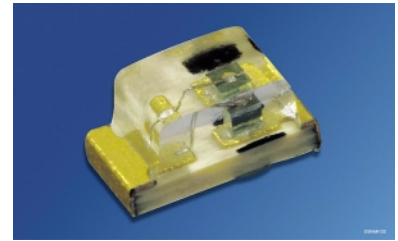


Hyper CHIPLED Hyper-Bright LED

LB Q993



Besondere Merkmale

- **Gehäusotyp:** SMT Gehäuse 0603
- **Besonderheit des Bauteils:** kleinste Bauform 1,6 x 0,8 x 0,8 mm (LxBxH)
- **Wellenlänge:** 470 nm (blau)
- **Abstrahlwinkel:** extrem breite Abstrahlcharakteristik (160°)
- **Technologie:** InGaN
- **optischer Wirkungsgrad:** 2 lm/W
- **Gruppierungsparameter:** Lichtstärke; Wellenlänge
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** IR Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 8 mm Gurt mit 4000/Rolle, ø180 mm
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach EOS/ESD-5.1-1993

Anwendungen

- flache Hinterleuchtung (LCD, Handy, Schalter, Display)
- Spielsachen
- Informationsanzeigen im Aussenbereich
- Signal- und Symbolleuchten
- Markierungsbeleuchtung (Stufen, Fluchtwege u. ä.)

Features

- **package:** SMT package 0603
- **feature of the device:** smallest package 1.6 x 0.8 x 0.8 mm (LxWxH)
- **wavelength:** 470 nm (blue)
- **viewing angle:** extremely wide (160°)
- **technology:** InGaN
- **optical efficiency:** 2 lm/W
- **grouping parameter:** luminous intensity; Wavelength
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** IR reflow soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 8 mm tape with 4000/reel, ø180 mm
- **ESD-withstand voltage:** up to 2 kV acc. to EOS/ESD-5.1-1993

Applications

- flat backlighting (LCD, cellular phones, switches, displays)
- toys
- outdoor displays
- signal and symbol luminary
- marker lights (e.g. steps, exit ways, etc.)

Typ	Emissions- farbe	Farbe der Lichtaustritts- fläche	Lichtstärke	Lichtstrom	Bestellnummer
Type	Color of Emission	Color of the Light Emitting Area	Luminous Intensity $I_F = 10 \text{ mA}$ $I_V (\text{mcd})$	Luminous Flux $I_F = 10 \text{ mA}$ $\Phi_V (\text{lm})$	Ordering Code
LB Q993-JK-1	blue	colorless clear	4.5 ... 11.2	22 (typ.)	Q62702-P5438
LB Q993-KM-1			7.1 ... 28.0	45 (typ.)	Q62702-P5439

Anm.: -1 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)

*Die Standardlieferform von Serientypen beinhaltet eine untere bzw. eine obere Familiengruppe, die aus nur 3 bzw. 4 Halbgruppen besteht. Einzelne Halbgruppen sind nicht erhältlich.
In einer Verpackungseinheit / Gurt ist immer nur eine Halbgruppe enthalten.*

Note: -1 Total color tolerance range, delivery in single groups (please see **page 5**)

*The standard shipping format for serial types includes a lower or upper family group of 3 or 4 individual groups. Individual half groups are not available.
No packing unit / tape ever contains more than one luminous intensity half group.*

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebstemperatur Operating temperature range	T_{op}	– 30 ... + 85	°C
Lagertemperatur Storage temperature range	T_{stg}	– 40 ... + 85	°C
Sperrschichttemperatur Junction temperature	T_j	+ 95	°C
Durchlassstrom Forward current	I_F	15	mA
Stoßstrom Surge current $t = 10 \mu s, D = 0.1$	I_{FM}	0.1	A
Sperrspannung Reverse voltage	V_R	5	V
Leistungsaufnahme Power consumption	P_{tot}	60	mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient Sperrschicht/Lötpad Junction/solder point Montage auf PC-Board FR 4 (Padgröße $\geq 16 \text{ mm}^2$) mounted on PC board FR 4 (pad size $\geq 16 \text{ mm}^2$)	$R_{th JA}$ $R_{th JS}$	650 370	K/W K/W

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

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 10\text{ mA}$	λ_{peak}	465	nm
Dominantwellenlänge ¹⁾ (typ.) Dominant wavelength $I_F = 10\text{ mA}$	λ_{dom}	470 ± 6	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 10\text{ mA}$	$\Delta\lambda$	25	nm
Abstrahlwinkel bei 50 % I_V (Vollwinkel) (typ.) Viewing angle at 50 % I_V	2ϕ	160	Grad deg.
Durchlassspannung ²⁾ (typ.) Forward voltage (max.) $I_F = 10\text{ mA}$	V_F V_F	3.4 3.8	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 5\text{ V}$	I_R I_R	0.01 10	μA μA
Temperaturkoeffizient von λ_{peak} (typ.) Temperature coefficient of λ_{peak} $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{peak}}}$	0.04	nm/K
Temperaturkoeffizient von λ_{dom} (typ.) Temperature coefficient of λ_{dom} $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{dom}}}$	0.02	nm/K
Temperaturkoeffizient von V_F (typ.) Temperature coefficient of V_F $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	TC_{V_F}	- 2.9	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 10\text{ mA}$	η_{opt}	2	lm/W

¹⁾ Wellenlängengruppen werden mit einer Stromeinprägungsdauer von 25 ms und einer Genauigkeit von $\pm 1\text{ nm}$ ermittelt.
Wavelength groups are tested at a current pulse duration of 25 ms and a tolerance of $\pm 1\text{ nm}$.

²⁾ Spannungswerte werden mit einer Stromeinprägungsdauer von 1 ms und einer Genauigkeit von $\pm 0.1\text{ V}$ ermittelt.
Voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.1\text{ V}$.

¹⁾Wellenlängengruppen / Wavelength groups

Gruppe Group	blue		Einheit Unit
	min.	max.	
3	464	468	nm
4	468	472	nm
5	472	476	nm

Helligkeits-Gruppierungsschema
Luminous Intensity Groups

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity I_V (mcd)	Lichtstrom Luminous Flux Φ_V (lm)
J	4.5 ... 7.1	16 (typ.)
K	7.1 ... 11.2	26 (typ.)
L	11.2 ... 18.0	43 (typ.)
M	18.0 ... 28.0	65 (typ.)

Helligkeitswerte werden mit einer Stromeinprägedauer von 25 ms und einer Genauigkeit von $\pm 11\%$ ermittelt.
 Luminous intensity is tested at a current pulse duration of 25 ms and a tolerance of $\pm 11\%$.

Gruppenbezeichnung auf Etikett
Group Name on Label

Beispiel: L-3

Example: L-3

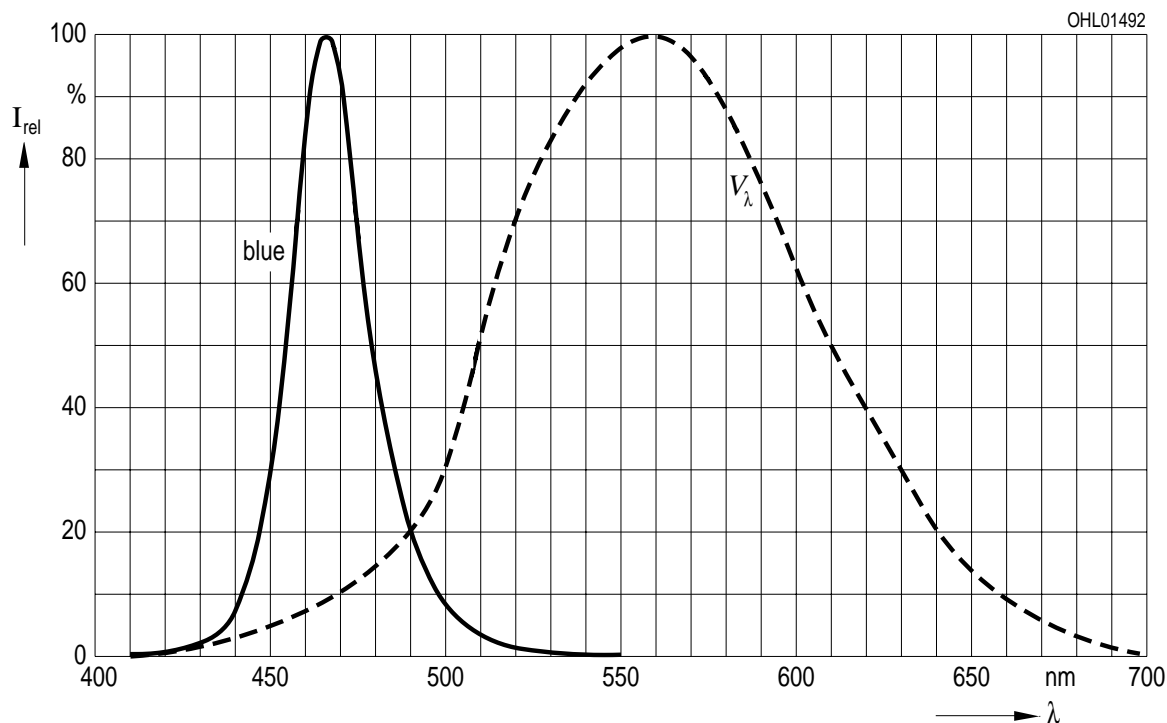
Lichtgruppe Luminous Intensity Group	Wellenlänge Wavelength
L	3

Relative spektrale Emission $I_{\text{rel}} = f(\lambda)$, $T_A = 25^\circ\text{C}$, $I_F = 10\text{ mA}$

Relative Spectral Emission

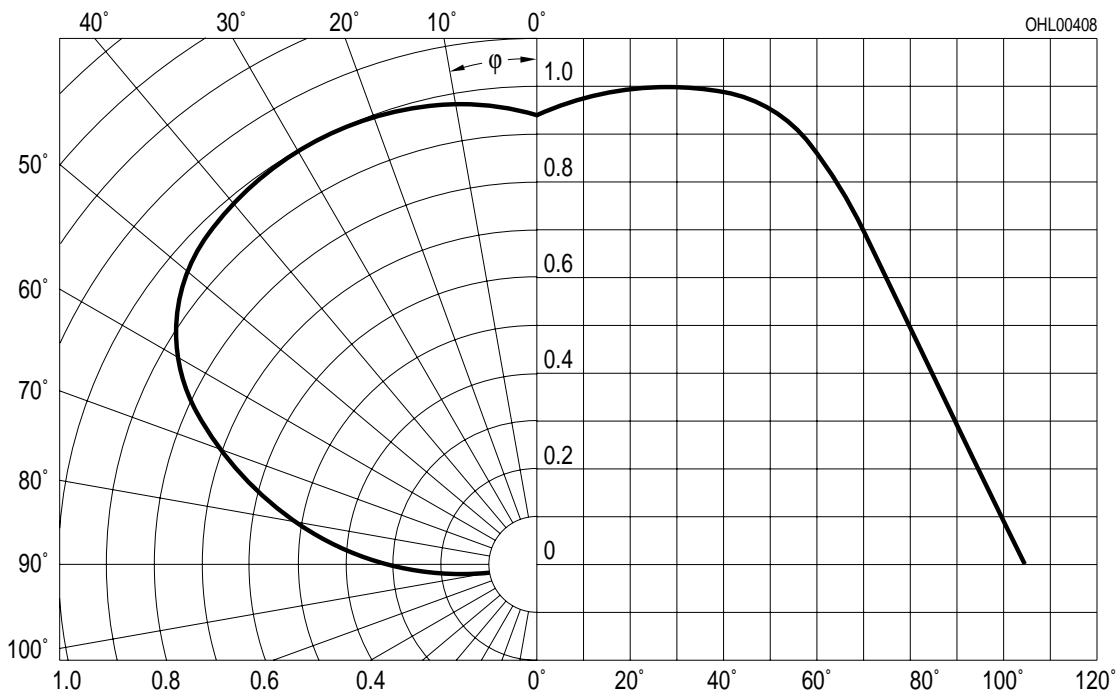
$V(\lambda)$ = spektrale Augenempfindlichkeit

Standard eye response curve



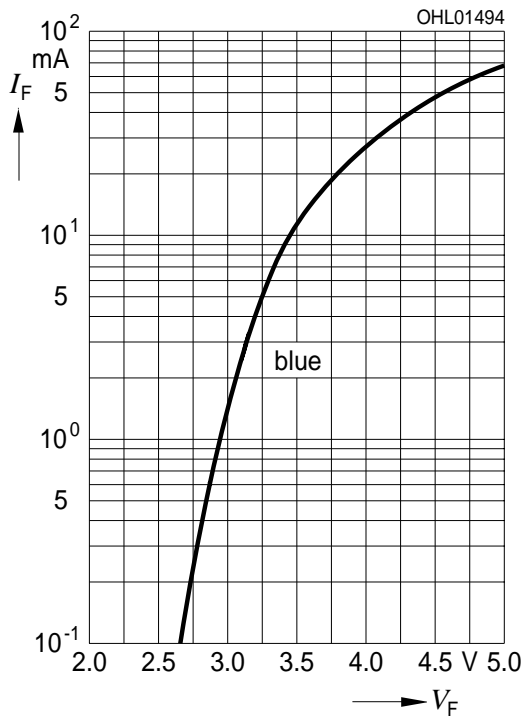
Abstrahlcharakteristik $I_{\text{rel}} = f(\varphi)$

Radiation Characteristic

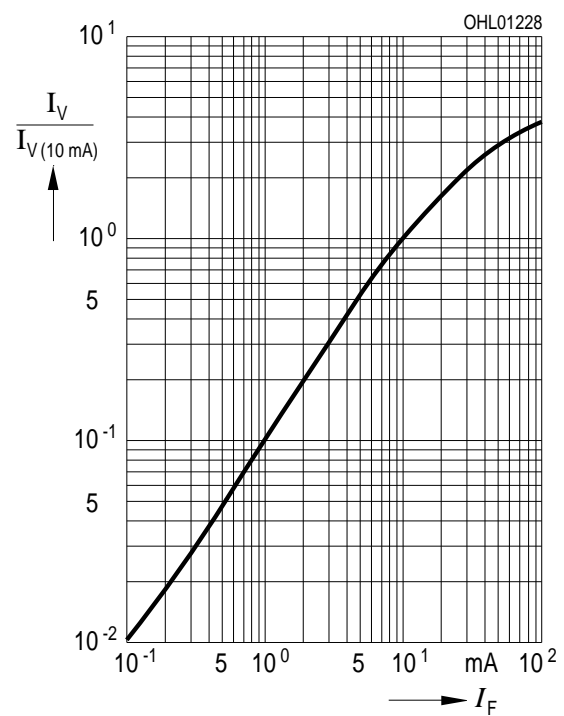


Durchlassstrom $I_F = f(V_F)$

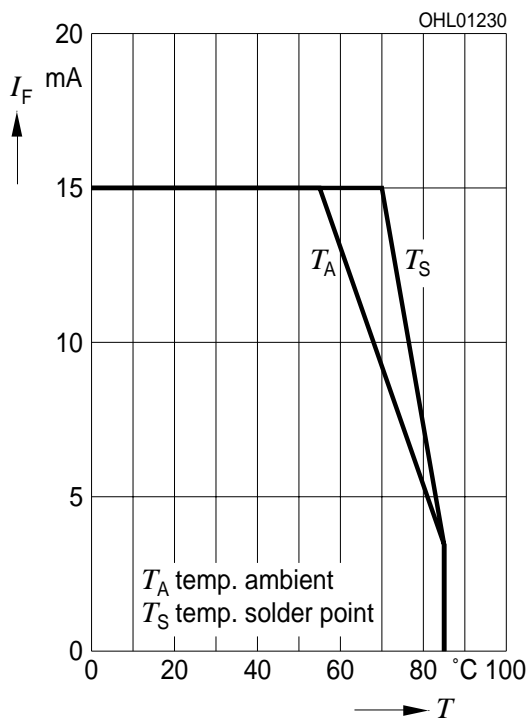
Forward Current

 $T_A = 25\text{ °C}$ Relative Lichtstärke $I_V/I_{V(10\text{ mA})} = f(I_F)$

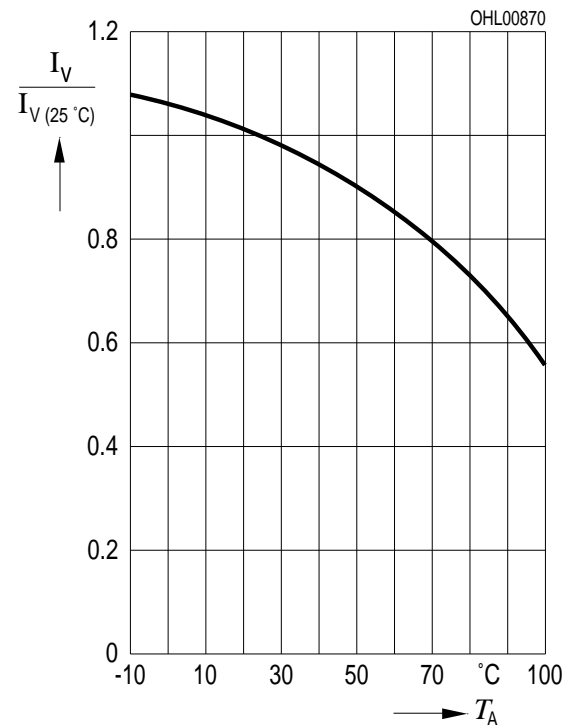
Relative Luminous Intensity

 $T_A = 25\text{ °C}$ Maximal zulässiger Durchlassstrom $I_F = f(T)$

Max. Permissible Forward Current

Relative Lichtstärke $I_V/I_{V(25\text{ °C})} = f(T_A)$

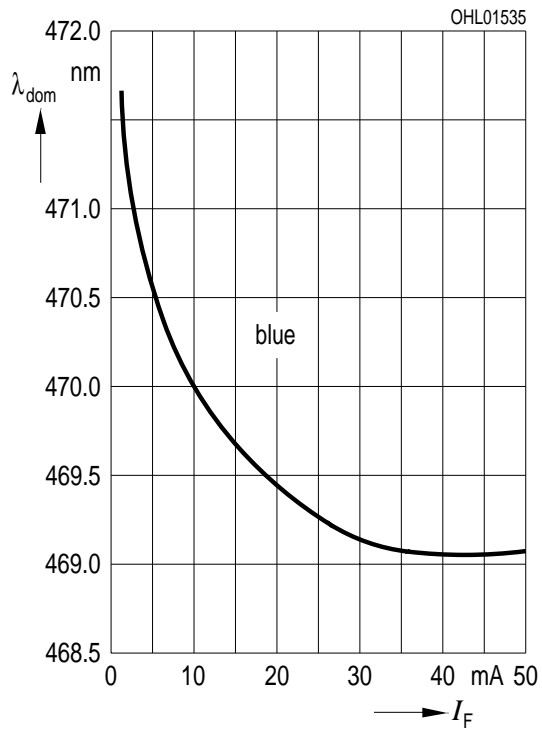
Relative Luminous Intensity

 $I_F = 10\text{ mA}$ 

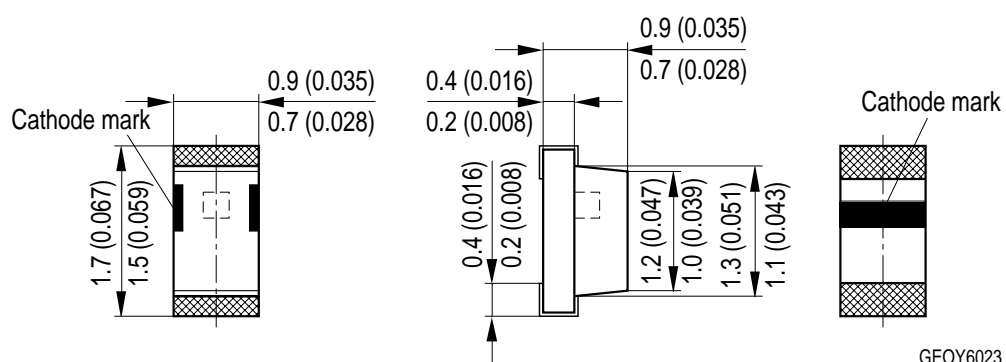
Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$

Dominant wavelength

$T_A = 25\text{ °C}$



Maßzeichnung Package Outlines

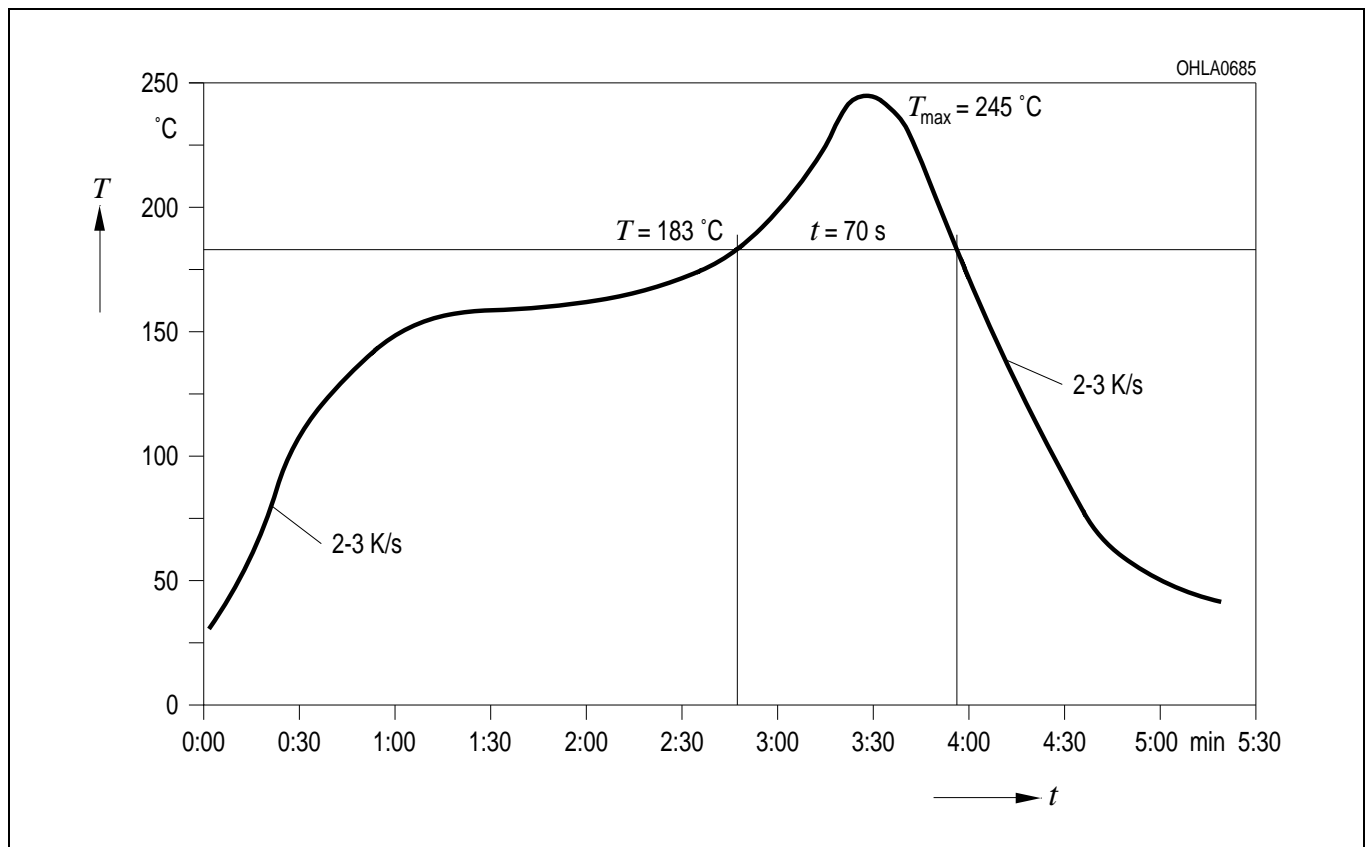


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

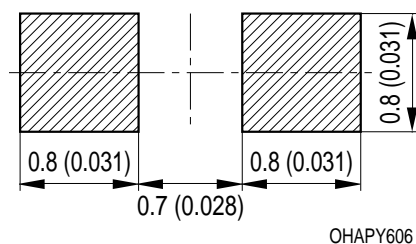
Gewicht / Approx. weight: 1.4 mg

Lötbedingungen Vorbehandlung nach JEDEC Level 2
Soldering Conditions Preconditioning acc. to JEDEC Level 2

IR-Reflow Lötprofil (nach CECC 00802)
IR Reflow Soldering Profile (acc. to CECC 00802)

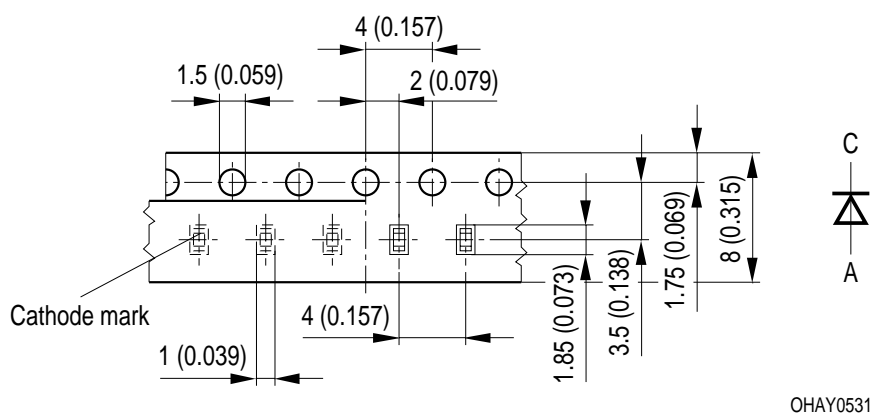


Empfohlenes Lötpaddesign IR Reflow Lötén
Recommended Solder Pad IR Reflow Soldering



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Gurtung / Polarität und Lage Verpackungseinheit 4000/Rolle, ø180 mm
Method of Taping / Polarity and Orientation Packing unit 4000/reel, ø180 mm



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Revision History: 2001-02-21

Previous Version: 2001-02-21

Page	Subjects (major changes since last revision)

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