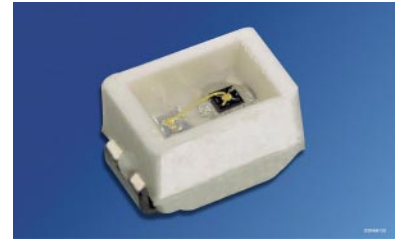


# Hyper Mini TOPLED® Hyper-Bright LED

LS M676, LA M676, LO M676, LY M676



## Besondere Merkmale

- **Gehäusetyp:** weißes SMT-Gehäuse
- **Besonderheit des Bauteils:** kleine Bauform 2,3 mm x 1,3 mm x 1,4 mm
- **Wellenlänge:** 632 nm (super-rot), 615 nm (amber), 605 nm (orange), 587 nm (gelb)
- **Abstrahlwinkel:** Lambertscher Strahler (120°)
- **Technologie:** InGaAlP
- **optischer Wirkungsgrad:** 11 lm/W (gelb, orange, amber), 7 lm/W (super-rot)
- **Gruppierungsparameter:** Lichtstärke
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** IR Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 8 mm Gurt mit 3000/Rolle, ø180 mm oder 12000/Rolle, ø330 mm

## Anwendungen

- Informationsanzeigen im Innenbereich
- optischer Indikator
- Einkopplung in Lichtleiter
- Hinterleuchtung (LCD, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung, u.ä.)

## Features

- **package:** white SMT package
- **feature of the device:** small package 2.3 mm x 1.3 mm x 1.4 mm
- **wavelength:** 632 nm (super-red), 615 nm (amber), 605 nm (orange), 587 nm (yellow)
- **viewing angle:** Lambertian Emitter (120°)
- **technology:** InGaAlP
- **optical efficiency:** 11 lm/W (yellow, orange, amber), 7 lm/W (super-red)
- **grouping parameter:** luminous intensity
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** IR reflow soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 8 mm tape with 3000/reel, ø180 mm or 12000/reel, ø330 mm

## Applications

- indoor displays
- optical indicators
- coupling into light guides
- backlighting (LCD, switches, keys, displays, illuminated advertising, general lighting)
- interior automotive lighting. (e.g. dashboard backlighting, etc.)

## LS M676, LA M676, LO M676, LY M676

| Typ                                                                                                                  | Emissions-<br>farbe  | Farbe der<br>Lichtaustritts-<br>fläche | Lichtstärke                                                                                                                                      | Lichtstrom                                                                                                   | Bestellnummer                |
|----------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------|
| Type                                                                                                                 | Color of<br>Emission | Color of the<br>Light Emitting<br>Area | Luminous<br>Intensity<br>$I_F = 20 \text{ mA}$<br>$I_V \text{ (mcd)}$                                                                            | Luminous<br>Flux<br>$I_F = 20 \text{ mA}$<br>$\Phi_V \text{ (lm)}$                                           | Ordering Code                |
| LS M676-N2P2-1<br>LS M676-P2R1-1<br>LS M676-N2<br>LS M676-P1<br>LS M676-P2<br>LS M676-Q1<br>LS M676-Q2<br>LS M676-R1 | super-red            | colorless clear                        | 35.5 ... 71.0<br>56.0 ... 140.0<br>35.5 ... 45.0<br>45.0 ... 56.0<br>56.0 ... 71.0<br>71.0 ... 90.0<br>90.0 ... 112.0<br>112.0 ... 140.0         | 150 (typ.)<br>280 (typ.)<br>120 (typ.)<br>150 (typ.)<br>190 (typ.)<br>240 (typ.)<br>300 (typ.)<br>380 (typ.) | Q62703-Q5085<br>Q62703-Q5086 |
| LA M676-P2Q2-1<br>LA M676-Q2S1-1<br>LA M676-P2<br>LA M676-Q1<br>LA M676-Q2<br>LA M676-R1<br>LA M676-R2<br>LA M676-S1 | amber                | colorless clear                        | 56.0 ... 112.0<br>90.0 ... 224.0<br>56.0 ... 71.0<br>71.0 ... 90.0<br>90.0 ... 112.0<br>112.0 ... 140.0<br>140.0 ... 180.0<br>180.0 ... 224.0    | 240 (typ.)<br>440 (typ.)<br>190 (typ.)<br>240 (typ.)<br>300 (typ.)<br>380 (typ.)<br>480 (typ.)<br>600 (typ.) | Q62703-Q4978<br>Q62703-Q4979 |
| LO M676-Q1R1-1<br>LO M676-R1S2-1<br>LO M676-Q1<br>LO M676-Q2<br>LO M676-R1<br>LO M676-R2<br>LO M676-S1<br>LO M676-S2 | orange               | colorless clear                        | 71.0 ... 140.0<br>112.0 ... 280.0<br>71.0 ... 90.0<br>90.0 ... 112.0<br>112.0 ... 140.0<br>140.0 ... 180.0<br>180.0 ... 224.0<br>224.0 ... 280.0 | 310 (typ.)<br>560 (typ.)<br>240 (typ.)<br>300 (typ.)<br>380 (typ.)<br>480 (typ.)<br>600 (typ.)<br>760 (typ.) | Q62703-Q5040<br>Q62703-Q5041 |
| LY M676-P2Q2-1<br>LY M676-Q2S1-1<br>LY M676-P2<br>LY M676-Q1<br>LY M676-Q2<br>LY M676-R1<br>LY M676-R2<br>LY M676-S1 | yellow               | colorless clear                        | 56.0 ... 112.0<br>90.0 ... 224.0<br>56.0 ... 71.0<br>71.0 ... 90.0<br>90.0 ... 112.0<br>112.0 ... 140.0<br>140.0 ... 180.0<br>180.0 ... 224.0    | 240 (typ.)<br>440 (typ.)<br>190 (typ.)<br>240 (typ.)<br>300 (typ.)<br>380 (typ.)<br>480 (typ.)<br>600 (typ.) | Q62703-Q5123<br>Q62703-Q5124 |

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 an accuracy of  $\pm 11 \%$ .

**Grenzwerte**  
**Maximum Ratings**

| Bezeichnung<br>Parameter                                                                                                                                                    | Symbol<br>Symbol | Werte<br>Values |     | Einheit<br>Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|-----|-----------------|
|                                                                                                                                                                             |                  | LS, LO, LA      | LY  |                 |
| Betriebstemperatur<br>Operating temperature range                                                                                                                           | $T_{op}$         | – 40 ... + 100  |     | °C              |
| Lagertemperatur<br>Storage temperature range                                                                                                                                | $T_{stg}$        | – 40 ... + 100  |     | °C              |
| Sperrschichttemperatur<br>Junction temperature                                                                                                                              | $T_j$            | + 125           |     | °C              |
| Durchlassstrom<br>Forward current                                                                                                                                           | $I_F$            | 30              |     | mA              |
| Stoßstrom<br>Surge current<br>$t \leq 10 \mu s, D = 0.005$                                                                                                                  | $I_{FM}$         | 0.8             | 0.2 | A               |
| Sperrspannung<br>Reverse voltage                                                                                                                                            | $V_R$            | 3               |     | V               |
| Leistungsaufnahme<br>Power dissipation                                                                                                                                      | $P_{tot}$        | 80              |     | mW              |
| Wärmewiderstand<br>Thermal resistance<br>Sperrschicht/Umgebung<br>Junction/ambient                                                                                          | $R_{th JA}$      | 580             |     | K/W             |
| Sperrschicht/Lötpad<br>Junction/solder point<br>Montage auf PC-Board FR 4 (Padgröße $\geq 16 \text{ mm}^2$ )<br>mounted on PC board FR 4 (pad size $\geq 16 \text{ mm}^2$ ) | $R_{th JS}$      | 330             |     | K/W             |

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

**Characteristics**

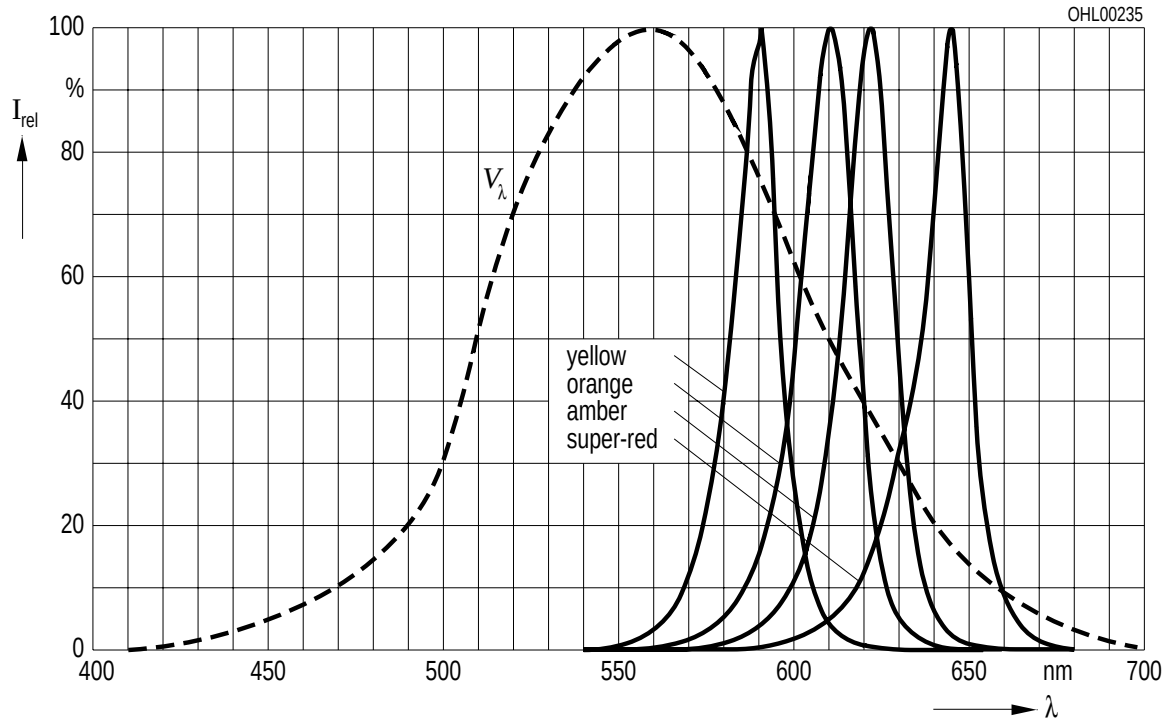
| Bezeichnung<br>Parameter                                                                                                               | Symbol<br>Symbol             | Werte<br>Values |            |            |            | Einheit<br>Unit                |
|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------|------------|------------|------------|--------------------------------|
|                                                                                                                                        |                              | LS              | LA         | LO         | LY         |                                |
| Wellenlänge des emittierten Lichtes (typ.)<br>Wavelength at peak emission<br>$I_F = 20\text{ mA}$                                      | $\lambda_{\text{peak}}$      | 645             | 622        | 610        | 591        | nm                             |
| Dominantwellenlänge (typ.)<br>Dominant wavelength<br>$I_F = 20\text{ mA}$                                                              | $\lambda_{\text{dom}}$       | 632             | 615        | 605        | 587        | nm                             |
| Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.)<br>Spectral bandwidth at 50 % $I_{\text{rel max}}$<br>$I_F = 20\text{ mA}$   | $\Delta\lambda$              | 16              | 16         | 16         | 15         | nm                             |
| Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.)<br>Viewing angle at 50 % $I_V$                                                       | $2\phi$                      | 120             | 120        | 120        | 120        | Grad<br>deg.                   |
| Durchlassspannung (typ.)<br>Forward voltage<br>$I_F = 20\text{ mA}$                                                                    | $V_F$<br>(max.) $V_F$        | 2.0<br>2.5      | 2.0<br>2.5 | 2.0<br>2.5 | 2.0<br>2.5 | V<br>V                         |
| Sperrstrom (typ.)<br>Reverse current<br>$V_R = 3\text{ V}$                                                                             | $I_R$<br>(max.) $I_R$        | 0.01<br>10      | 0.01<br>10 | 0.01<br>10 | 0.01<br>10 | $\mu\text{A}$<br>$\mu\text{A}$ |
| Temperaturkoeffizient von $\lambda_{\text{peak}}$ (typ.)<br>Temperature coefficient of $\lambda_{\text{peak}}$<br>$I_F = 20\text{ mA}$ | $TC_{\lambda_{\text{peak}}}$ | 0.14            | 0.13       | 0.13       | 0.13       | nm/K                           |
| Temperaturkoeffizient von $\lambda_{\text{dom}}$ (typ.)<br>Temperature coefficient of $\lambda_{\text{dom}}$<br>$I_F = 20\text{ mA}$   | $TC_{\lambda_{\text{dom}}}$  | 0.01            | 0.06       | 0.07       | 0.10       | nm/K                           |
| Temperaturkoeffizient von $V_F$ (typ.)<br>Temperature coefficient of $V_F$<br>$I_F = 20\text{ mA}$                                     | $TC_V$                       | -2.0            | -1.8       | -1.7       | -2.5       | mV/K                           |
| Optischer Wirkungsgrad (typ.)<br>Optical efficiency<br>$I_F = 20\text{ mA}$                                                            | $\eta_{\text{opt}}$          | 7               | 11         | 11         | 11         | lm/W                           |

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

### Relative Spectral Emission

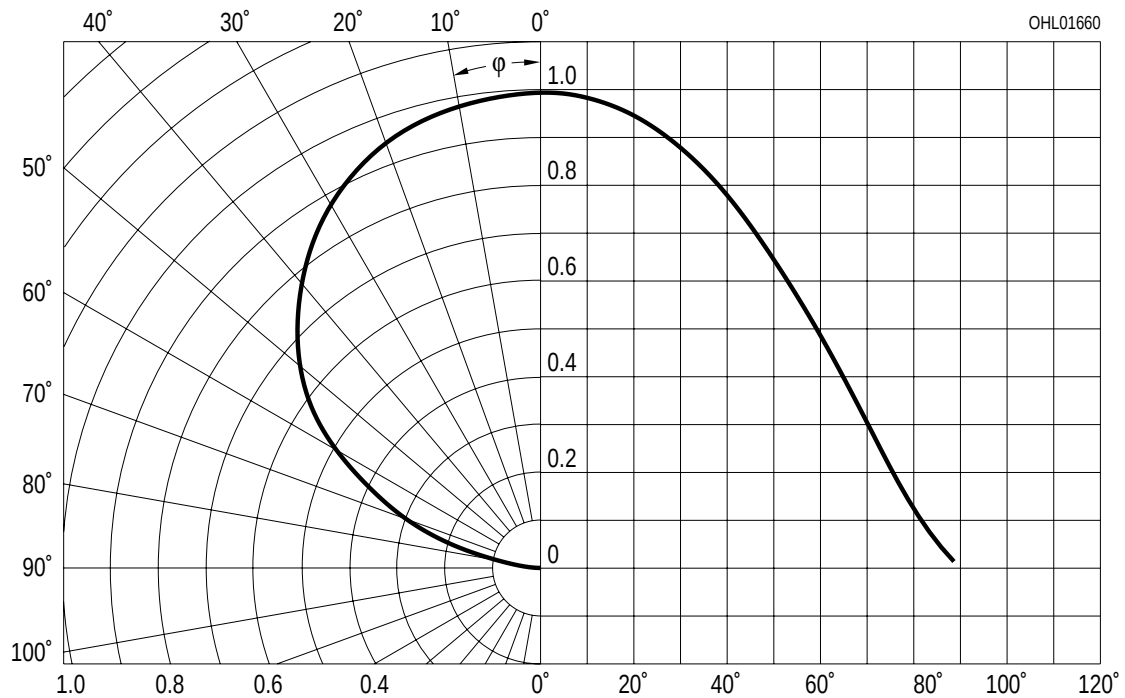
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



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

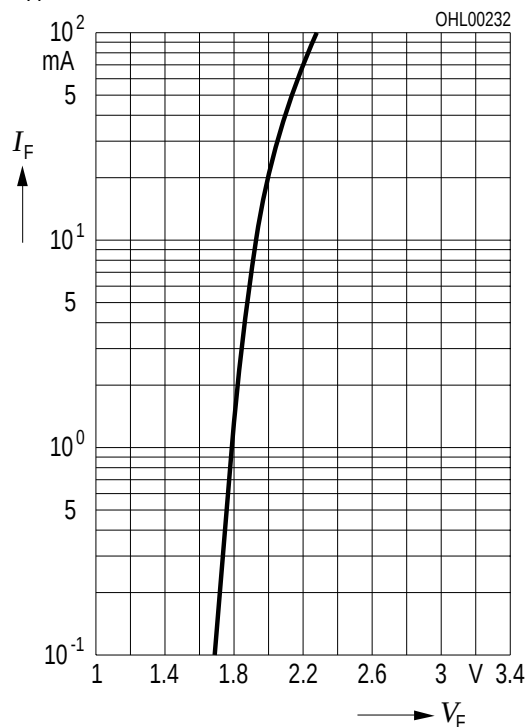
### Radiation Characteristic



**Durchlassstrom  $I_F = f(V_F)$**

**Forward Current**

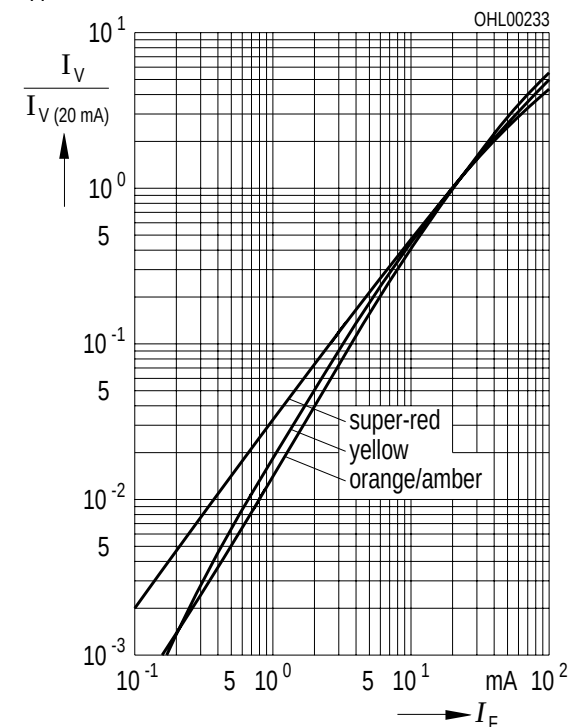
$T_A = 25^\circ\text{C}$



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

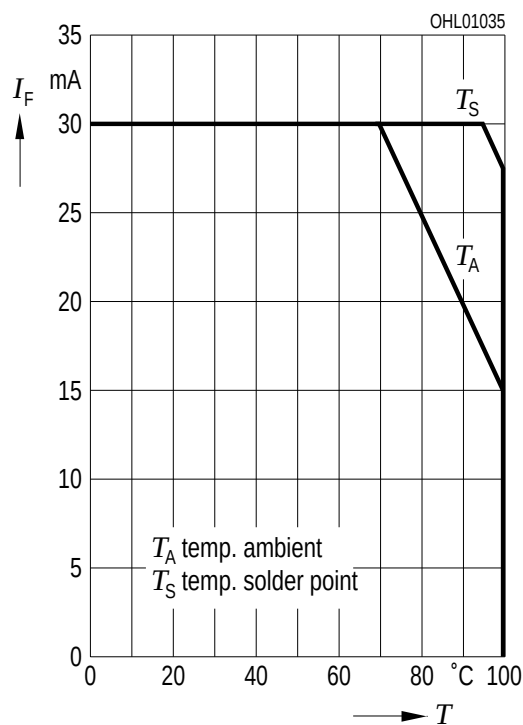
**Relative Luminous Intensity**

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



**Maximal zulässiger Durchlassstrom  $I_F = f(T)$**

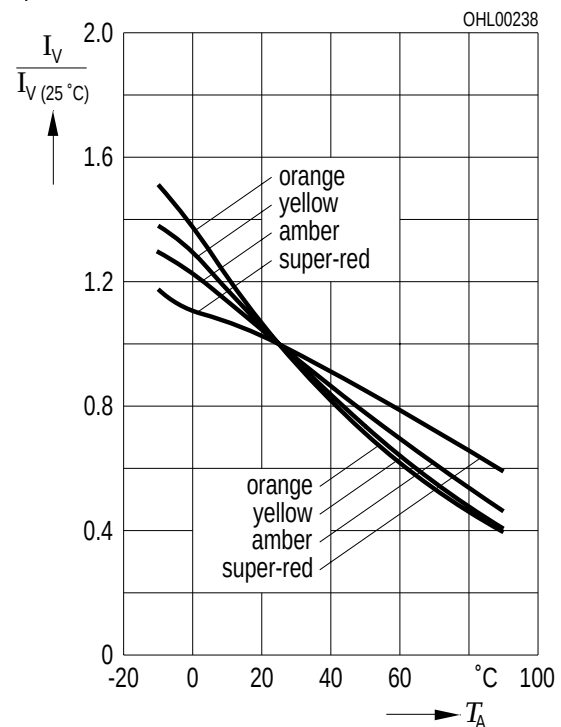
**Max. Permissible Forward Current**



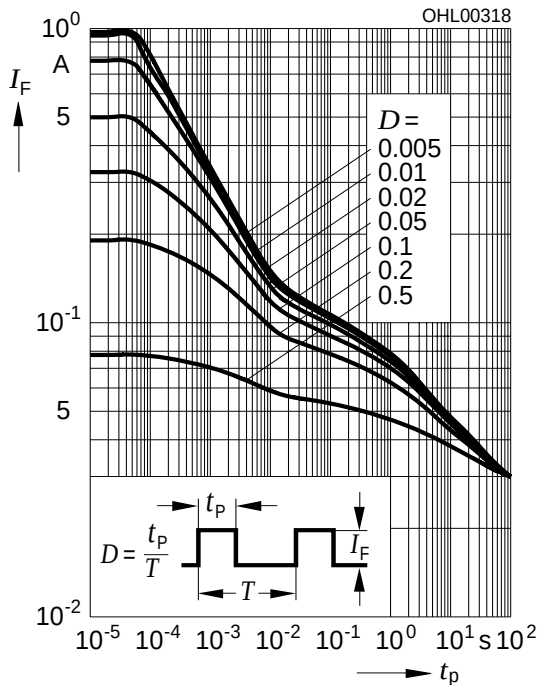
**Relative Lichtstärke  $I_V/I_{V(25^\circ\text{C})} = f(T_A)$**

**Relative Luminous Intensity**

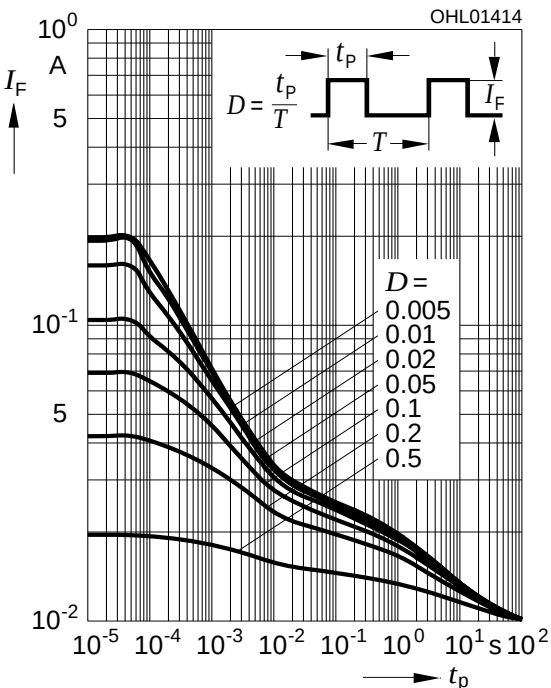
$I_F = 20\text{ mA}$



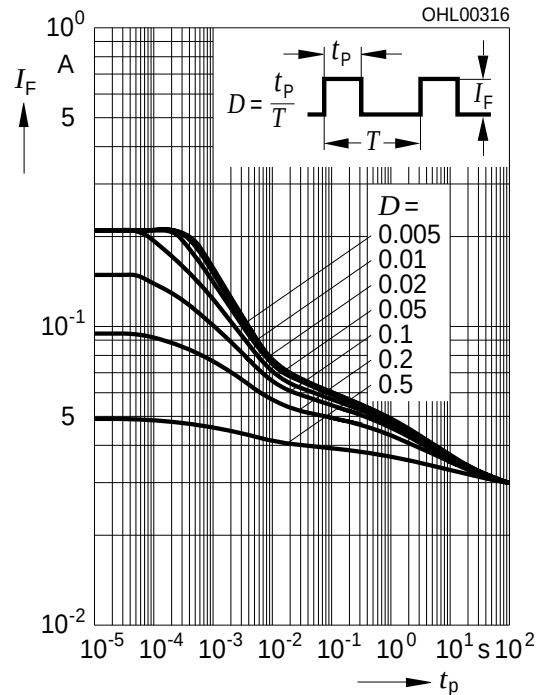
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
Duty cycle  $D = \text{parameter}$ ,  $T_A = 25^\circ\text{C}$   
**LS, LA, LO**



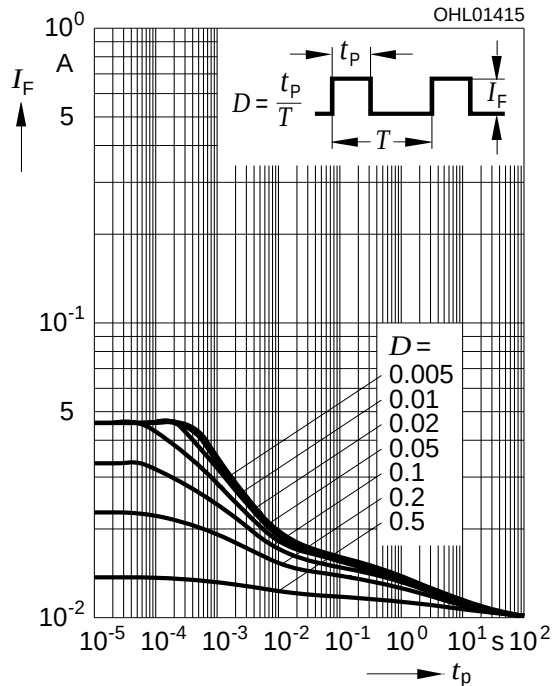
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
Duty cycle  $D = \text{parameter}$ ,  $T_A = 85^\circ\text{C}$   
**LS, LA, LO**



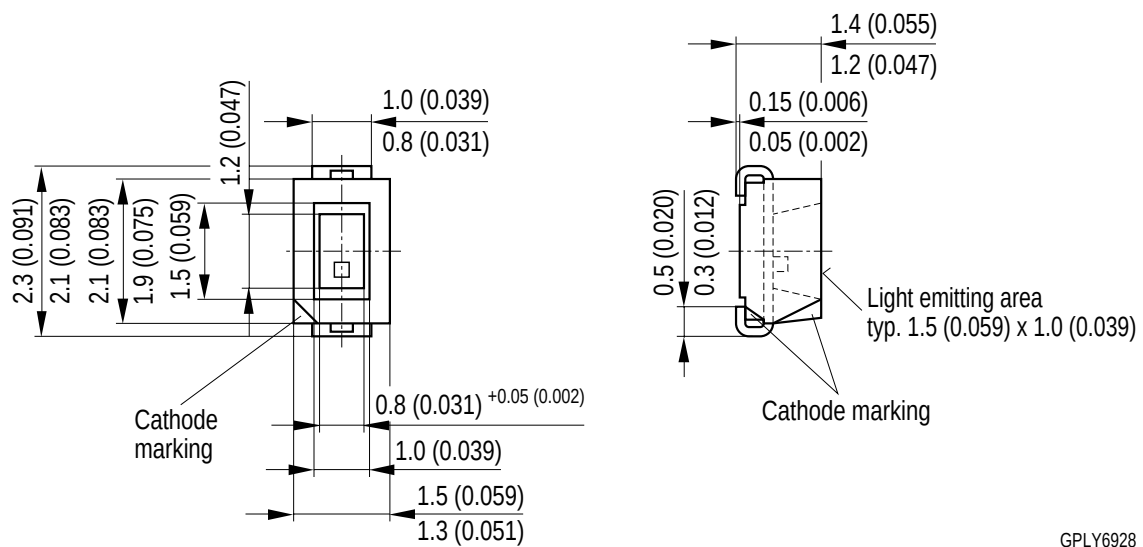
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
Duty cycle  $D = \text{parameter}$ ,  $T_A = 25^\circ\text{C}$   
**LY**



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



**Maßzeichnung**  
**Package Outlines**



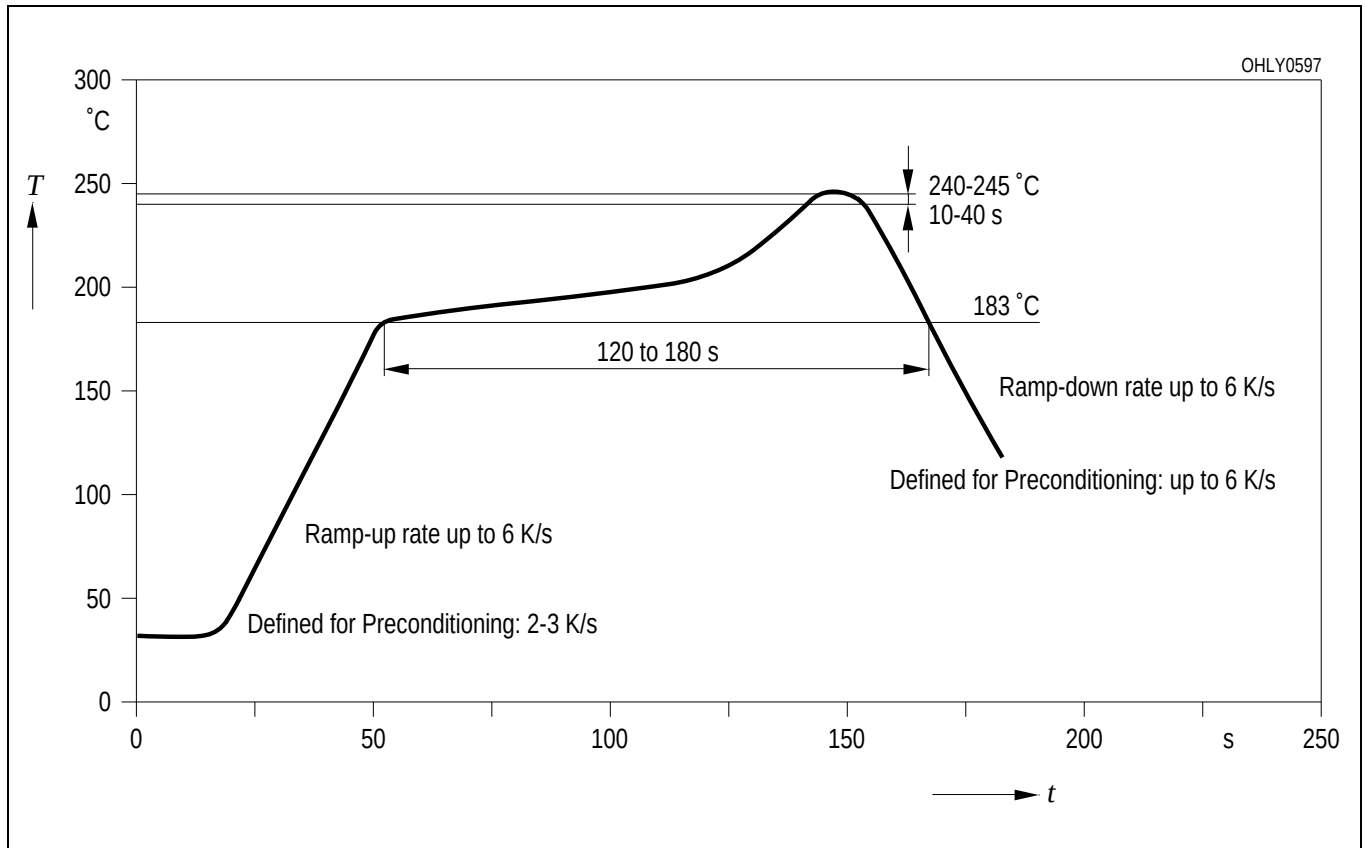
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

**Kathodenkennung:** abgeschrägte Ecke  
**Cathode mark:** bevelled edge

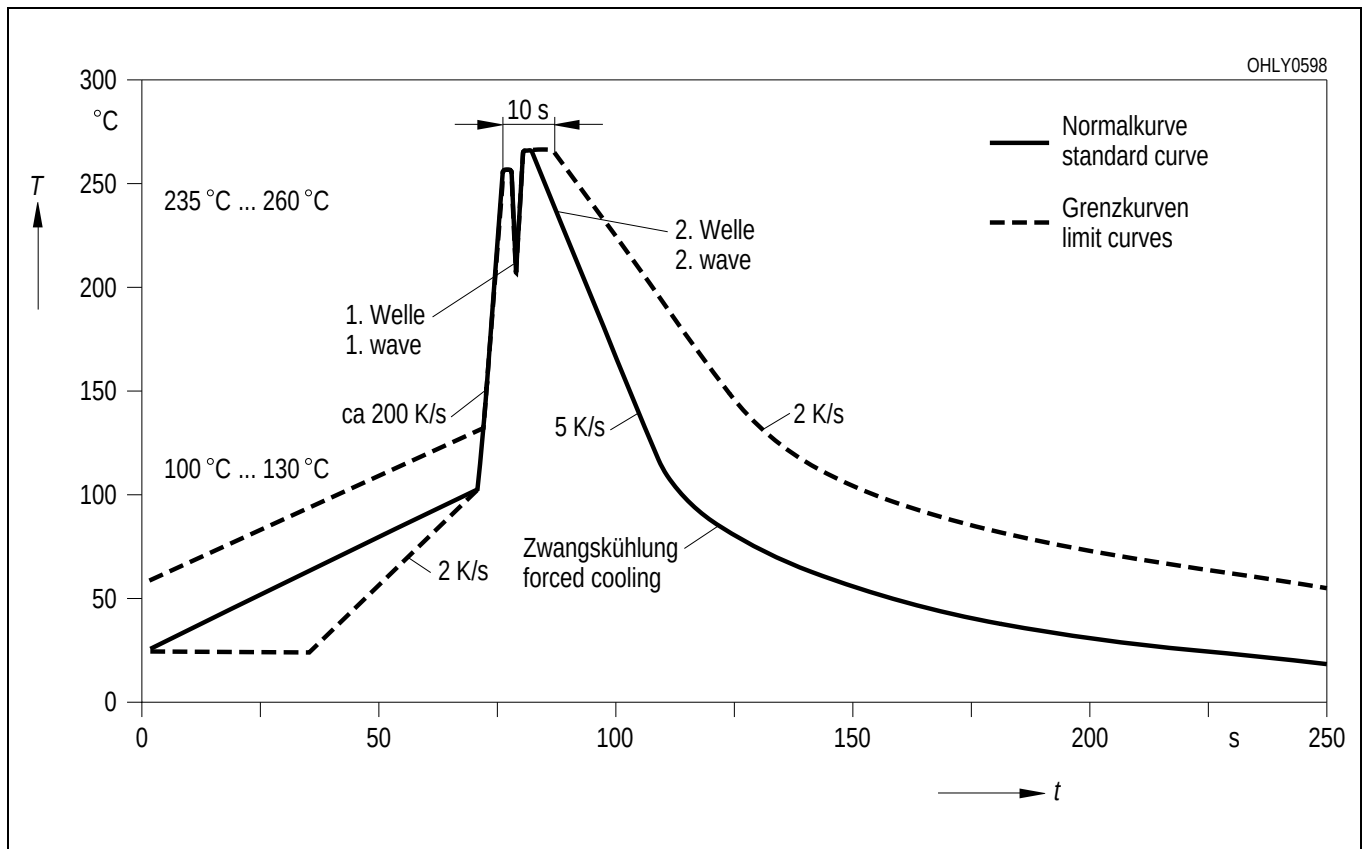


**Lötbedingungen** Vorbehandlung nach JEDEC Level 2  
**Soldering Conditions** Preconditioning acc. to JEDEC Level 2

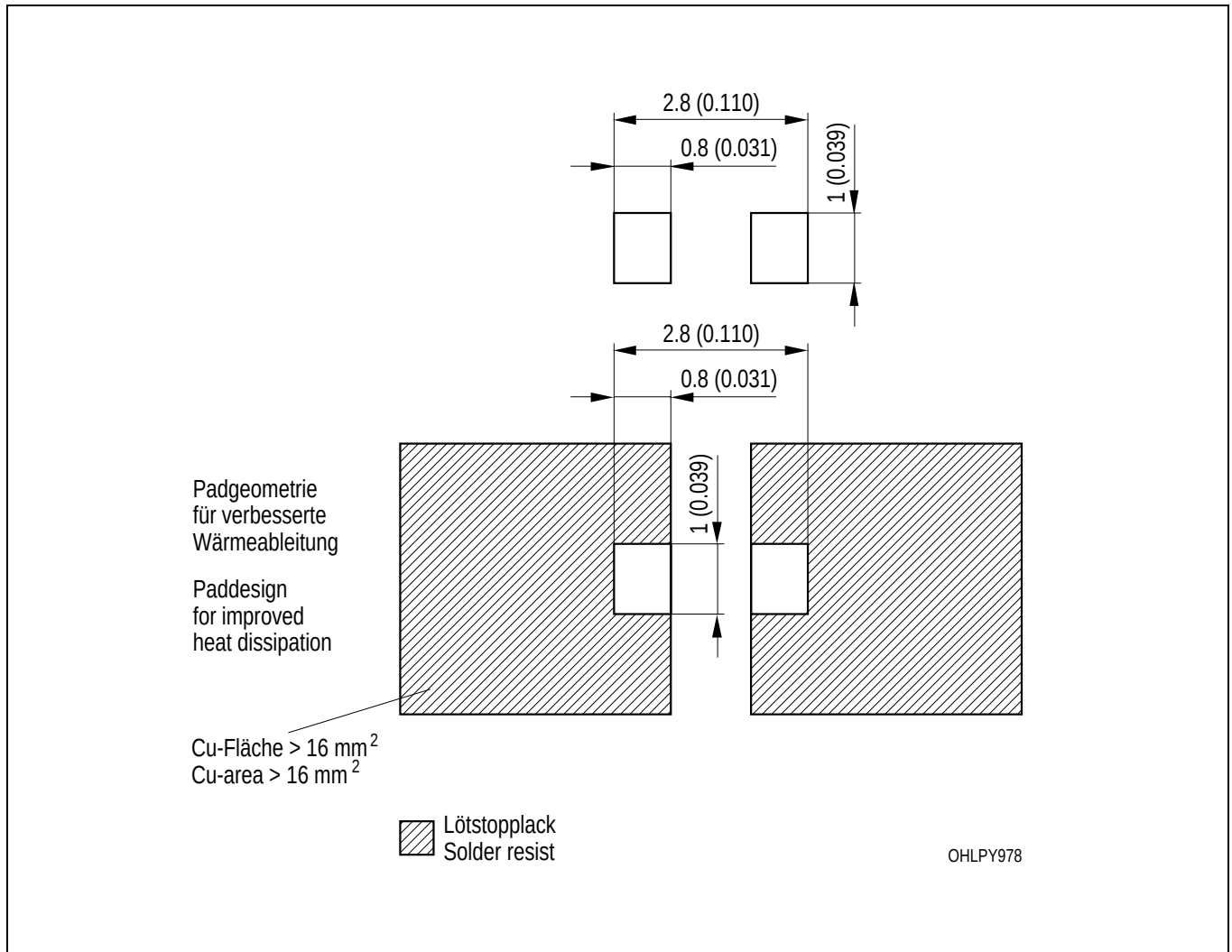
**IR-Reflow Lötprofil** (nach IPC 9501)  
**IR Reflow Soldering Profile** (acc. to IPC 9501)



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



**Empfohlenes Lötpaddesign** IR Reflow Lötten  
**Recommended Solder Pad** IR Reflow Soldering



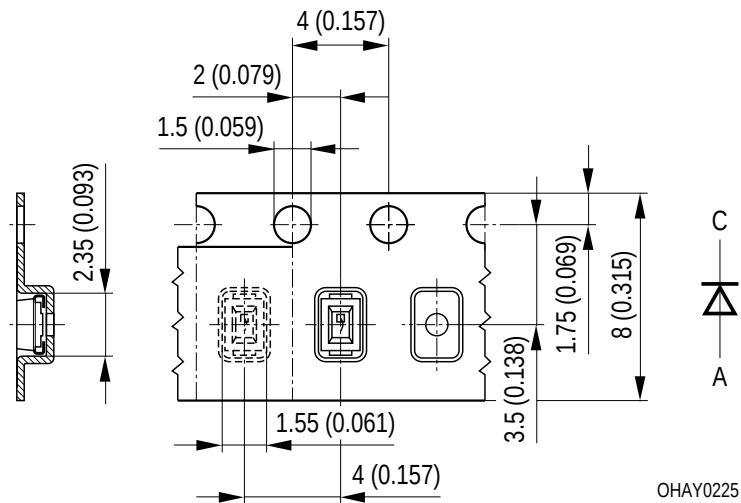
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch)

**Gurtung / Polarität und Lage**

Verpackungseinheit 3000/Rolle,  $\varnothing 180$  mm  
oder 12000/Rolle,  $\varnothing 330$  mm

**Method of Taping / Polarity and Orientation**

Packing unit 3000/reel,  $\varnothing 180$  mm  
or 12000/reel,  $\varnothing 330$  mm



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