GaAlAs-IR-Lumineszenzdiode (880 nm) und Si-Fototransistor
GaAlAs-Infrared-Emitter (880 nm) and Si-Phototransistor
Lead (Pb) Free Product - RoHS Compliant

SFH 7221

Wesentliche Merkmale

- SMT-Gehäuse mit IR-Sender (880 nm) und Si-Fototransistor
- Geeignet für SMT-Bestückung
- Gegurtet lieferbar
- Sender und Empfänger getrennt ansteuerbar

Features

- SMT package with IR emitter (880 nm) and Si-phototransistor
- Suitable for SMT assembly
- Available on tape and reel
- Emitter und detector can be controlled separately

Anwendungen

- Datenübertragung
- Wegfahrsperre
- Infrarotschnittstelle

Applications

- Data transmission
- Lock bar
- Infrared interface

Typ Type	Bestellnummer Ordering Code	Gehäuse Package
SFH 7221	Q65110A2741	SMT Multi TOPLED®

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Wert Value		Einheit Unit
		IRED	Transistor	
Betriebstemperatur Operating temperature range	T_{op}	– 40 ... + 100	– 40 ... + 100	°C
Lagertemperatur Storage temperature range	T_{stg}	– 40 ... + 100	– 40 ... + 100	°C
Sperrschichttemperatur Junction temperature	T_j	+ 100	+ 100	°C
Durchlassstrom (LED) Forward current (LED)	I_F	100	–	mA
Kollektorstrom (Transistor) Collector current (Transistor)	I_C	–	15	mA
Stoßstrom Surge current $t \leq 10$ µs, $D = 0.005$	I_{FM}	2500	75	mA
Sperrspannung (LED) Reverse voltage (LED)	V_R	5	–	V
Kollektor-Emitter Spannung (Transistor) Collector-emitter voltage (Transistor)	V_{CE}	–	35	V
Verlustleistung Total power dissipation	P_{tot}	180	165	mW
Wärmewiderstand Sperrschicht / Umgebung Thermal resistance junction / ambient Montage auf PC-Board[1] (Padgröße ≥ 16 mm²) mounting on pcb[1] (pad size ≥ 16 mm²)	$R_{th\ JA}$	500	450	K/W
Sperrschicht / Lötstelle junction / soldering joint	$R_{th\ JS}$	400	–	K/W

[1] PC-board: G30/FR4

Hinweis / Notes

Die angegebenen Grenzdaten gelten für einen Chip.

The stated maximum ratings refer to one chip.

Kennwerte IRED (T_A = 25 °C)
Characteristics IRED

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength of radiation I_F = 100 mA, t_p = 20 ms	λ_{peak}	880	nm
Spektrale Bandbreite bei 50% von I_{max}, I_F = 100 mA Spectral bandwidth at 50% of I_{max}, I_F = 100 mA	$\Delta\lambda$	80	nm
Abstrahlwinkel Viewing angle	φ	± 60	Grad deg.
Aktive Chipfläche Active chip area	A	0.09	mm^2
Abmessungen der aktiven Chipfläche Dimensions of active chip area	$L \times B$ $L \times W$	0.3 × 0.3	mm²
Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10% Switching times, I_e from 10% to 90 % and from 90% to 10% I_F = 100 mA, R_L = 50 Ω	t_r, t_f	0.5	µs
Kapazität Capacitance V_R = 0 V, f = 1 MHz	C_o	15	pF
Durchlassspannung Forward voltage I_F = 100 mA, t_p = 20 ms I_F = 1 A, t_p = 100 µs	 V_F V_F	 1.5 (≤ 1.8) 3.0 (≤ 3.8)	 V V
Sperrstrom Reverse current V_R = 5 V	I_R	0.01 (≤ 1)	µA
Gesamtstrahlungsfluss Total radiant flux I_F = 100 mA, t_p = 20 ms	Φ_e	23	mW
Temperaturkoeffizient von I_e bzw. Φ_e Temperature coefficient of I_e bzw. Φ_e I_F = 100 mA, I_F = 100 mA	TC_I	– 0.5	%/K

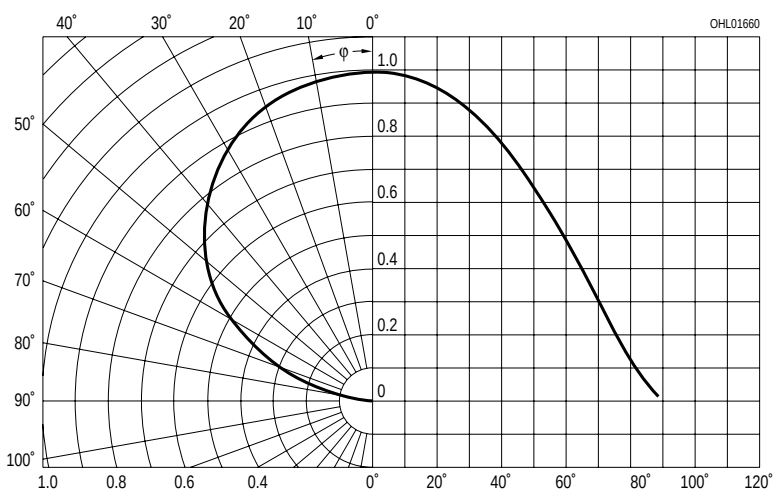
Kennwerte IRED (T_A = 25 °C)
Characteristics IRED (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Temperaturkoeffizient von V_F Temperature coefficient of V_F I_F = 100 mA	TC_V	– 2	mV/K
Temperaturkoeffizient von λ Temperature coefficient of λ I_F = 100 mA	TC_λ	+ 0.25	nm/K

Strahlstärke I_e in Achsrichtung
gemessen bei einem Raumwinkel Ω = 0.01 sr
Radiant Intensity I_e in Axial Direction
at a solid angle of Ω = 0.01 sr

Bezeichnung Parameter	Symbol Symbol	Werte Values	Einheit Unit
Strahlstärke Radiant intensity I_F = 100 mA, t_p = 20 ms	I_e	> 4	mW/sr
Strahlstärke Radiant intensity I_F = 1 A, t_p = 100 µs	$I_{e\ typ.}$	48	mW/sr

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

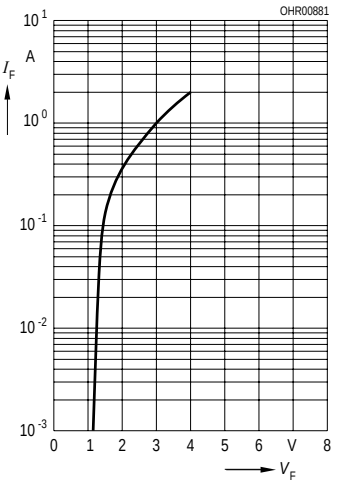


Kennwerte Fototransistor (T_A = 25 °C, λ = 880 nm)
Characteristics Phototransistor

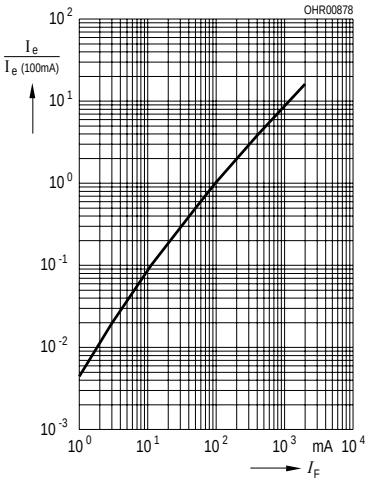
Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\ max}$	860	nm
Spektraler Bereich der Fotoempfindlichkeit S = 10% von S_{max} Spectral range of sensitivity S = 10% of S_{max}	λ	380 … 1150	nm
Bestrahlungsempfindliche Fläche (∅ 240 µm) Radiant sensitive area (∅ 240 µm)	A	0.045	mm^2
Abmessung der Chipfläche Dimensions of chip area	$L \times B$	0.45 × 0.45	mm × mm
Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface	H	0.5 … 0.7	mm
Halbwinkel Half angle	φ	± 60	Grad deg.
Kapazität Capacitance V_{CE} = 0 V, f = 1 MHz, E = 0	C_{CE}	5.0	pF
Dunkelstrom Dark current V_{CE} = 25 V, E = 0	I_{CEO}	1 (≤ 200)	nA
Fotostrom Photocurrent E_e = 0.1 mW/cm², V_{CE} = 5 V	I_{PCE}	≥ 16	µA
Anstiegszeit/Abfallzeit Rise time/Fall time I_C = 1 mA, V_{CC} = 5 V, R_L = 1 kΩ	t_r, t_f	7	µs
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage I_C = 5 µA, E_e = 0.1 mW/cm²	V_{CEsat}	150	mV

IRED

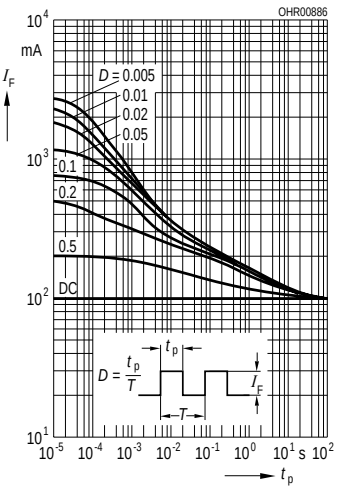
Forward Current $I_F = f(V_F)$
T_A = 25 °C



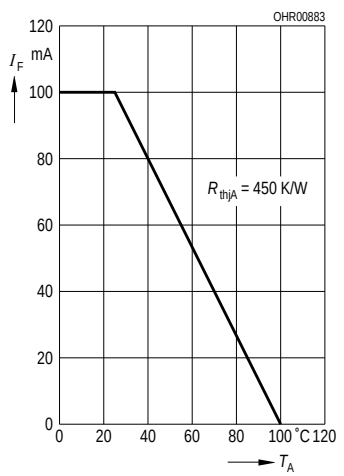
Rel Luminous Intensity
I_V / I_V (10 mA) = $f(I_F)$, T_A = 25 °C



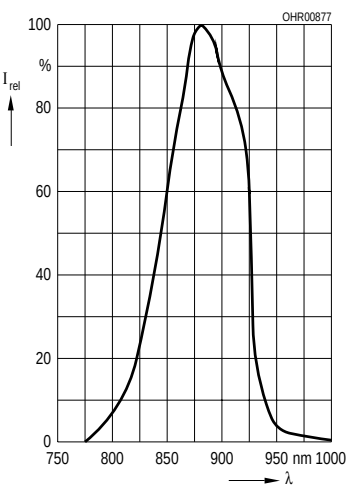
Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter,
T_A = 25 °C



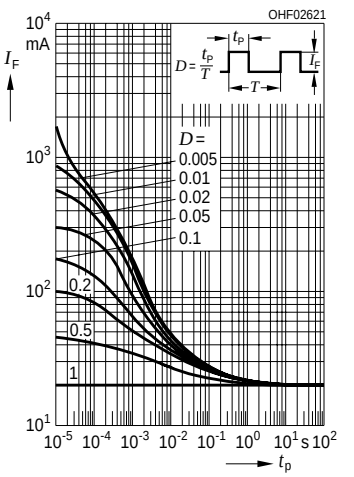
Max. Permissible Forward Current
$I_F = f(T_A)$



Relative Spectral Emission
$I_{rel} = f(\lambda)$

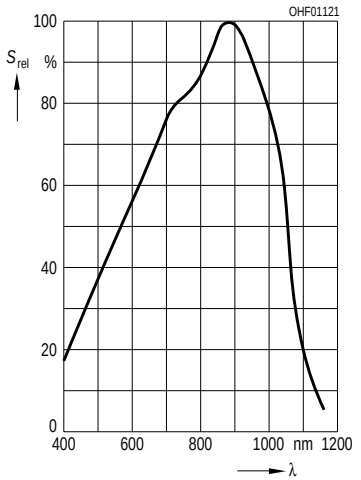


Perm. Pulse Handling Capability
$I_F = f(t_p)$, Duty cycle D = parameter,
T_A = 85 °C

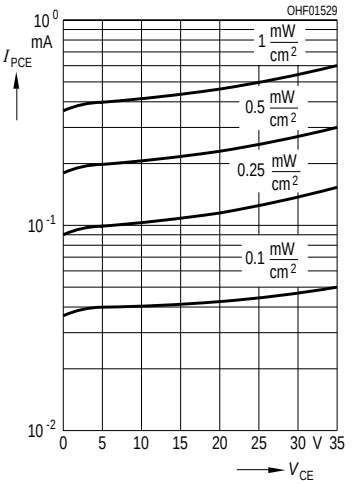


Phototransistor

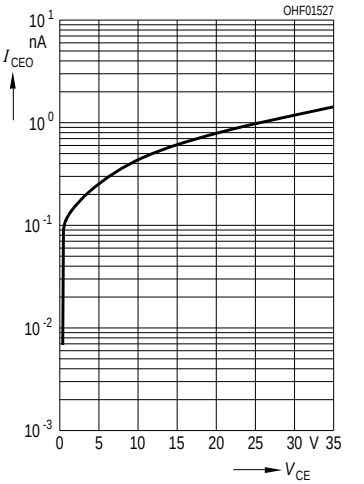
Rel. Spectral Sensitivity
$S_{rel} = f(\lambda)$



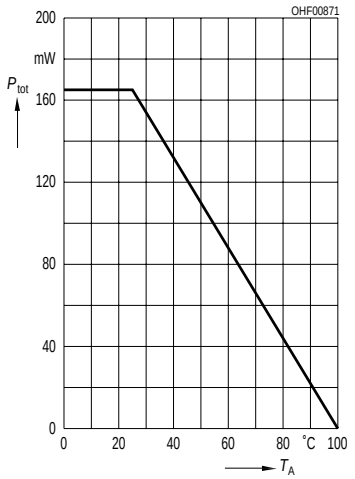
Photocurrent $I_{PCE} = f(V_{CE})$, E_e = Parameter



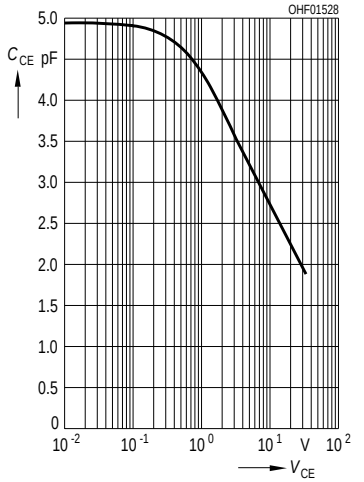
Dark Current
$I_{CEO} = f(V_{CE})$, $E = 0$



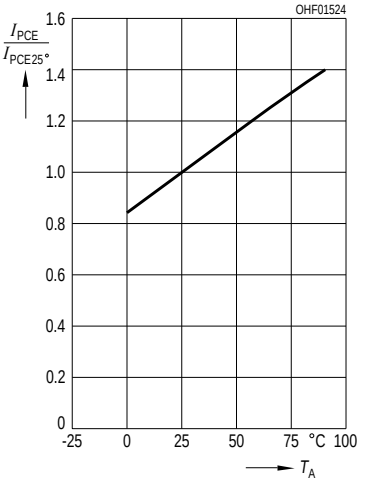
Total Power Dissipation
$P_{tot} = f(T_A)$



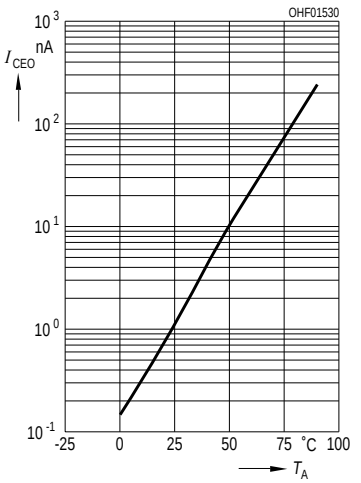
Capacitance
$C_{CE} = f(V_{CE})$, f = 1 MHz, $E = 0$



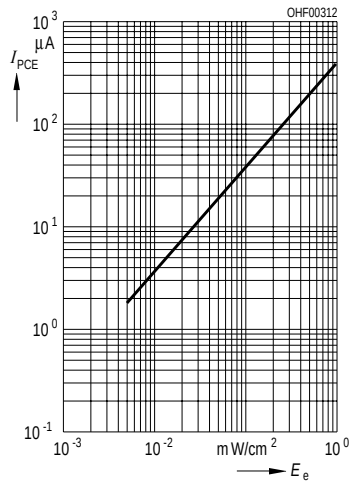
Photocurrent $I_{PCE}/I_{PCE25°} = f(T_A)$, V_{CE} = 5 V



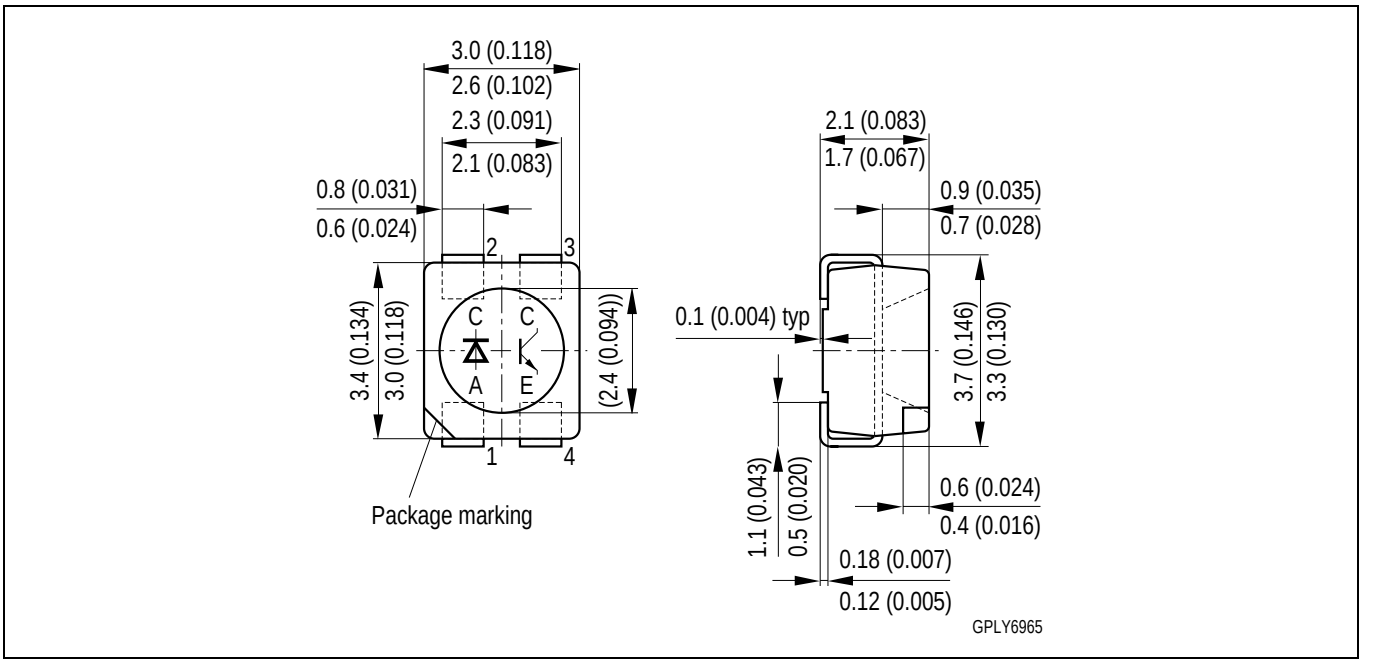
Dark Current
$I_{CEO} = f(T_A)$, V_{CE} = 5 V, $E = 0$



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



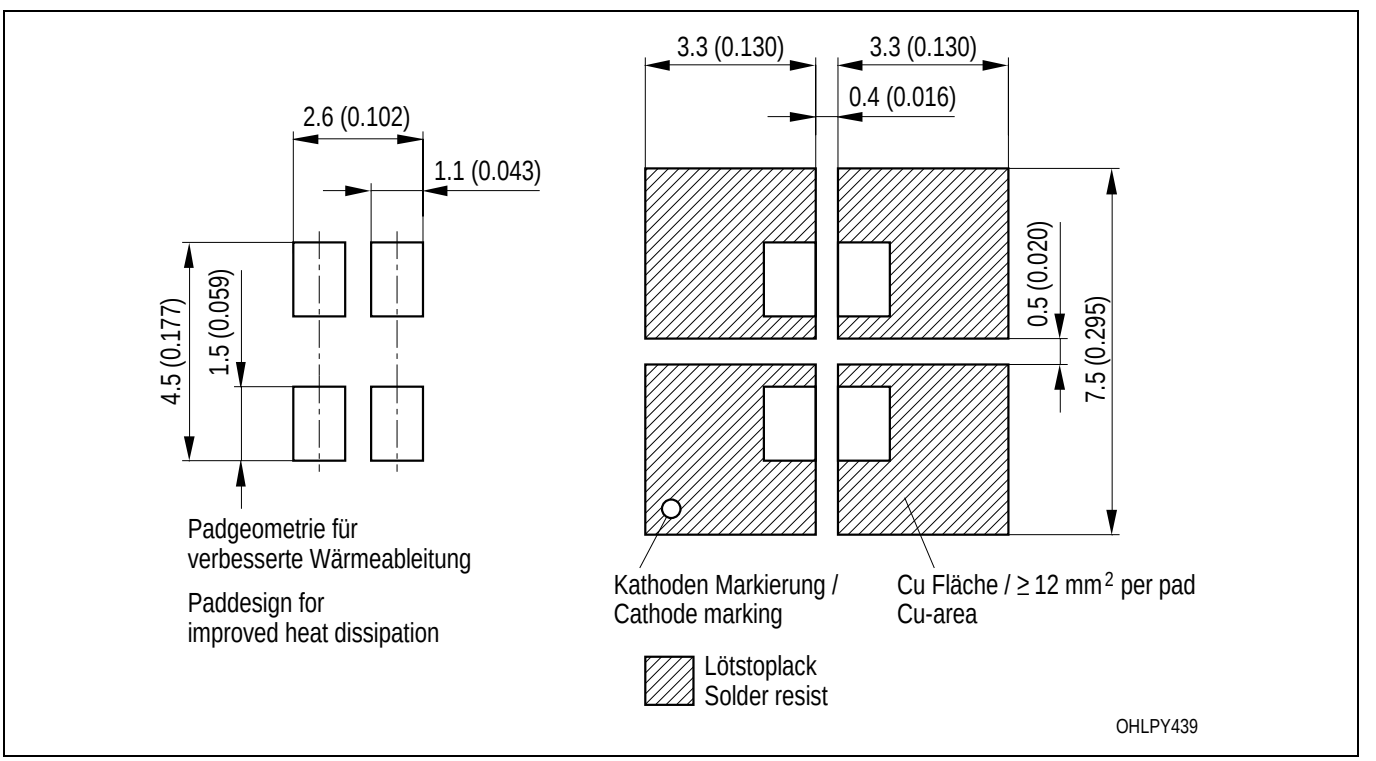
Maßzeichnung
Package Outlines



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

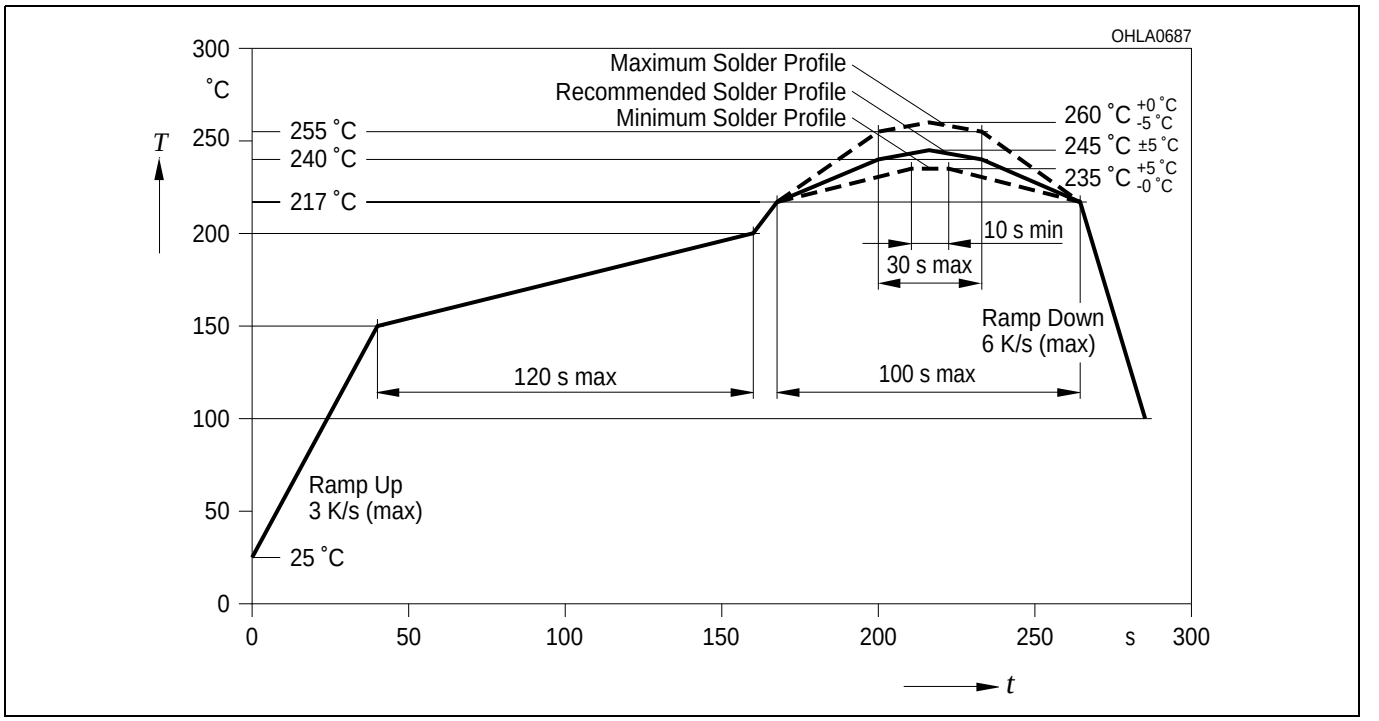
Empfohlenes Lötpaddesign
Recommended Solder Pad

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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