

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

LB 5413, LV 5413, LT 5413



Vorläufige Daten / Preliminary Data

Besondere Merkmale

- **Gehäusetypp:** nicht eingefärbtes, klares 5 mm (T1 ¾) Gehäuse
- **Besonderheit des Bauteils:** enge Abstrahlcharakteristik für große Lichtstärken
- **Wellenlänge:** 470 nm (blau), 505 nm (verde), 528 nm (true green)
- **Abstrahlwinkel:** engwinklig (15°)
- **Technologie:** InGaN
- **optischer Wirkungsgrad:** 2 lm/W (blau), 6 lm/W (verde), 8 lm/W (true green)
- **Gruppierungsparameter:** Lichtstärke
- **Lötmethode:** Wellenlöten (TTW)
- **Verpackung:** Schüttgut, gegurtet lieferbar
- **ESD-Festigkeit:** ESD-sicher bis 2 kV nach EOS/ESD-5.1-1993

Anwendungen

- Ampelanwendungen
- Hinterleuchtung (LCD, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Tastenbeleuchtung, u. ä.)
- Ersatz von Kleinst-Glühlampen

Features

- **package:** colorless, clear 5 mm (T1 ¾) package
- **feature of the device:** narrow viewing angle for more brightness
- **wavelength:** 470 nm (blue), 505 nm (verde), 528 nm (true green)
- **viewing angle:** narrow (15°)
- **technology:** InGaN
- **optical efficiency:** 2 lm/W (blue), 6 lm/W (verde), 8 lm/W (true green)
- **grouping parameter:** luminous intensity
- **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

- traffic lights
- backlighting (LCD, switches, keys, displays, illuminated advertising, general lighting)
- interior automotive lighting (e.g. key backlighting, etc.)
- substitution of micro incandescent lamps

Type	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
LB 5413-TV LB 5413-VBW LB 5413-T LB 5413-U LB 5413-V LB 5413-AW LB 5413-BW	blue	colorless clear	280 ... 1120 710 ... 2800 280 ... 450 450 ... 710 710 ... 1120 1120 ... 1800 1800 ... 2800	120 (typ.) 300 (typ.) 60 (typ.) 100 (typ.) 150 (typ.) 240 (typ.) 380 (typ.)	Q62703-Q5930 Q62703-Q5931
LV 5413-VBW LV 5413-BWDW LV 5413-V LV 5413-AW LV 5413-BW LV 5413-CW LV 5413-DW	verde	colorless clear	710 ... 2800 1800 ... 7100 710 ... 1120 1120 ... 1800 1800 ... 2800 2800 ... 4500 4500 ... 7100	470 (typ.) 1200 (typ.) 230 (typ.) 370 (typ.) 590 (typ.) 900 (typ.) 1400 (typ.)	Q62703-Q5932 Q62703-Q5933
LT 5413-VBW LT 5413-BWDW LT 5413-V LT 5413-AW LT 5413-BW LT 5413-CW LT 5413-DW	true green	colorless clear	710 ... 2800 1800 ... 7100 710 ... 1120 1120 ... 1800 1800 ... 2800 2800 ... 4500 4500 ... 7100	470 (typ.) 1200 (typ.) 230 (typ.) 370 (typ.) 590 (typ.) 900 (typ.) 1400 (typ.)	Q62703-Q5934 Q62703-Q5935

Anm.: - gesamter Farbbereich, Lieferung in Einzelgruppen (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: - 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 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
		LB	LV, LT	
Betriebstemperatur Operating temperature range	T_{op}	– 55 ... + 100		°C
Lagertemperatur Storage temperature range	T_{stg}	– 55 ... + 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	250	mA
Sperrspannung Reverse voltage	V_R	5		V
Leistungsaufnahme Power consumption $T_A \leq 25 \text{ °C}$	P_{tot}	85		mW
Wärmewiderstand 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	$R_{th JA}$ $R_{th JS}$	400 180		K/W K/W

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

Bezeichnung Parameter	Symbol Symbol	Werte Values			Einheit Unit
		LB	LV	LT	
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 20\text{ mA}$	λ_{peak}	465	503	523	nm
Dominantwellenlänge ¹⁾ (typ.) Dominant wavelength $I_F = 20\text{ mA}$	λ_{dom}	470 ± 6	505 ± 7	528 ± 9	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 20\text{ mA}$	$\Delta\lambda$	25	30	33	nm
Abstrahlwinkel bei 50 % I_V (Vollwinkel) (typ.) Viewing angle at 50 % I_V	2ϕ	15	15	15	Grad deg.
Durchlassspannung ²⁾ (typ.) Forward voltage (max.) $I_F = 20\text{ mA}$	V_F V_F	3.5 4.1	3.3 4.1	3.3 4.1	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 5\text{ V}$	I_R I_R	0.01 10	0.01 10	0.01 10	μA μA
Temperaturkoeffizient von λ_{peak} (typ.) Temperature coefficient of λ_{peak} $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{peak}}}$	0.04	0.03	0.04	nm/K
Temperaturkoeffizient von λ_{dom} (typ.) Temperature coefficient of λ_{dom} $I_F = 20\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{dom}}}$	0.02	0.02	0.03	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	- 2.9	- 3.2	- 3.6	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 20\text{ mA}$	η_{opt}	2	6	8	lm/W

¹⁾ 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 $\pm 1\text{ nm}$.

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) Wellenlängengruppen / Wavelength groups

Gruppe Group	blue		verde		true green		Einheit Unit
	min.	max.	min.	max.	min.	max.	
3	464	468	498	503	519	525	nm
4	468	472	503	507	525	531	nm
5	472	476	507	512	531	537	nm

Helligkeits-Gruppierungsschema
Luminous Intensity Groups

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity I_V (mcd)	Lichtstrom Luminous Flux Φ_V (lm)
T	280 ... 450	60 (typ.)
U	450 ... 710	100 (typ.)
V	710 ... 1120	150 (typ.)
AW	1120 ... 1800	240 (typ.)
BW	1800 ... 2800	380 (typ.)
CW	2800 ... 4500	900 (typ.)
DW	4500 ... 7100	1400 (typ.)

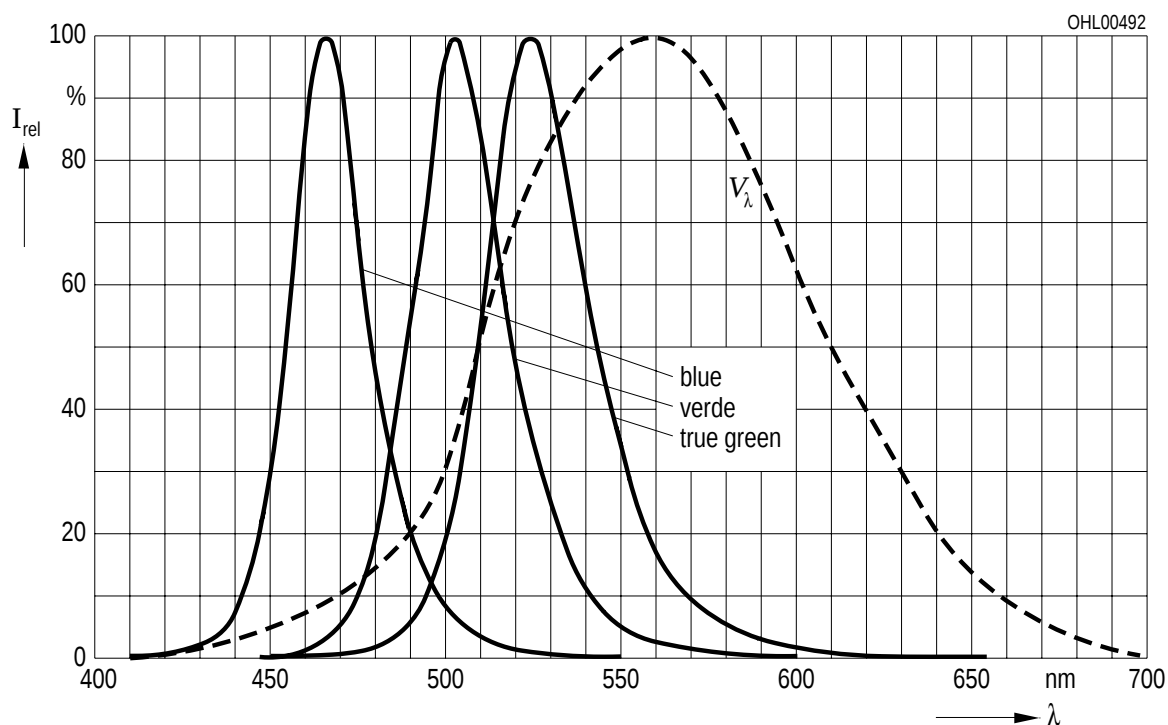
Helligkeitswerte werden mit einer Stromeinprägedauer von 25 ms und einer Genauigkeit von $\pm 11\%$ ermittelt.
 Luminous intensity is tested at a current pulse duration of 25 ms and a tolerance of $\pm 11\%$.

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

Relative Spectral Emission

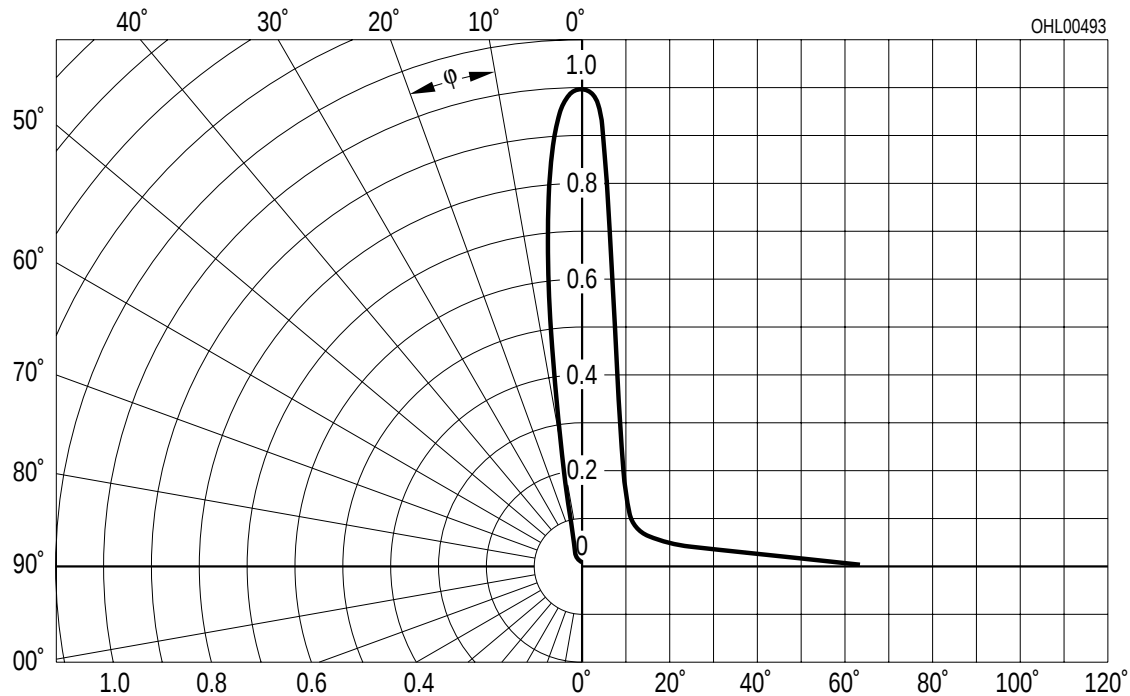
$V(\lambda)$ = spektrale Augenempfindlichkeit

Standard eye response curve



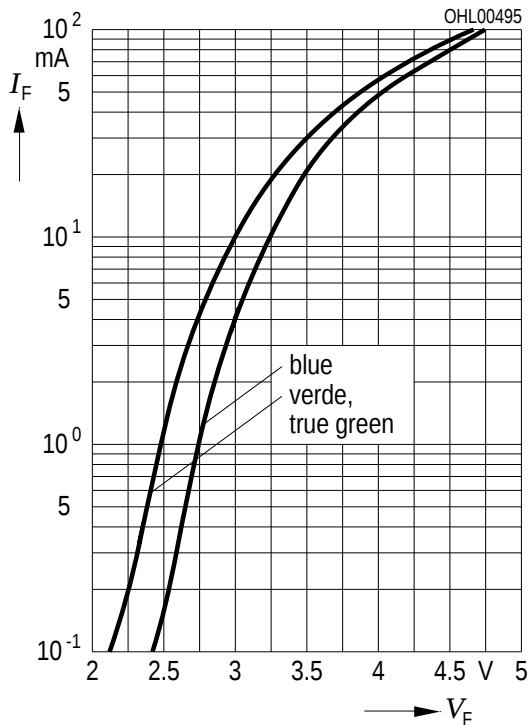
Abstrahlcharakteristik $I_{\text{rel}} = f(\varphi)$

Radiation Characteristic

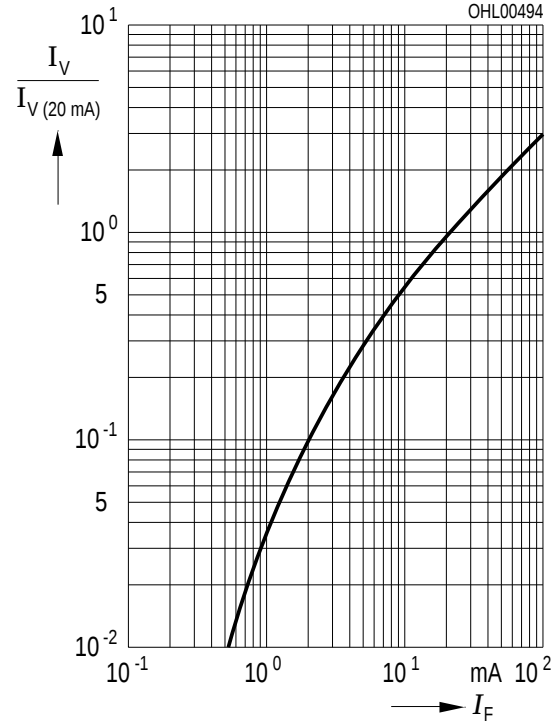


Durchlassstrom $I_F = f(V_F)$

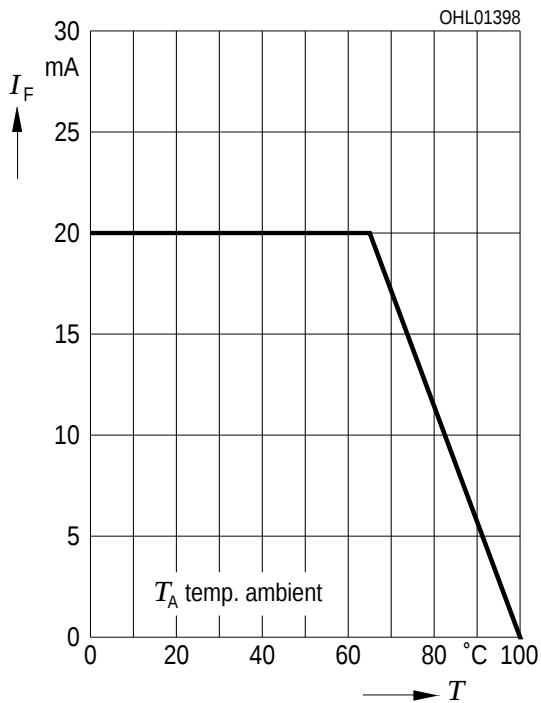
Forward Current

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

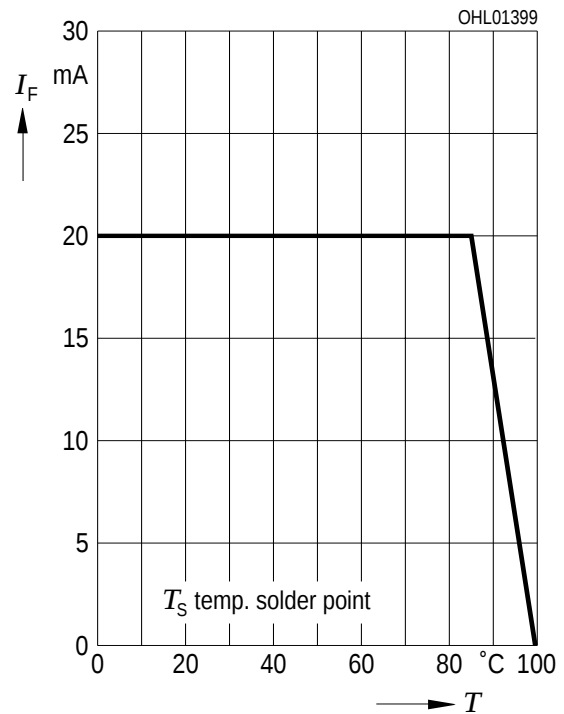
Relative Luminous Intensity

 $T_A = 25\text{ °C}$ Maximal zulässiger Durchlassstrom $I_F = f(T)$

Max. Permissible Forward Current

Maximal zulässiger Durchlassstrom $I_F = f(T)$

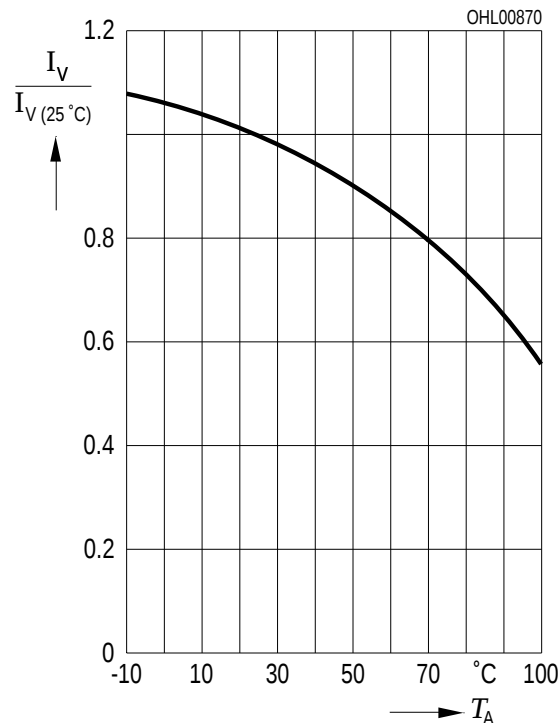
Max. Permissible Forward Current



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

Relative Luminous Intensity

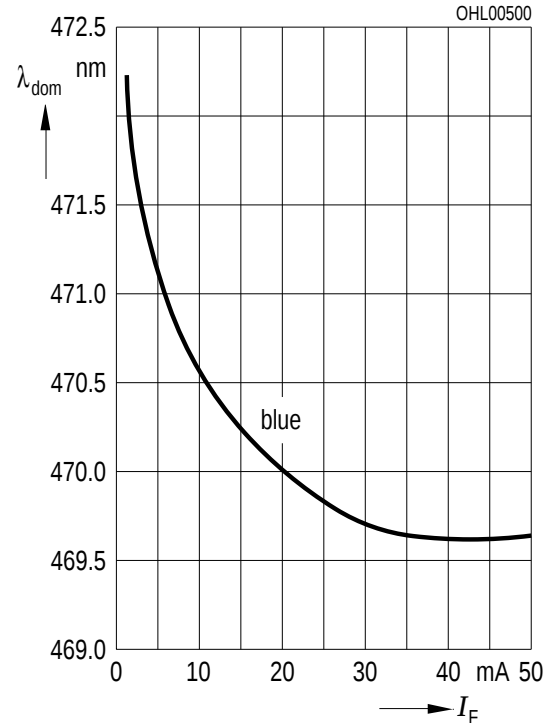
$I_F = 20\text{ mA}$



Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$

Dominant Wavelength

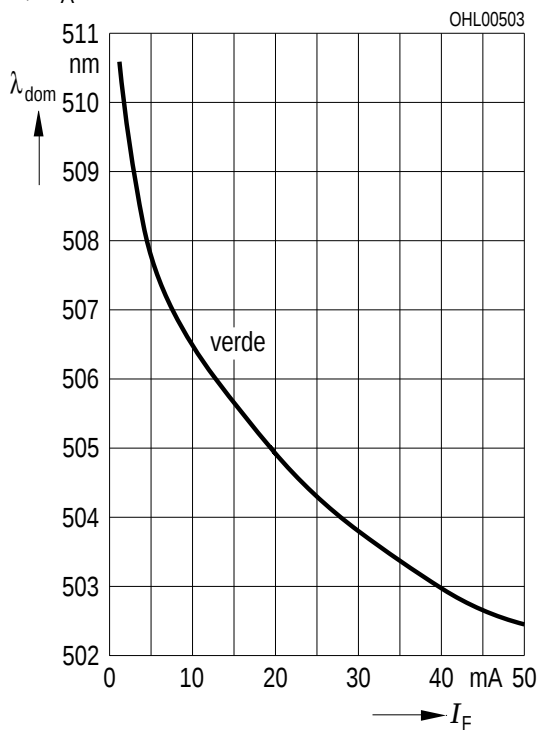
LB, $T_A = 25\text{ °C}$



Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$

Dominant Wavelength

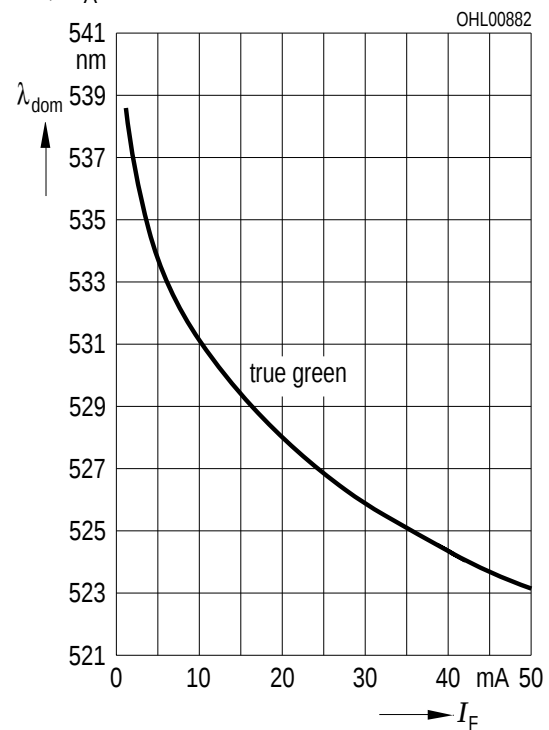
LV, $T_A = 25\text{ °C}$



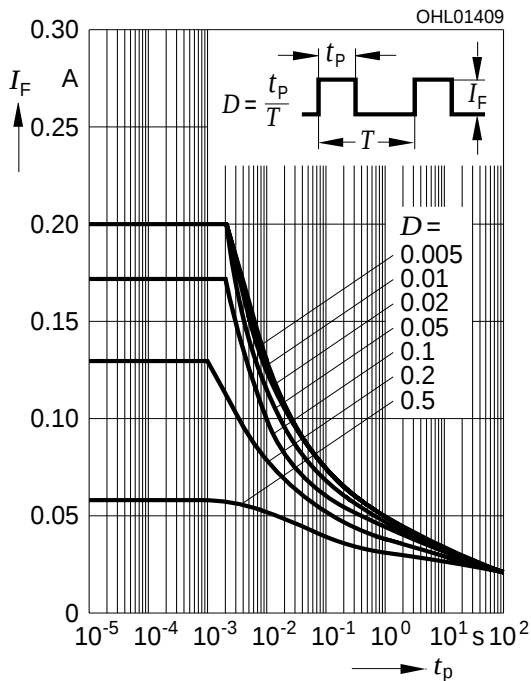
Dominante Wellenlänge $\lambda_{\text{dom}} = f(I_F)$

Dominant Wavelength

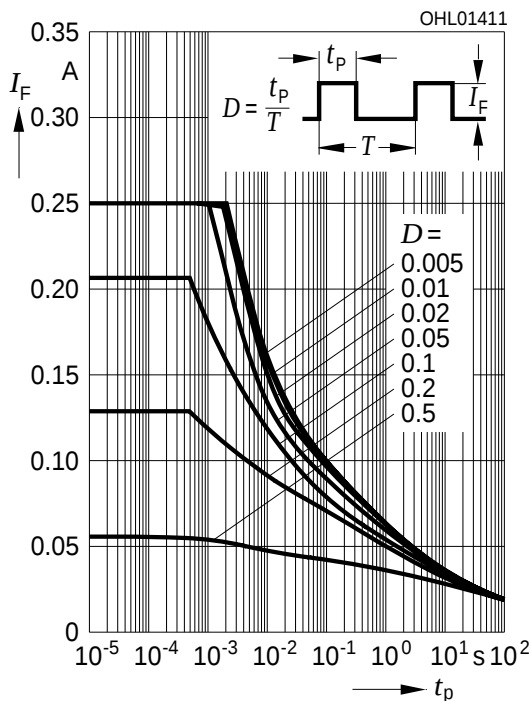
LT, $T_A = 25\text{ °C}$



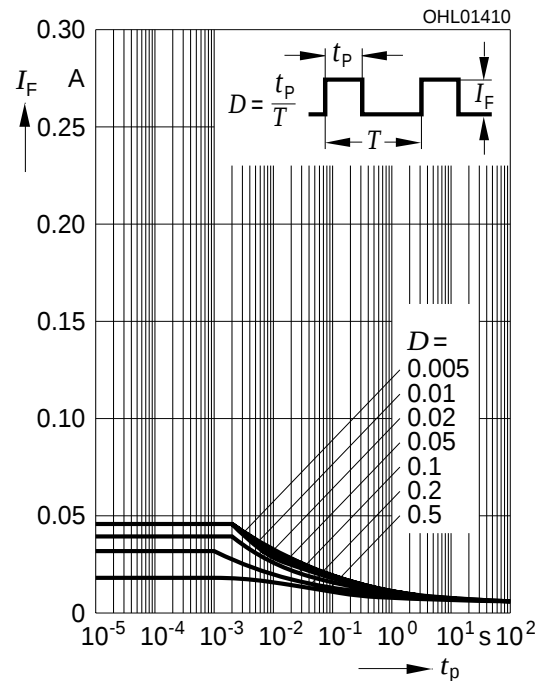
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
 Duty cycle $D = \text{parameter}$, $T_A = 25\text{ °C}$
LB



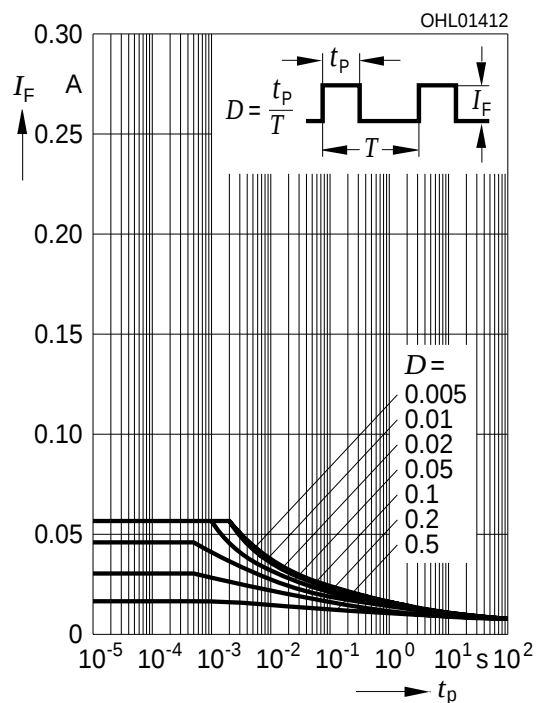
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
 Duty cycle $D = \text{parameter}$, $T_A = 25\text{ °C}$
LV, LT



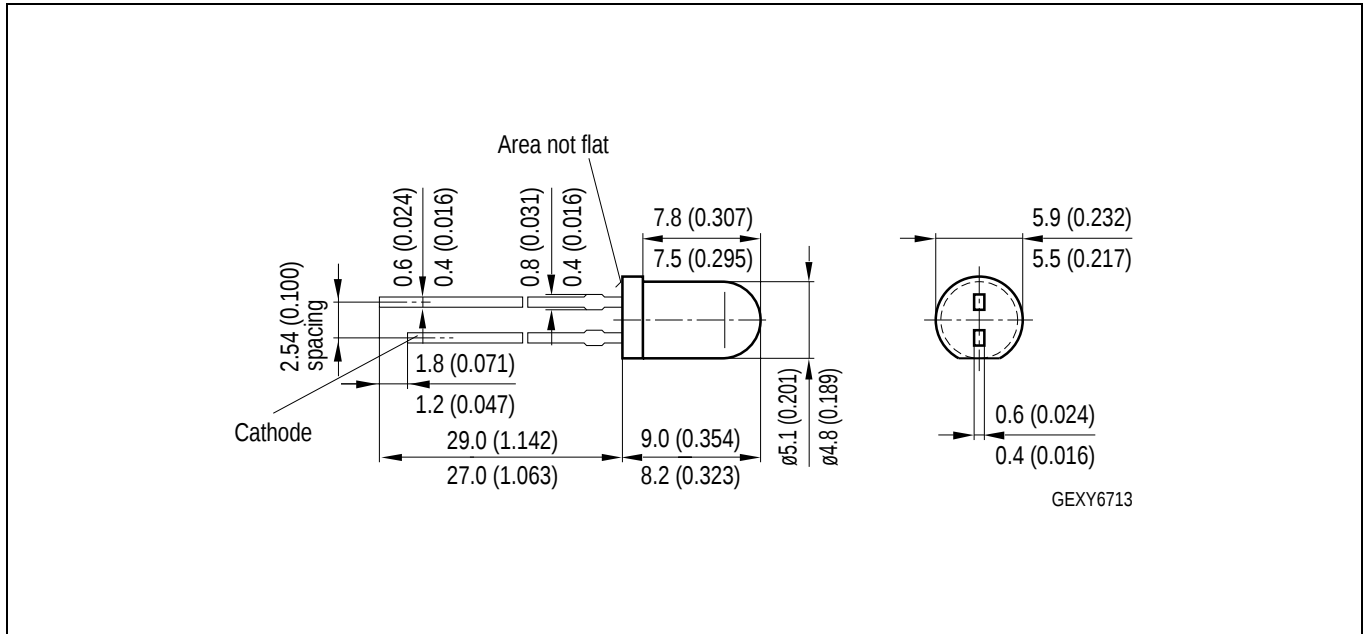
Zulässige Impulsbelastbarkeit $I_F = f(t_p)$
Permissible Pulse Handling Capability
 Duty cycle $D = \text{parameter}$, $T_A = 85\text{ °C}$
LB



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



Maßzeichnung Package Outlines



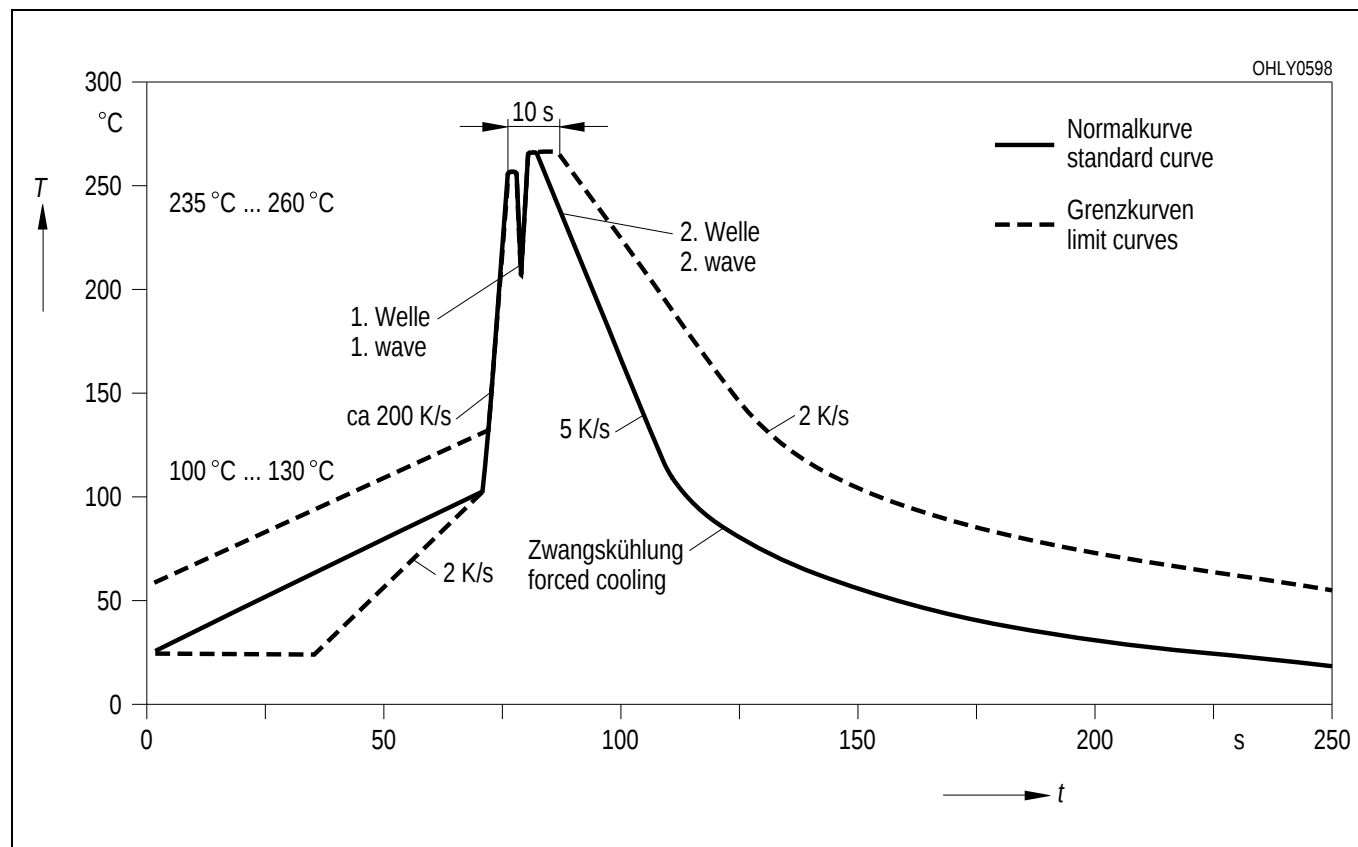
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

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

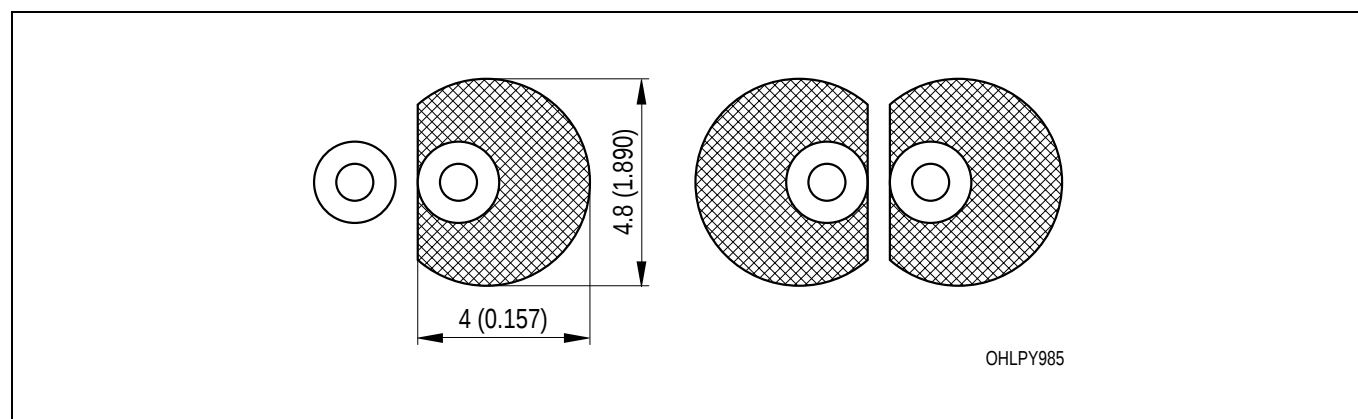
Lötbedingungen Soldering Conditions

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: 2001-03-01

Previous Version: 2001-03-01

Page	Subjects (major changes since last revision)

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