

Hyper Mini TOPLED® Hyper-Bright LED

LB M673, LV M673, LT M673



Vorläufige Daten / Preliminary Data

Besondere Merkmale

- **Gehäusetyp:** weißes SMT Gehäuse
- **Besonderheit des Bauteils:** kleine Bauform für Anwendungen mit wenig Platzbedarf
- **Wellenlänge:** 470 nm (blau), 505 nm (verde), 528 nm (true green)
- **Abstrahlwinkel:** Lambertischer Strahler (120°)
- **Technologie:** InGaN
- **optischer Wirkungsgrad:** 2 lm/W (blau), 6 lm/W (verde), 8 lm/W (true green)
- **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 3000/Rolle, \varnothing 180 mm oder 12000/Rolle, \varnothing 330 mm
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach EOS/ESD-5.1-1993

Anwendungen

- Informationsanzeigen im Außenbereich
- optischer Indikator
- Hinterleuchtung (LCD, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung, u. ä.)
- Markierungsbeleuchtung (z.B. Stufen, Fluchtwege, u.ä.)
- Signal- und Symbolleuchten

Features

- **package:** white SMT package
- **feature of the device:** small package for applications where small space is required
- **wavelength:** 470 nm (blue), 505 nm (verde), 528 nm (true green)
- **viewing angle:** Lambertian Emitter (120°)
- **technology:** InGaN
- **optical efficiency:** 2 lm/W (blue), 6 lm/W (verde), 8 lm/W (true green)
- **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 3000/reel, \varnothing 180 mm or 12000/reel, \varnothing 330 mm
- **ESD-withstand voltage:** up to 2 kV acc. to EOS/ESD-5.1-1993

Applications

- outdoor displays
- optical indicators
- backlighting (LCD, switches, keys, displays, illuminated advertising, general lighting)
- interior automotive lighting (e.g. dashboard backlighting, etc.)
- marker lights (e.g. steps, exit ways, etc.)
- signal and symbol luminaire

| Typ | Emissions- farbe | Farbe der Lichtaustritts- fläche | Lichtstärke | Lichtstrom | Bestellnummer |
|-------------------|----------------------|--|---|--|---------------|
| Type | Color of Emission | Color of the Light Emitting Area | Luminous Intensity $I_F = 20 \text{ mA}$ $I_V \text{ (mcd)}$ | Luminous Flux $I_F = 20 \text{ mA}$ $\Phi_V \text{ (lm)}$ | Ordering Code |
| LB M673-M2N2-35 | blue | colorless clear | 22.4 ... 45.0 | 100 (typ.) | Q65110A0543 |
| LB M673-N2Q1-35 | | | 35.5 ... 90.0 | 180 (typ.) | Q65110A0544 |
| ■ LV M673-P2Q2-35 | verde | colorless clear | 56 ... 112 | 240 (typ.) | Q62703Q4847 |
| ■ LV M673-Q2S1-35 | | | 90 ... 224 | 440 (typ.) | Q62703Q4893 |
| LT M673-Q1R1-35 | true green | colorless clear | 71 ... 140 | 310 (typ.) | Q62703Q4853 |
| LT M673-R1S2-35 | | | 112 ... 280 | 560 (typ.) | Q62703Q4897 |

■ Nicht für Neuentwicklungen / Not for New Designs

Anm.: -35 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: -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 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 | Werte Values | | Einheit Unit |
|--|------------------|-----------------|--------|-----------------|
| | | LB | LV, LT | |
| Betriebstemperatur Operating temperature range | T_{op} | - 40 ... + 100 | | °C |
| Lagertemperatur Storage temperature range | T_{stg} | - 40 ... + 100 | | °C |
| Sperrschichttemperatur Junction temperature | T_j | + 110 | + 125 | °C |
| Durchlassstrom Forward current | I_F | 20 | | mA |
| Stoßstrom Surge current $t \leq 10 \mu s, D = 0.005$ | I_{FM} | 200 | 250 | A |
| Sperrspannung ¹⁾ Reverse voltage | V_R | 5 | | V |
| Leistungsaufnahme Power consumption $T_A \leq 25 \text{ °C}$ | P_{tot} | 80 | | mW |
| Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient | $R_{th JA}$ | 480 | | K/W |
| Sperrschicht/Löt­pad Junction/solder point Montage auf PC-Board FR 4 (Padgröße $\geq 5 \text{ mm}^2$) mounted on PC board FR 4 (pad size $\geq 5 \text{ mm}^2$) | $R_{th JS}$ | 230 | | K/W |

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

Kennwerte ($T_A = 25\text{ °C}$)

Characteristics

| Bezeichnung Parameter | Symbol Symbol | Werte Values | | | Einheit Unit |
|--|--|-------------------|-------------------|-------------------|--------------------------------|
| | | LB | LV | LT | |
| Wellenlänge des emittierten Lichtes Wavelength at peak emission $I_F = 20\text{ mA}$ | (typ.) λ_{peak} | 465 | 503 | 523 | nm |
| Dominantwellenlänge ¹⁾ Dominant wavelength $I_F = 20\text{ mA}$ | (typ.) λ_{dom} | 470 ± 6 | 505 ± 7 | 528 ± 9 | nm |
| Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 20\text{ mA}$ | (typ.) $\Delta\lambda$ | 25 | 30 | 33 | nm |
| Abstrahlwinkel bei 50 % I_V (Vollwinkel) Viewing angle at 50 % I_V | (typ.) 2ϕ | 120 | 120 | 120 | Grad deg. |
| Durchlassspannung ²⁾ Forward voltage $I_F = 20\text{ mA}$ | (min.) V_F (typ.) V_F (max.) V_F | 2.9 3.5 3.9 | 2.9 3.3 3.9 | 2.9 3.3 3.9 | V V V |
| Sperrstrom Reverse current $V_R = 5\text{ V}$ | (typ.) I_R (max.) I_R | 0.01 10 | 0.01 10 | 0.01 10 | μA μA |
| Temperaturkoeffizient von λ_{peak} Temperature coefficient of λ_{peak} $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$ | (typ.) $TC_{\lambda_{\text{peak}}}$ | 0.04 | 0.03 | 0.04 | nm/K |
| Temperaturkoeffizient von λ_{dom} Temperature coefficient of λ_{dom} $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$ | (typ.) $TC_{\lambda_{\text{dom}}}$ | 0.03 | 0.04 | 0.04 | nm/K |
| Temperaturkoeffizient von V_F Temperature coefficient of V_F $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$ | (typ.) TC_V | - 4.5 | - 3.6 | - 3.6 | mV/K |
| Optischer Wirkungsgrad Optical efficiency $I_F = 20\text{ mA}$ | (typ.) η_{opt} | 2 | 6 | 8 | lm/W |

¹⁾ Wellenlängengruppen werden mit einer Stromeinprägedauer 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⁾ Durchlassspannungsguppen werden mit einer Stromeinprägedauer von 1 ms und einer Genauigkeit von $\pm 0,05\text{ V}$ ermittelt.
Forward voltage groups are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.05\text{ V}$.

1) Wellenlängengruppen / Wavelength groups

| Gruppe Group | blue | | verde | | true green | | Einheit Unit |
|-----------------|------|------|-------|------|------------|------|-----------------|
| | min. | max. | min. | max. | min. | max. | |
| 3 | 464 | 468 | 498 | 503 | 519 | 525 | nm |
| 4 | 468 | 472 | 503 | 507 | 525 | 531 | nm |
| 5 | 472 | 476 | 507 | 512 | 531 | 537 | nm |

Helligkeits-Gruppierungsschema
Luminous Intensity Groups

| Lichtgruppe Luminous Intensity Group | Lichtstärke Luminous Intensity I_V (mcd) | Lichtstrom Luminous Flux Φ_V (lm) |
|---|--|--|
| M2 | 22.4 ... 28.0 | 75 (typ.) |
| N1 | 28.0 ... 35.5 | 95 (typ.) |
| N2 | 35.5 ... 45.0 | 120 (typ.) |
| P1 | 45.0 ... 56.0 | 150 (typ.) |
| P2 | 56.0 ... 71.0 | 190 (typ.) |
| Q1 | 71.0 ... 90.0 | 240 (typ.) |
| Q2 | 90.0 ... 112.0 | 300 (typ.) |
| R1 | 112.0 ... 140.0 | 380 (typ.) |
| R2 | 140.0 ... 180.0 | 480 (typ.) |
| S1 | 180.0 ... 224.0 | 600 (typ.) |
| S2 | 224.0 ... 280.0 | 760 (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: S2-3

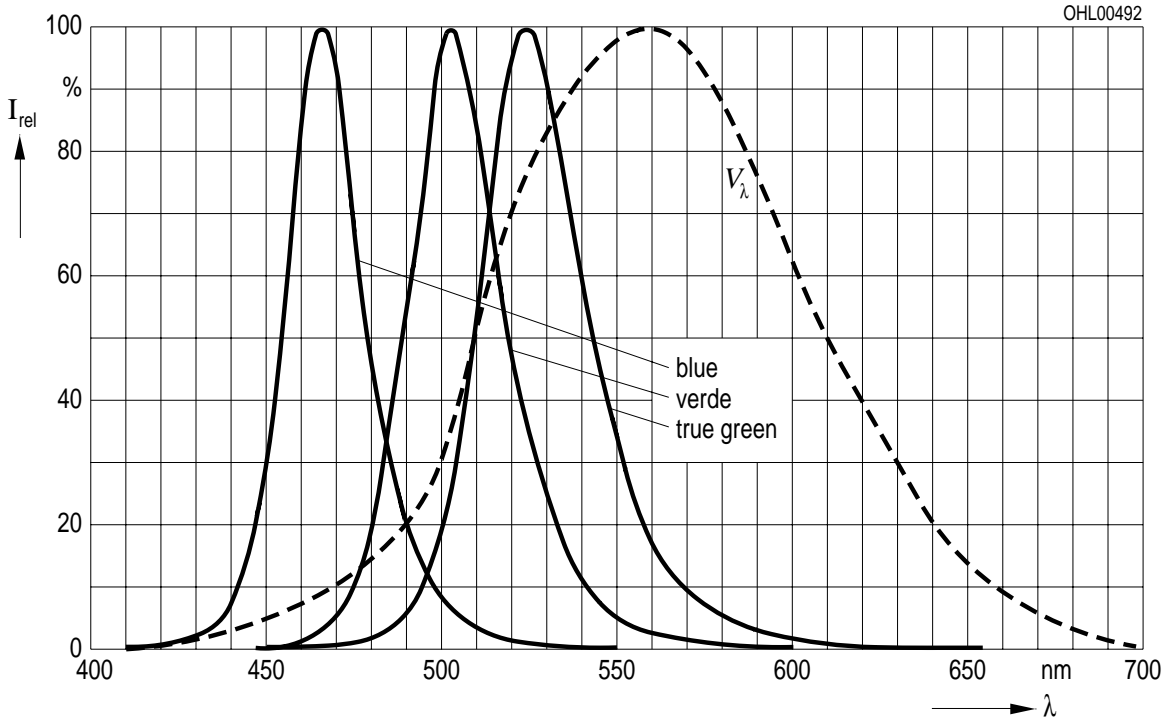
Example: S2-3

| Lichtgruppe Luminous Intensity Group | Halbgruppe Half Group | Wellenlänge Wavelength |
|---|--------------------------|---------------------------|
| S | 2 | 3 |

Relative spektrale Emission $I_{rel} = f(\lambda)$, $T_A = 25\text{ °C}$, $I_F = 20\text{ mA}$

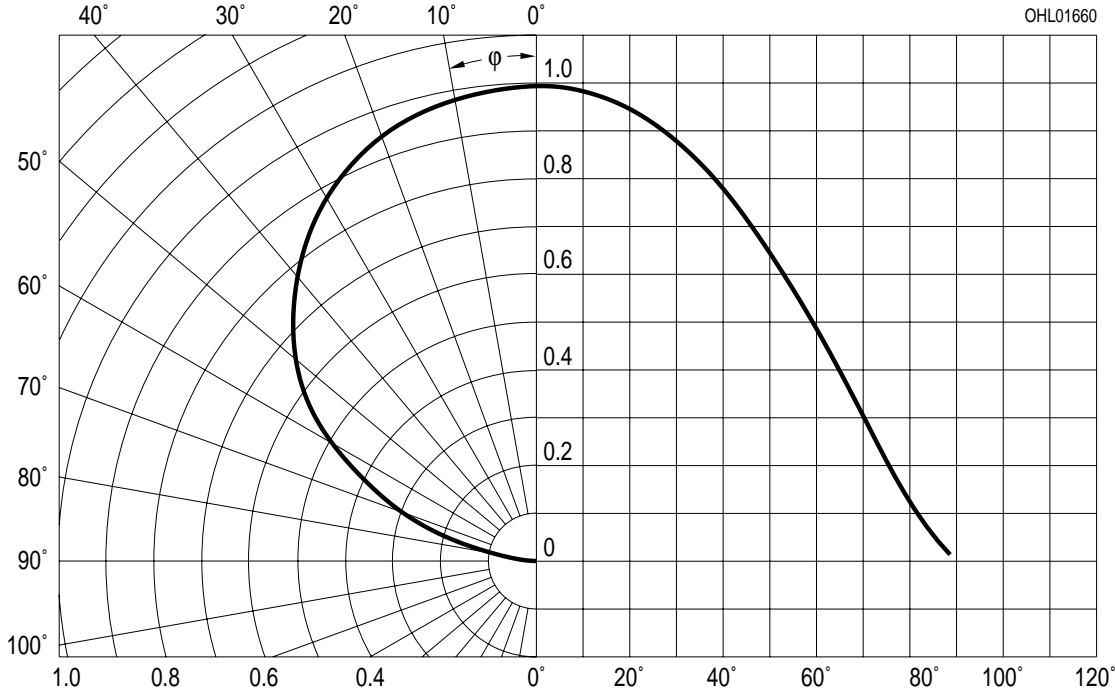
Relative Spectral Emission

$V(\lambda)$ = spektrale Augenempfindlichkeit
Standard eye response curve



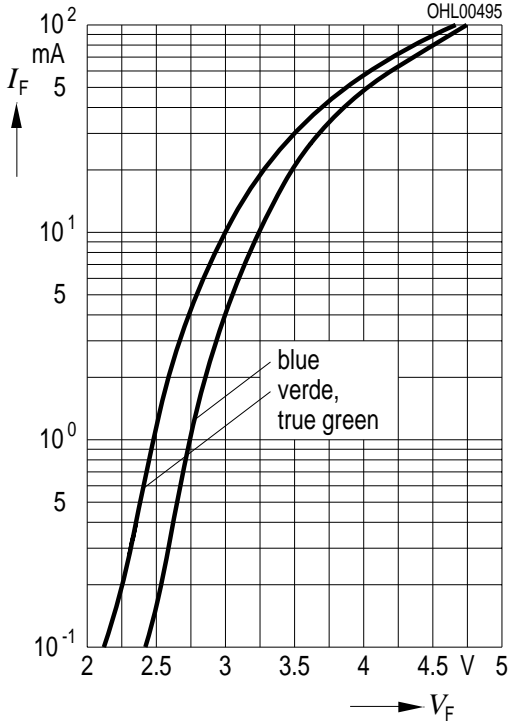
Abstrahlcharakteristik $I_{rel} = f(\varphi)$

Radiation Characteristic



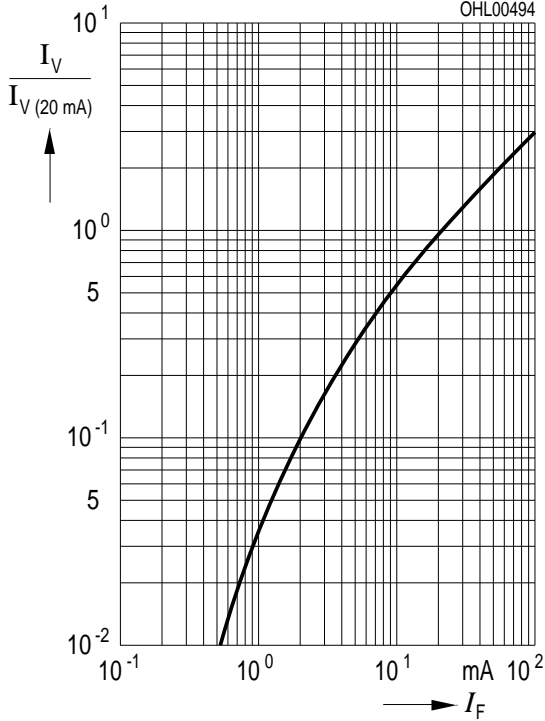
Durchlassstrom $I_F = f(V_F)$
Forward Current

$T_A = 25\text{ }^\circ\text{C}$

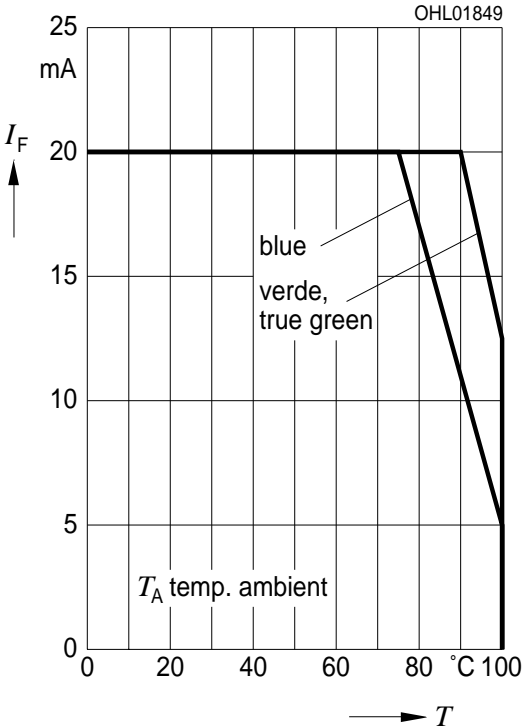


Relative Lichtstärke $I_V/I_{V(20\text{ mA})} = f(I_F)$
Relative Luminous Intensity

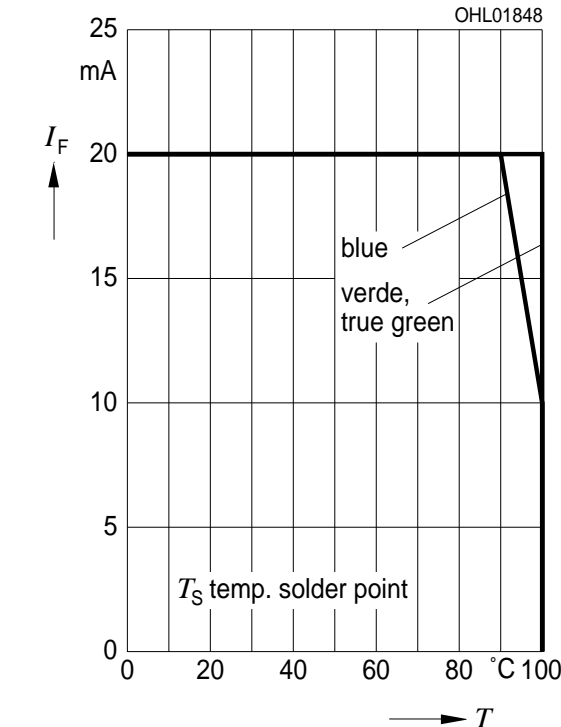
$T_A = 25\text{ }^\circ\text{C}$



Maximal zulässiger Durchlassstrom $I_F = f(T)$
Max. Permissible Forward Current

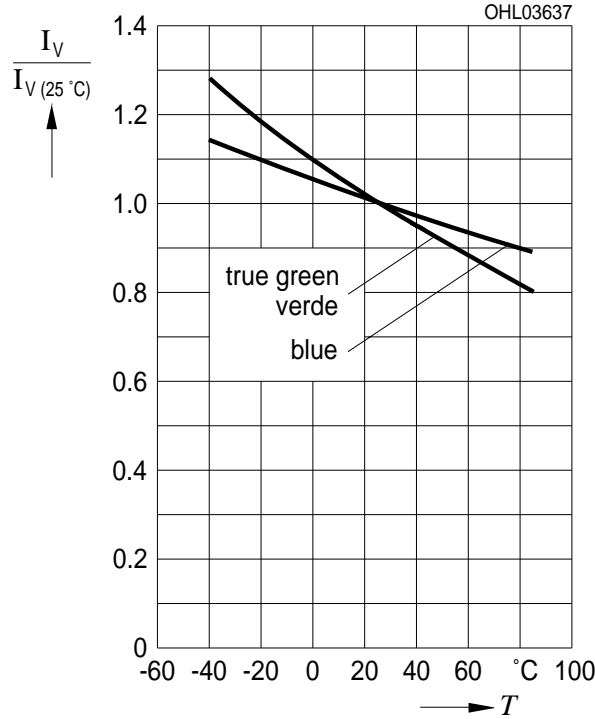


Maximal zulässiger Durchlassstrom $I_F = f(T)$
Max. Permissible Forward Current



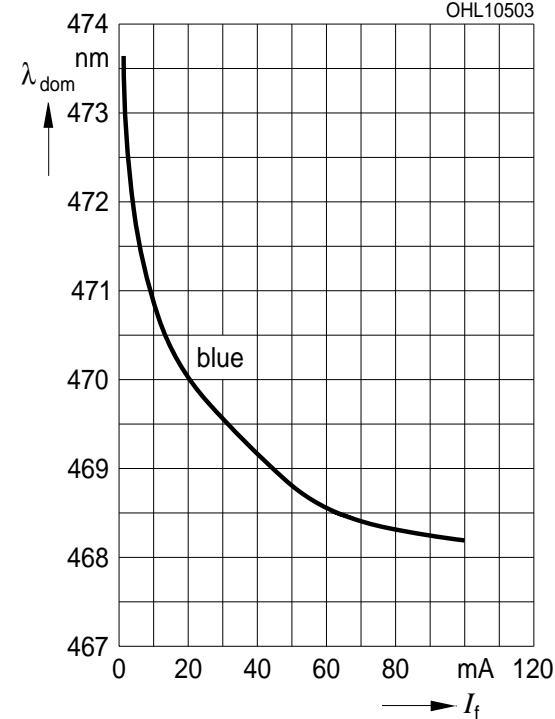
Relative Lichtstärke $I_V/I_{V(25\text{ °C})} = f(T_A)$
 Relative Luminous Intensity

$I_F = 20\text{ mA}$



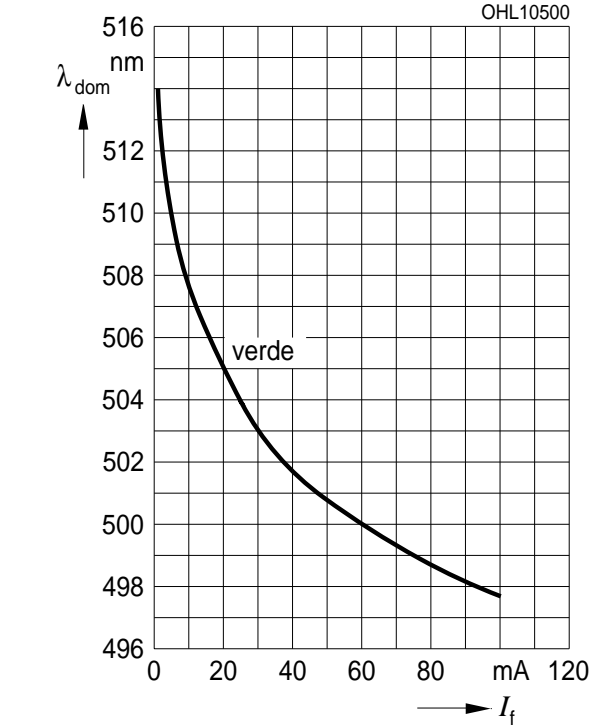
Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$
 Dominant Wavelength

LB, $T_A = 25\text{ °C}$



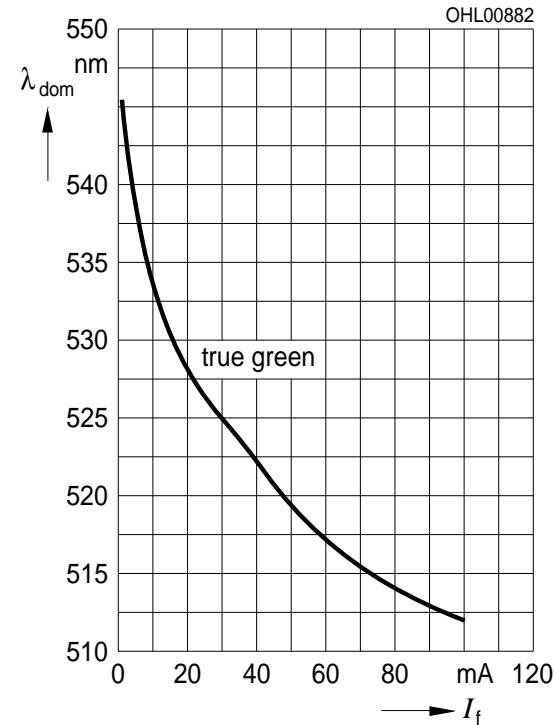
Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$
 Dominant Wavelength

LV, $T_A = 25\text{ °C}$

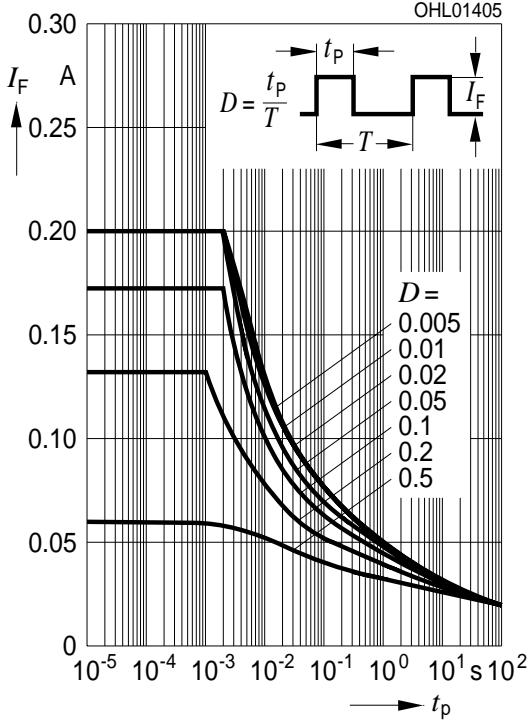


Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$
 Dominant Wavelength

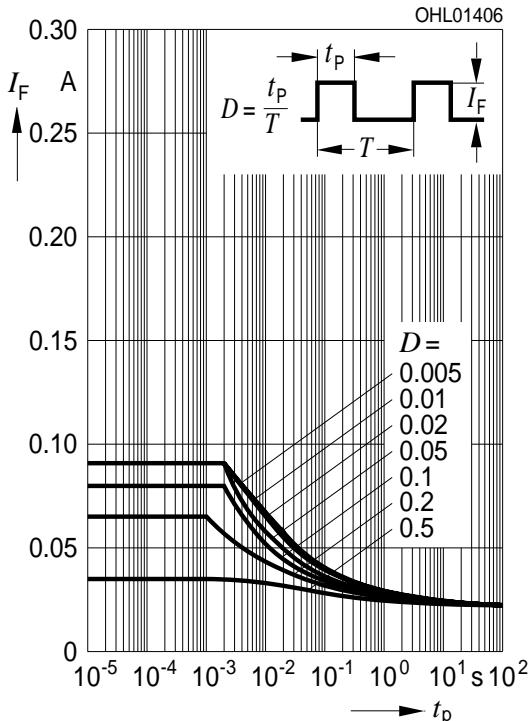
LT, $T_A = 25\text{ °C}$



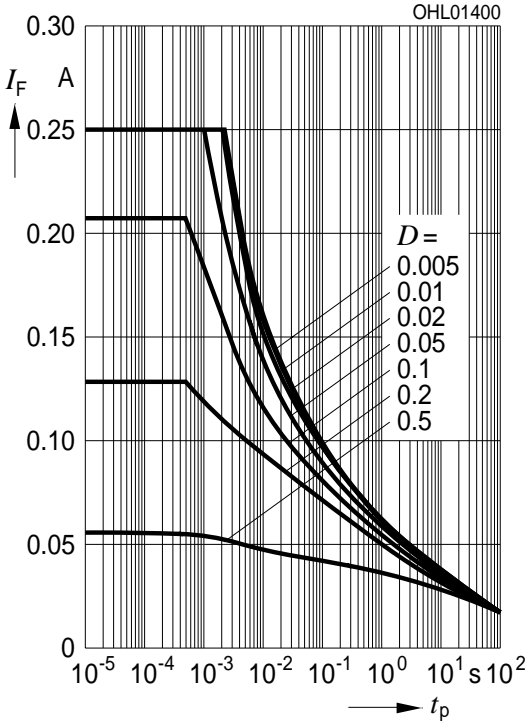
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
Duty cycle $D =$ parameter, $T_A = 25\text{ °C}$
LB



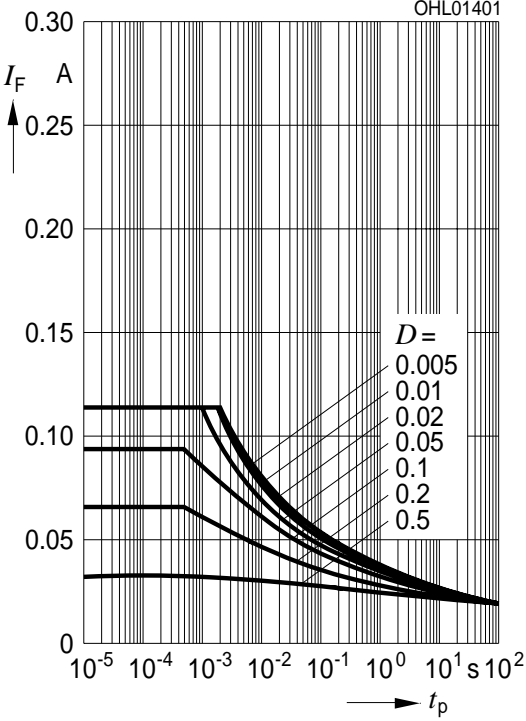
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
Duty cycle $D =$ parameter, $T_A = 85\text{ °C}$
LB



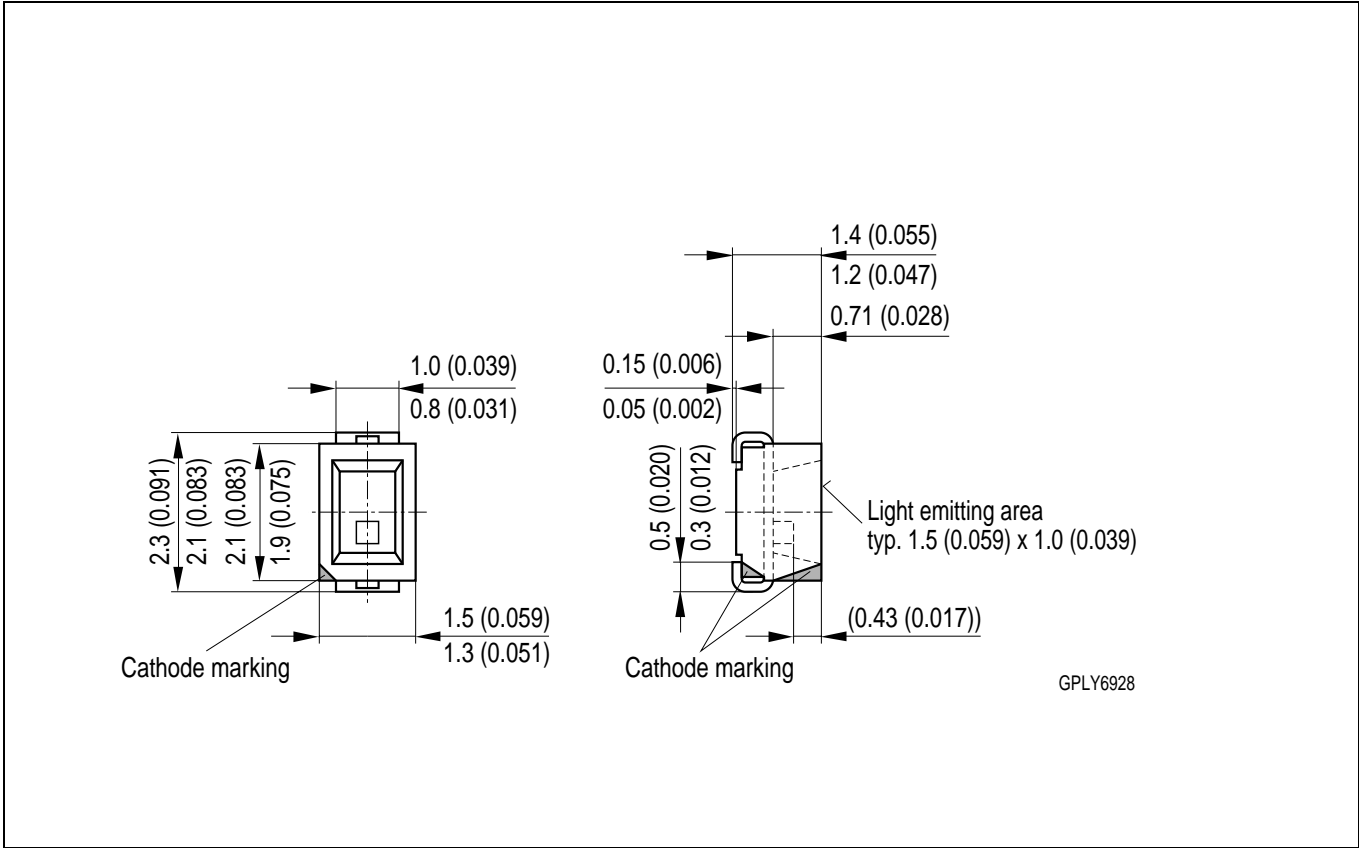
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
Duty cycle $D =$ parameter, $T_A = 25\text{ °C}$
LV, LT



Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
Duty cycle $D =$ parameter, $T_A = 85\text{ °C}$
LV, LT



Maßzeichnung
Package Outlines

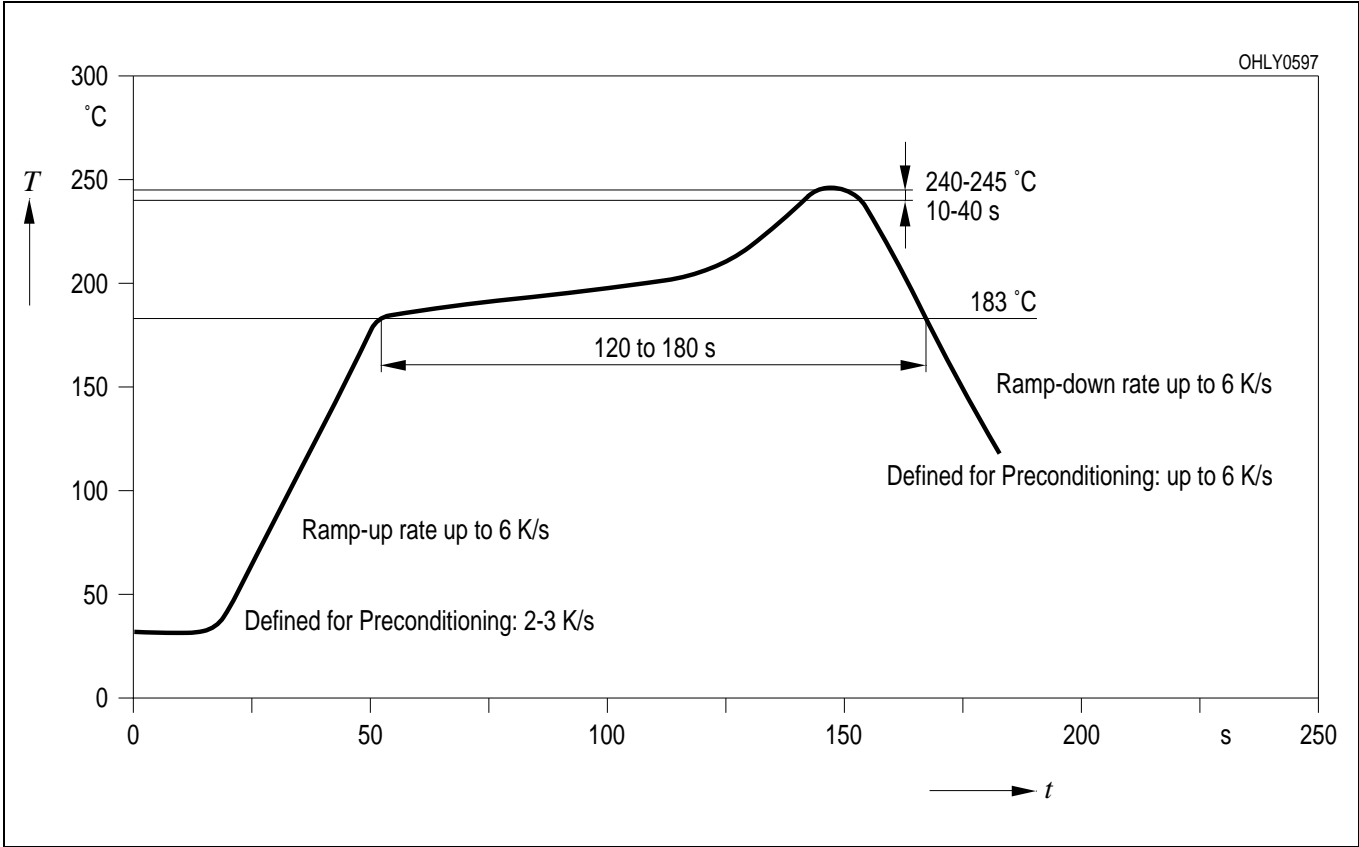


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

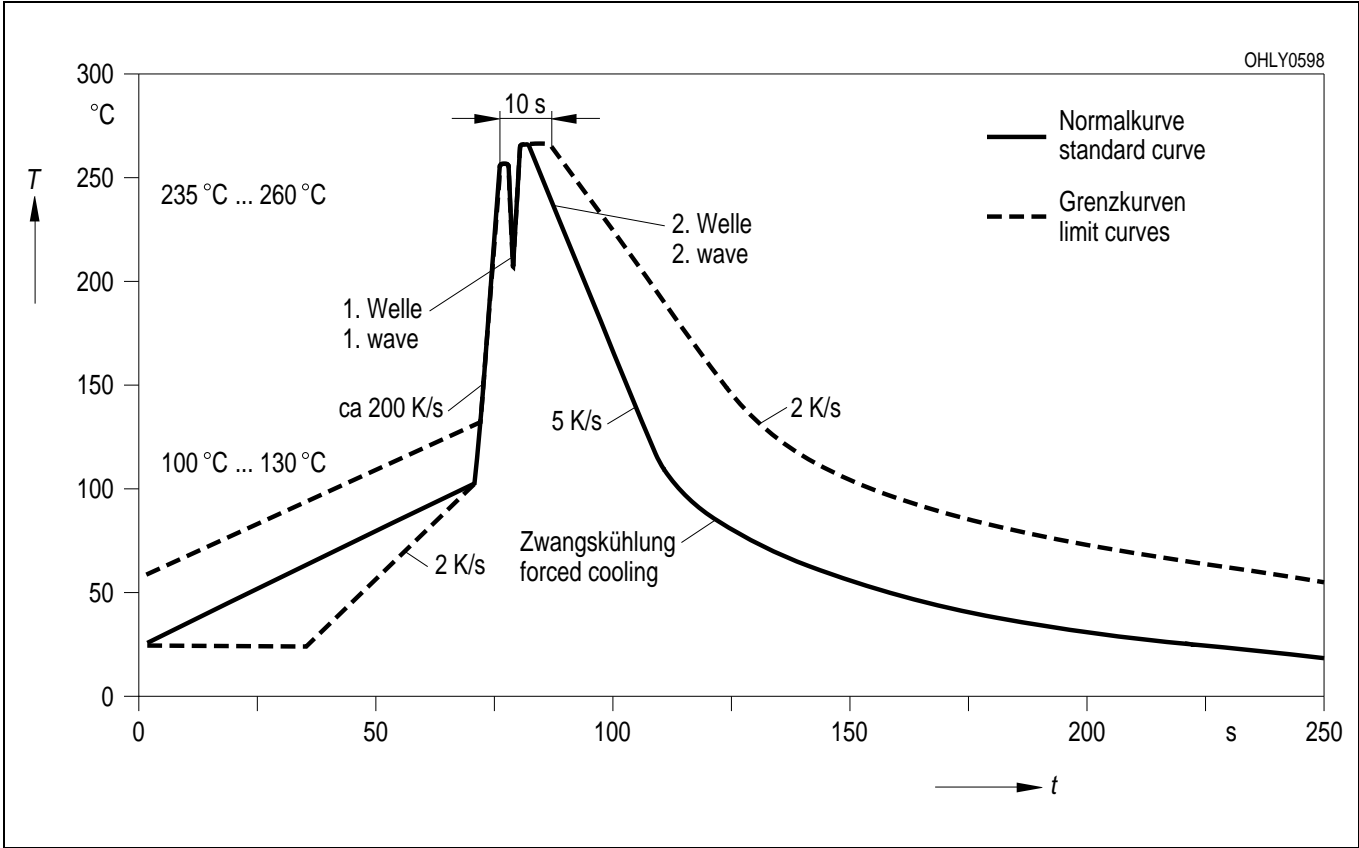
- Kathodenkennung:** abgeschrägte Ecke
- Cathode mark:** bevelled edge
- Gewicht / Approx. weight:** 10 mg

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

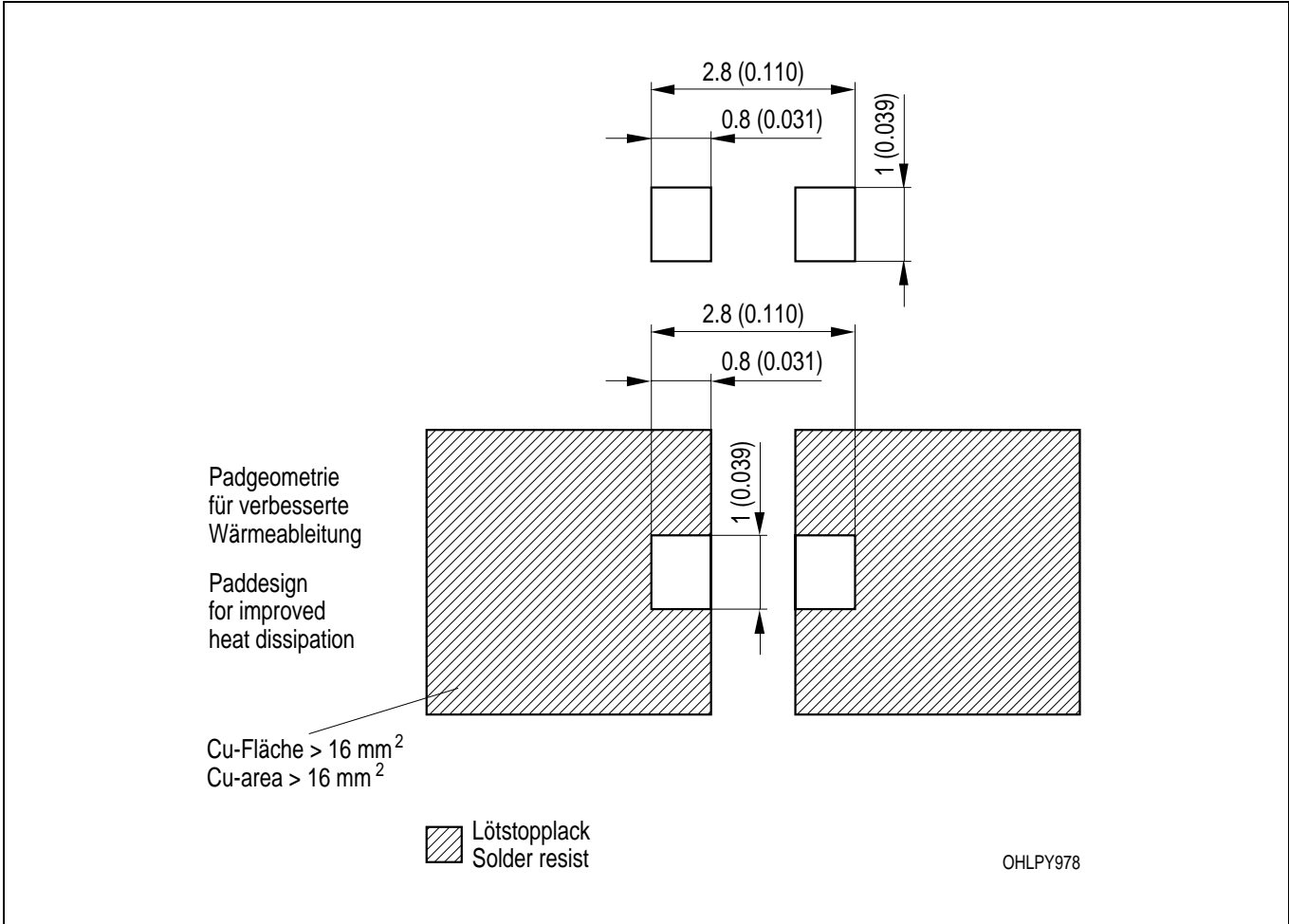
IR-Reflow Lötprofil (nach IPC 9501)
IR Reflow Soldering Profile (acc. to IPC 9501)



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



Empfohlenes Lötpad Design IR Reflow Löten
Recommended Solder Pad IR Reflow Soldering



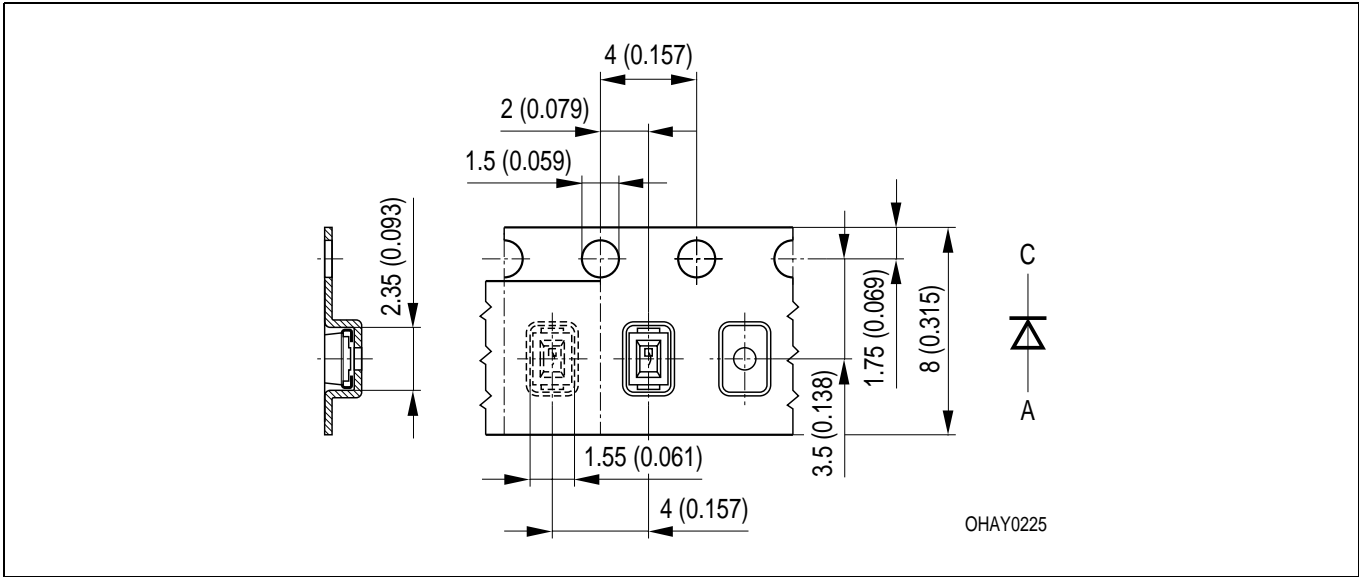
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).
Gehäuse hält TTW-Löthitze aus / Package able to withstand TTW-soldering heat

Gurtung / Polarität und Lage

Verpackungseinheit 3000/Rolle, ø180 mm
oder 12000/Rolle, ø330 mm

Method of Taping / Polarity and Orientation

Packing unit 3000/reel, ø180 mm
or 12000/reel, ø330 mm



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

| Revision History: 2003-06-16 | | Date of change |
|------------------------------|--|----------------|
| Previous Version: 2003-04-14 | | |
| Page | Subjects (major changes since last revision) | |
| 4 | value (forward voltage) | |
| 3 | power consumption from 85 mW to 80 mW | |
| 5 | wavelength groups | |
| 8 | diagram max. permissible forward current to OHL01573 and OHL 11574 | |
| 2 | wavelength grouping for blue, true green and verde | |
| 3 | pad size from 16 mm ² to 5 mm ² | |
| 16 | annotations | 2002-07-23 |
| 3 | reverse voltage (footnote) | 2002-08-21 |
| 2 | new luminous intensity groups for LB M673 | 2003-03-11 |
| 4 | values (temperature coefficient of λ_{dom} and V_F) | 2003-04-14 |
| 7 | diagrams max. perm. forward current | 2003-06-16 |

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Attention please!

The information describes the type of component and shall not be considered as assured characteristics.

All typical data and graphs are basing on representative samples, but don't represent the production range. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances. For information on the types in question please contact our Sales Organization.

If printed or downloaded, please find the latest version in the Internet.

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.