SmartLED™
Hyper-Bright Low Current LED

LS L89K, LO L89K, LY L89K

Vorläufige Daten / Preliminary Data

Besondere Merkmale

- **Gehäusetyp:** SMT Gehäuse SCD 80
- **Besonderheit des Bauteils:** kleinste Bauform 1,7 mm x 0,8 mm x 0,65 mm (LxBxH)
- **Wellenlänge:** 630 nm (super-rot), 606 nm (orange), 587 nm (gelb)
- **Abstrahlwinkel:** extrem breite Abstrahlcharakteristik (160°)
- **Technologie:** InGaAlP
- **optischer Wirkungsgrad:** 6 lm/W (gelb) 5 lm/W (super-rot), 9 lm/W (orange)
- **Gruppierungsparameter:** Lichtstärke, Wellenlänge
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** IR Reflow Löten und Wellenlöten (TTW)
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 8 mm Gurt mit 10000/Rolle, ø180 mm oder 40000/Rolle, ø330 mm

Features

- **package:** SMT package SCD 80
- **feature of the device:** smallest package 1.7 mm x 0.8 mm x 0.65 mm (LxWxH)
- **wavelength:** 630 nm (super-red), 606 nm (orange), 587 nm (yellow)
- **viewing angle:** extremely wide (160°)
- **technology:** InGaAlP
- **optical efficiency:** 6 lm/W (yellow) 5 lm/W (super-red), 9 lm/W (orange)
- **grouping parameter:** luminous intensity, wavelength
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** IR reflow soldering and TTW soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 8 mm tape with 10000/reel, ø180 mm or 40000/reel, ø330 mm

Anwendungen

- Informationsanzeigen im Innenbereich (z. B. im Laufschriftanzeigen)
- optischer Indikator
- Einkopplung in Lichtleiter
- Hinterleuchtung (LCD, Handy, Schalter, Tasten, Displays, Werbebeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung)
- Markierungsbeleuchtung
- Signal- und Symbolleuchten

Applications

- indoor displays (e.g. light writing displays)
- optical indicators
- coupling into light guides
- backlighting (LCD, cellular phones, switches, keys, displays, illuminated advertising)
- interior automotive lighting (e.g. dashboard backlighting)
- marker lights
- signal and symbol luminaire

Typ Type	Emissions-farbe Color of Emission	Gehäusefarbe Color of Package	Lichtstärke Luminous Intensity I_F = 2 mA I_V (mcd)	Lichtstrom Luminous Flux I_F = 2 mA Φ_V (mlm)	Bestellnummer Ordering Code
LS L89K-G1H1-1 LS L89K-H1J2-1	super-red	colorless diffused	1.80 … 3.55 2.80 … 7.10	10 (typ.) 20 (typ.)	Q62703-Q6432 Q62703-Q6433
LO L89K-H2J2-24 LO L89K-J2L1-24	orange	colorless diffused	3.55 … 7.10 5.60 …14.00	20 (typ.) 40 (typ.)	Q62703-Q6428 Q62703-Q6429
LY L89K-G2H2-26 LY L89K-H2K1-26	yellow	colorless diffused	2.24 … 4.50 3.55 … 9.00	15 (typ.) 25 (typ.)	Q62703-Q6436 Q62703-Q6437

*Anm.: -1 gesamter Farbbereich (siehe **Seite 4**)*
*-24 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)*
*-26 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 (please see **page 4**)*
*-24 Total color tolerance range, delivery in single groups (please see **page 5**)*
*-26 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.

Vergleichstabelle für 10 mA
Correllation Table for 10 mA

Typ Type I_F = 2 mA	Emissions-farbe Color of Emission	Lichtstärke Luminous Intensity I_F = 2 mA I_V (mcd)		Lichtstärke Luminous Intensity I_F = 10 mA I_V (mcd)	Lichtstrom Luminous Flux I_F =10 mA Φ_V (mlm)
LS L89K-G1H1-1 LS L89K-H1J2-1	super-red	1.80 … 3.55 2.80 … 7.10	⇒	15 (typ.) 25 (typ.)	55 (typ.) 100 (typ.)
LO L89K-H2J2-24 LO L89K-J2L1-24	orange	3.55 … 7.10 5.60 …14.00	⇒	25 (typ.) 50 (typ.)	110 (typ.) 200 (typ.)
LY L89K-G2H2-26 LY L89K-H2K1-26	yellow	2.24 … 4.50 3.55 … 9.00	⇒	15 (typ.) 30 (typ.)	70 (typ.) 130 (typ.)

*Siehe auch Grafik auf **Seite 7** / Please see also graph on **page 7***

Grenzwerte
Maximum Ratings

Bezeichnung Parameter	Symbol Symbol	Werte Values		Einheit Unit
		LS	LO, LY	
Betriebstemperatur Operating temperature range	T_{op}	– 40 … + 100		°C
Lagertemperatur Storage temperature range	T_{stg}	– 40 … + 100		°C
Sperrschichttemperatur Junction temperature	T_j	+ 110		°C
Durchlassstrom Forward current	I_F	15		mA
Stoßstrom Surge current $t \leq 10$ µs, $D = 0.1$	I_{FM}	–	–	A
Sperrspannung Reverse voltage	V_R	5		V
Leistungsaufnahme Power consumption	P_{tot}	40		mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th\ JA}$	400		K/W
Sperrschicht/Lötpad Junction/solder point Montage auf PC-Board FR 4 (Padgröße ≥ 5 mm²) mounted on PC board FR 4 (pad size ≥ 5 mm²)	$R_{th\ JS}$	210		K/W

Kennwerte (T_A = 25 °C)
Characteristics

Bezeichnung **Parameter**		**Symbol** **Symbol**	**Werte** **Values**			**Einheit** **Unit**
			LS	**LO**	**LY**	
Wellenlänge des emittierten Lichtes Wavelength at peak emission I_F = 2 mA	(typ.)	λ_{peak}	643	610	591	nm
Dominantwellenlänge [1] Dominant wavelength I_F = 2 mA	(typ.)	λ_{dom}	630 ± 6	606 +3/–6	587 +8/–7	nm
Spektrale Bandbreite bei 50 % $I_{rel\ max}$ Spectral bandwidth at 50 % $I_{rel\ max}$ I_F = 2 mA	(typ.)	$\Delta\lambda$	16	16	15	nm
Abstrahlwinkel bei 50 % I_V (Vollwinkel) Viewing angle at 50 % I_V	(typ.)	2φ	160	160	160	Grad deg.
Durchlassspannung [2] Forward voltage I_F = 2 mA	(typ.) (max.)	V_F V_F	1.8 2.2	1.8 2.2	1.8 2.2	V V
Sperrstrom Reverse current V_R = 5 V	(typ.) (max.)	I_R I_R	0.01 10	0.01 10	0.01 10	µA µA
Temperaturkoeffizient von λ_{peak} Temperature coefficient of λ_{peak} I_F = 2 mA; –10°C ≤ T ≤ 100°C	(typ.)	$TC_{\lambda peak}$	0.14	0.14	0.12	nm/K
Temperaturkoeffizient von λ_{dom} Temperature coefficient of λ_{dom} I_F = 2 mA; –10°C ≤ T ≤ 100°C	(typ.)	$TC_{\lambda dom}$	0.05	0.09	0.09	nm/K
Temperaturkoeffizient von V_F Temperature coefficient of V_F I_F = 2 mA; –10°C ≤ T ≤ 100°C	(typ.)	TC_V	– 1.8	– 1.5	– 2.1	mV/K
Optischer Wirkungsgrad Optical efficiency I_F = 2 mA	(typ.)	η_{opt}	5	9	6	lm/W

[1] Wellenlängengruppen werden mit einer Stromeinprägedauer von 25 ms und einer Genauigkeit von ±1 nm ermittelt.
Wavelength groups are tested at a current pulse duration of 25 ms and a tolerance of ±1 nm.

[2] Spannungswerte werden mit einer Stromeinprägedauer von 1 ms und einer Genauigkeit von ±0,1 V ermittelt.
Voltages are tested at a current pulse duration of 1 ms and a tolerance of ±0.1 V.

[1] **Wellenlängengruppen**
Wavelength groups

Gruppe Group	yellow		orange		Einheit Unit
	min.	max.	min.	max.	
2	580	583	600	603	nm
3	583	586	603	606	nm
4	586	589	606	609	nm
5	589	592			nm
6	592	595			nm

Helligkeits-Gruppierungsschema
Luminous Intensity Groups

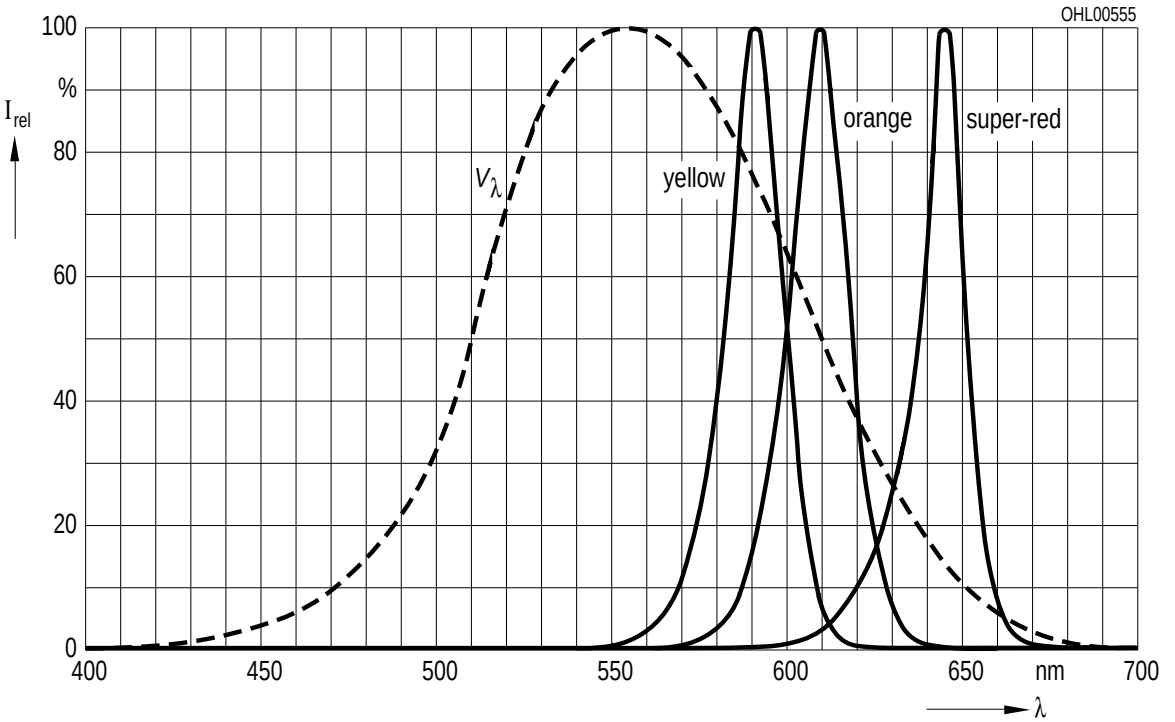
Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity I_V (mcd)	Lichtstrom Luminous Flux Φ_V (mlm)
F1	1.12 … 1.40	5 (typ.)
F2	1.40 … 1.80	6 (typ.)
G1	1.80 … 2.24	8 (typ.)
G2	2.24 … 2.80	10 (typ.)
H1	2.80 … 3.55	13 (typ.)
H2	3.55 … 4.50	16 (typ.)
J1	4.50 … 5.60	20 (typ.)
J2	5.60 … 7.10	25 (typ.)
K1	7.10 … 9.00	32 (typ.)

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

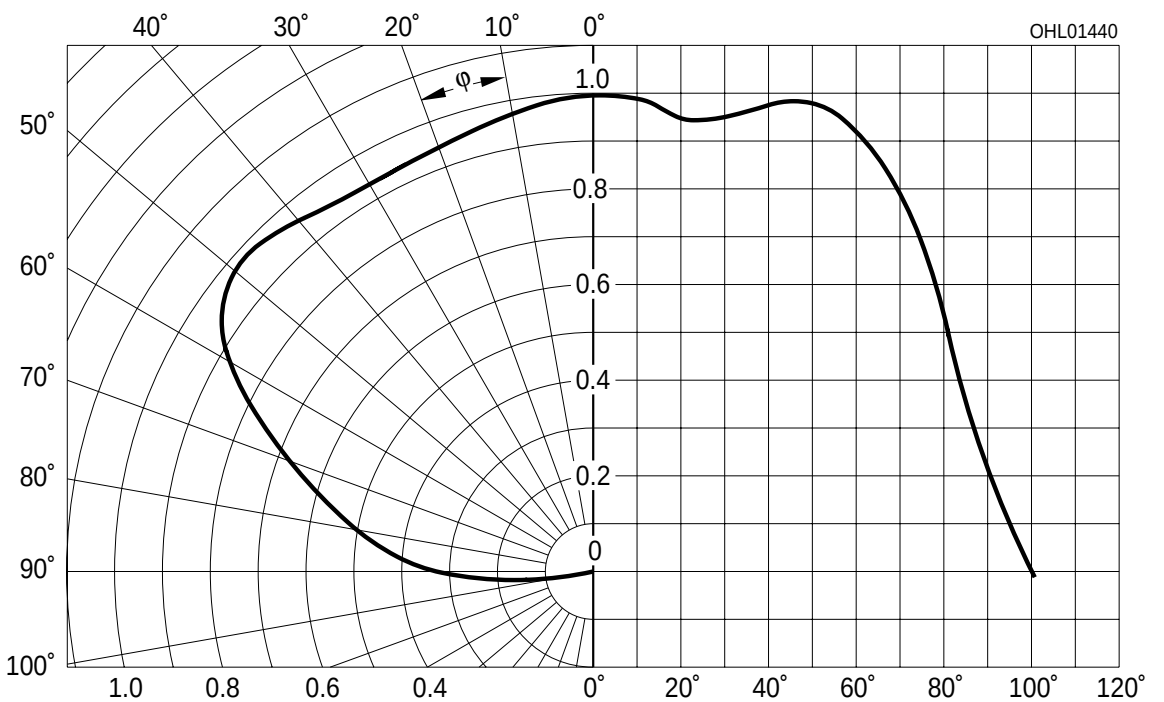
Gruppenbezeichnung auf Etikett
Group Name on Label
Beispiel: H2-3
Example: H2-3

Lichtgruppe Luminous Intensity Group	Halbgruppe Half Group	Wellenlänge Wavelength
H	2	3

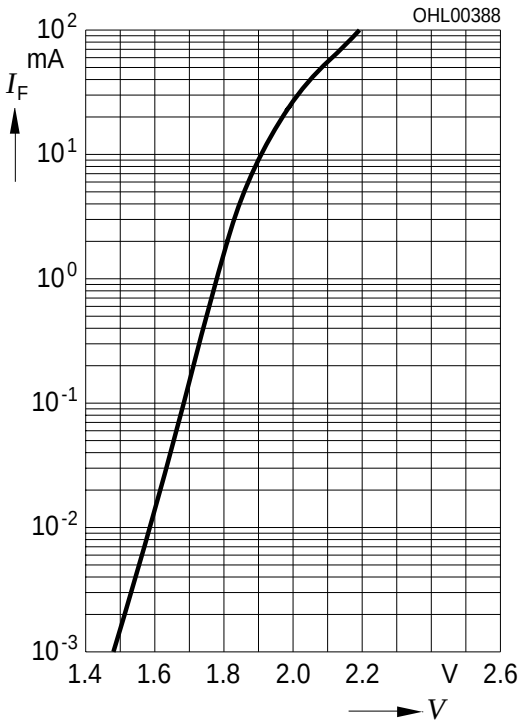
Relative spektrale Emission $I_{rel} = f(\lambda)$, T_A = 25 °C, I_F = 2 mA
Relative Spectral Emission
V(λ) = spektrale Augenempfindlichkeit
Standard eye response curve



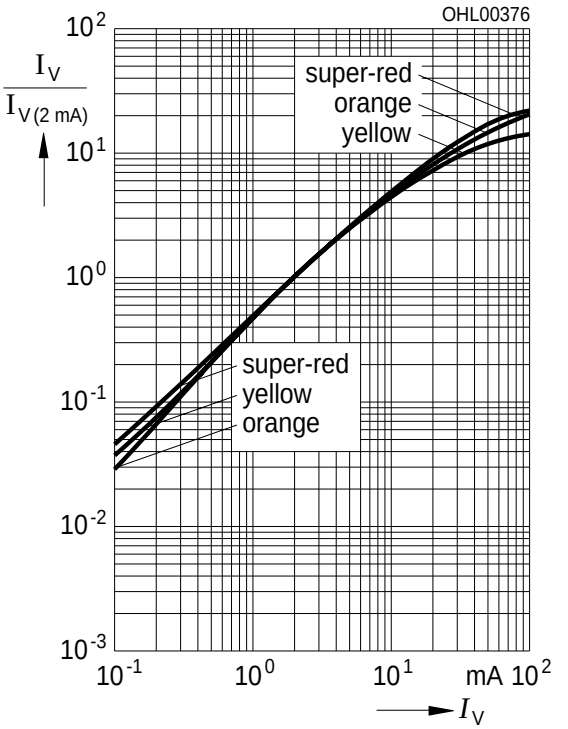
Abstrahlcharakteristik $I_{rel} = f(\varphi)$
Radiation Characteristic



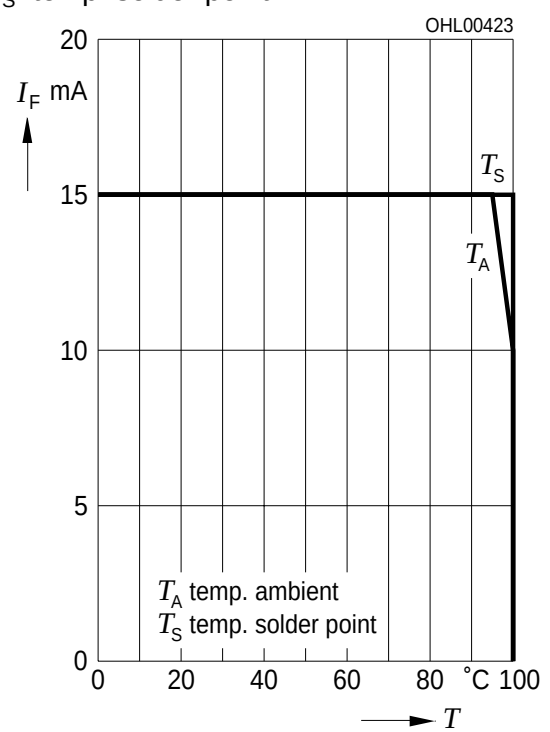
Durchlassstrom $I_F = f(V_F)$
Forward Current
T_A = 25 °C



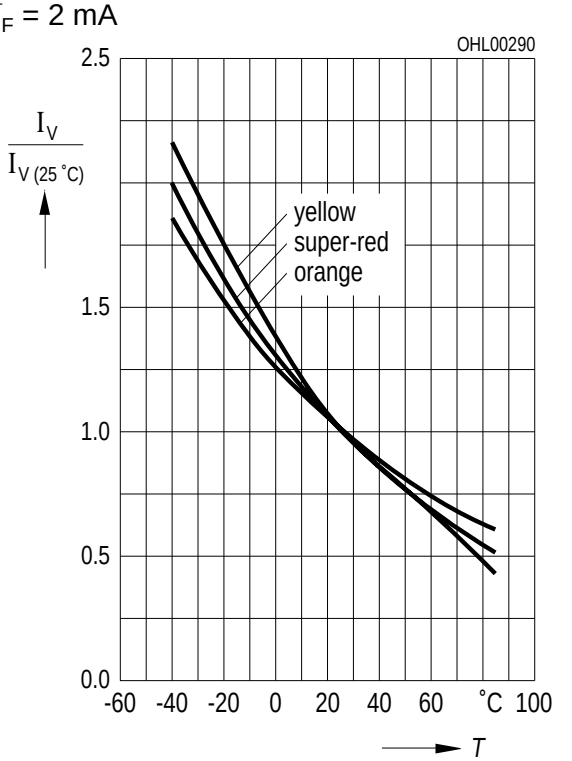
Relative Lichtstärke $I_V/I_{V(2\ mA)} = f(I_F)$
Relative Luminous Intensity
T_A = 25 °C



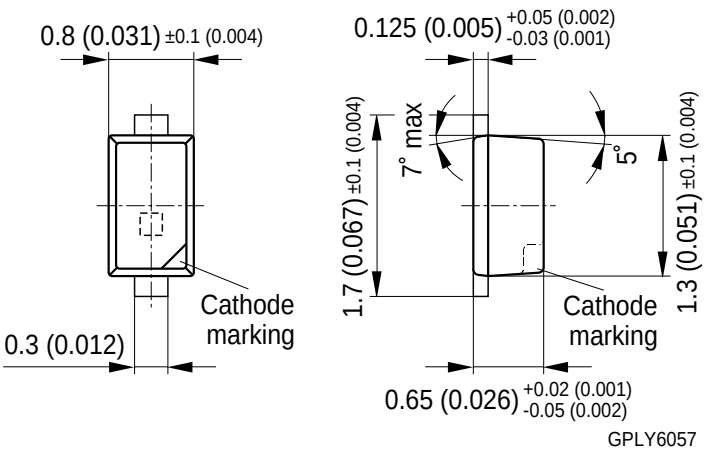
Maximal zulässiger Durchlassstrom $I_F = f(T)$
Max. Permissible Forward Current
T_S: temp. solder point



Relative Lichtstärke $I_V/I_{V(25\ °C)} = f(T_A)$
Relative Luminous Intensity
I_F = 2 mA



Maßzeichnung
Package Outlines

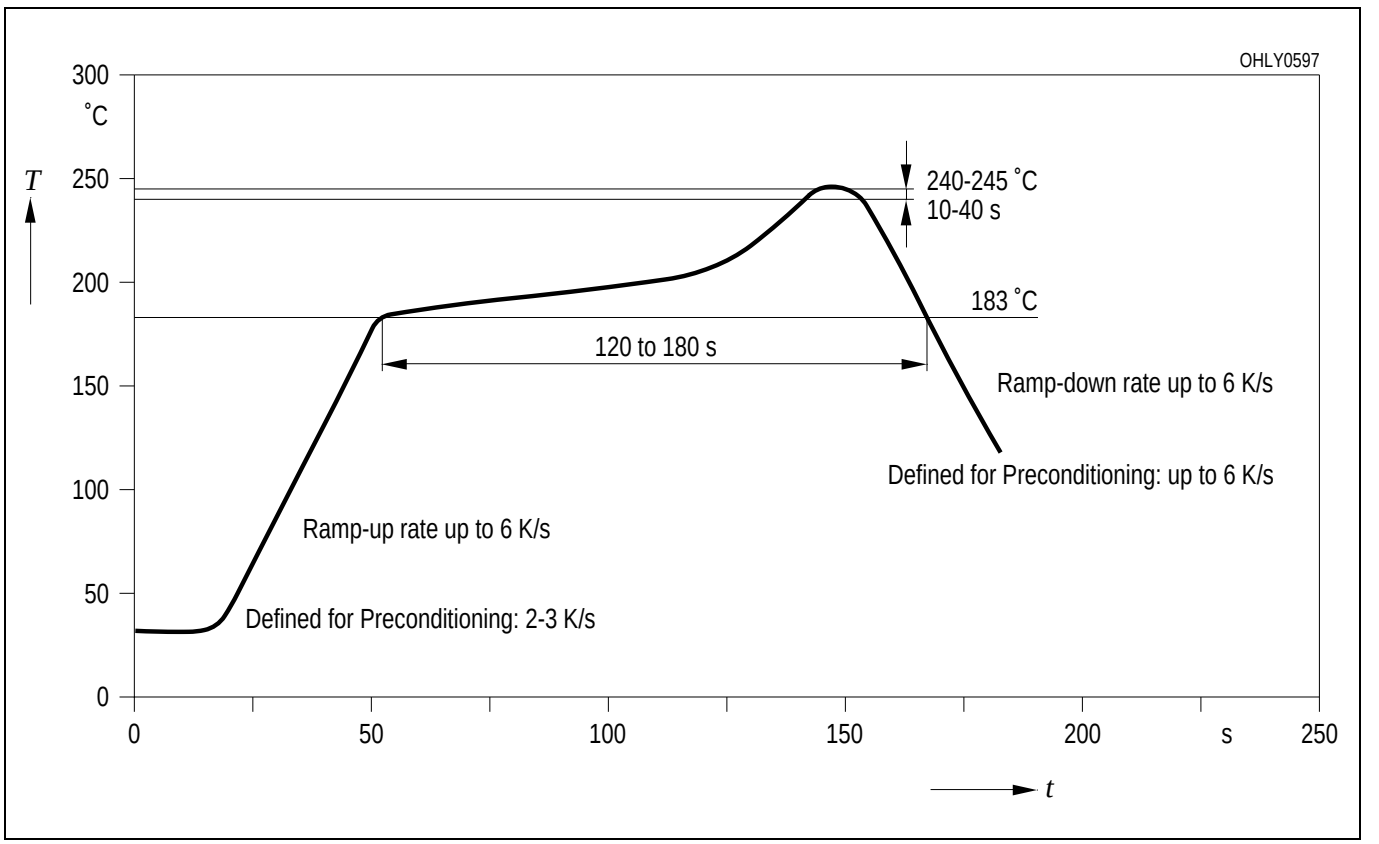


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

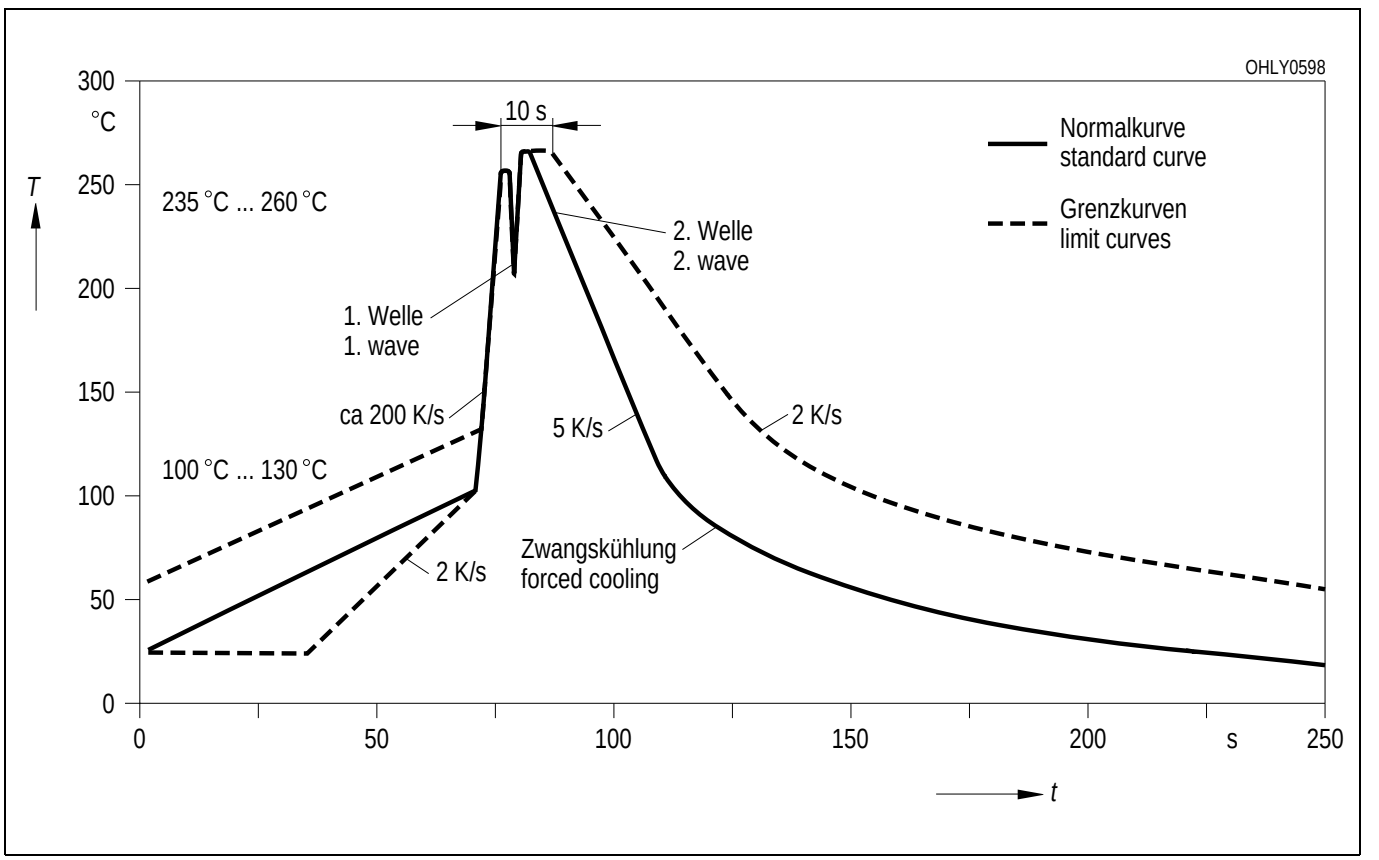
Gewicht / Approx. weight: 1.4 mg

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

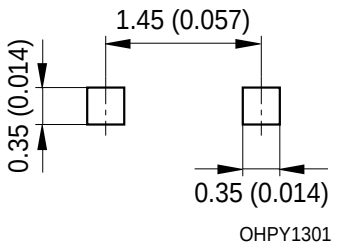
IR-Reflow Lötprofil (nach IPC 9501)
IR Reflow Soldering Profile (acc. to IPC 9501)



Wellenlöten (TTW) (nach CECC 00802)
TTW Soldering (acc. to CECC 00802)

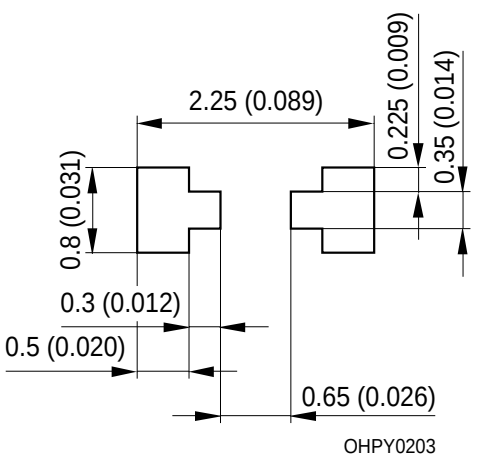


Empfohlenes Lötpaddesign IR Reflow Löten
Recommended Solder Pad IR Reflow Soldering



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).
Gehäuse für Wellenlöten (TTW) geeignet / Package suitable for TTW-soldering

Empfohlenes Lötpaddesign verwendbar für SmartLED™ und Chipled - Bauform 0603
IR Reflow Löten
Recommended Solder Pad useable for SmartLED™ and Chipled - Package 0603
IR Reflow Soldering



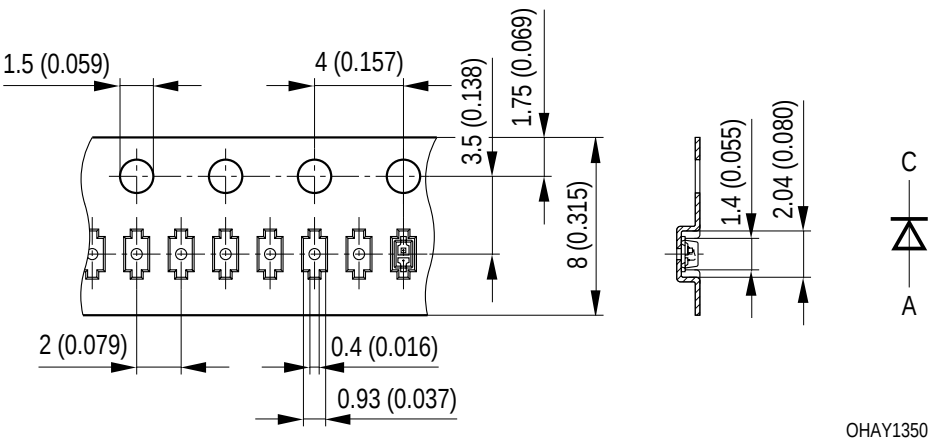
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).
Empfohlene Lötpastendicke: 120 µm/ recommended thickness of solder paste: 120 µm
Gehäuse für Wellenlöten (TTW) geeignet / Package suitable for TTW-soldering

Gurtung / Polarität und Lage

Verpackungseinheit 8 mm Gurt mit 10000/Rolle, ø180 mm oder 40000/Rolle, ø330 mm

Method of Taping / Polarity and Orientation

Packing unit 8 mm tape with 10000/reel, ø180 mm or 40000/reel, ø330 mm



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

Revision History: 2002-06-03	
Previous Version: 2001-03-09	
Page	**Subjects (major changes since last revision)**
7	exchange of diagram permissible foward current
11	recommended solder pad
2	wavelength grouping for yellow and orange

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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.
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