

# Hyper 5 mm (T1 3/4) LED, Non Diffused Enhanced optical Power LED (ATON®)

## LW 541C



### Vorläufige Daten / Preliminary Data

#### Besondere Merkmale

- **Gehäusetypp:** nicht eingefärbtes, klares 5 mm (T1<sup>3/4</sup>) Gehäuse
- **Besonderheit des Bauteils:** enge Abstrahlcharakteristik; Lötspieße ohne Aufsetzebene
- **Farbort:** x = 0.32, y = 0.31 nach CIE 1931 (weiß)
- **typ. Farbtemperatur:** 6500 K
- **Farbwiedergabeindex:** 80
- **Abstrahlwinkel:** 20°
- **Technologie:** InGaN
- **optischer Wirkungsgrad:** 12 lm/W
- **Gruppierungsparameter:** Lichtstärke, Farbort
- **Lötmethode:** Wellenlöten (TTW)
- **Verpackung:** Schüttgut, gegurtet lieferbar
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach EOS/ESD-5.1-1993

#### Anwendungen

- Informationsanzeigen im Außenbereich
- optischer Indikator
- Signal- und Symbolleuchten
- Markierungsbeleuchtung (z.B. Stufen, Fluchtwege, u.ä.)
- Effektbeleuchtung (z.B. Sternenhimmel)
- Ersatz von Miniaturlampen
- Möbelbeleuchtung (z.B. Vitrinen)

#### Features

- **package:** colorless, clear 5 mm (T1<sup>3/4</sup>) package
- **feature of the device:** narrow viewing angle, solder leads without stand-off
- **color coordinates:** x = 0.32, y = 0.31 acc. to CIE 1931 (white)
- **typ. color temperature:** 6500 K
- **color reproduction index:** 80
- **viewing angle:** 20°
- **technology:** InGaN
- **optical efficiency:** 12 lm/W
- **grouping parameter:** luminous intensity, color coordinates
- **soldering methods:** TTW soldering
- **packing:** bulk, available taped on reel
- **ESD-withstand voltage:** up to 2 kV acc. to EOS/ESD-5.1-1993

#### Applications

- outdoor displays
- optical indicators
- signal and symbol luminaire
- marker lights (e.g. steps, exit ways, etc.)
- lighting for special effects (e.g. starry sky)
- substitute for miniature flashlight
- furniture lighting (e.g. glass cupboards)

Typ	Emissions- farbe	Gehäusefarbe	Lichtstärke	Lichtstrom	Bestellnummer
Type	Color of Emission	Color of Package	Luminous Intensity $I_F = 20 \text{ mA}$ $I_V \text{ (mcd)}$	Luminous Flux $I_F = 20 \text{ mA}$ $\Phi_V \text{ (lm)}$	Ordering Code
LW 541C-BWCW-35	white	colorless clear	1800 ...4500	950(typ.)	Q62703Q6401
LW 541C-CWDW-35			2800 ...7100	1500(typ.)	Q65110A0630

Anm.: -35 Farbselektiert nach Farbortgruppen (siehe **Seite 5**).

*Die Standardlieferform von Serientypen beinhaltet eine untere bzw. eine obere Familiengruppe oder mindestens zwei Einzelgruppen.*

*In einer Verpackungseinheit / Gurt ist immer nur eine Helligkeitsgruppe enthalten.*

*Die technologiebedingte Helligkeits-Streuung der heutigen LED-Herstellprozesse über einen längeren Fertigungszeitraum (Halbleitermaterial - Chipherstellung - Montageprozess) erlaubt keine Zusage einer einzelnen Helligkeitsgruppe. Daher müssen mindestens zwei Helligkeitsgruppen vorgesehen werden!*

Note: -35 Color selection acc. to Chromaticity coordinate groups (see **page 5**)

*The standard shipping format for serial types includes a lower or upper family group or at least two individual groups.*

*No packing unit / tape ever contains more than one luminous intensity group.*

*Luminosity variations caused by the technology used in current LED manufacturing processes over a protracted manufacturing period (semiconductor material - chip fabrication - assembly process) mean that it is not possible to assign LEDs to a single luminous intensity group. For this reason at least two luminous intensity groups must be provided!*

**Grenzwerte**  
**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebstemperatur Operating temperature range	$T_{op}$	- 40 ... + 100	°C
Lagertemperatur Storage temperature range	$T_{stg}$	- 40 ... + 100	°C
Sperrschichttemperatur Junction temperature	$T_j$	+ 100	°C
Durchlassstrom Forward current	$I_F$	20	mA
Stoßstrom Surge current $t \leq 10 \mu s, D = 0.005$	$I_{FM}$	200	mA
Sperrspannung <sup>1)</sup> Reverse voltage	$V_R$	5	V
Leistungsaufnahme Power consumption $T_A \leq 25 \text{ °C}$	$P_{tot}$	85	mW
Wärmewiderstand <sup>2)</sup> Thermal resistance Sperrschicht/Umgebung Junction/ambient Sperrschicht/Löt­pad Junction/solder point Montage auf PC-Board FR 4 (Padgröße $\geq 16 \text{ mm}^2$ ) mounted on PC board FR 4 (pad size $\geq 16 \text{ mm}^2$ ) Minimale Beinchenlänge Minimum lead length	$R_{th JA}$  $R_{th JS}$	450  230	K/W  K/W

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

<sup>2)</sup>  $R_{th}$  erhöht sich um 13 K/W pro mm Beinchenlänge.  
Each additional 1 mm of lead length increases  $R_{th}$  by 13 K/W.

Kennwerte ( $T_A = 25\text{ °C}$ )

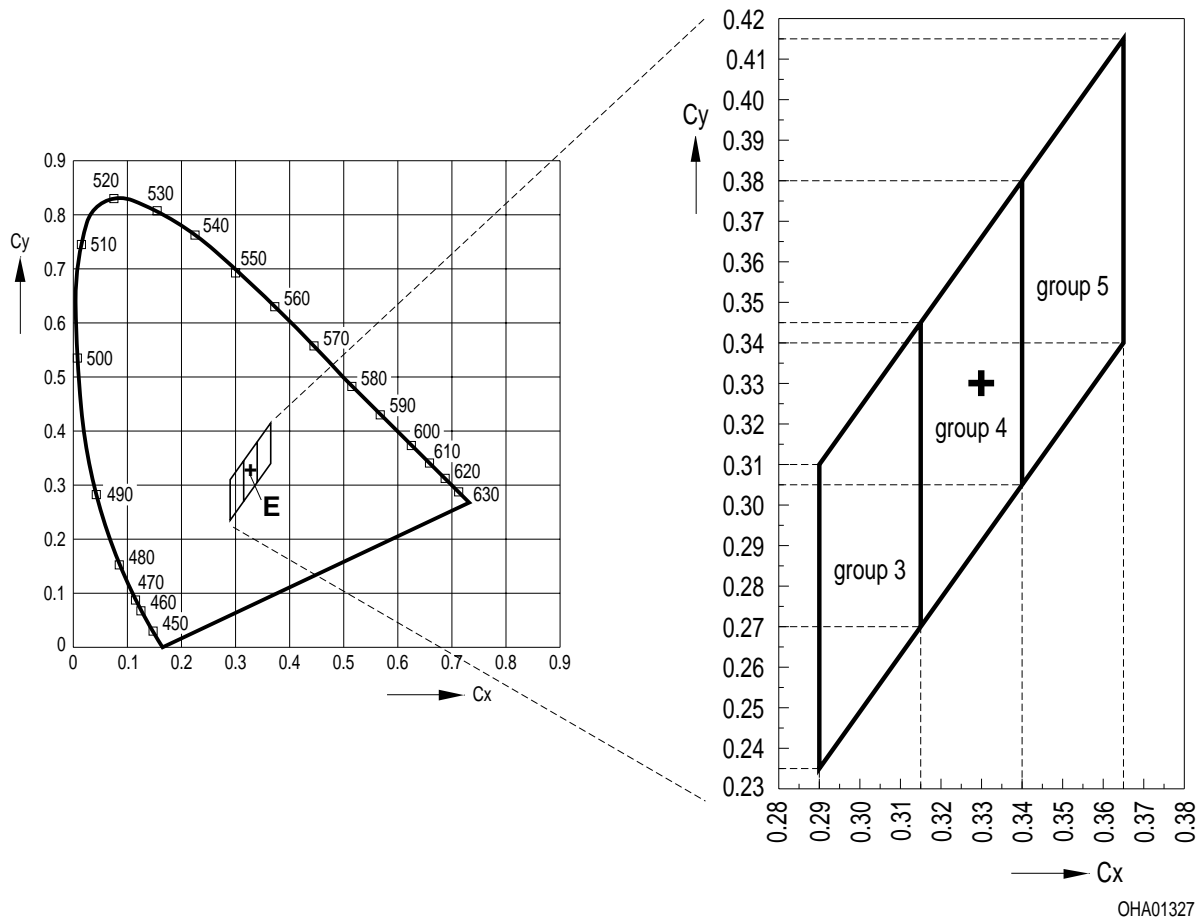
## Characteristics

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Farbkoordinate x nach CIE 1931 <sup>1)</sup> Chromaticity coordinate x acc. to CIE 1931 $I_F = 20\text{ mA}$	x	0.32	–
Farbkoordinate y nach CIE 1931 <sup>1)</sup> Chromaticity coordinate y acc. to CIE 1931 $I_F = 20\text{ mA}$	y	0.31	–
Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) Viewing angle at 50 % $I_V$	2 $\phi$	20	Grad deg.
Durchlassspannung <sup>2)</sup> (min.) Forward voltage (typ.) $I_F = 20\text{ mA}$ (max.)	$V_F$ $V_F$ $V_F$	3.0 3.6 4.1	V V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 5\text{ V}$	$I_R$ $I_R$	0.01 10	$\mu\text{A}$ $\mu\text{A}$
Temperaturkoeffizient von x Temperature coefficient of x $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_X$	–0.1	$10^{-3}/\text{K}$
Temperaturkoeffizient von y Temperature coefficient of y $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_Y$	–0.2	$10^{-3}/\text{K}$
Temperaturkoeffizient von $V_F$ Temperature coefficient of $V_F$ ) $I_F = 20\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_V$	–3.0	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 20\text{ mA}$	$\eta_{\text{opt}}$	12	lm/W

<sup>1)</sup> Farbortgruppen werden mit einer Stromeinprägungsdauer von 25 ms und einer Genauigkeit von  $\pm 0,01$  ermittelt.  
Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$ .

<sup>2)</sup> Durchlassspannungsgruppen werden mit einer Stromeinprägungsdauer von 1 ms und einer Genauigkeit von  $\pm 0,1\text{ V}$  ermittelt.  
Forward voltage groups are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ .

1) Farbortgruppen  
Chromaticity coordinate groups



**Helligkeits-Gruppierungsschema**  
**Luminous Intensity Groups**

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity $I_V$ (mcd)	Lichtstrom Luminous Flux $\Phi_V$ (mlm)
BW	1800 ... 2800	690 (typ.)
CW	2800 ... 4500	1090 (typ.)
DW	4500 ... 7100	1750 (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: BW-3

Example: BW-3

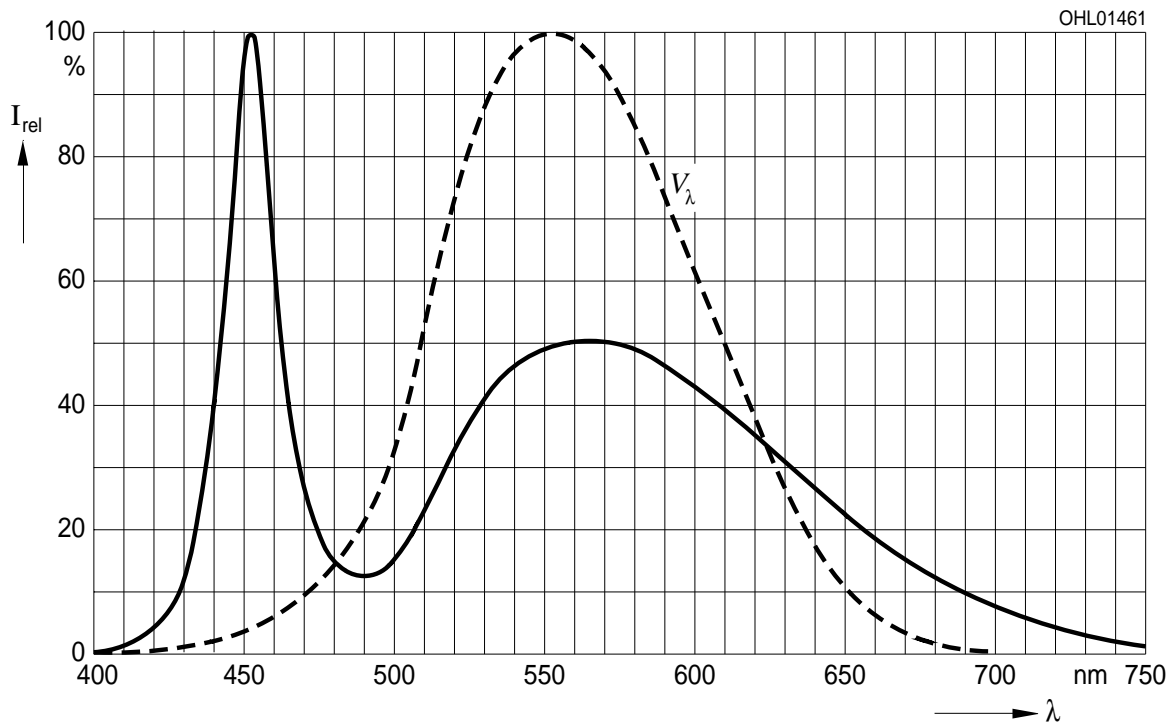
Lichtgruppe Luminous Intensity Group	Farbortgruppe Chromaticity Coordinate Group
BW	3

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

**Relative Spectral Emission**

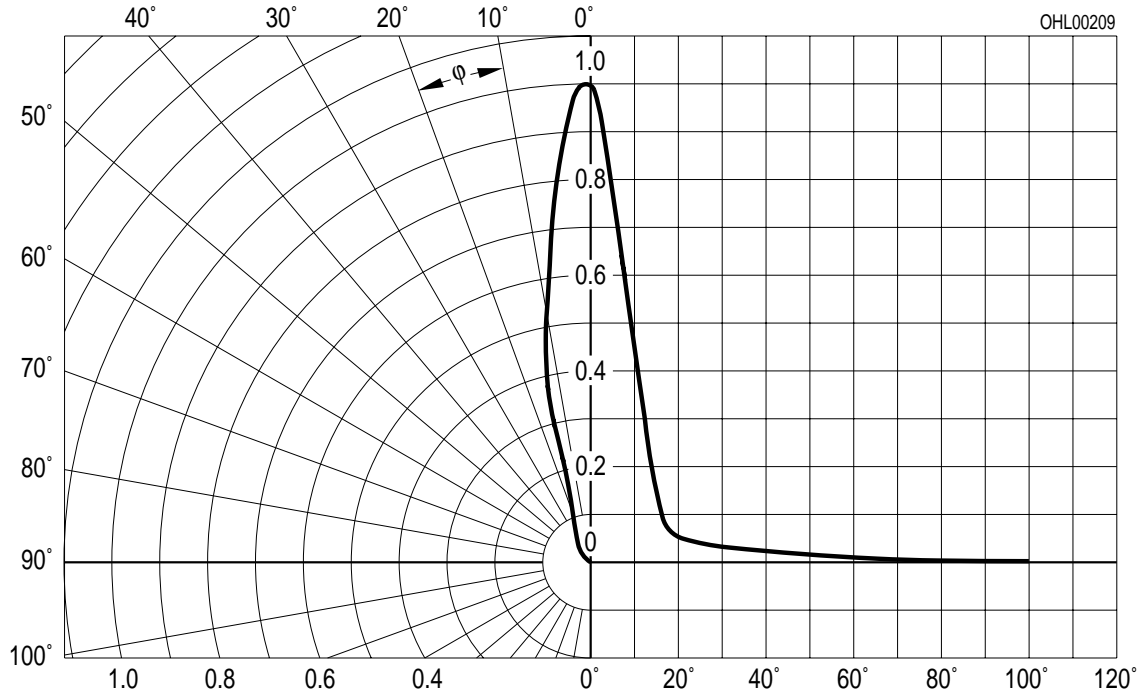
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve

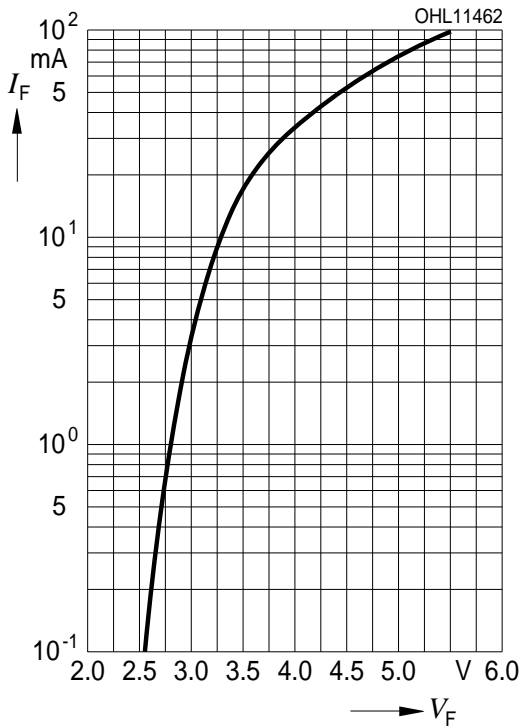


Abstrahlcharakteristik  $I_{rel} = f(\varphi)$

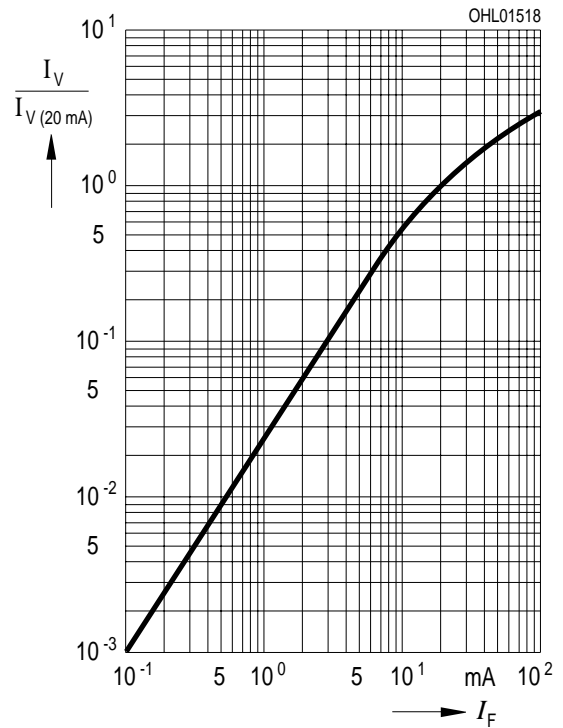
**Radiation Characteristic**



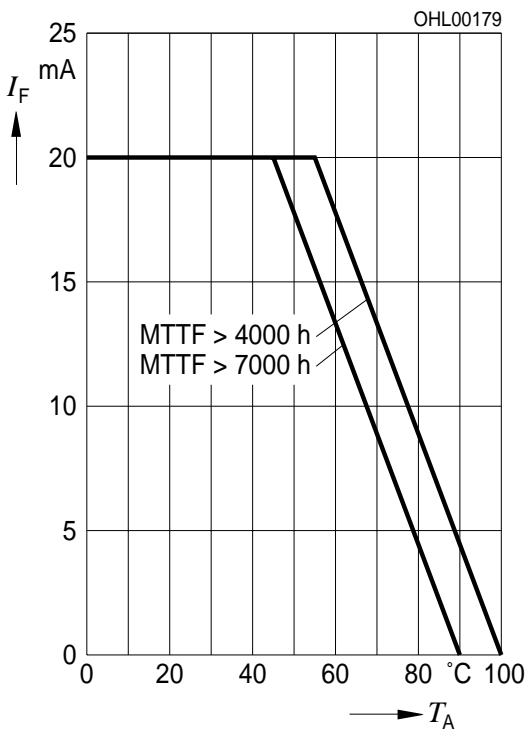
**Durchlassstrom  $I_F = f(V_F)$**   
**Forward Current**  
 $T_A = 25\text{ }^\circ\text{C}$



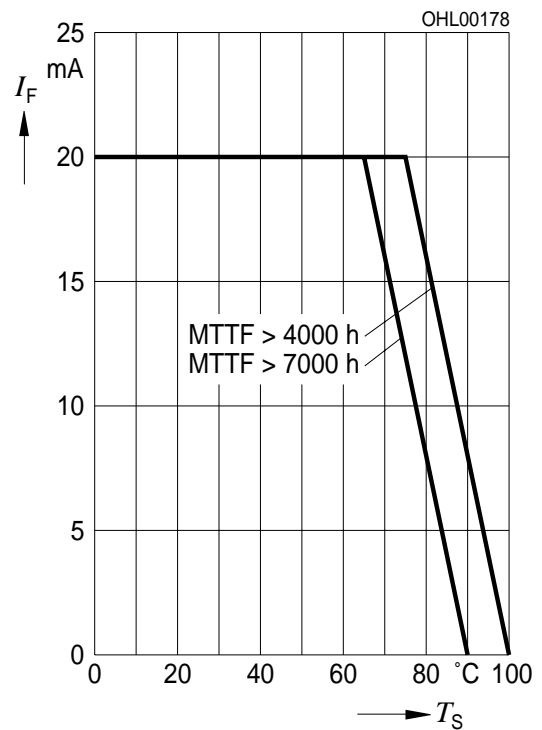
**Relative Lichtstärke  $I_V/I_{V(20\text{ mA})} = f(I_F)$**   
**Relative Luminous Intensity**  
 $T_A = 25\text{ }^\circ\text{C}$



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

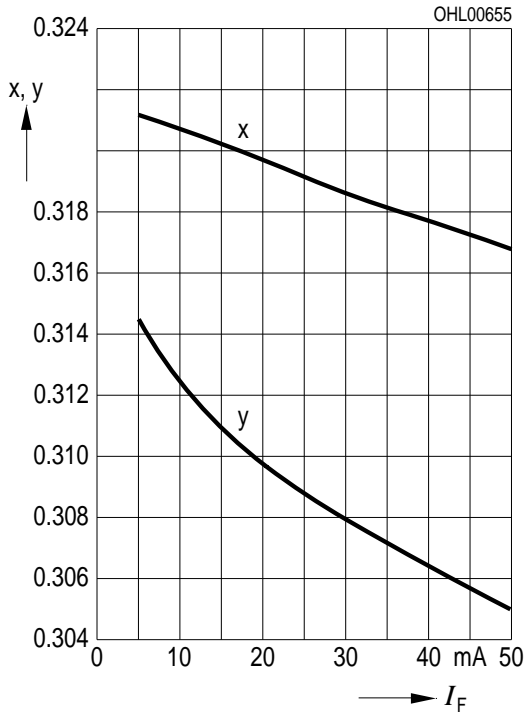


**Maximal zulässiger Durchlassstrom**  
**Max. Permissible Forward Current**  
 $I_F = f(T_S)$

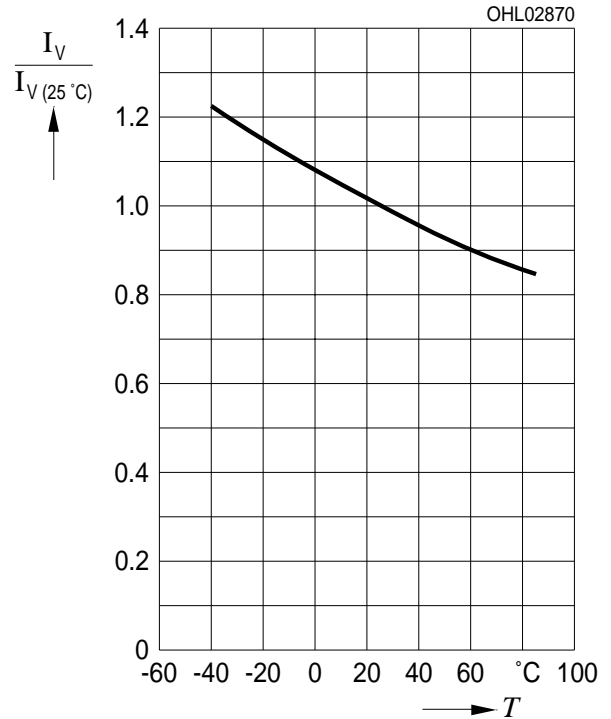




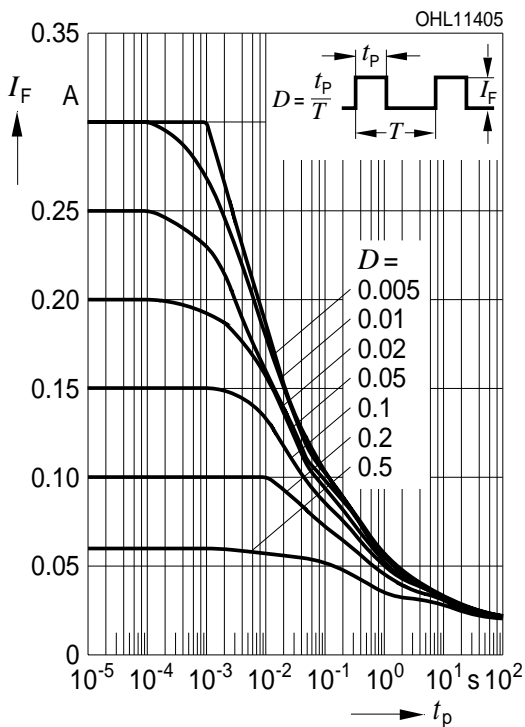
**Farbortverschiebung  $x, y = f(I_F)$**   
**Chromaticity Coordinate Shift**  
 $T_A = 25\text{ °C}$



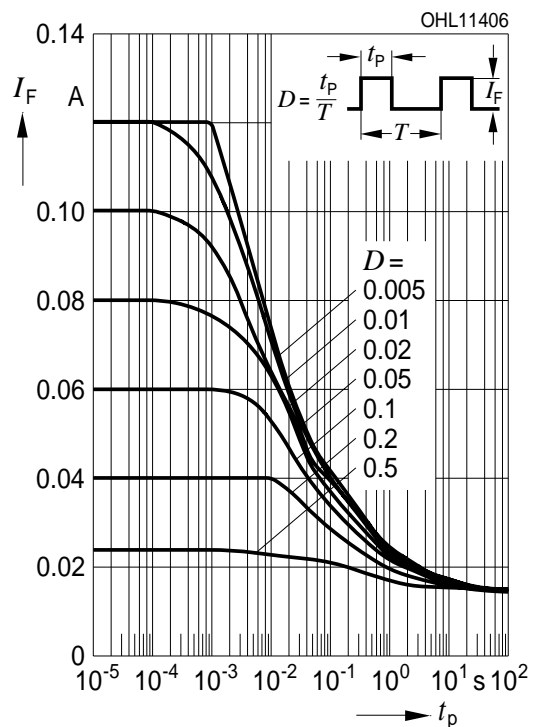
**Relative Lichtstärke  $I_V/I_{V(25\text{ °C})} = f(T_A)$**   
**Relative Luminous Intensity**  
 $I_F = 20\text{ mA}$



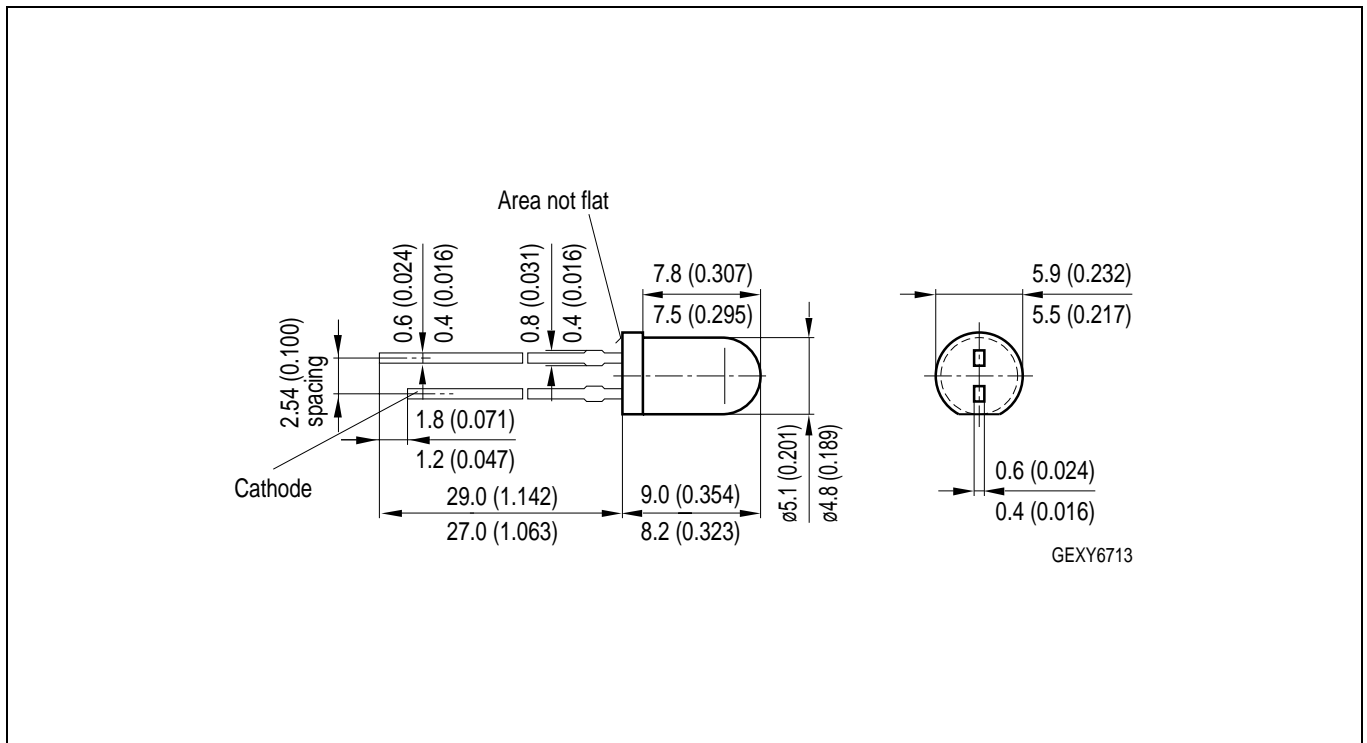
**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**  
 Duty cycle  $D = \text{parameter}$ ,  $T_A = 25\text{ °C}$



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



**Maßzeichnung**  
**Package Outlines**

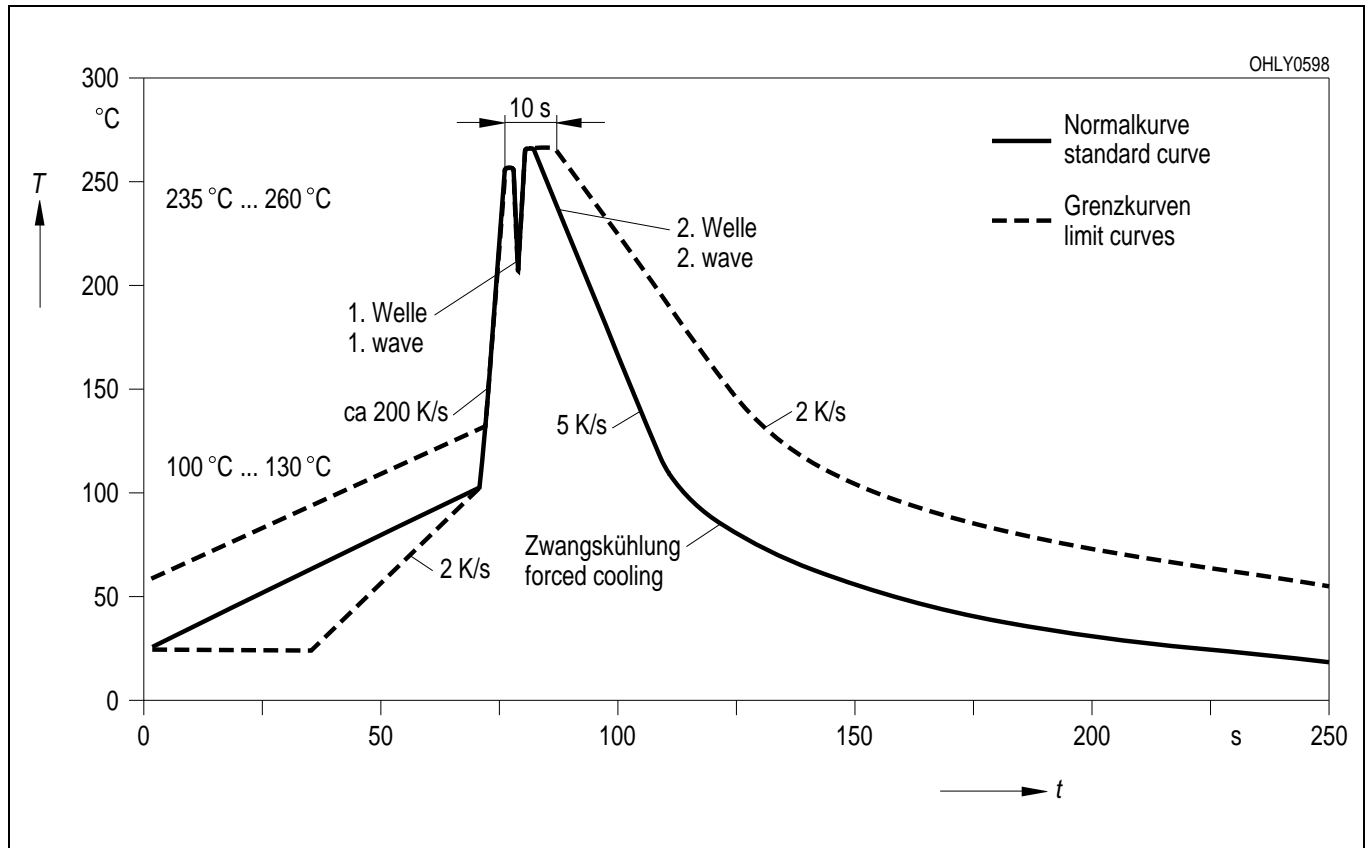


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

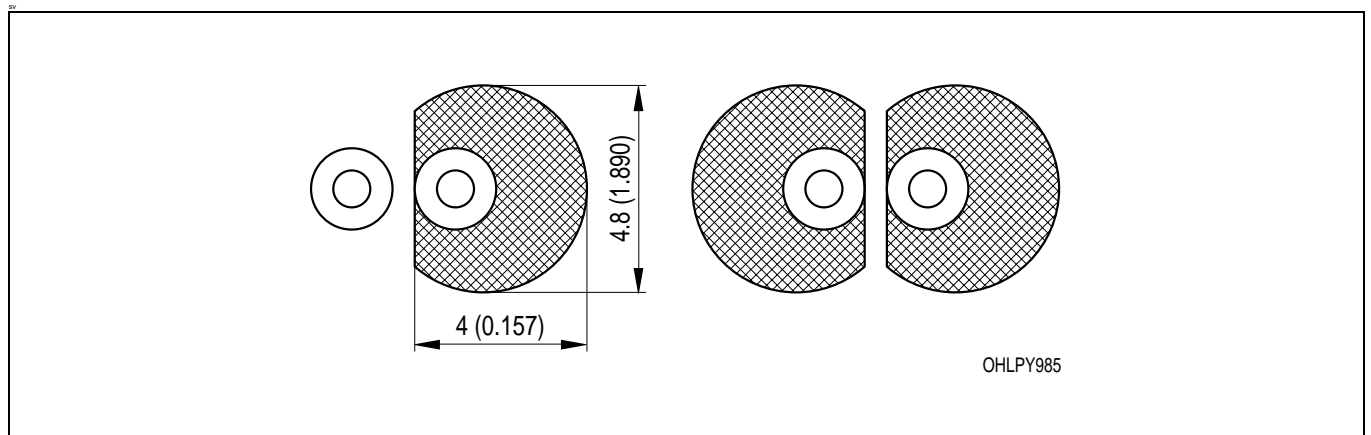
**Kathodenkennung:** kürzerer Lötspieß  
**Cathode mark:** short solder lead  
**Gewicht / Approx. weight:** 0.35 g

**Lötbedingungen**  
**Soldering Conditions**

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



**Empfohlenes Lötpadesign** Wellenlöten (TTW)  
**Recommended Solder Pad** TTW Soldering



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

<b>Revision History: 2003-03-04</b>		<b>Date of change</b>
Previous Version: 2002-11-28		
<b>Page</b>	<b>Subjects (major changes since last revision)</b>	
3	thermal resistance (footnote)	
4	value (forward voltage)	
2	change grouping from ABBB to AWBW and from BBCB to BWCW	
6	change grouping from half groups to single groups acc. to page 2	
3	power consumption from 90 mW to 85 mW	
8	diagram luminous intensity from OHL01462 to OHL11462	
2	value of $R_{th}$ from 470 to 450 K/W	
9	diagram pulse handling from OHL01405 to OHL00064 and from OHL01406 to OHL00060	
12	annotations	2002-07-25
9	diagram pulse handling (25°C) OHL00064 to OHL11405	2002-08-13
9	diagram pulse handling (85°C) OHL00060 to OHL11406	2002-08-13
3	reverse voltage (footnote)	2002-08-21
2, 5	new luminous intensity groups and new ordering codes	2002-11-18
12	new patent no.	2003-03-04

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**Patent List**

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**Patent No.**

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US 6 066 861, US 6 277 301, US 6 245 259

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