

Hyper 5 mm (T1 ¾) LED, Non Diffused Hyper-Bright LED

LW 541C



Vorläufige Daten / Preliminary Data

Besondere Merkmale

- **Gehäusotyp:** nicht eingefärbtes, klares 5 mm (T1¾) 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 (T1¾) 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-AWBW-1	white	colorless clear	1120 ...2800	590 (typ.)	Q62703-Q6400
LW 541C-BWCW-1			1800 ...4500	950 (typ.)	Q62703-Q6401

Anm.: -1 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 - Montageprozesses) erlaubt keine Zusage einer einzelnen Helligkeitsgruppe. Daher müssen mindestens zwei Helligkeitsgruppen vorgesehen werden!

Note: -1 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 Reverse voltage	V_R	5	V
Leistungsaufnahme Power consumption $T_A \leq 25 \text{ °C}$	P_{tot}	90	mW
Wärmewiderstand ¹⁾ 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	$R_{th JA}$ $R_{th JS}$	470 230	K/W K/W

¹⁾ 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.

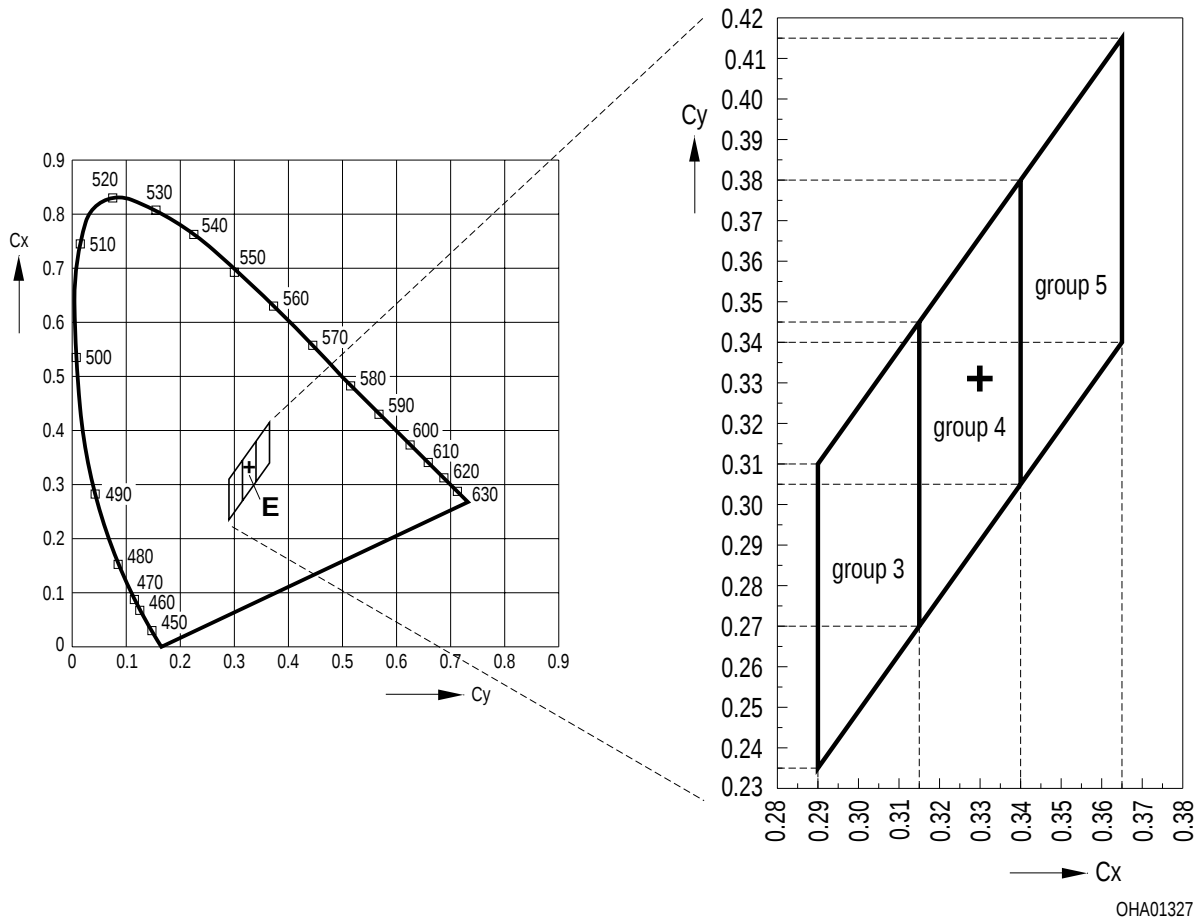
Kennwerte ($T_A = 25\text{ °C}$)**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Farbkoordinate x nach CIE 1931 ¹⁾ Chromaticity coordinate x acc. to CIE 1931 $I_F = 20\text{ mA}$	x	0.32	–
Farbkoordinate y nach CIE 1931 ¹⁾ 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 ϕ	20	Grad deg.
Durchlassspannung ²⁾ (typ.) Forward voltage (max.) $I_F = 20\text{ mA}$	V_F V_F	3.6 4.1	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 5\text{ V}$	I_R I_R	0.01 10	μA μA
Temperaturkoeffizient von x Temperature coefficient of x $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	TC_X	–0.1	$10^{-3}/\text{K}$
Temperaturkoeffizient von y Temperature coefficient of y $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	TC_Y	–0.2	$10^{-3}/\text{K}$
Temperaturkoeffizient von V_F Temperature coefficient of V_F) $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	TC_V	–3.0	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 20\text{ mA}$	η_{opt}	12	lm/W

¹⁾ Farbortgruppen werden mit einer Stromeinprägedauer 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 ± 0.01 .

²⁾ 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) **Farbortgruppen**
Chromaticity coordinate groups



Helligkeits-Gruppierungsschema
Luminous Intensity Groups

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity I_v (mcd)	Lichtstrom Luminous Flux Φ_v (lm)
AW	1120 ... 1800	440 (typ.)
BW	1800 ... 2800	690 (typ.)
CW	2800 ... 4500	1090 (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

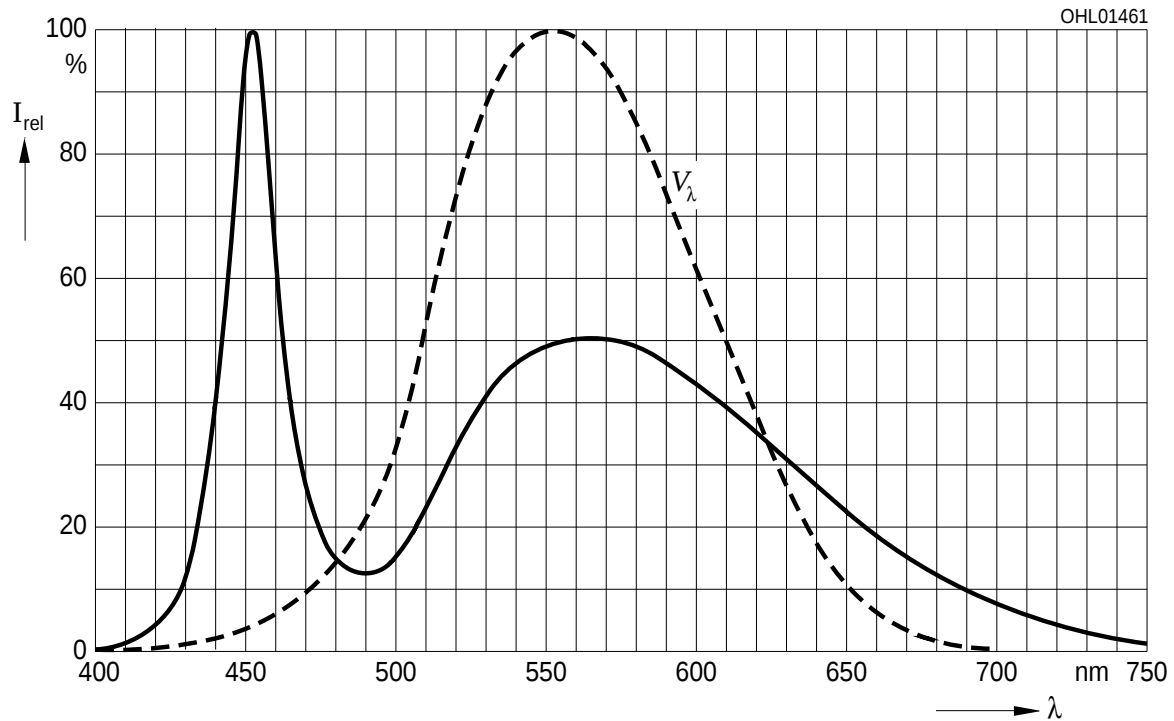
Lichtgruppe Luminous Intensity Group	Farbortgruppe Chromaticity Coordinate Group
BW	3

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

Relative Spectral Emission

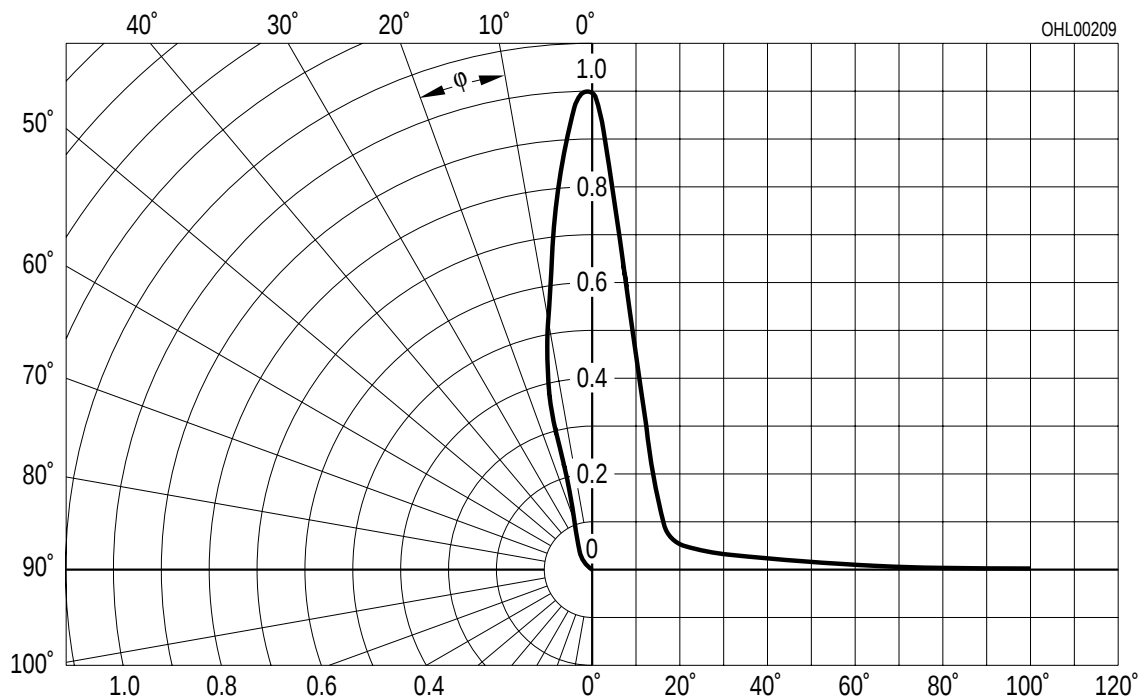
$V(\lambda)$ = spektrale Augenempfindlichkeit

Standard eye response curve



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

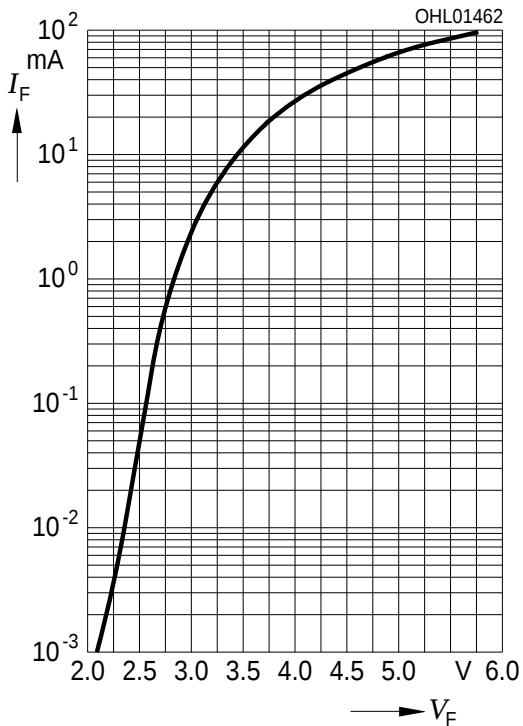
Radiation Characteristic



Durchlassstrom $I_F = f(V_F)$

Forward Current

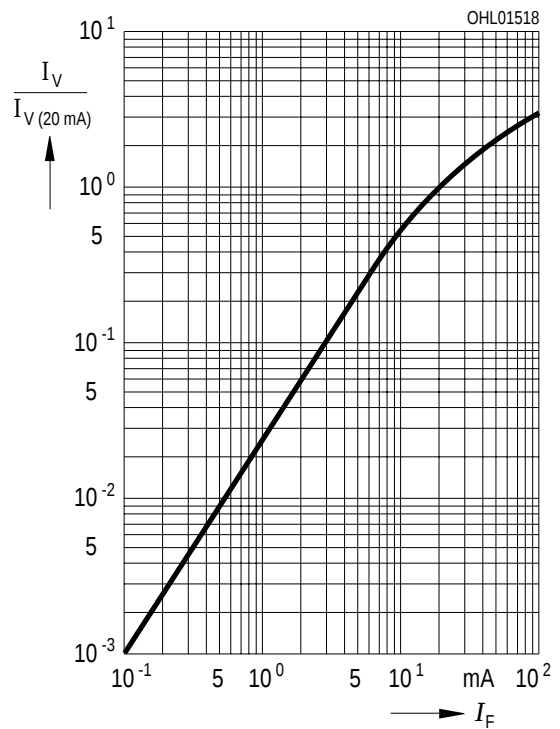
$T_A = 25^\circ\text{C}$



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

Relative Luminous Intensity

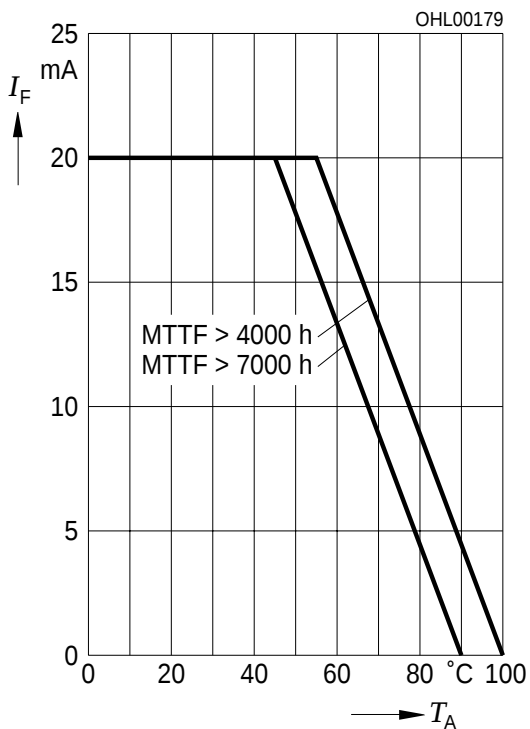
$T_A = 25^\circ\text{C}$



Maximal zulässiger Durchlassstrom

Max. Permissible Forward Current

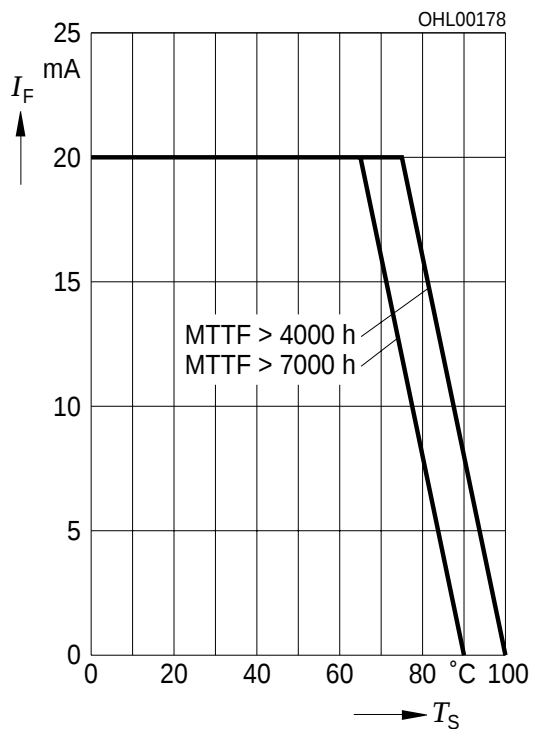
$I_F = f(T_A)$

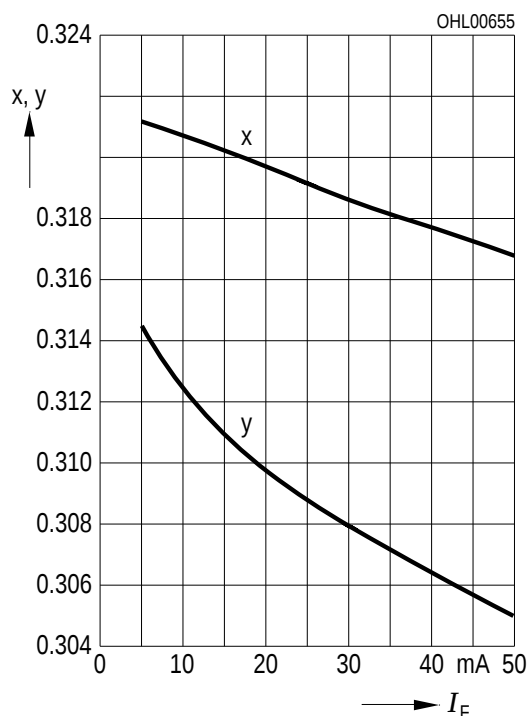
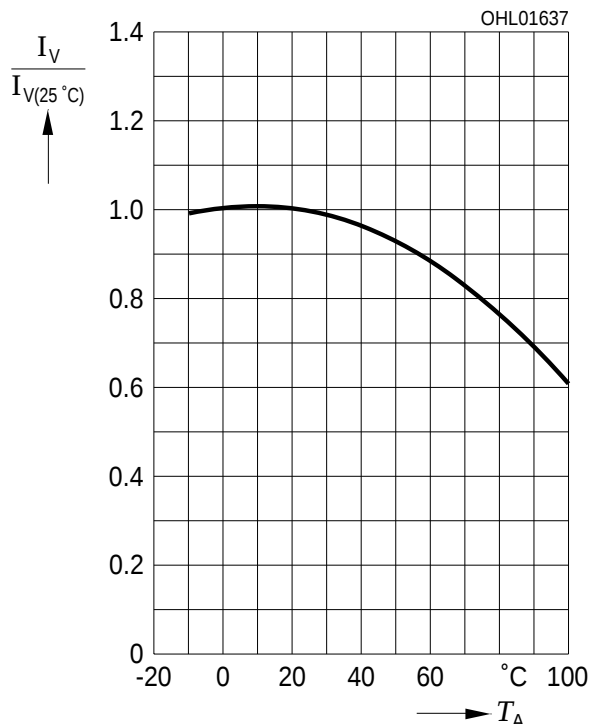
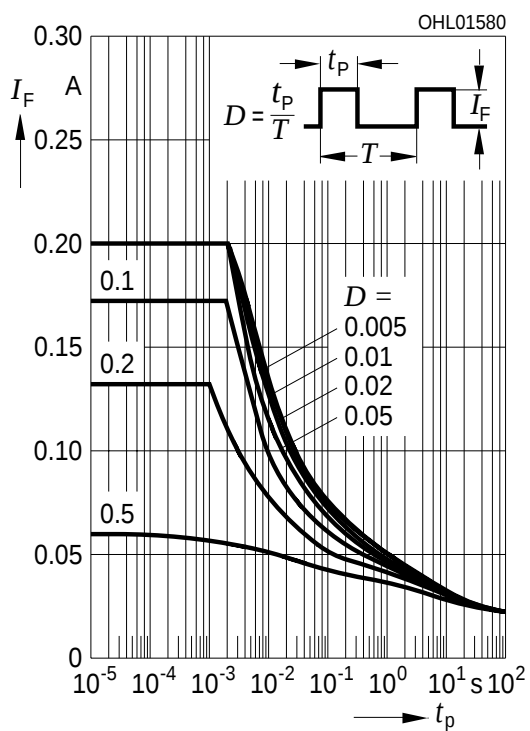
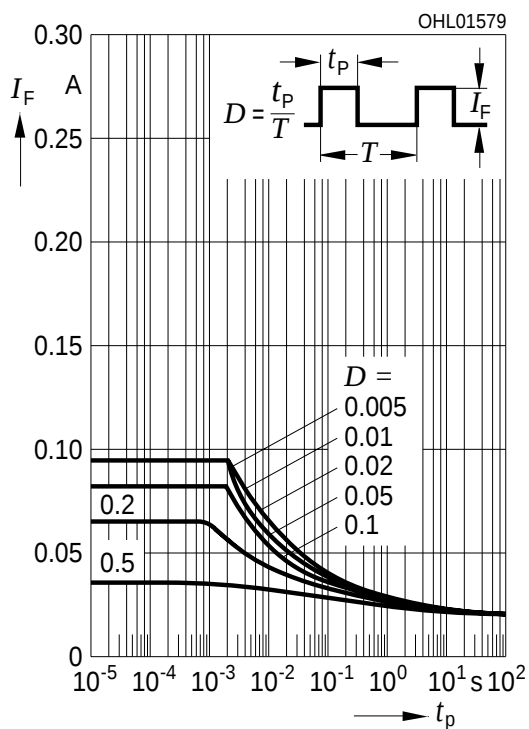


Maximal zulässiger Durchlassstrom

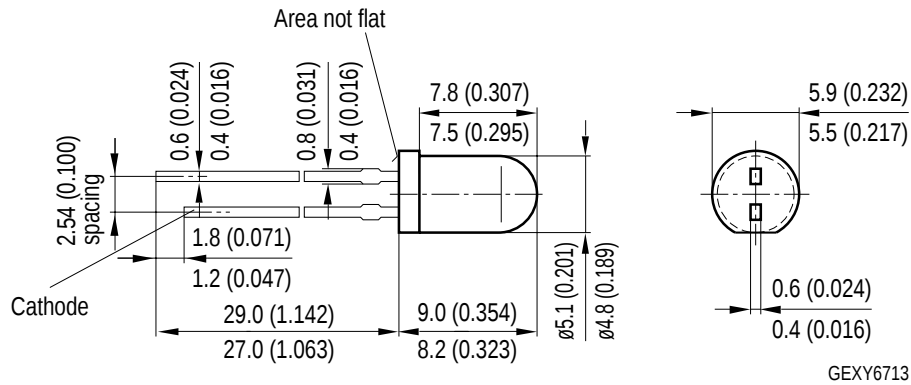
Max. Permissible Forward Current

$I_F = f(T_S)$



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



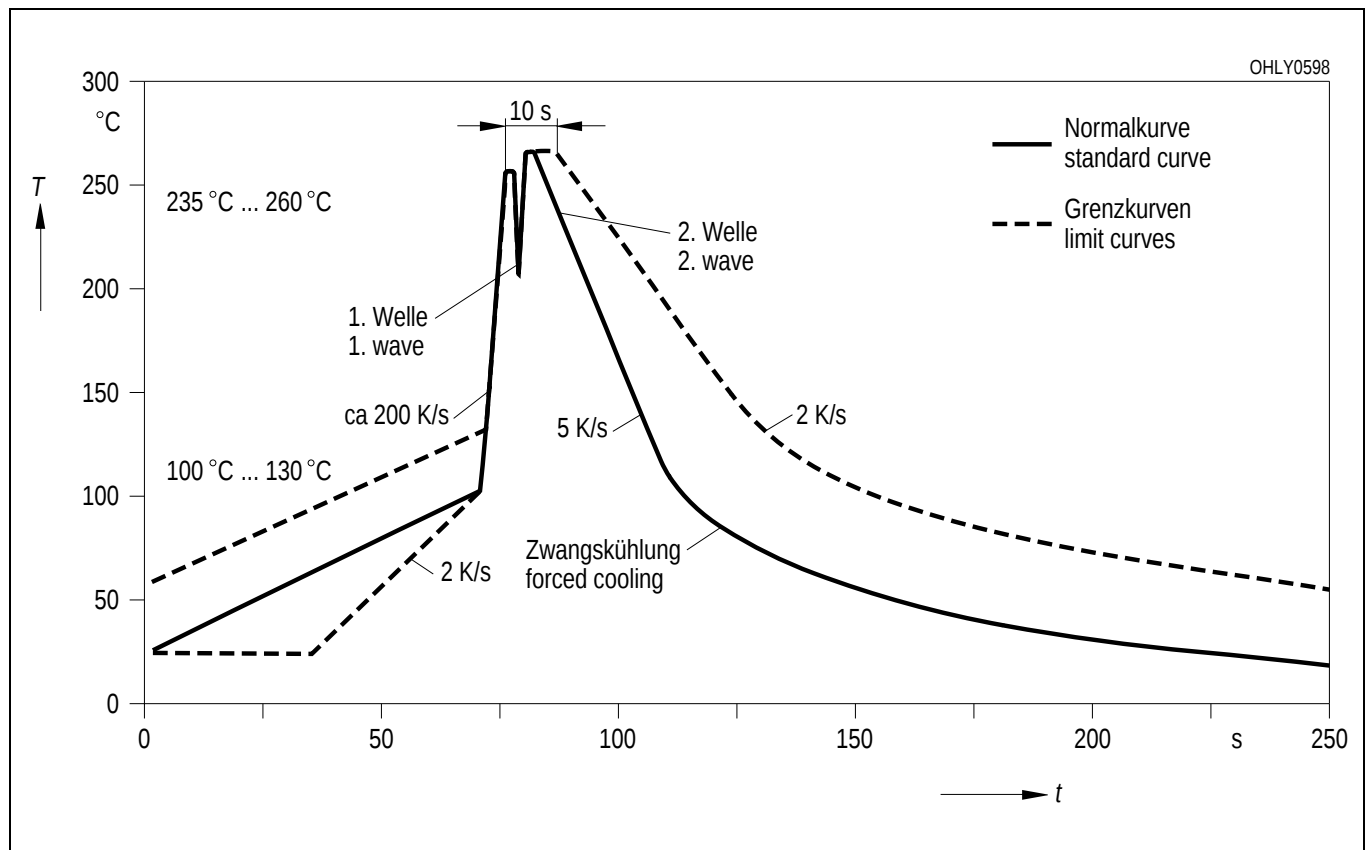
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

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

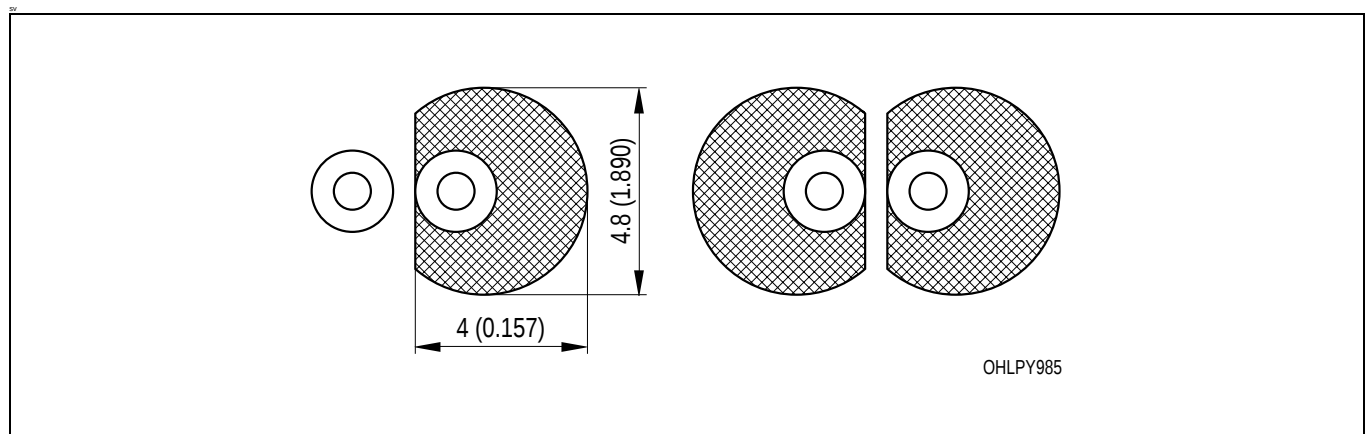
Lötbedingungen Soldering Conditions

Wellenlöten (TTW)(nach CECC 00802)

TTW Soldering(acc. to CECC 00802)



Empfohlenes Lötpad design Wellenlöten (TTW)
Recommended Solder Pad TTW Soldering



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

Revision History: 2001-12-07

Previous Version: 2001-11-26

Page	Subjects (major changes since last revision)
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

Patent List

Patent No.

US 6 066 861, US 6 277 301

Published by OSRAM Opto Semiconductors GmbH & Co. OHG
Wernerwerkstrasse 2, D-93049 Regensburg

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