschaften Profile Feature	Bleifreier Aufbau / Pb-Free Assembly (SnAgCu)	
	Empfehlung / Recommendation	Grenzwerte / Max. Ratings
Aufheizrate zum Vorwärmen*) / Ramp-up rate to preheat*) 25 $^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$	2 K / s	3 K / s
Zeit t_s von T_{Smin} bis T_{Smax} / Time t_s from T_{Smin} to T_{Smax} 150 $^{\circ}\text{C}$ to 200 $^{\circ}\text{C}$	100 s	min. 60 s max. 120 s
Aufheizrate zur Spitzentemperatur*) / Ramp-up rate to peak*) 180 $^{\circ}\text{C}$ to T_p	2 K / s	3 K / s
Liquidustemperatur T_L / Liquidus temperature T_L	217 $^{\circ}\text{C}$	
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 $^{\circ}\text{C}$	max. 250 $^{\circ}\text{C}$
Verweilzeit t_p innerhalb des spezifizierten Spitzentemperaturbereichs $T_p - 5\text{ K}$ / Time t_p within the specified peak temperature range $T_p - 5\text{ K}$	20 s	min. 10 s max. 30 s
Abkühlrate*) / Ramp-down rate*) T_p to 100 $^{\circ}\text{C}$	3 K / s	4 K / s maximum
Zeitspanne von 25 $^{\circ}\text{C}$ bis zur Spitzentemperatur / Time from 25 $^{\circ}\text{C}$ 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

Wellenlötten (TTW) TTW Soldering

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



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