

Multi TOPLED mit LED und Fototransistor-Detektor
Multi TOPLED with LED and Phototransistor-Detector
Lead (Pb) Free Product - RoHS Compliant

SFH 7225
SFH 7226



SFH 7226: Nicht für Neuentwicklungen / Not for new designs

Wesentliche Merkmale

- Anzeigefunktion kann durch eingebauten Fototransistor überwacht werden
- SFH 7225: gelbe LED
- SFH 7226: super-rote LED
- Dominantwellenlänge:
SFH 7225: 589 nm
SFH 7226: 630 nm
- Silizium-Fototransistor
- Geringe Sättigungsspannung
- Emitter und Diode galvanisch getrennt

Features

- Display function can be controlled by built-in phototransistor
- SFH 7225: yellow LED
- SFH 7226: super-red LED
- Dominant wavelength:
SFH 7225: 589 nm
SFH 7226: 630 nm
- Silicon phototransistor
- Low saturation voltage
- Emitter and detector electrically isolated

Anwendungen

- Anzeige mit Funktionskontrolle

Applications

- Display with controlling function

Typ Type	Bestellnummer Ordering Code	Lichtstärke Luminous Intensity $I_F = 20 \text{ mA}$, $t_p = 20 \text{ ms}$ I_V (mcd)	Gehäuse Package
SFH 7225-Q/R	Q65110A2743	63 ... 200	SMT Multi TOPLED
SFH 7226-P/Q	Q65110A2744	40 ... 125	SMT Multi TOPLED

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebstemperatur Operating temperature range	T_{op}	– 40 ... + 100	°C
Lagertemperatur Storage temperature range	T_{stg}	– 40 ... + 100	°C

Sender
Emitter

Sperrspannung Reverse voltage	V_R	5	V
Durchlassstrom Forward current	I_F (DC)	30	mA
Verlustleistung Total power dissipation	P_{tot}	80	mW
Wärmewiderstand Thermal resistance	$R_{th JA}$ $R_{th JS}$	800	K/W
Sperrschicht/Umgebung Junction/ambient		600 ¹⁾	K/W
Sperrschicht/Lötpad Junction/solder point		500	K/W
Montage auf PC-Board FR4 Mounted on PC board FR4		340 ¹⁾	K/W

Empfänger (Si-Fototransistor)
Detector (Silicon phototransistor)

Kollektor-Emitterspannung Collector-emitter voltage	V_{CE}	35	V
Kollektorstrom Collector current	I_C	15	mA
Kollektorspitzenstrom, $t_p < 10 \mu s$ Collector surge current	I_{CS}	75	mA
Verlustleistung Total power dissipation	P_{tot}	90	mW

¹⁾ This value is valid only when the power dissipation of the photo transistor is limited to max. 2.5 mW.

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

Bezeichnung Description	Symbol Symbol	Wert Value		Einheit Unit
		SFH 7225	SFH 7226	

Sender**Emitter**

Wellenlänge der Strahlung, $I_F = 20\text{ mA}$ Wavelength of peak emission	λ_{peak}	591	645	nm
Dominantwellenlänge, $I_F = 20\text{ mA}$ Dominant wavelength	λ_{dom}	589	630	nm
Spektrale Bandbreite, $I_F = 20\text{ mA}$ Spectral radiation bandwidth	$\Delta\lambda$	15	16	nm
Abstrahlwinkel Half angle	Φ	± 60	± 60	Grad Deg.
Durchlassspannung Forward voltage $I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$	V_F	2.0 (≤ 2.6)	2.0 (≤ 2.6)	V
Sperrstrom, $V_R = 3\text{ V}$ Reverse current	I_R	0.01 (< 10)	0.01 (< 10)	μA
Temperaturkoeffizient von λ_{dom} Temperature coefficient of λ_{dom} $I_F = 20\text{ mA}$	$TC_{\lambda_{\text{dom}}}$	0.096	0.014	nm/K
Temperaturkoeffizient von λ_{peak} Temperature coefficient of λ_{peak} $I_F = 20\text{ mA}$	$TC_{\lambda_{\text{peak}}}$	0.13	0.14	nm/K
Temperaturkoeffizient von V_F Temperature coefficient of V_F $I_F = 20\text{ mA}$	TC_{V_F}	- 2.5	- 2.0	mV/K

Empfänger**Detector**

Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	990	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von S_{max} Spectral range of sensitivity $S = 10\%$ von S_{max}	λ	440 ... 1150	nm

Kennwerte ($T_A = 25\text{ °C}$)

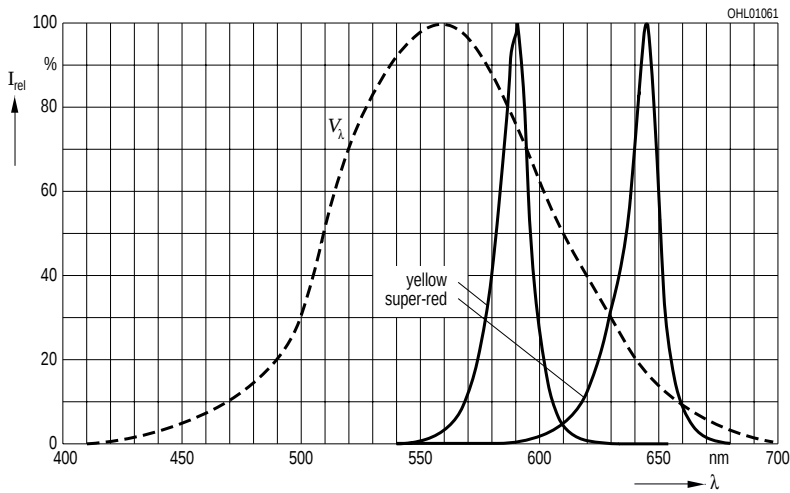
Characteristics (cont'd)

Bezeichnung Description	Symbol Symbol	Wert Value		Einheit Unit
		SFH 7225	SFH 7226	
Dunkelstrom, $V_{CE} = 25\text{ V}$ Dark current	I_{CEO}	1 (< 200)		nA
Kapazität, $V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ Capacitance	C_{CE}	5		pF
Fremdlichtempfindlichkeit Sensitivity to ambient light $E_V = 1000\text{ lx}$, Normlicht A/standard light A, $V_{CE} = 5\text{ V}$	I_{CEtyp}	650		μA

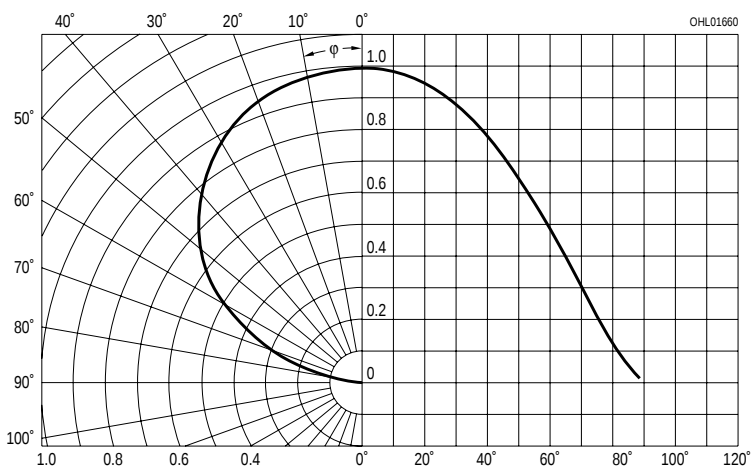
MULTILED

Übersprechen: Kollektor-Emitterstrom Crosstalk: collector-emitter current $I_F = 20\text{ mA}$, $V_{CE} = 5\text{ V}$	I_{CEmin}	0.5 ... 5.0	2.0 ... 15.0	mA
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage $I_F = 20\text{ mA}$, $I_C = 0.3 \times I_{CEmin}$	V_{CEsat}	< 0.4		V

Relative Spectral Emission $I_{\text{rel}} = f(\lambda)$, $T_A = 25\text{ °C}$, $I_F = 20\text{ mA}$
 $V(\lambda)$ = Standard Eye Response Curve



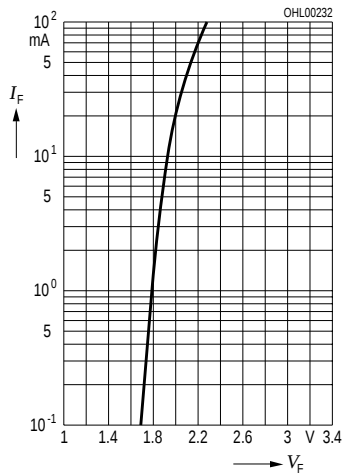
LED Radiation Characteristics $I_{\text{rel}} = f(\varphi)$
Phototransistor Directional Characteristics $S_{\text{rel}} = f(\varphi)$



LED

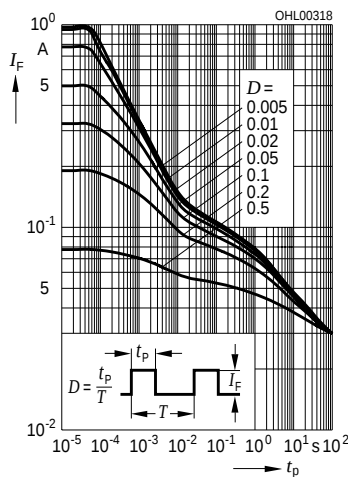
Forward Current

$$I_F = f(V_F), T_A = 25^\circ\text{C}$$



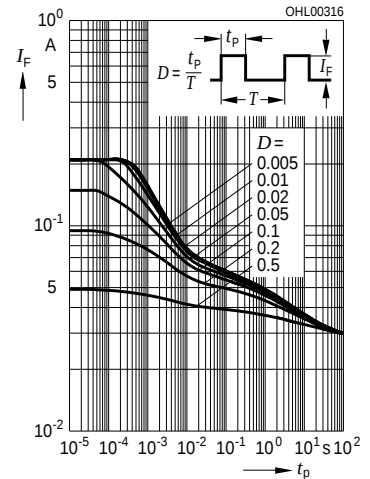
Perm. Pulse Handling Capability

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



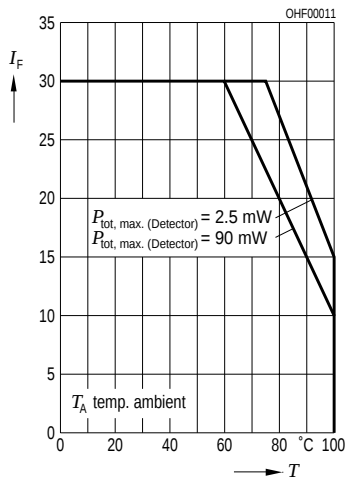
Perm. Pulse Handling Capability

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



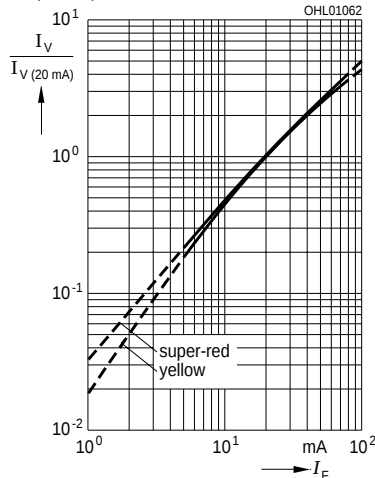
Max. Permissible Forward Current

$$I_F = f(T_A)$$



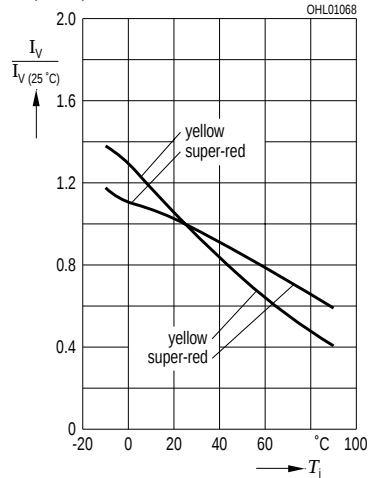
Relative Luminous Intensity

$$I_V/I_{V(10\text{ mA})} = f(I_F), T_A = 25^\circ\text{C}$$



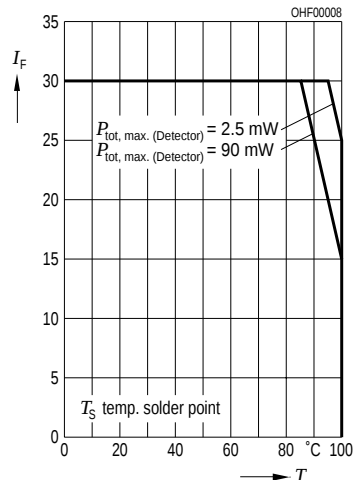
Rel. Luminous Intensity

$$I_V/I_{V(25^\circ\text{C})} = f(T_A), I_F = 10\text{ mA}$$



Max. Permissible Forward Current

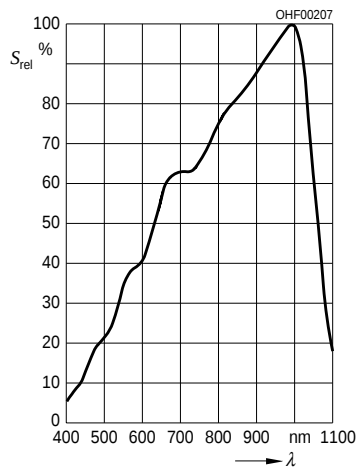
$$I_F = f(T_S)$$



Phototransistor

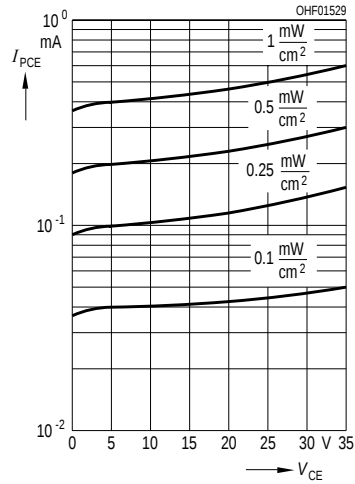
Rel. spectral sensitivity

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



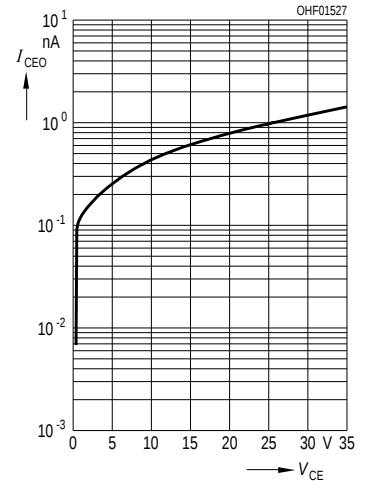
Photocurrent

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



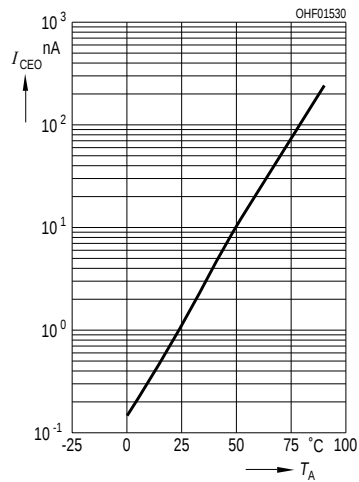
Dark current

$$I_{\text{CEO}} = f(V_{\text{CE}}), E = 0$$



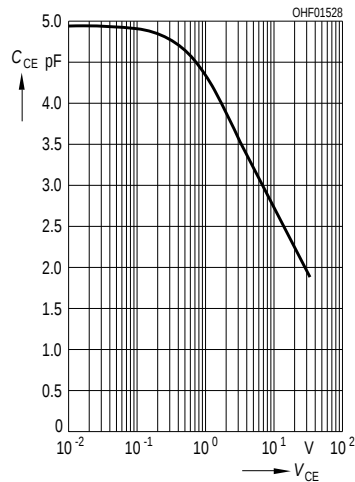
Dark current

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



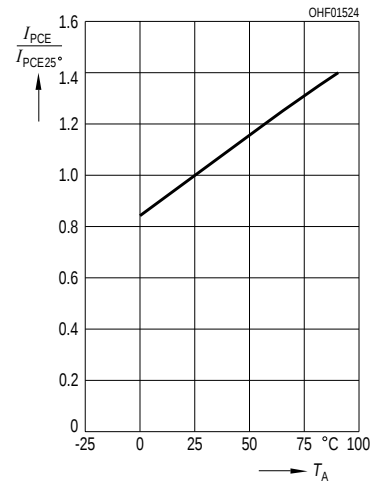
Capacitance

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

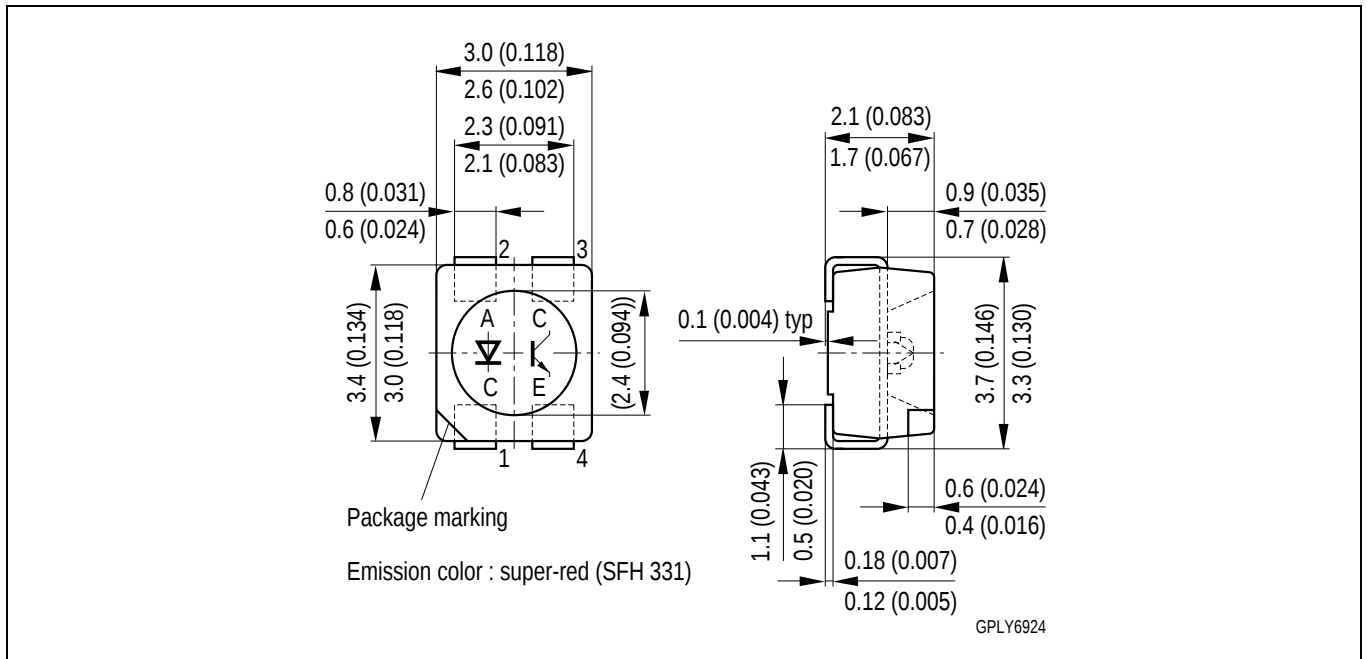


Photocurrent

$$I_{\text{PCE}}/I_{\text{PCE}25^\circ} = f(T_A), V_{\text{CE}} = 5 \text{ V}$$



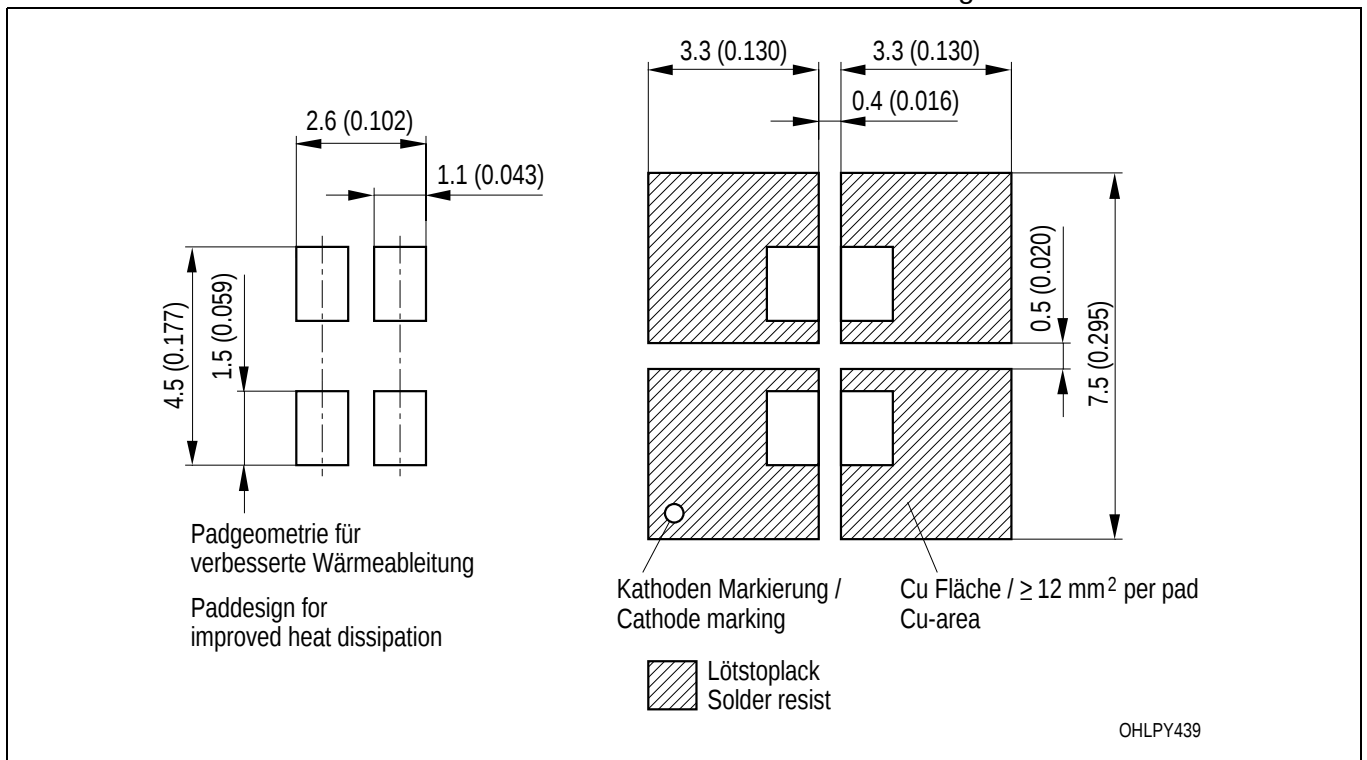
Maßzeichnung Package Outlines



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

Empfohlenes Lötpaddesign Recommended Solder Pad

Reflow Löten Reflow Soldering



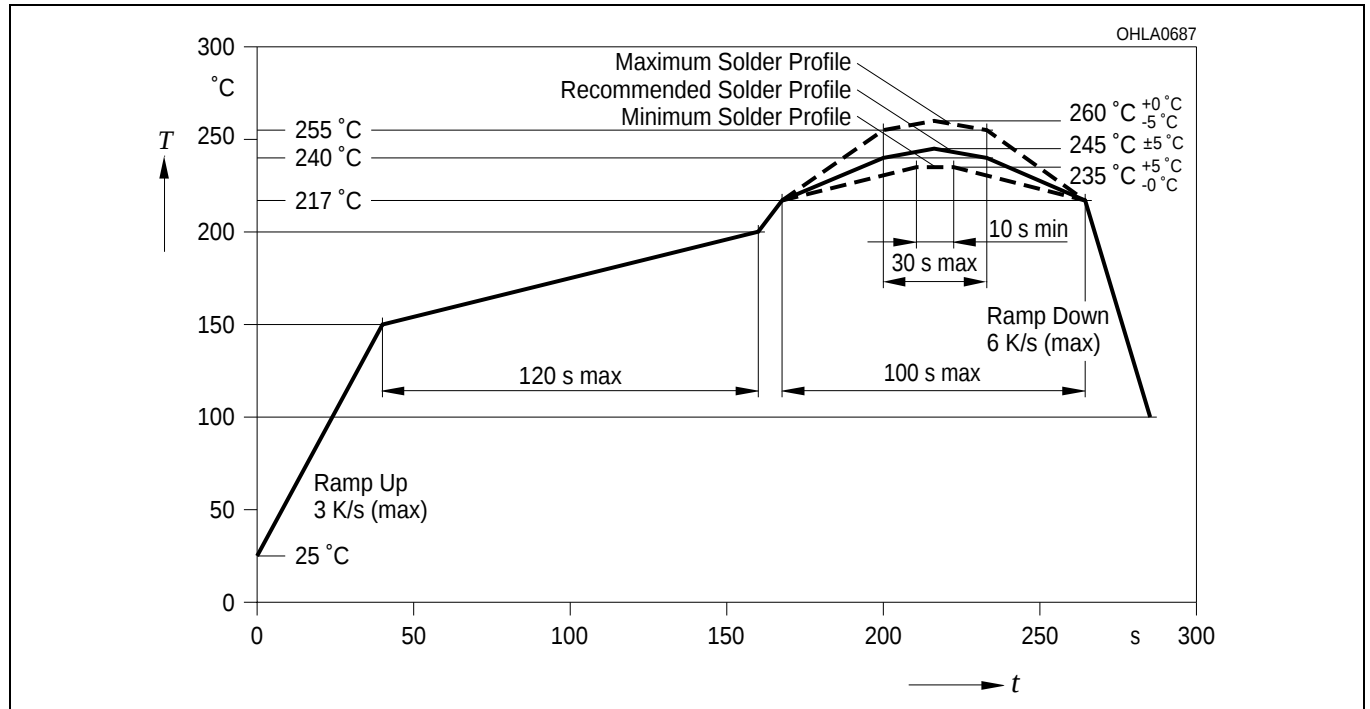
Lötbedingungen**Soldering Conditions****Reflow Lötprofil für bleifreies Löten****Reflow Soldering Profile for lead free soldering**

Vorbehandlung nach JEDEC Level 2

Preconditioning acc. to JEDEC Level 2

(nach J-STD-020C)

(acc. to J-STD-020C)



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