

# Hyper TOPLED® Hyper-Bright LED

LG T676, LP T676



## Vorläufige Daten / Preliminary Data

### Besondere Merkmale

- **Gehäusotyp:** weißes P-LCC-2-Gehäuse
- **Besonderheit des Bauteils:** extrem breite Abstrahlcharakteristik; ideal für Hinterleuchtungen und Einkopplungen in Lichtleiter
- **Wellenlänge:** 570 nm (grün), 560 nm (pure green)
- **Abstrahlwinkel:** Lambertscher Strahler (120°)
- **Technologie:** InGaAlP (grün, pure green)
- **optischer Wirkungsgrad:** 5 lm/W (grün), 1,5 lm/W (pure 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 2000/Rolle, ø180 mm oder 8000/Rolle, ø330 mm
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach EOS/ESD-5.1-1993

### Anwendungen

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

### Features

- **package:** white P-LCC-2 package
- **feature of the device:** extremely wide viewing angle; ideal for backlighting and coupling in light guides
- **wavelength:** 570 nm (green), 560 nm (pure green)
- **viewing angle:** Lambertian Emitter (120°)
- **technology:** InGaAlP (green, pure green)
- **optical efficiency:** 5 lm/W (green), 1.5 lm/W (pure 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 2000/reel, ø180 mm or 8000/reel, ø330 mm
- **ESD-withstand voltage:** up to 2 kV acc. to EOS/ESD-5.1-1993

### Applications

- indoor and outdoor displays
- optical indicators
- backlighting (LCD, cellular phones, switches, keys, displays, illuminated advertising, general lighting)
- interior automotive lighting (e.g. dashboard backlighting)
- marker lights (e.g. steps, exit ways, etc.)
- coupling into light guides
- light writing displays
- 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
LG T676-N2P2-24 LG T676-P2Q2-24	green	colorless clear	35.5 ... 71.0 56.0 ... 112.0	150 (typ.) 240 (typ.)	Q62703Q6411 Q65110A0530
LP T676-L1M2-25	pure green	colorless clear	11.2 ... 28.0	60 (typ.)	Q62703Q6410

Anm.: -24 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)  
 -25 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)

*Die Standardlieferform von Serientypen beinhaltet eine Familiengruppe, die aus 4 Halbgruppen besteht. Einzelne Halbgruppen sind nicht erhältlich.  
 In einer Verpackungseinheit / Gurt ist immer nur eine Halbgruppe enthalten.*

Note: -24 Total color tolerance range, delivery in single groups (see **page 5**)  
 -25 Total color tolerance range, delivery in single groups (see **page 5**)

*The standard shipping format for serial types includes one family group of 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	Wert Value		Einheit Unit
		LG	LP	
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 $t \leq 10 \mu s, D = 0.005$	$I_{FM}$	0.5		A
Sperrspannung <sup>1)</sup> Reverse voltage	$V_R$	12		V
Leistungsaufnahme Power consumption	$P_{tot}$	80		mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th JA}$	500		K/W
Sperrschicht/Löt看 Junction/soldering point Montage auf PC-Board FR 4 (Padgröße $\geq 16 \text{ mm}^2$ ) mounted on PC board FR 4 (pad size $\geq 16 \text{ mm}^2$ )	$R_{th JS}$	280		K/W

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

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

Bezeichnung Parameter	Symbol Symbol	Werte Value		Einheit Unit
		LG	LP	
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 20\text{ mA}$	$\lambda_{\text{peak}}$	572	562	nm
Dominantwellenlänge <sup>1)</sup> (typ.) Dominant wavelength <sup>1)</sup> $I_F = 20\text{ mA}$	$\lambda_{\text{dom}}$	570 −4/+5	560 ± 6	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 20\text{ mA}$	$\Delta\lambda$	22	22	nm
Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.) Viewing angle at 50 % $I_V$	$2\phi$	120	120	Grad deg.
Durchlassspannung <sup>2)</sup> (typ.) Forward voltage <sup>2)</sup> (max.) $I_F = 20\text{ mA}$	$V_F$ $V_F$	2.0 2.4	2.0 2.4	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 12\text{ V}$	$I_R$ $I_R$	0.01 10	0.01 10	$\mu\text{A}$ $\mu\text{A}$
Temperaturkoeffizient von $\lambda_{\text{peak}}$ (typ.) Temperature coefficient of $\lambda_{\text{peak}}$ $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{peak}}}$	0.12	0.10	nm/K
Temperaturkoeffizient von $\lambda_{\text{dom}}$ (typ.) Temperature coefficient of $\lambda_{\text{dom}}$ $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{dom}}}$	0.10	0.10	nm/K
Temperaturkoeffizient von $V_F$ (typ.) Temperature coefficient of $V_F$ $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_V$	− 2.6	− 2.3	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 20\text{ mA}$	$\eta_{\text{opt}}$	5	1.5	lm/W

<sup>1)</sup> Wellenlängen werden mit einer Stromeinprägedauer von 25 ms und einer Genauigkeit von  $\pm 1\text{ nm}$  ermittelt.  
Wavelengths 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  $\pm 0.1\text{ V}$ .

<sup>1)</sup> Wellenlängengruppen  
Wavelength groups

Gruppe Group	pure green		green		Einheit Unit
	min.	max.	min.	max.	
2	554	557	566	569	nm
3	557	560	569	572	nm
4	560	563	572	575	nm
5	563	566			nm

Helligkeits-Gruppierungsschema  
Luminous Intensity Groups

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity $I_V$ (mcd)	Lichtstrom Luminous Flux $\Phi_V$ (lm)
L1	11.2 ... 14.0	35 (typ.)
L2	14.0 ... 18.0	45 (typ.)
M1	18.0 ... 22.4	60 (typ.)
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.)

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: M2

Example: M2

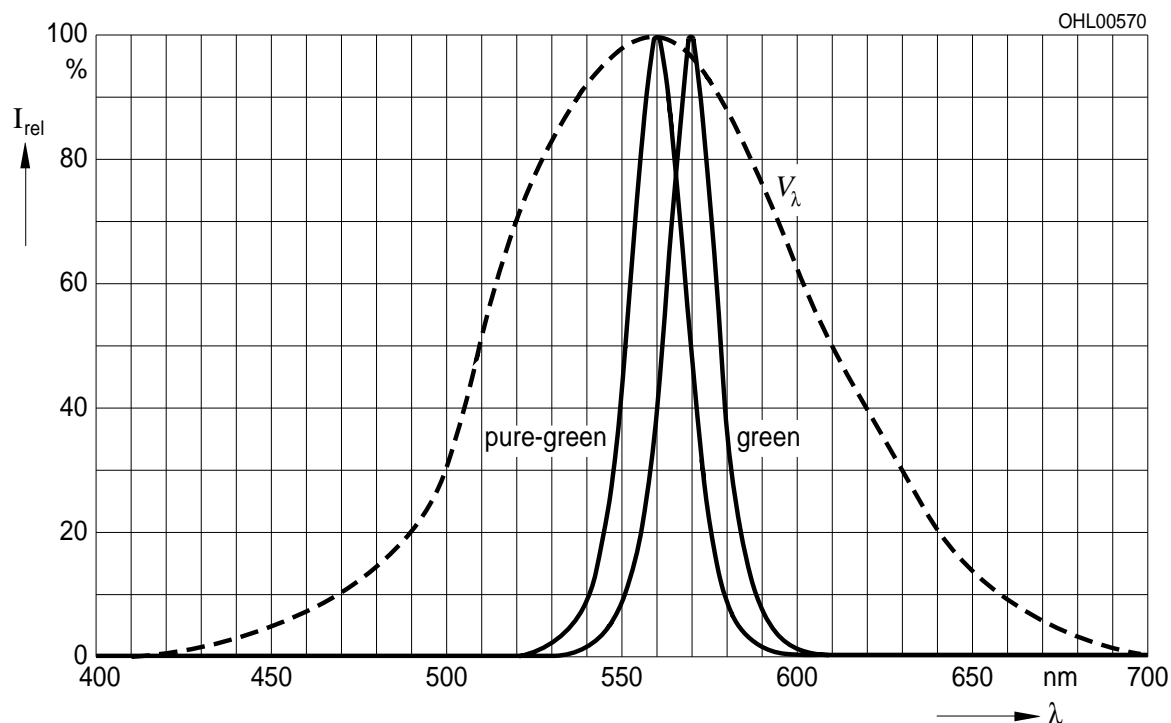
Lichtgruppe Luminous Intensity Group	Halbgruppe Half Group
M	2

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

**Relative Spectral Emission**

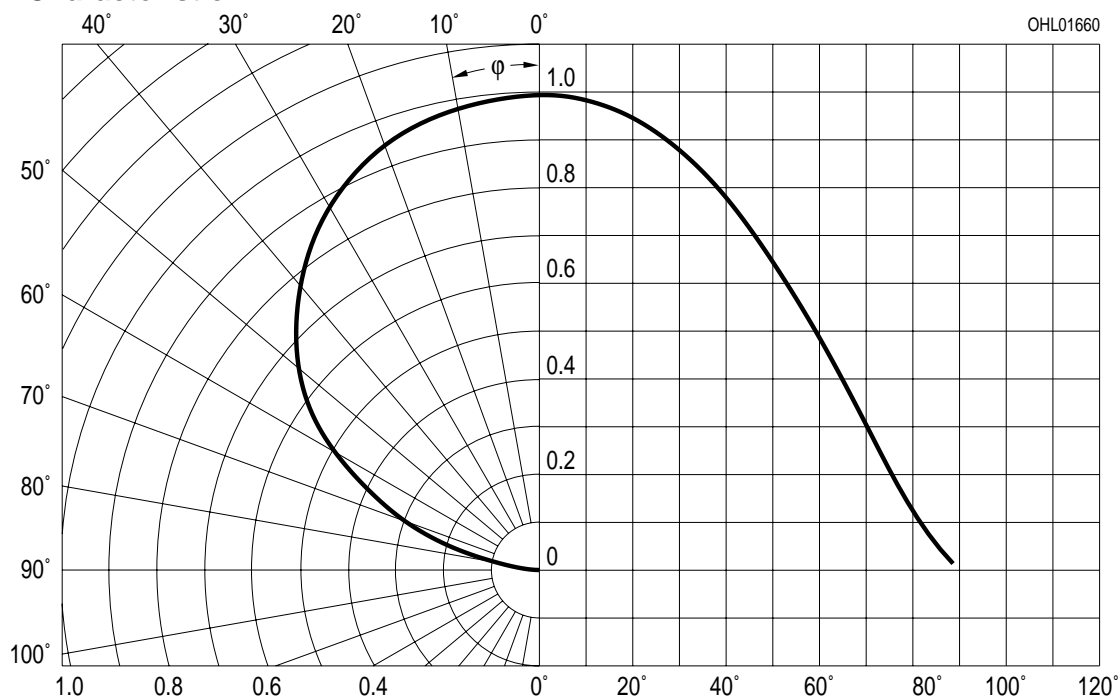
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



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

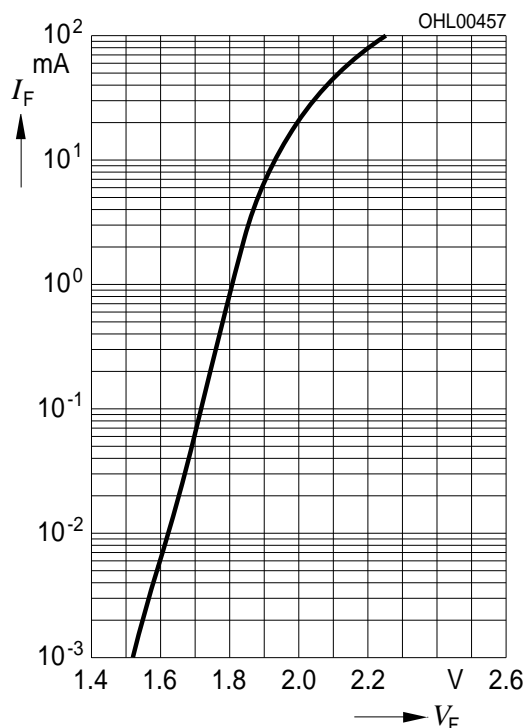
**Radiation Characteristic**



Durchlassstrom  $I_F = f(V_F)$

Forward Current

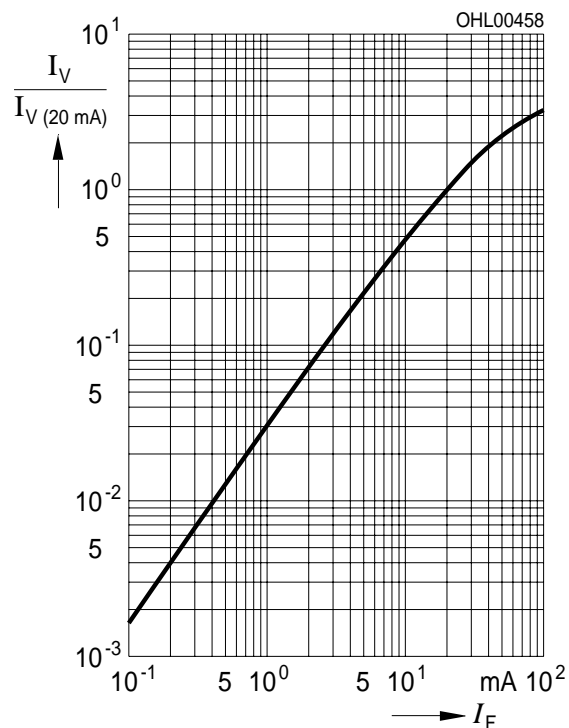
$T_A = 25\text{ °C}$



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

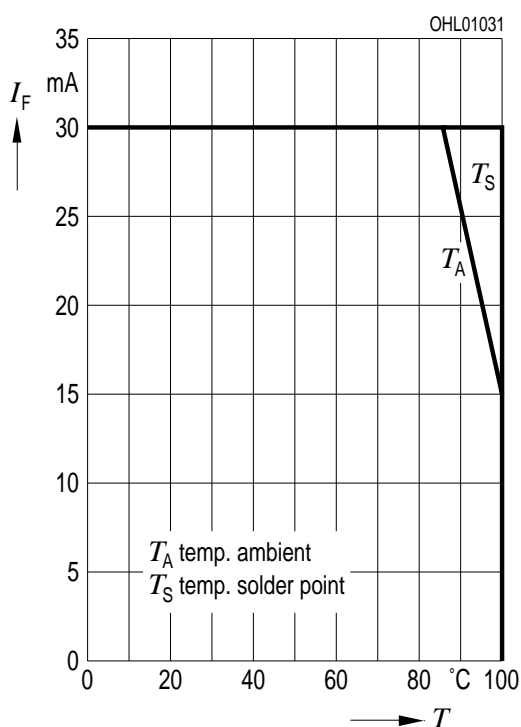
Relative Luminous Intensity

$T_A = 25\text{ °C}$



Maximal zulässiger Durchlassstrom  $I_F = f(T_A)$

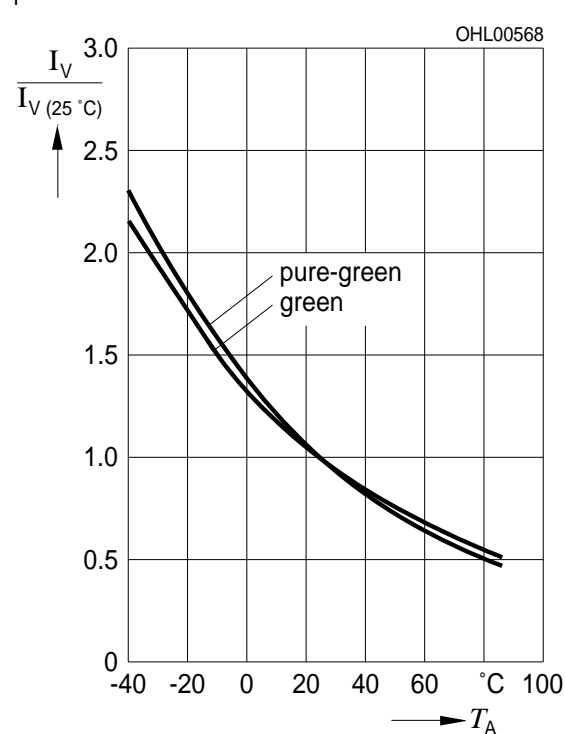
Max. Permissible Forward Current



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

Relative Luminous Intensity

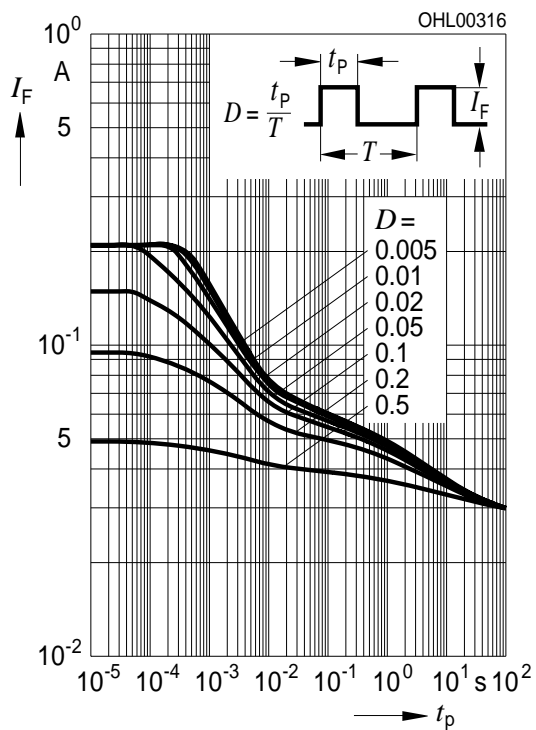
$I_F = 20\text{ mA}$



**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**

**Permissible Pulse Handling Capability**

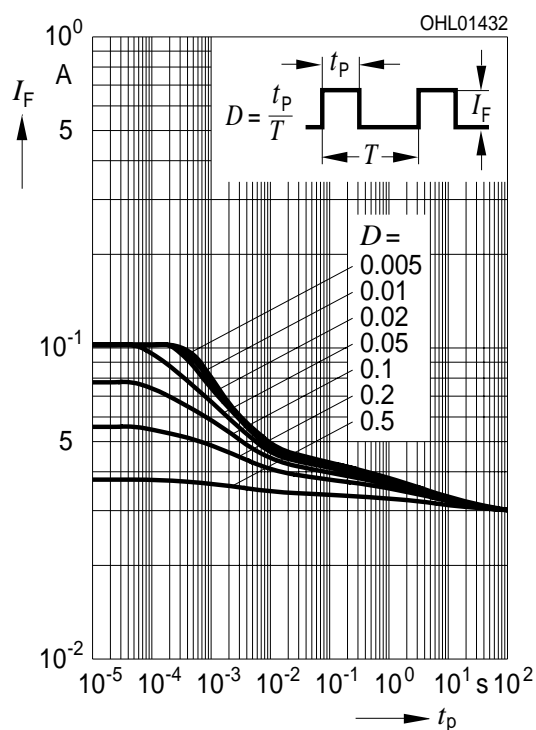
Duty cycle  $D =$  parameter,  $T_A = 25\text{ °C}$



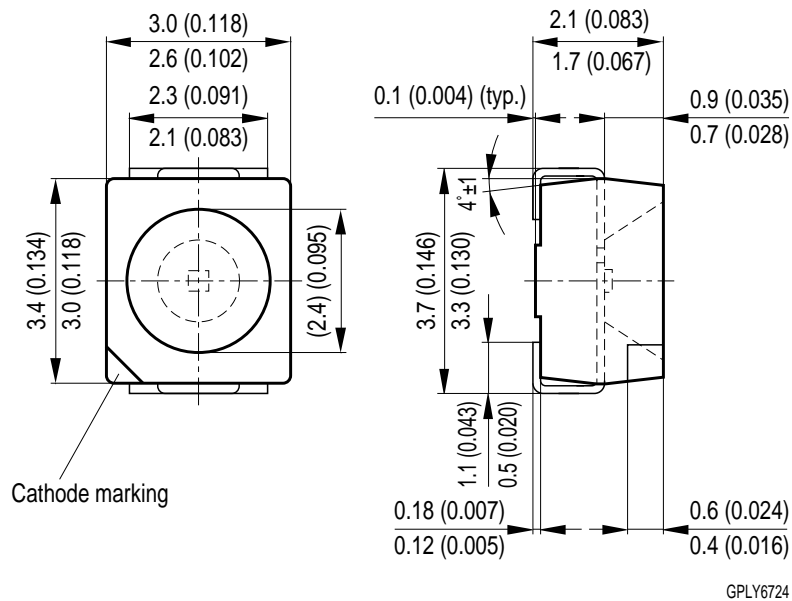
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**

**Permissible Pulse Handling Capability**

Duty cycle  $D =$  parameter,  $T_A = 85\text{ °C}$



**Maßzeichnung**  
**Package Outlines**

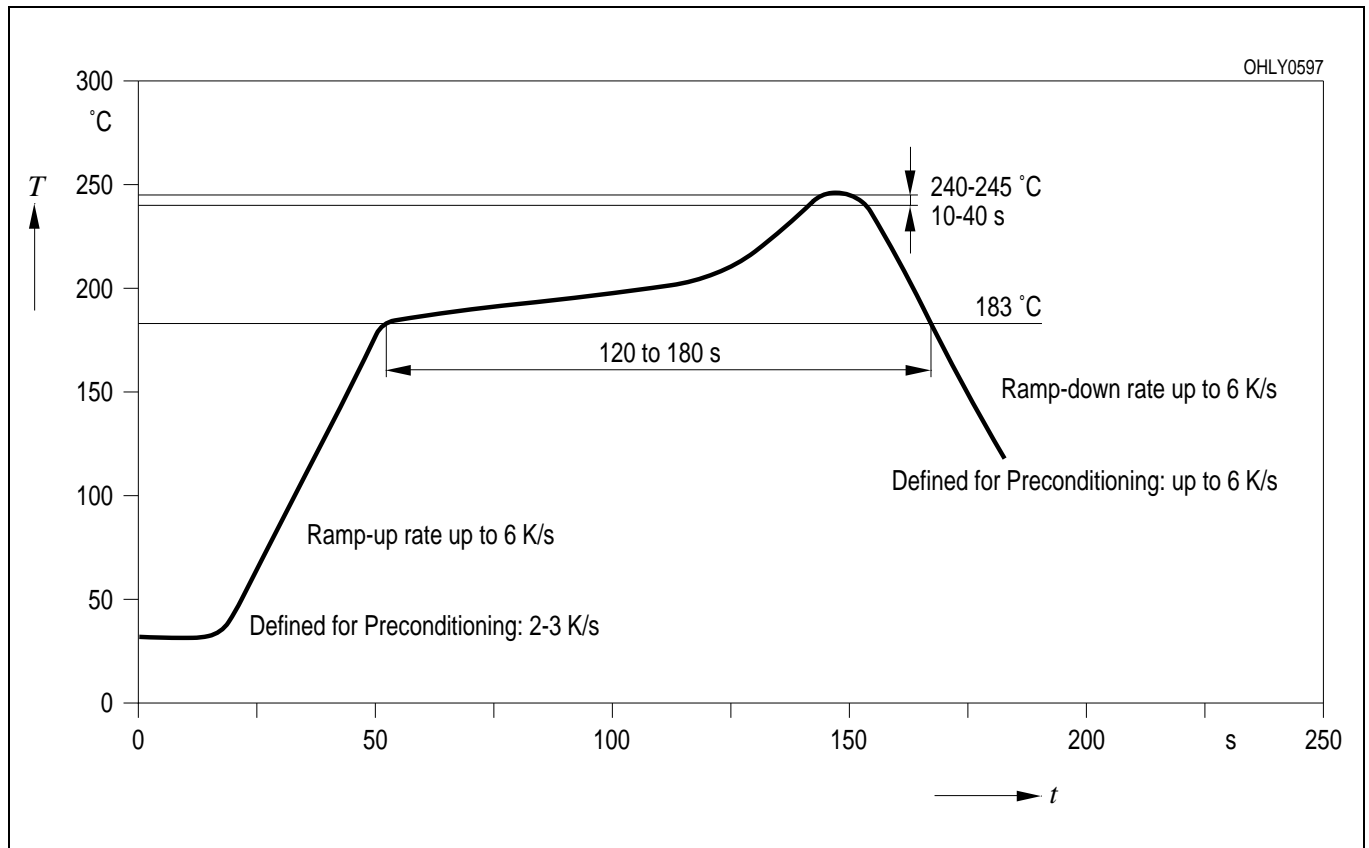


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

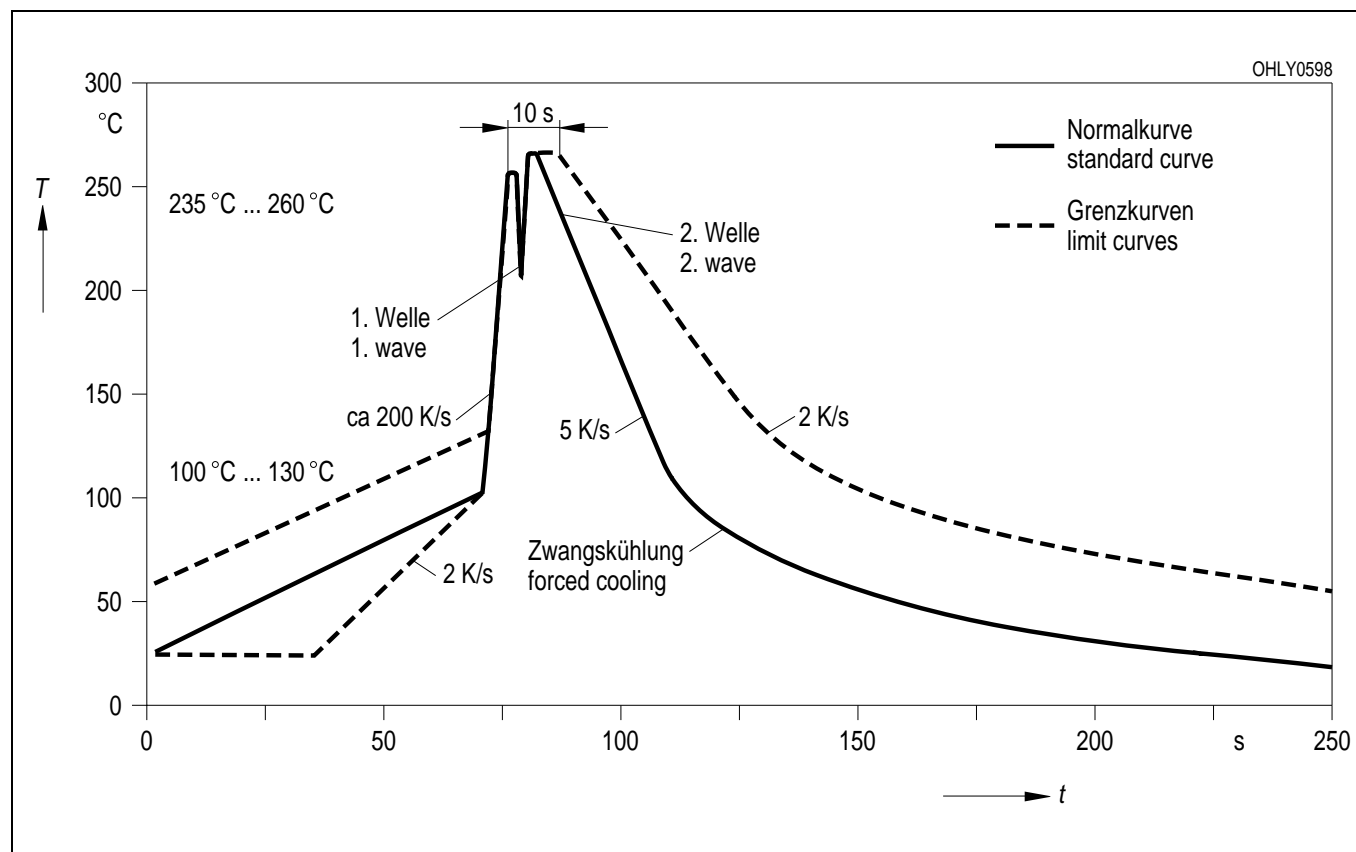
**Kathodenkennung:** abgeschrägte Ecke  
**Cathode mark:** bevelled edge  
**Gewicht / Approx. weight:** 35 mg

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

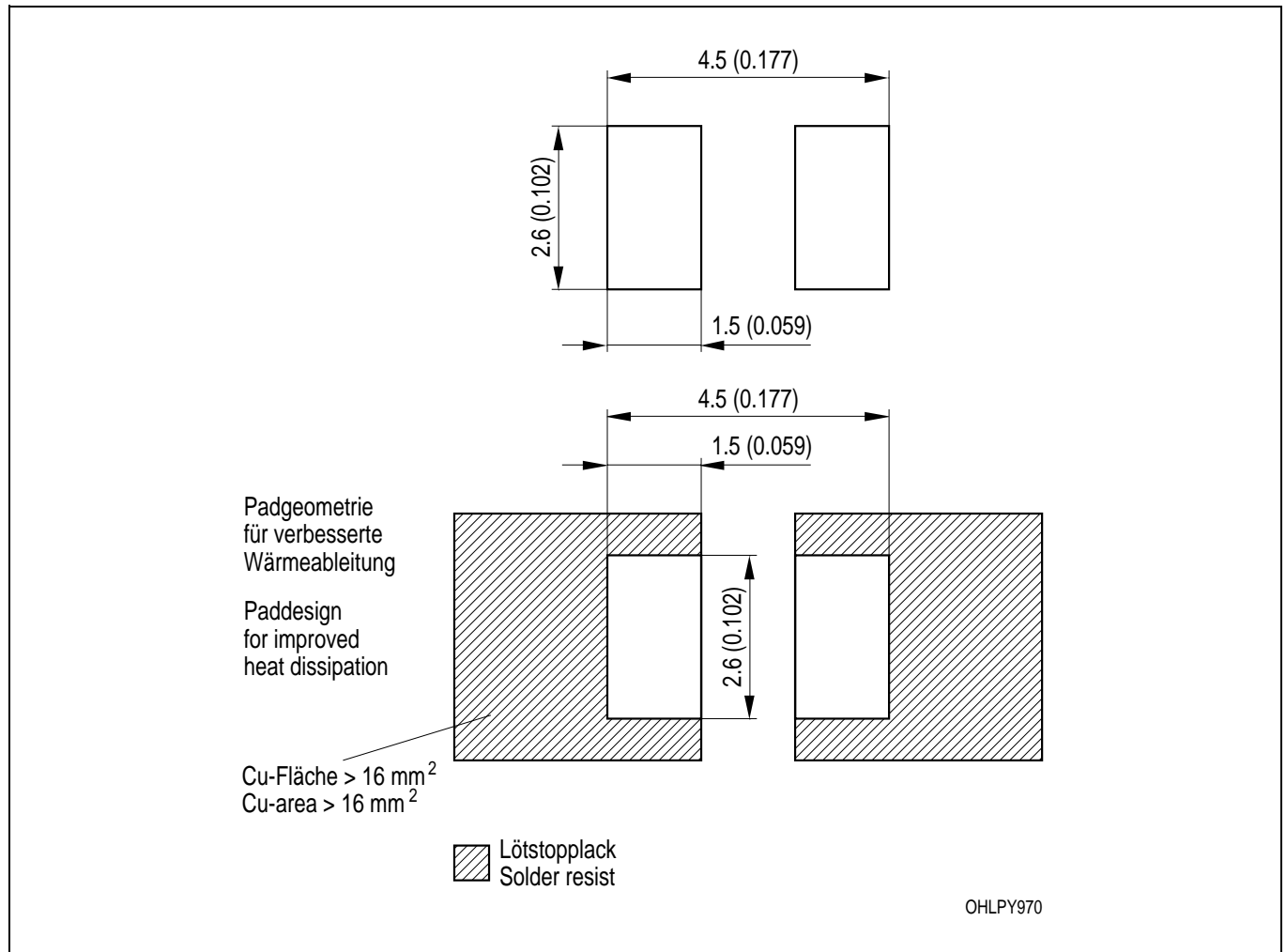
**IR-Reflow Lötprofil** (nach IPC 9501)  
**IR Reflow Soldering Profile** (acc. to IPC 9501)



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



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



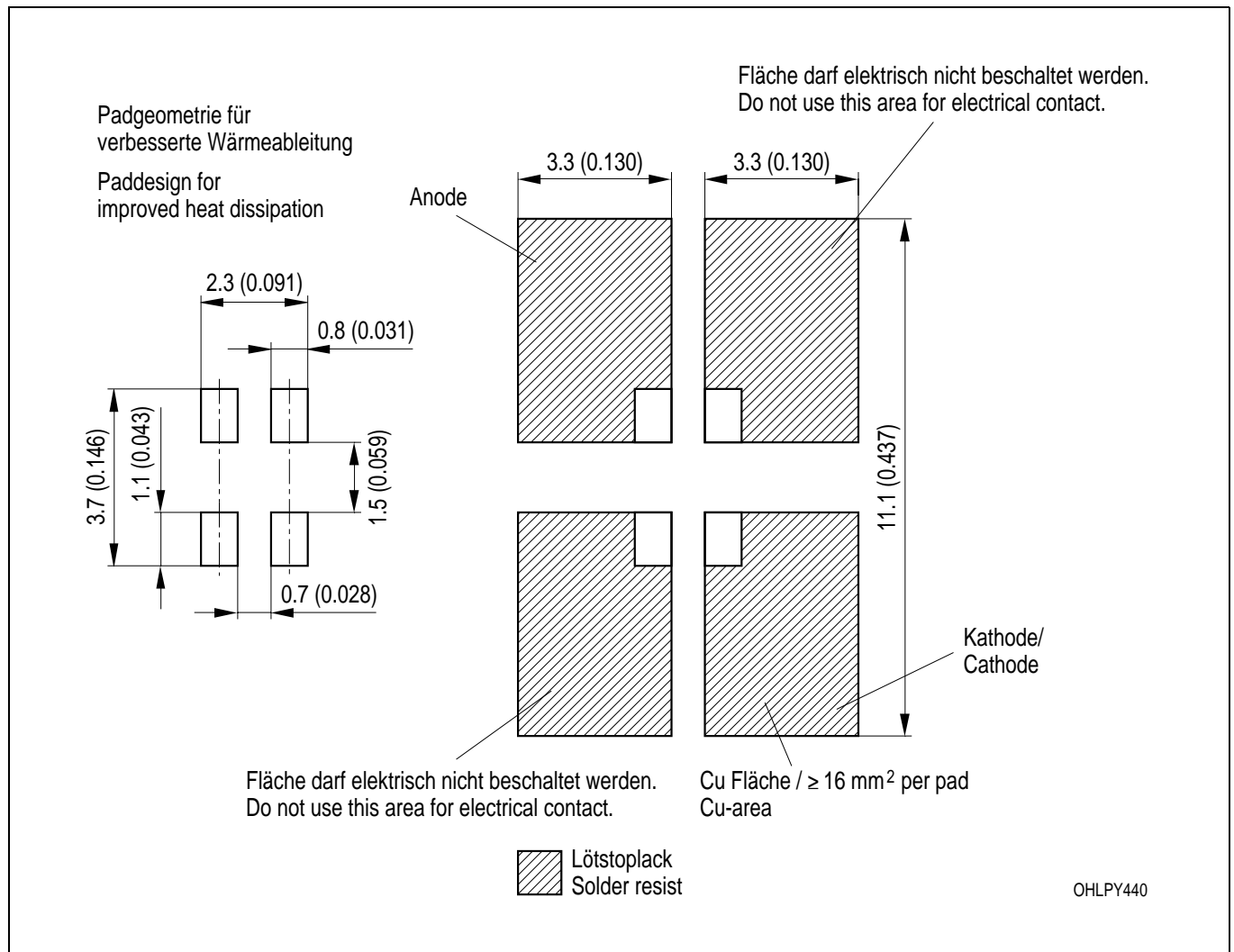
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).  
 Gehäuse hält TTW-Löthitze aus / Package able to withstand TTW-soldering heat

**Empfohlenes Lötpaddesign verwendbar für TOPLED® und Power TOPLED®**

IR Reflow Löten

**Recommended Solder Pad useable for TOPLED® and Power TOPLED®**

IR Reflow Soldering



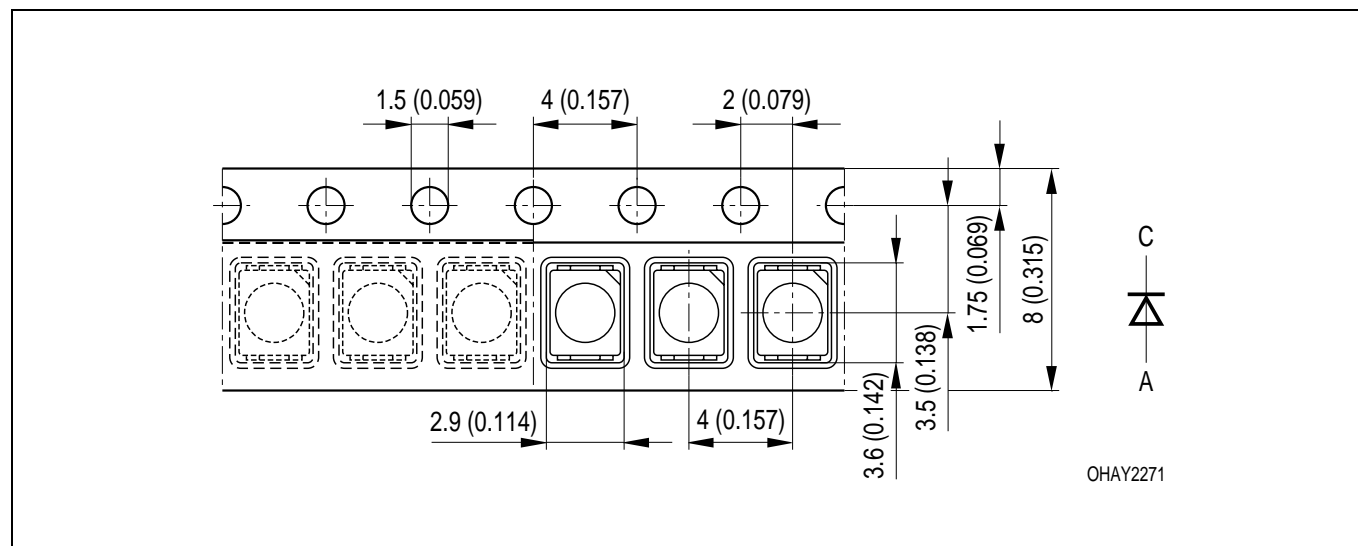
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

**Gurtung / Polarität und Lage**

Verpackungseinheit 2000/Rolle, ø180 mm oder  
8000/Rolle, ø330 mm

**Method of Taping / Polarity and Orientation**

Packing unit 2000/reel, ø180 mm or 8000/reel,  
ø330 mm



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

Revision History: 2002-11-12		Date of change
Previous Version: 2002-10-18		
Page	Subjects (major changes since last revision)	
8	Insert of permissible pulse handling capability diagrams	
5	wavelength groups (pure green)	
4	change of wavelength at peak emission from 567nm to 562 nm	
9	change of weight from 30 ,mg to 35 mg	2002-07-05
14	annotations	2002-07-23
13	recomm. solder pad for TOPLED® and Power TOPLED® (OHLPY440)	2002-08-05
3, 4	value (reverse voltage from 3 V to 12 V)	2002-09-18
2	new types and new ordering codes	2002-11-12
5	wavelength groups (green)	2002-09-26

**Published by OSRAM Opto Semiconductors GmbH**  
**Wernerwerkstrasse 2, D-93049 Regensburg**  
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