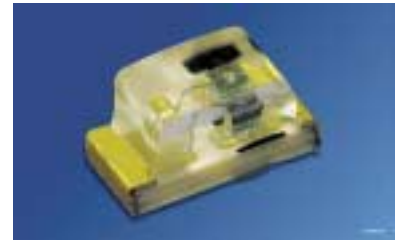


Hyper CHIPLED Hyper-Bright LED

LB Q993

Abgekündigt nach OS-PD-2003-007 - wird durch
LB L293 ersetzt werden

Obsolete acc. to OS-PD-2003-007 - will be replaced by
LB L293



Besondere Merkmale

- **Gehäusotyp:** SMT Gehäuse 0603, farbloser klarer Verguss
- **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 JESD22-A114-B

Anwendungen

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

Features

- **package:** SMT package 0603, colorless clear
- **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 JESD22-A114-B

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	Lichtstärke	Lichtstrom	Bestellnummer
Type	Color of Emission	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-35	blue	4.5 ... 11.2	40 (typ.)	Q62702P5438
■LB Q993-KM-35		7.1 ... 28.0	85 (typ.)	Q62702P5439

- Abgekündigt nach OS-PD-2003-007 - wird durch LB L293 ersetzt werden
 Obsolete acc. to OS-PD-2003-007 - will be replaced by LB L293
 Letzte Bestellung / Last Order: 2003-10-31
 Letzte Lieferung / Last Delivery: 2004-03-31

Anm.: -35 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)

Die Standardlieferform von Serientypen beinhaltet eine untere bzw. eine obere Familiengruppe. Diese besteht aus zwei bzw. drei Helligkeitsgruppen. Einzelne Helligkeitsgruppen sind nicht bestellbar.

In einer Verpackungseinheit / Gurt ist immer nur eine Helligkeitsgruppe enthalten.

Note: -35 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 two or three luminous intensity groups. Individual luminous intensity groups cannot be ordered.

No packing unit / tape ever contains more than one luminous intensity 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 ($T_A=25^\circ\text{C}$)	I_F	15	mA
Stoßstrom Surge current $t = 10 \mu\text{s}$, $D = 0.1$, $T_A=25^\circ\text{C}$	I_{FM}	0.1	A
Sperrspannung ¹⁾ Reverse voltage ($T_A=25^\circ\text{C}$)	V_R	5	V
Leistungsaufnahme Power consumption ($T_A=25^\circ\text{C}$)	P_{tot}	60	mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th JA}$	650	K/W
Sperrschicht/Lötpad Junction/solder point ²⁾	$R_{th JS}$	370	K/W

¹⁾ für kurzzeitigen Betrieb geeignet / suitable for short term application

²⁾ Montage auf PC-Board FR 4 (Padgröße $\geq 5 \text{ mm}^2$)
 mounted on PC board FR 4 (pad size $\geq 5 \text{ mm}^2$)

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⁾ 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 3.9	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 für Dominantwellenlänge**
Wavelength groups for dominant wavelength

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

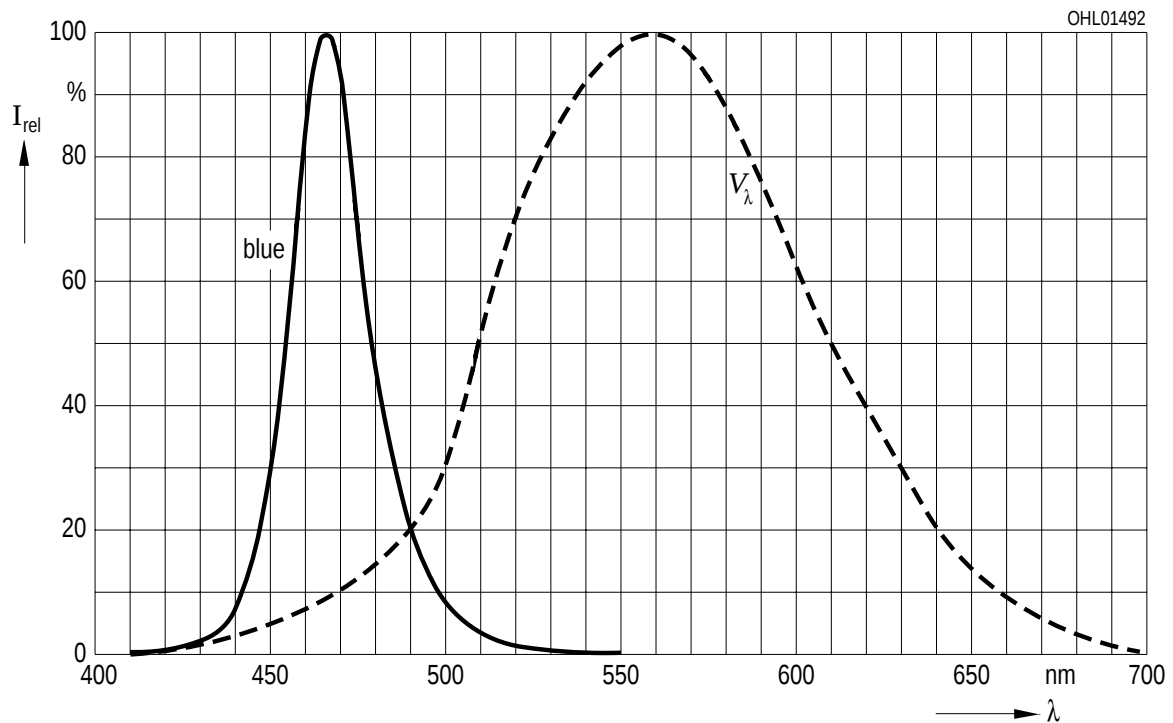
Lichtgruppe Luminous Intensity Group	Wellenlänge Wavelength
L	3

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

Relative Spectral Emission

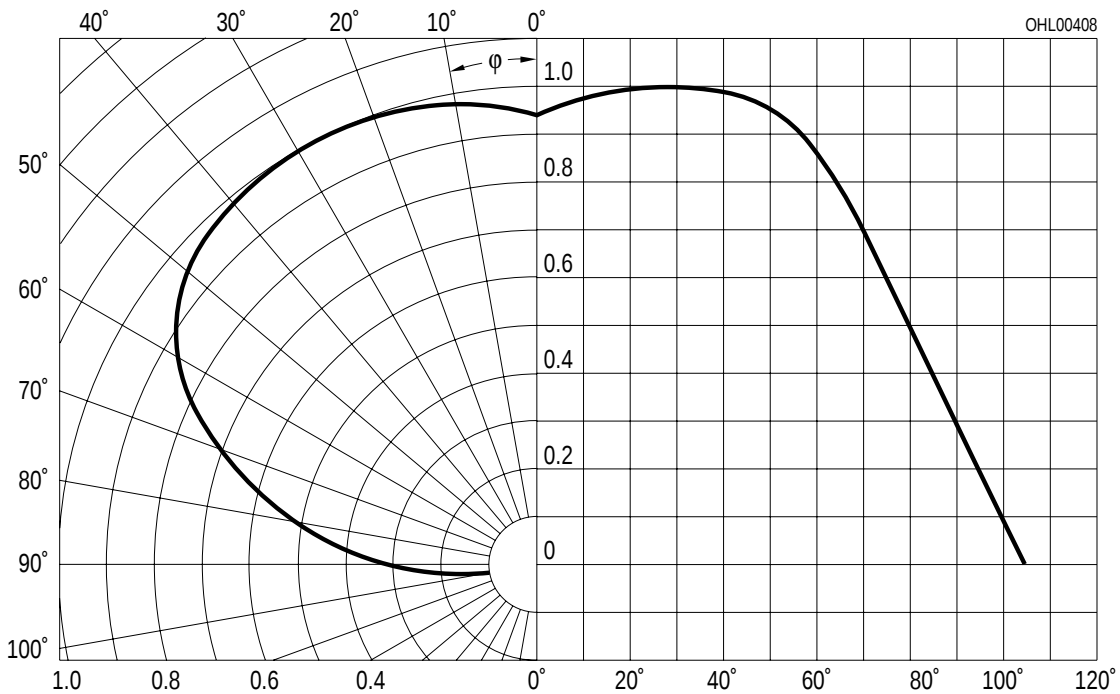
$V(\lambda)$ = spektrale Augenempfindlichkeit

Standard eye response curve



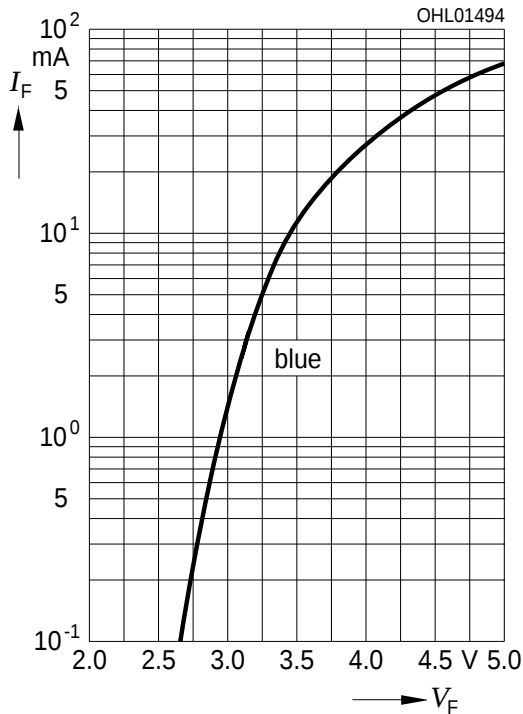
Abstrahlcharakteristik $I_{\text{rel}} = f(\varphi)$

Radiation Characteristic

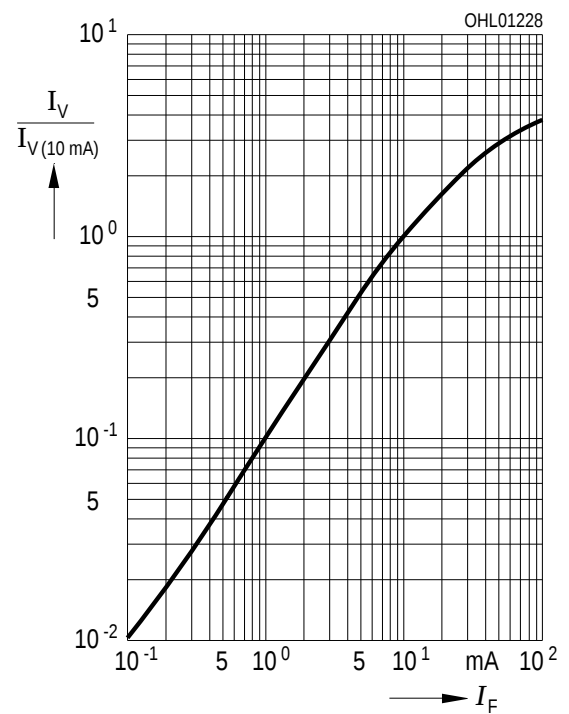


Durchlassstrom $I_F = f(V_F)$

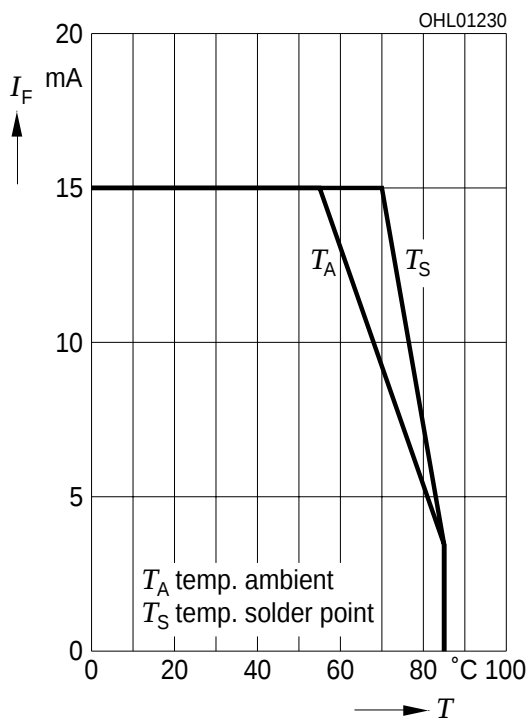
Forward Current

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

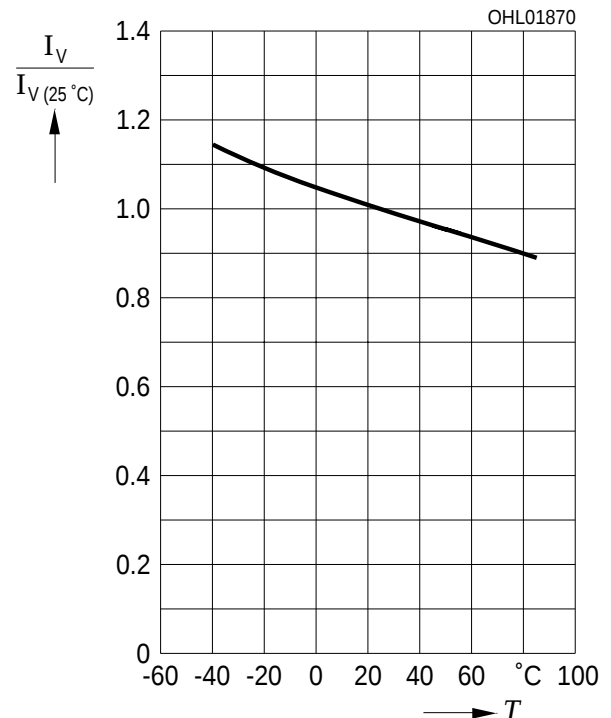
Relative Luminous Intensity

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

Max. Permissible Forward Current

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

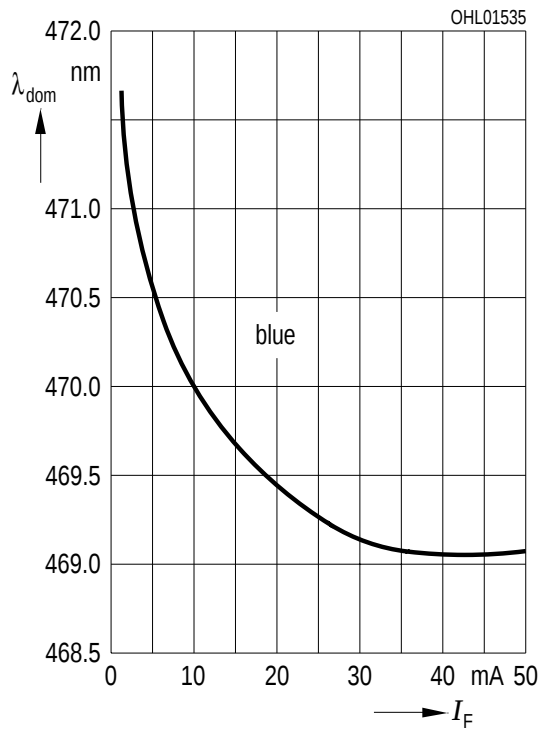
Relative Luminous Intensity

 $I_F = 10\text{ mA}$ 

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

Dominant wavelength

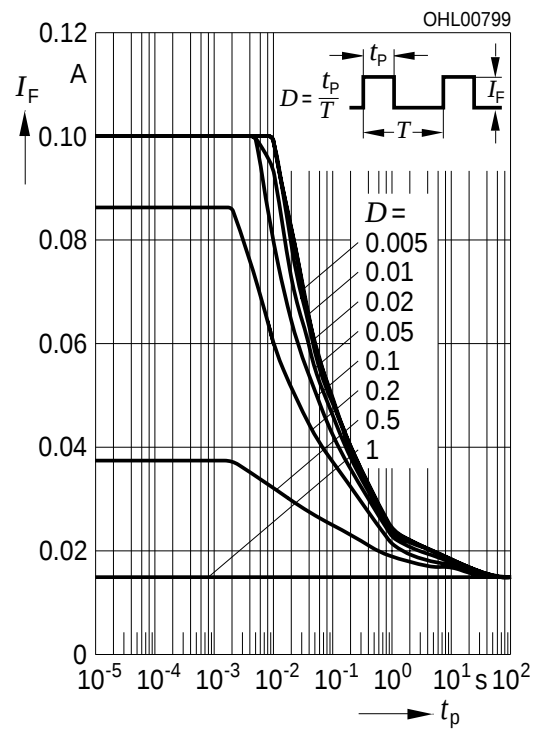
$T_A = 25\text{ °C}$



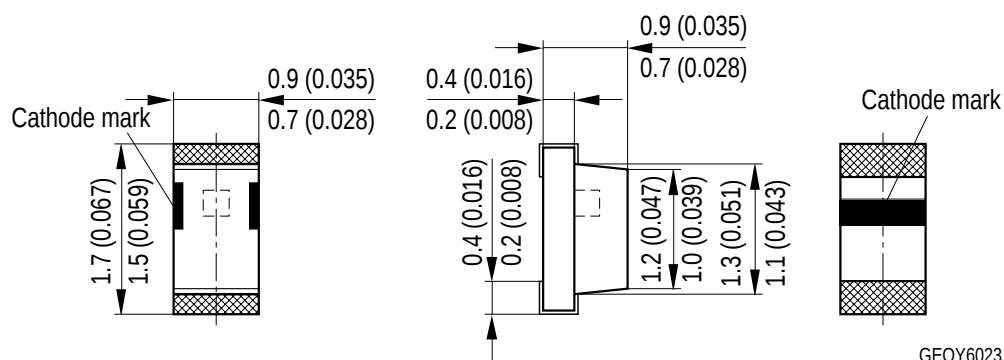
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$

Permissible Pulse Handling Capability

Duty cycle $D = \text{parameter}$, $T_A = 25\text{ °C}$



Maßzeichnung Package Outlines

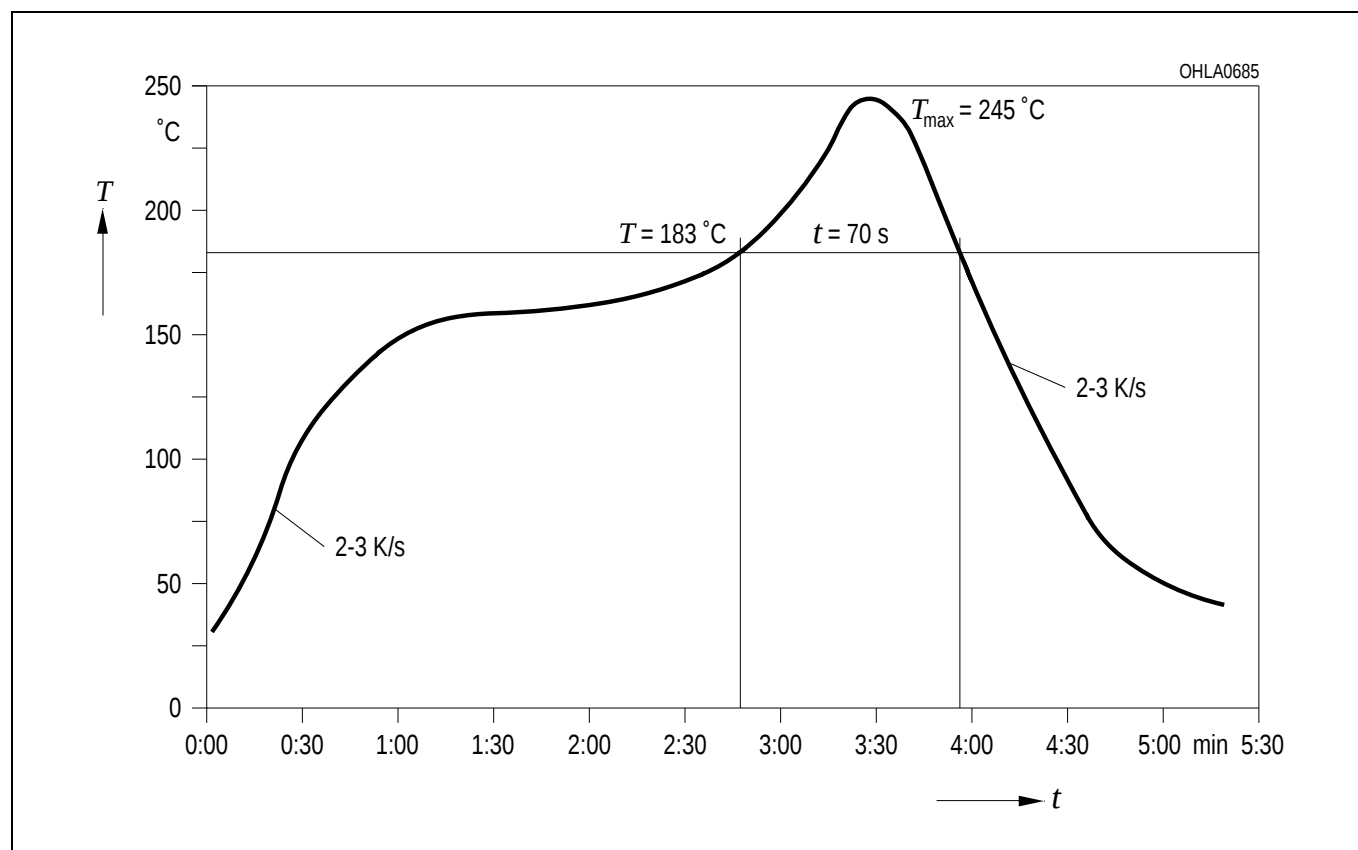


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

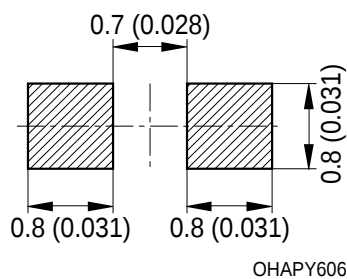
Gewicht / Approx. weight: 1.4 mg

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 Löten
Recommended Solder Pad IR Reflow Soldering



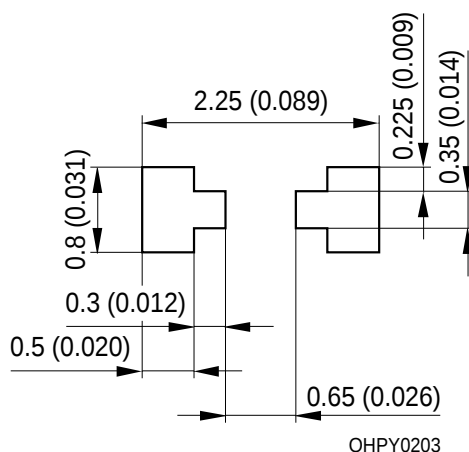
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

Empfohlenes Lötpaddesign verwendbar für Hyper CHIPLED und Chiplid - Bauform 0603

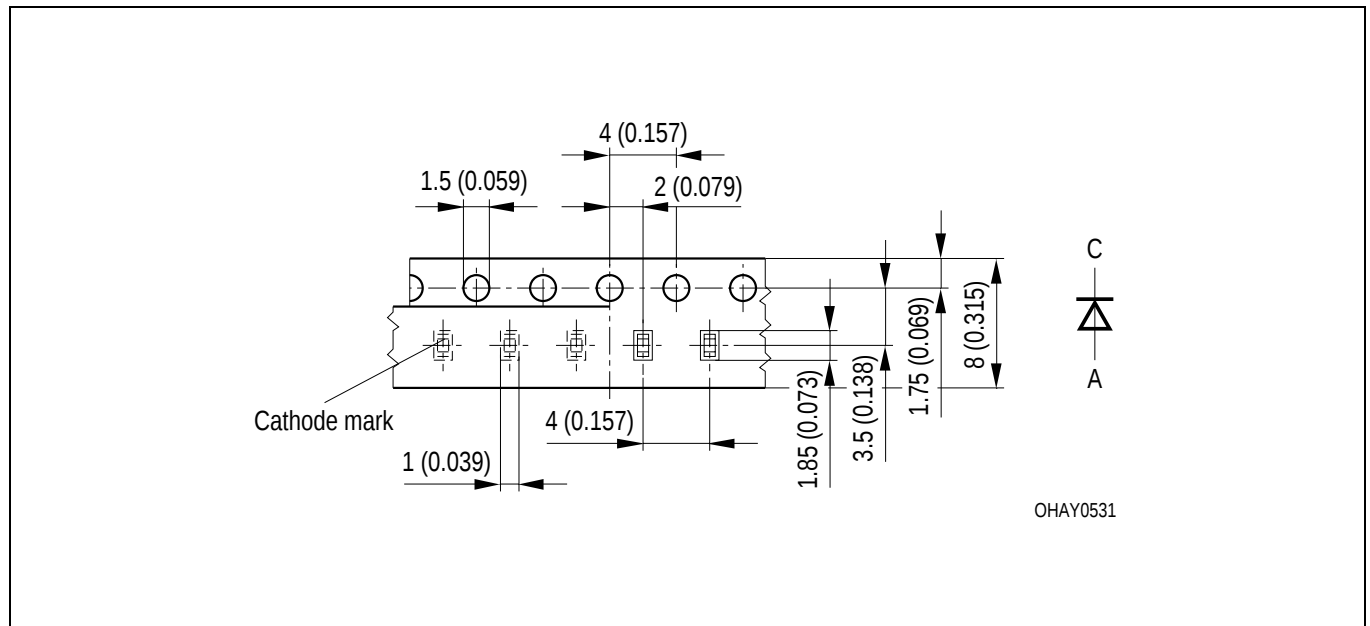
IR Reflow Löten

Recommended Solder Pad useable for Hyper CHIPLED and Chiplid - Package 0603

IR Reflow Soldering



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).
 Empfohlene Lötpastendicke: 120 µm/ recommended thickness of solder paste: 120 µm

Gurtung / Polarität und LageVerpackungseinheit 4000/Rolle, $\varnothing 180$ mm**Method of Taping / Polarity and Orientation**Packing unit 4000/reel, $\varnothing 180$ mm

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

Anm.: Bezüglich Trockenverpackung finden Sie weitere Hinweise im Internet und in unserem Short Form Catalog im Kapitel "Gurtung und Verpackung" unter dem Punkt "Trockenverpackung". Hier sind Normenbezüge, unter anderem ein Auszug der JEDEC-Norm, enthalten.

Note: Regarding dry pack you will find further information in the internet and in the Short Form Catalog in chapter "Tape and Reel" under the topic "Dry Pack". Here you will also find the normative references like JEDEC.

Revision History: 2003-09-03		Date of change
Previous Version: 2003-08-27		
Page	Subjects (major changes since last revision)	
11	recommended solder pad	
4	forward voltage	
7	diagram relative luminous intensity OHL00870 to OHL01870	
3	pad size from 16 mm ² to 5 mm ²	
2	changed to new SAP designation system	2002-06-28
13	annotations	2002-07-23
8	new: diagram pulse handling OHL00799	2002-08-13
3	reverse voltage (footnote)	2002-08-21
all	not for new design	2003-06-30
1, 2	obsolete	2003-08-27
14	note: dry pack	2003-09-03
1	ESD norm	2003-09-03
3	ambient temperature	2003-09-03

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Attention please!

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Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose! Critical components ¹ may only be used in life-support devices or systems ² with the express written approval of OSRAM OS.

¹ A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

² Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.