

# Hyper Mini TOPLED® Hyper-Bright LED

LS M676, LA M676, LO M676, LY M676



## Besondere Merkmale

- **Gehäusetypp:** weißes SMT-Gehäuse
- **Besonderheit des Bauteils:** kleine Bauform  
2,3 mm x 1,3 mm x 1,4 mm
- **Wellenlänge:** 633 nm (super-rot),  
615 nm (amber), 606 nm (orange),  
587 nm (gelb)
- **Abstrahlwinkel:** Lambertischer Strahler (120°)
- **Technologie:** InGaAIP
- **optischer Wirkungsgrad:** 11 lm/W (gelb,  
orange, amber), 7 lm/W (super-rot)
- **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, 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:** 633 nm (super-red),  
615 nm (amber), 606 nm (orange),  
587 nm (yellow)
- **viewing angle:** Lambertian Emitter (120°)
- **technology:** InGaAIP
- **optical efficiency:** 11 lm/W (yellow, orange,  
amber), 7 lm/W (super-red)
- **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, 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.)

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 $I_F = 20 \text{ mA}$ $\Phi_V \text{ (mlm)}$	Ordering Code
LS M676-N2P2-1 LS M676-P2R1-1	super-red	colorless clear	35.5 ... 71.0 56.0 ... 140.0	150 (typ.) 280 (typ.)	Q62703-Q5085 Q62703-Q5086
LA M676-P2Q2-1 LA M676-Q2S1-1	amber	colorless clear	56.0 ... 112.0 90.0 ... 224.0	240 (typ.) 440 (typ.)	Q62703-Q4978 Q62703-Q4979
LO M676-Q1R1-24 LO M676-R1S2-24	orange	colorless clear	71.0 ... 140.0 112.0 ... 280.0	310 (typ.) 560 (typ.)	Q62703-Q5040 Q62703-Q5041
LY M676-P2Q2-26 LY M676-Q2S1-26	yellow	colorless clear	56.0 ... 112.0 90.0 ... 224.0	240 (typ.) 440 (typ.)	Q62703-Q5123 Q62703-Q5124

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.*

**Grenzwerte**  
**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Werte Values		Einheit Unit
		LS, LO, LA	LY	
Betriebstemperatur Operating temperature range	$T_{op}$	- 40 ... + 100		°C
Lagertemperatur Storage temperature range	$T_{stg}$	- 40 ... + 100		°C
Sperrschichttemperatur Junction temperature	$T_j$	+ 125		°C
Durchlassstrom Forward current	$I_F$	30		mA
Stoßstrom Surge current $t \leq 10 \mu s, D = 0.005$	$I_{FM}$	0.8	0.2	A
Sperrspannung Reverse voltage	$V_R$	3		V
Leistungsaufnahme Power consumption	$P_{tot}$	80		mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th JA}$	580		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 $\geq 5 \text{ mm}^2$ )	$R_{th JS}$	330		K/W

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

Bezeichnung Parameter	Symbol Symbol	Werte Values				Einheit Unit
		LS	LA	LO	LY	
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 20\text{ mA}$	$\lambda_{\text{peak}}$	645	622	610	591	nm
Dominantwellenlänge <sup>1)</sup> (typ.) Dominant wavelength $I_F = 20\text{ mA}$	$\lambda_{\text{dom}}$	633 $\pm 6$	615 $\pm 6$	606 +3/-6	587 +8/-7	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 20\text{ mA}$	$\Delta\lambda$	16	16	16	15	nm
Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.) Viewing angle at 50 % $I_V$	$2\phi$	120	120	120	120	Grad deg.
Durchlassspannung <sup>2)</sup> (typ.) Forward voltage $I_F = 20\text{ mA}$	$V_F$ $V_F$	2.0 2.4	2.0 2.4	2.0 2.4	2.0 2.4	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 3\text{ V}$	$I_R$ $I_R$	0.01 10	0.01 10	0.01 10	0.01 10	$\mu\text{A}$ $\mu\text{A}$
Temperaturkoeffizient von $\lambda_{\text{peak}}$ (typ.) Temperature coefficient of $\lambda_{\text{peak}}$ $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_{\lambda_{\text{peak}}}$	0.14	0.13	0.13	0.13	nm/K
Temperaturkoeffizient von $\lambda_{\text{dom}}$ (typ.) Temperature coefficient of $\lambda_{\text{dom}}$ $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_{\lambda_{\text{dom}}}$	0.01	0.06	0.07	0.10	nm/K
Temperaturkoeffizient von $V_F$ (typ.) Temperature coefficient of $V_F$ $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_V$	-2.0	-1.8	-1.7	-2.5	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 20\text{ mA}$	$\eta_{\text{opt}}$	7	11	11	11	lm/W

<sup>1)</sup> 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  $\pm 1\text{ nm}$ .

<sup>2)</sup> Spannungswerte werden mit einer Stromeinprägedauer 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	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

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity $I_V$ (mcd)	Lichtstrom Luminous Flux $\Phi_V$ (mlm)
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

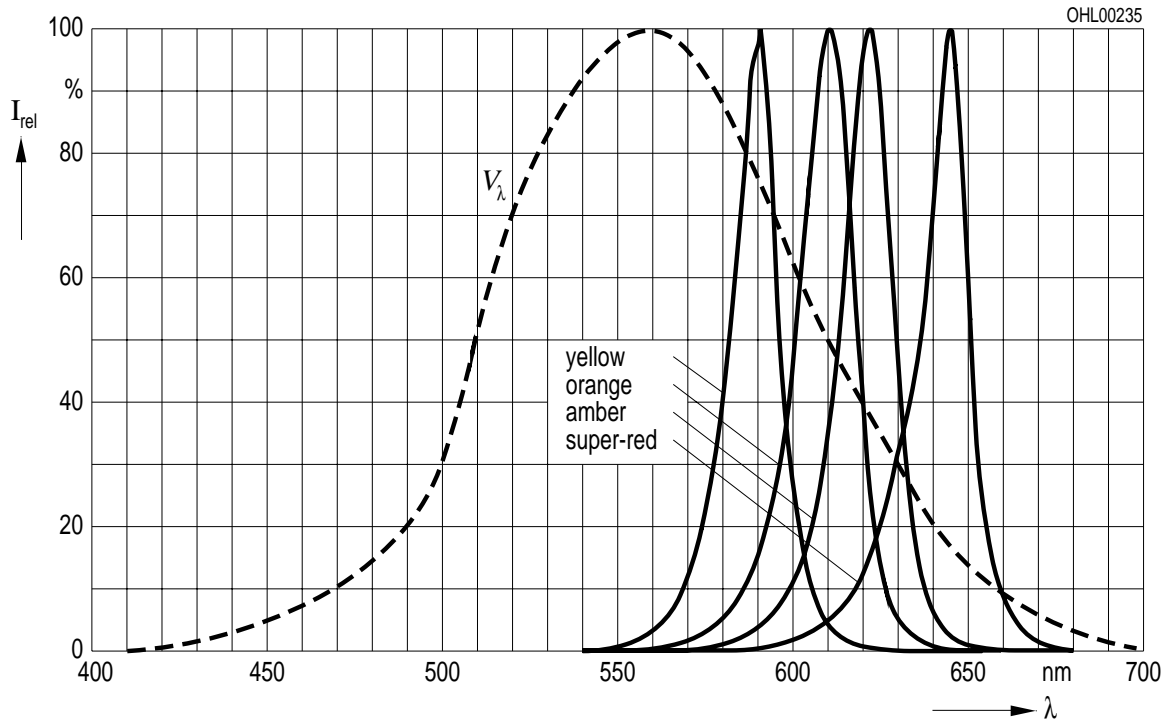
Lichtgruppe Luminous Intensity Group	Halbgruppe Half Group	Wellenlänge Wavelength
S	2	3

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

**Relative Spectral Emission**

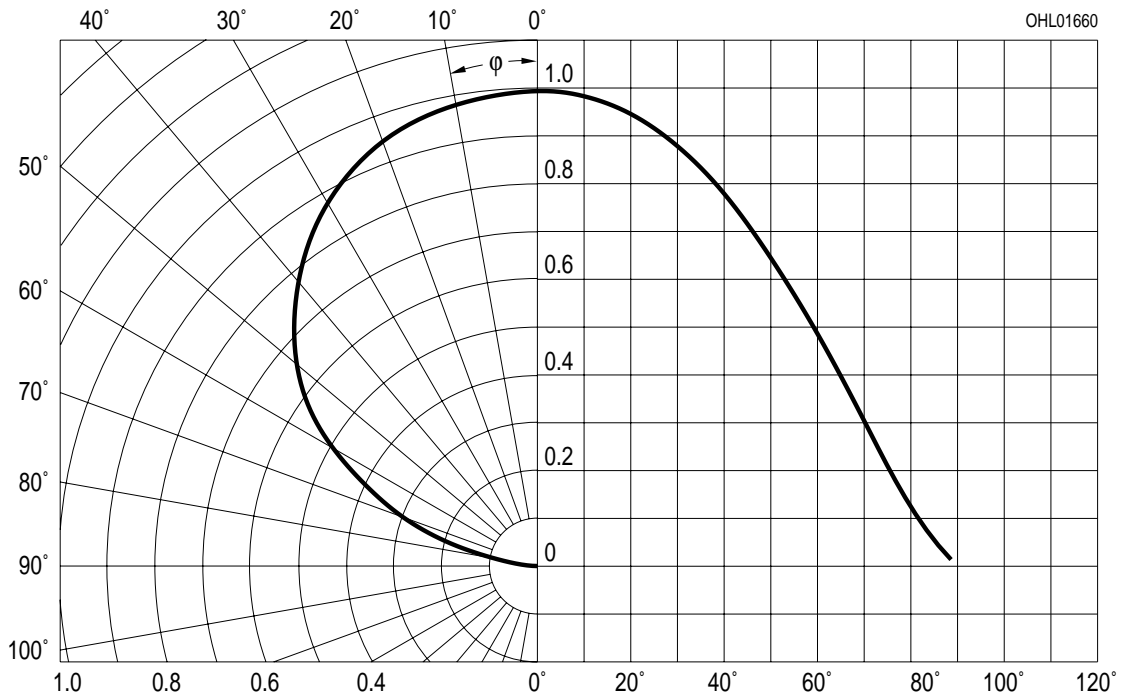
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



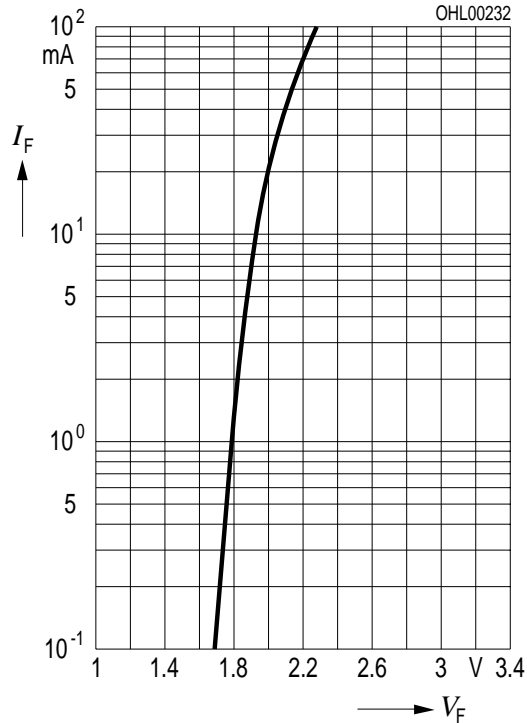
Abstrahlcharakteristik  $I_{rel} = f(\varphi)$

**Radiation Characteristic**



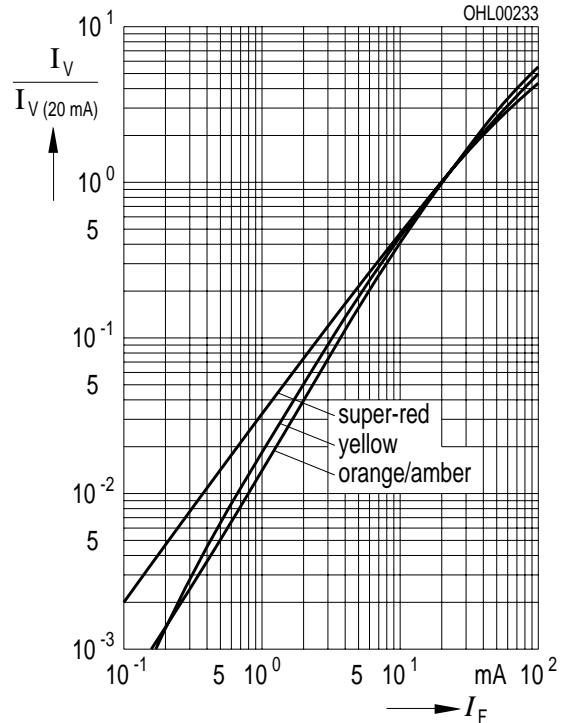
**Durchlassstrom  $I_F = f(V_F)$**   
**Forward Current**

$T_A = 25\text{ °C}$

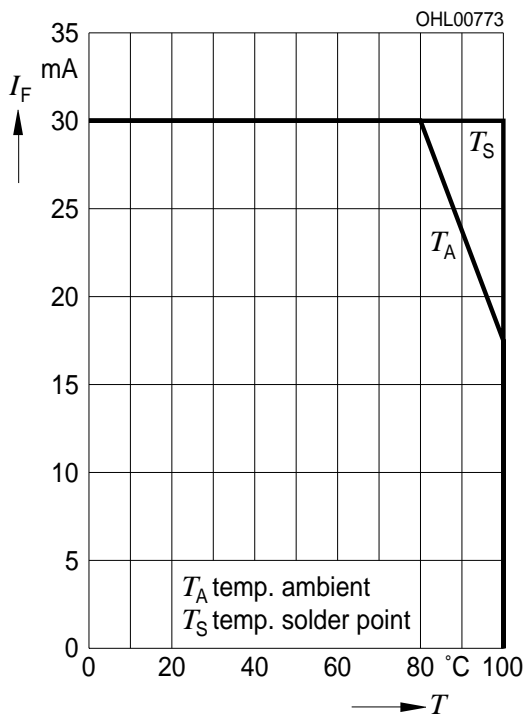


**Relative Lichtstärke  $I_V/I_{V(20\text{ mA})} = f(I_F)$**   
**Relative Luminous Intensity**

$T_A = 25\text{ °C}$

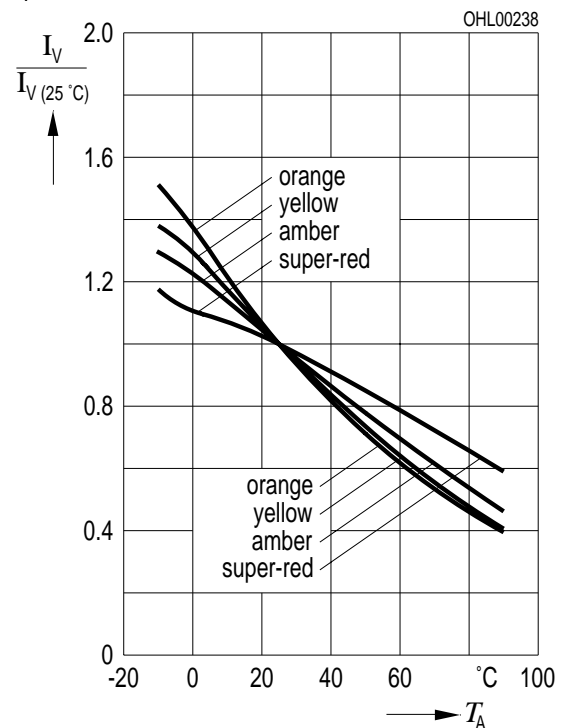


**Maximal zulässiger Durchlassstrom  $I_F = f(T)$**   
**Max. Permissible Forward Current**

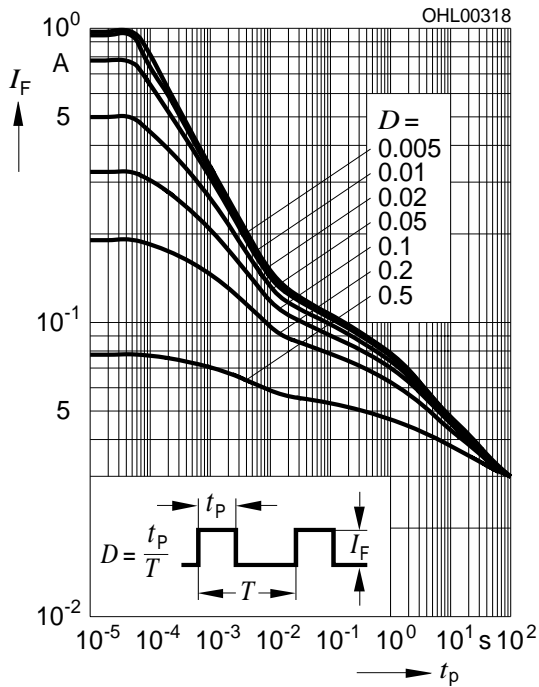


**Relative Lichtstärke  $I_V/I_{V(25\text{ °C})} = f(T_A)$**   
**Relative Luminous Intensity**

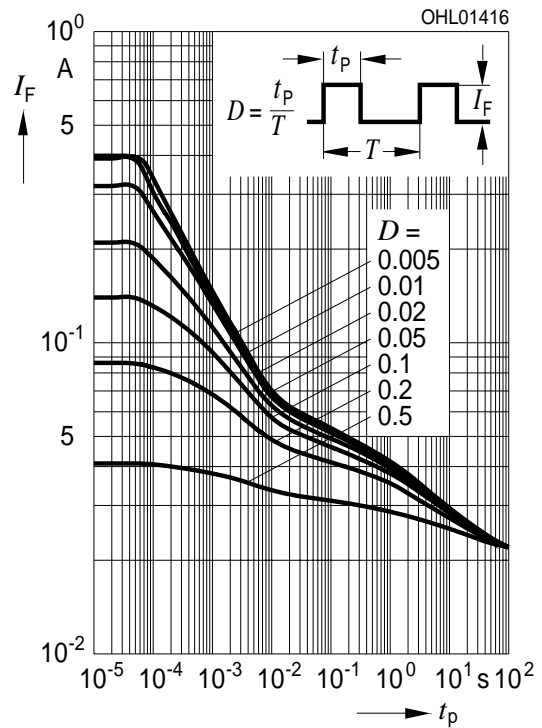
$I_F = 20\text{ mA}$



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

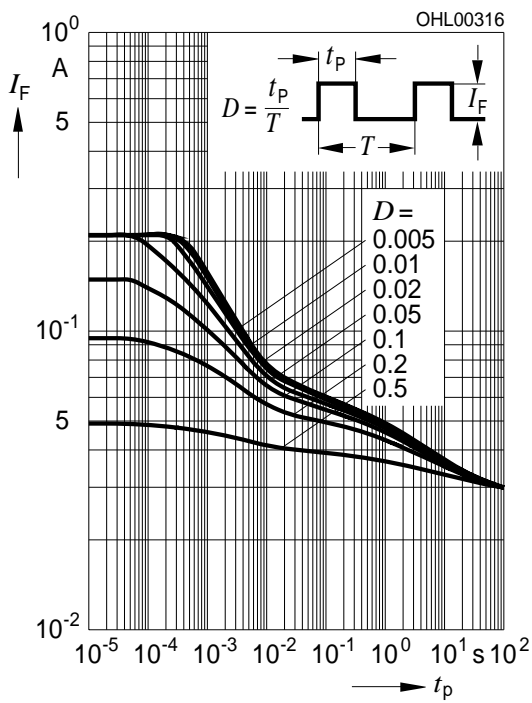


**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
 Duty cycle  $D =$  parameter,  $T_A = 85\text{ °C}$   
**LS, LA, LO**

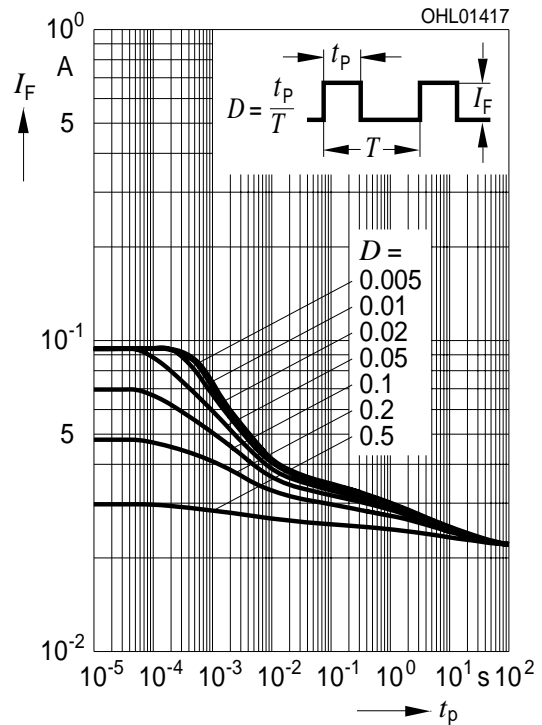




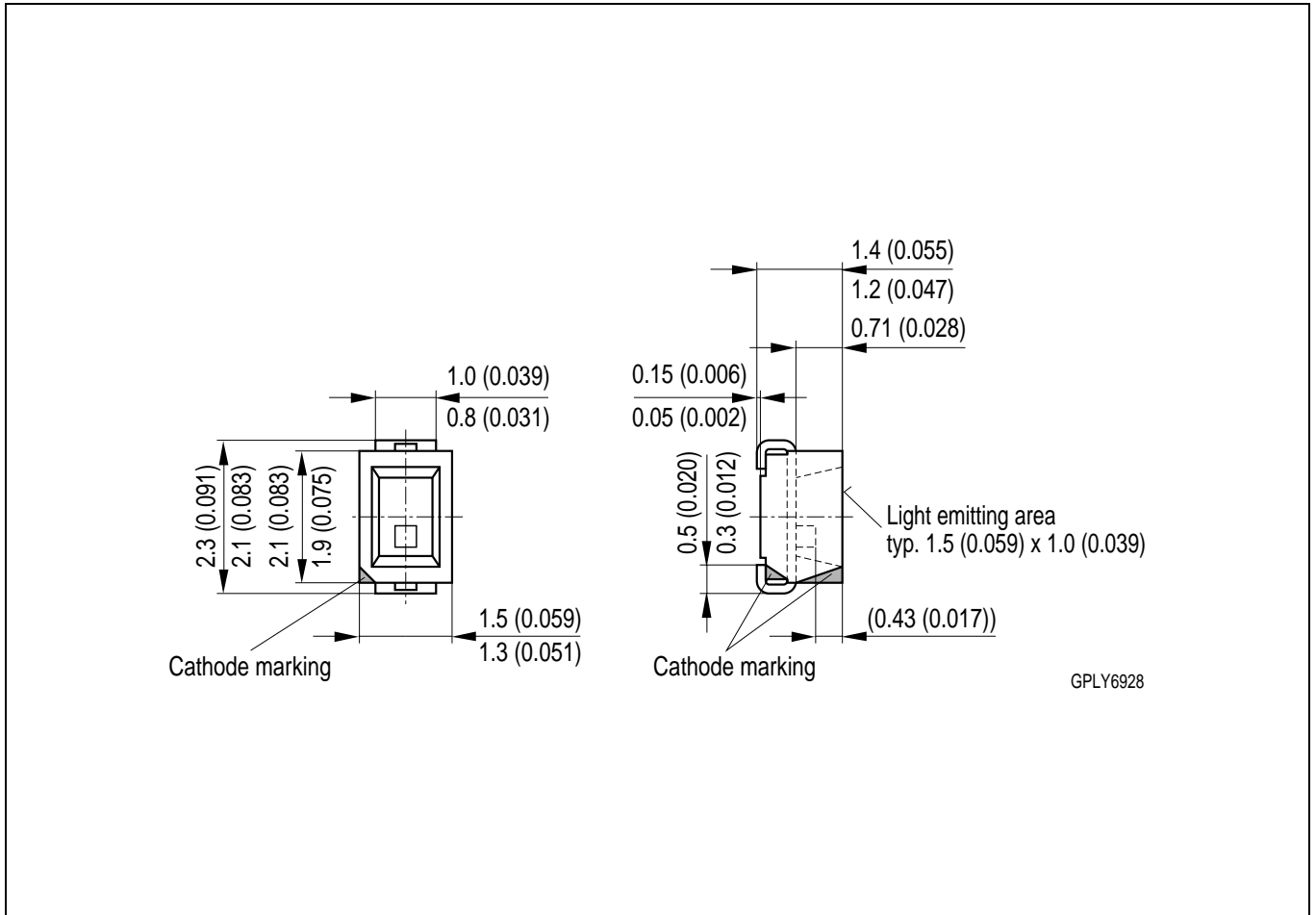
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
 Duty cycle  $D =$  parameter,  $T_A = 25\text{ °C}$   
**LY**



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



**Maßzeichnung**  
**Package Outlines**

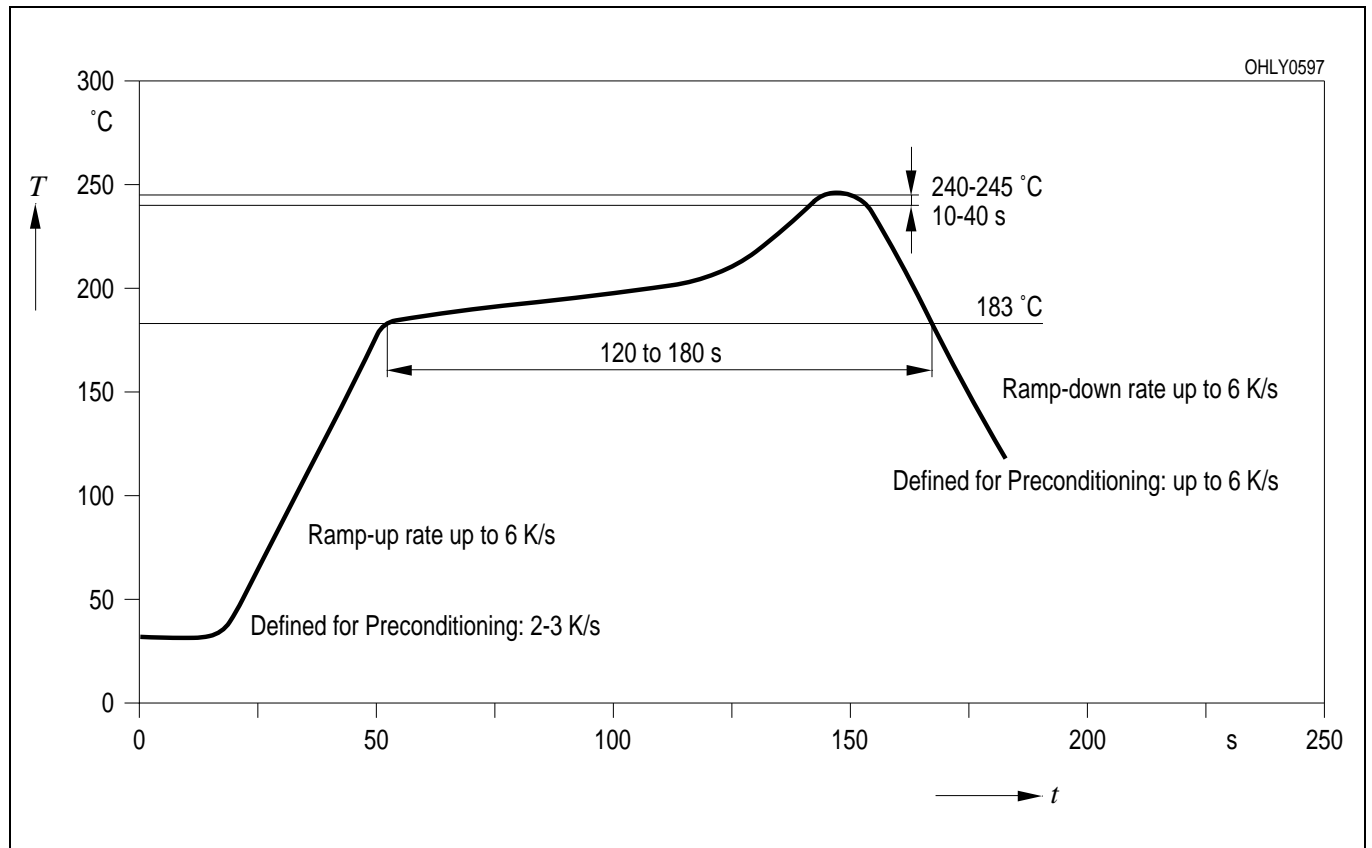


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

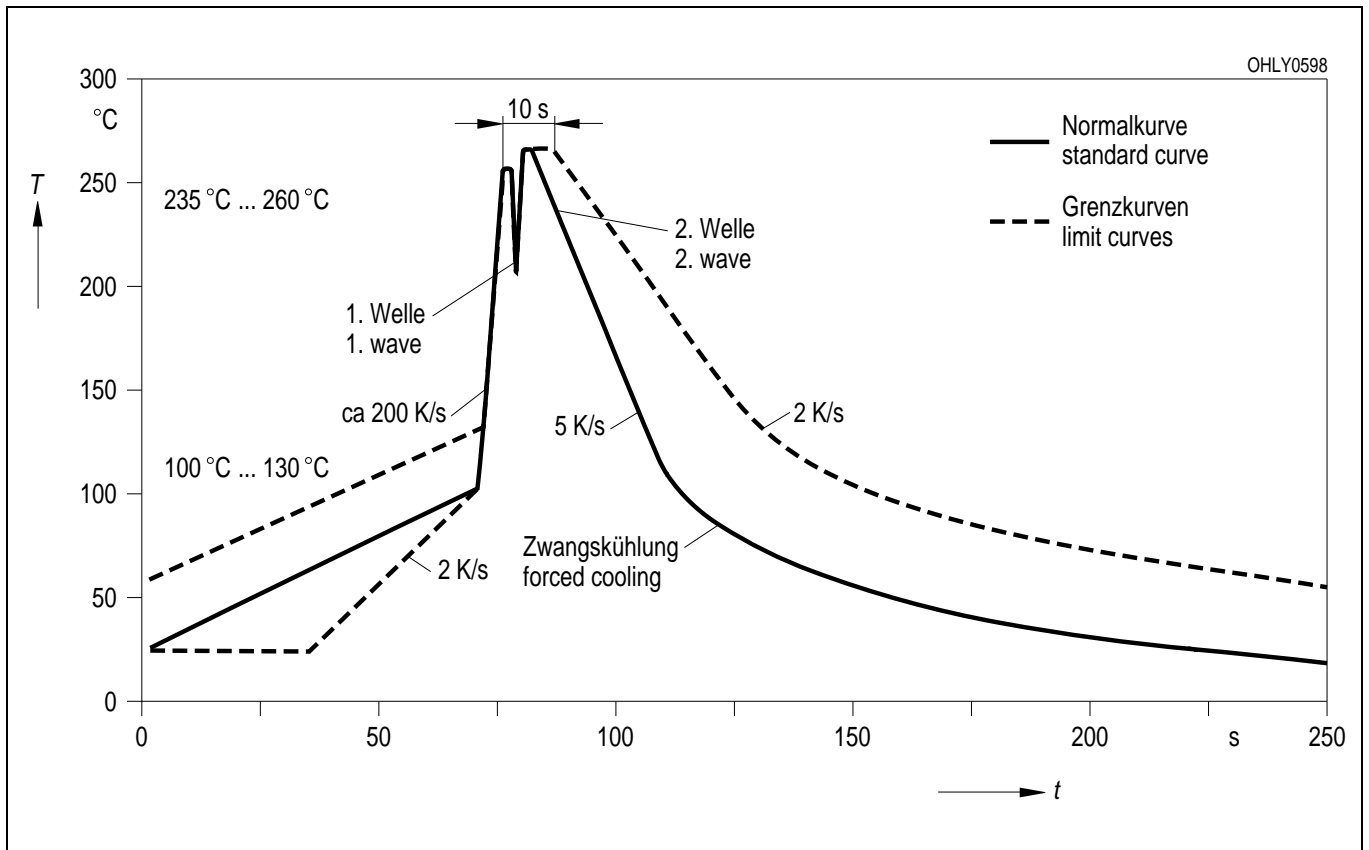
**Kathodenkennung:** abgeschrägte Ecke  
**Cathode mark:** bevelled edge  
**Gewicht / Approx. weight:** 10 mg

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

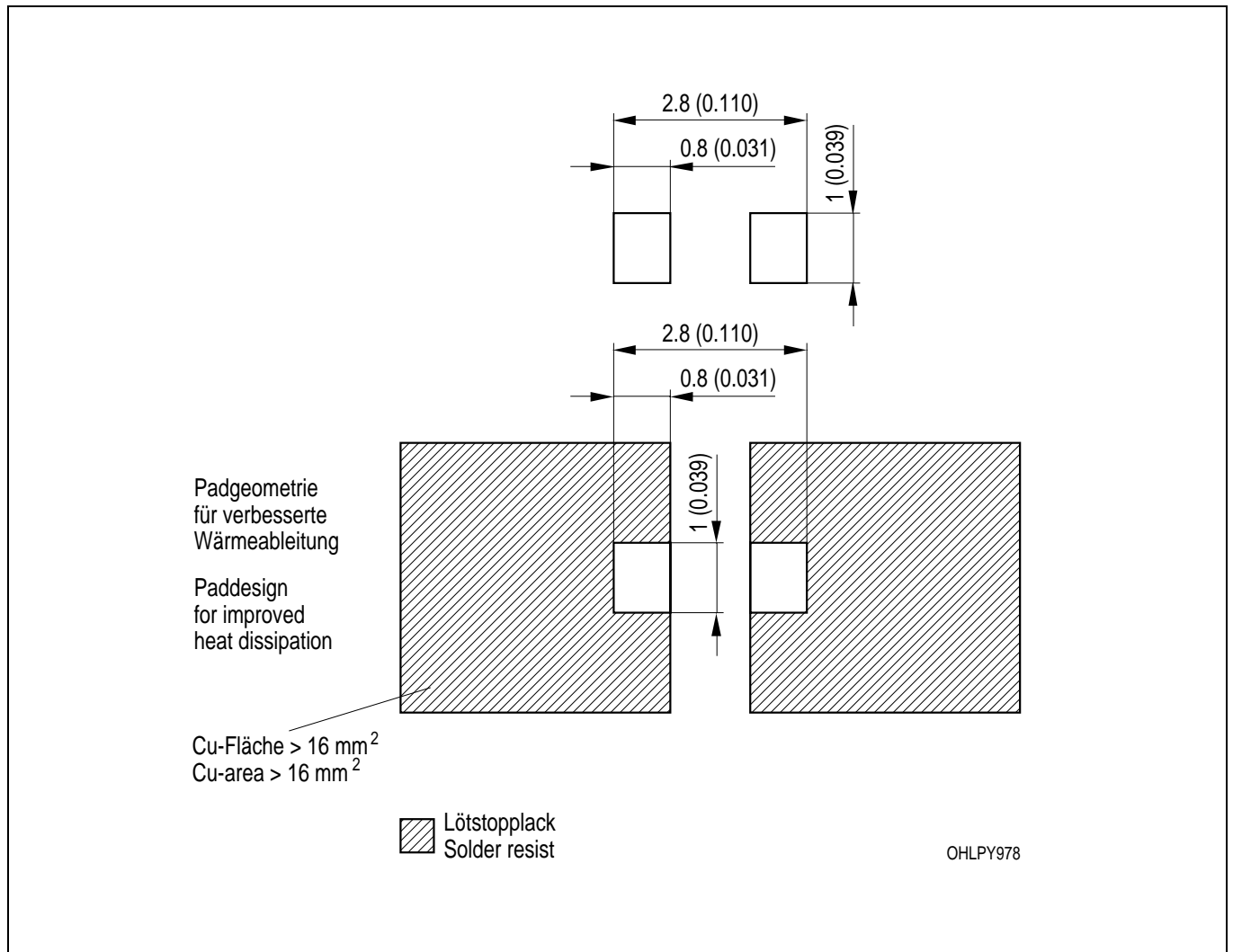
**IR-Reflow Lötprofil** (nach IPC 9501)  
**IR Reflow Soldering Profile** (acc. to IPC 9501)



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



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



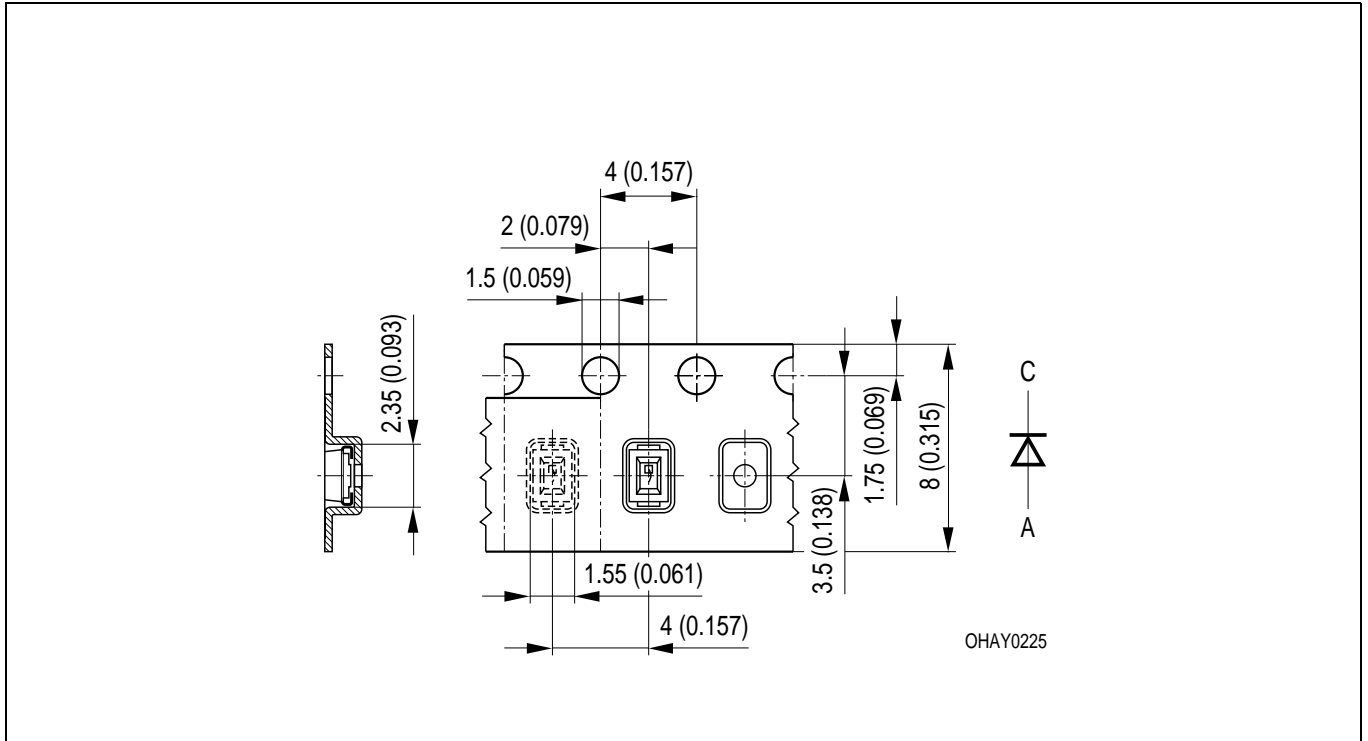
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch)  
Gehäuse für Wellenlöten (TTW) geeignet / Package suitable for TTW-soldering

**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)

**Revision History: 2002-05-24**

Previous Version: 2002-04-05

Page	Subjects (major changes since last revision)
4	value (wavelength amber)
2	wavelength grouping for yellow and orange
3	pad size from 16 mm <sup>2</sup> to 5 mm <sup>2</sup>
7	max. Permissible Forward Current

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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.

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<sup>1</sup> 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.

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