

## 5 mm (T1 ¾) LED, Diffused

LR 5460, LS 5460, LY 5460, LG 5460



### Besondere Merkmale

- **Gehäusetypp:** eingefärbtes, diffuses 5 mm (T1 ¾) Gehäuse
- **Besonderheit des Bauteils:** Lötspieße ohne Aufsetzebene
- **Wellenlänge:** 645 nm (rot), 628 nm (super-rot), 587 nm (gelb), 570 nm (grün)
- **Abstrahlwinkel:** 50°
- **Technologie:** GaAIP
- **optischer Wirkungsgrad:** 0,4 lm/W (rot), 1,5 lm/W (super-rot, gelb), 2,5 lm/W (grün)
- **Gruppierungsparameter:** Lichtstärke
- **Lötmethode:** Wellenlöten (TTW)
- **Verpackung:** Schüttgut, gegurtet lieferbar

### Anwendungen

- optischer Indikator
- Hinterleuchtung (LCD, Handy, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung, u.ä.)
- Markierungsbeleuchtung (z.B. Stufen, Fluchtwege, u.ä.)

### Features

- **package:** colored, diffused 5 mm (T1 ¾) package
- **feature of the device:** solder leads without stand-off
- **wavelength:** 645 nm (red), 628 nm (super-red), 587 nm (yellow), 570 nm (green)
- **viewing angle:** 50°
- **technology:** GaAIP
- **optical efficiency:** 0.4 lm/W (red), 1.5 lm/W (super-red, yellow), 2.5 lm/W (green)
- **grouping parameter:** luminous intensity
- **soldering methods:** TTW soldering
- **packing:** bulk, available taped on reel

### Applications

- optical indicators
- backlighting (LCD, cellular phones, switches, keys, displays, illuminated advertising, general lighting)
- interior automotive lighting (e.g. dashboard backlighting, etc.)
- marker lights (e.g. steps, exit ways, etc.)

Type	Emissions- farbe Color of Emission	Gehäuse- farbe Color of Package	Lichtstärke Luminous Intensity $I_F = 10 \text{ mA}$ $I_V \text{ (mcd)}$	Lichtstrom Luminous Flux $I_F = 10 \text{ mA}$ $\Phi_V \text{ (lm)}$	Bestellnummer Ordering Code
LR 5460-DG	red	red diffused	0.45 ... 2.8	4 (typ.)	Q62703-Q1392
LR 5460-F			1.12 ... 1.8	3 (typ.)	Q62703-Q1393
LR 5460-G			1.80 ... 2.8	5 (typ.)	Q62703-Q1394
LR 5460-FJ			1.12 ... 7.1	6 (typ.)	Q62703-Q1395
LS 5460-HL	super-red	red diffused	2.80 ... 18.0	35 (typ.)	Q62703-Q1396
LS 5460-J			4.50 ... 7.1	20 (typ.)	Q62703-Q1746
LS 5460-K			7.10 ... 11.2	30 (typ.)	Q62703-Q1397
LS 5460-L			11.20 ... 18.0	50 (typ.)	Q62703-Q1398
LS 5460-JM			4.50 ... 28.0	60 (typ.)	Q62703-Q3225
LY 5460-HL	yellow	yellow diffused	2.80 ... 18.0	35 (typ.)	Q62703-Q1400
LY 5460-J			4.50 ... 7.1	20 (typ.)	Q62703-Q1401
LY 5460-K			7.10 ... 11.2	30 (typ.)	Q62703-Q1402
LY 5460-L			11.20 ... 18.0	50 (typ.)	Q62703-Q2403
LY 5460-JM			4.50 ... 28.0	60 (typ.)	Q62703-Q1403
LG 5460-GK	green	green diffused	1.80 ... 11.2	20 (typ.)	Q62703-Q1407
LG 5460-J			4.50 ... 7.1	20 (typ.)	Q62703-Q1867
LG 5460-K			7.10 ... 11.2	30 (typ.)	Q62703-Q2014
LG 5460-HL			2.80 ... 18.0	50 (typ.)	Q62703-Q3190

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  $\pm 11 \%$ .

*Anm.: 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: 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
		LR	LS, LY, LG	
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	$I_F$	45	40	mA
Stoßstrom Surge current $t \leq 10 \mu s, D = 0.005$	$I_{FM}$	0.5		A
Sperrspannung Reverse voltage	$V_R$	5		V
Leistungsaufnahme Power consumption $T_A \leq 25 \text{ °C}$	$P_{tot}$	95	130	mW
Wärmewiderstand <sup>1)</sup> Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th JA}$	400		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 $\geq 16 \text{ mm}^2$ ) Minimale Beinchenlänge Minimum lead length	$R_{th JS}$	180		K/W

<sup>1)</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
		LR	LS	LY	LG	
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 10\text{ mA}$	$\lambda_{\text{peak}}$	660	635	586	572	nm
Dominantwellenlänge <sup>1)</sup> (typ.) Dominant wavelength $I_F = 10\text{ mA}$	$\lambda_{\text{dom}}$	645	628	587	570	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 10\text{ mA}$	$\Delta\lambda$	35	45	45	25	nm
Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.) Viewing angle at 50 % $I_V$	$2\phi$	50	50	50	50	Grad deg.
Durchlassspannung <sup>2)</sup> (typ.) Forward voltage $I_F = 10\text{ mA}$	$V_F$ $V_F$	1.6 1.9	2.0 2.5	2.0 2.5	2.0 2.5	V V
Sperrstrom (typ.) Reverse current $V_R = 5\text{ V}$	$I_R$ $I_R$	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 $\lambda_{\text{peak}}$ $I_F = 10\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_{\lambda_{\text{peak}}}$	0.03	0.11	0.10	0.11	nm/K
Temperaturkoeffizient von $\lambda_{\text{dom}}$ (typ.) Temperature coefficient of $\lambda_{\text{dom}}$ $I_F = 10\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_{\lambda_{\text{dom}}}$	0.06	0.07	0.07	0.07	nm/K
Temperaturkoeffizient von $V_F$ (typ.) Temperature coefficient of $V_F$ $I_F = 10\text{ mA}; -10\text{ °C} \leq T \leq 100\text{ °C}$	$TC_V$	- 1.4	- 1.9	- 1.9	- 1.4	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 10\text{ mA}$	$\eta_{\text{opt}}$	0.4	1.5	1.5	2.5	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  $\pm 1\text{ nm}$ .

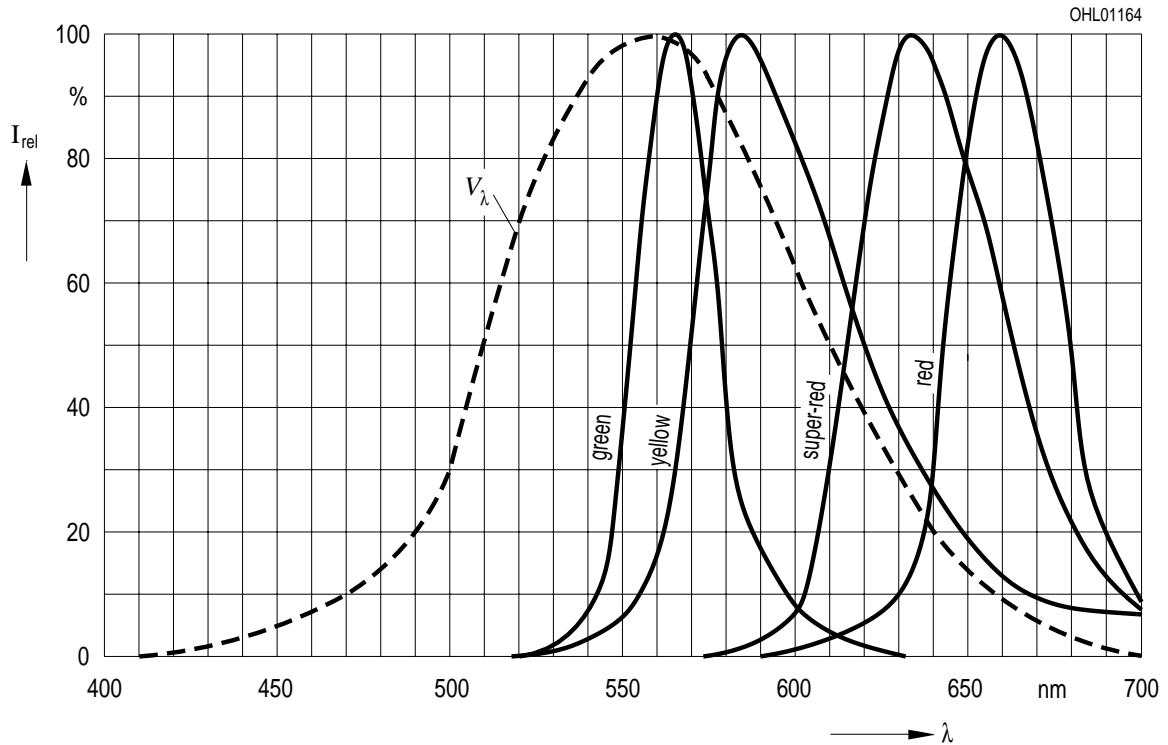
<sup>2)</sup> Spannungswerte werden mit einer Stromeinprägedauer von 1 ms und einer Genauigkeit von  $\pm 0,1\text{ V}$  ermittelt.  
Voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ .

Relative spektrale Emission  $I_{rel} = f(\lambda)$ ,  $T_A = 25\text{ °C}$ ,  $I_F = 10\text{ mA}$

**Relative Spectral Emission**

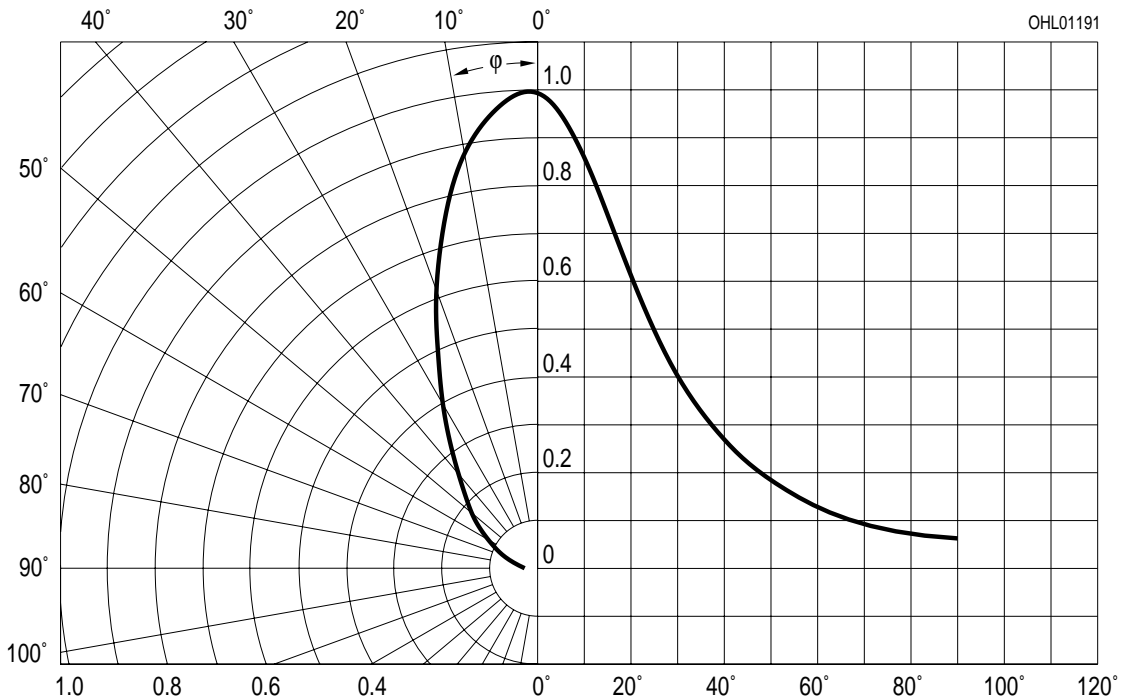
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



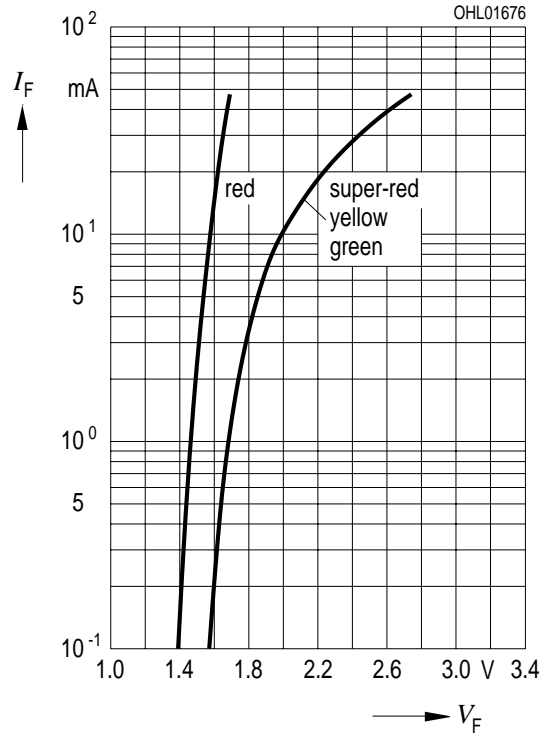
Abstrahlcharakteristik  $I_{rel} = f(\varphi)$

**Radiation Characteristic**



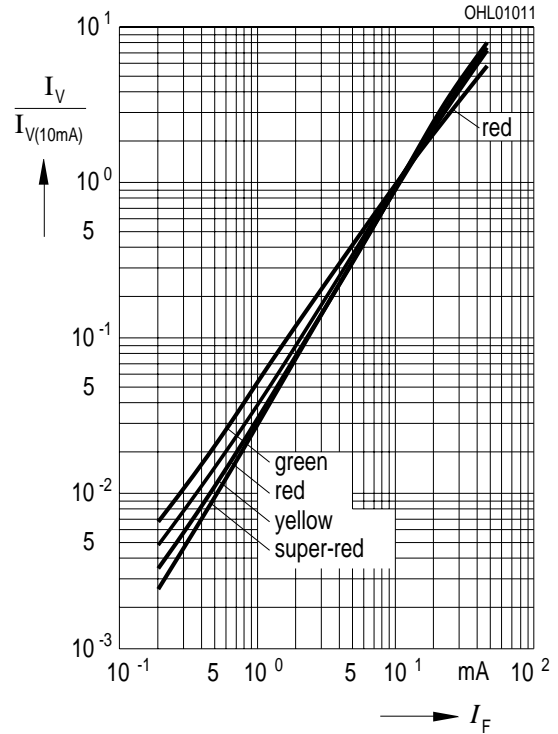
**Durchlassstrom  $I_F = f(V_F)$**   
**Forward Current**

$T_A = 25\text{ °C}$

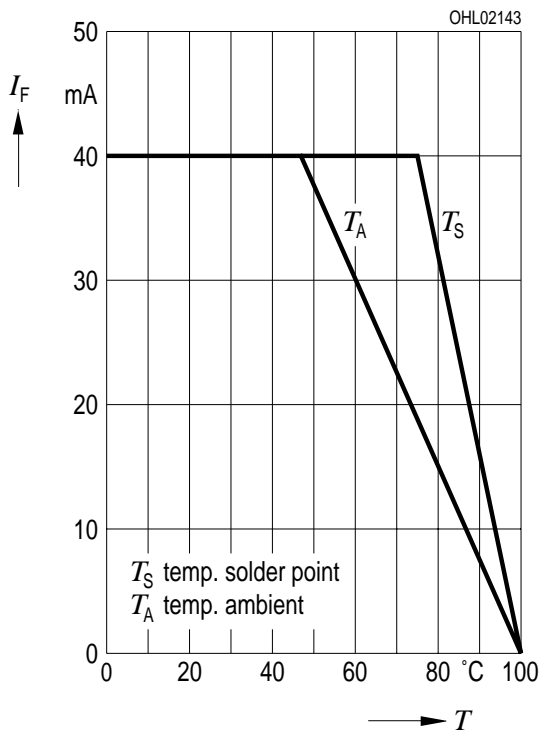


**Relative Lichtstärke  $I_V/I_{V(10\text{ mA})} = f(I_F)$**   
**Relative Luminous Intensity**

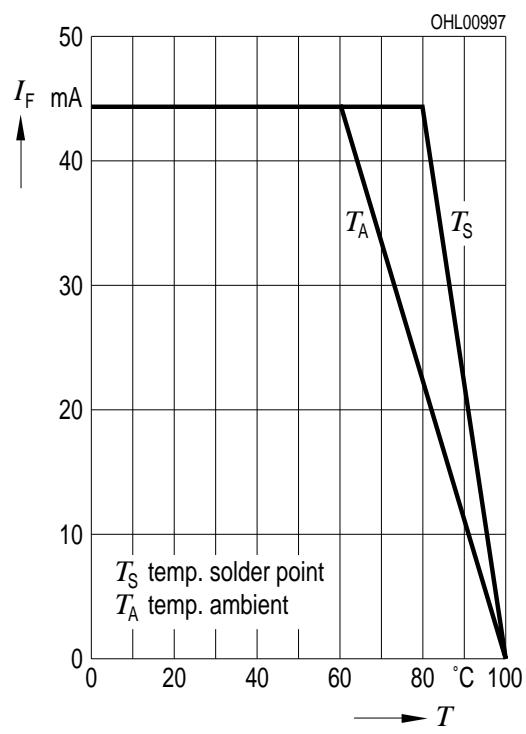
$T_A = 25\text{ °C}$



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

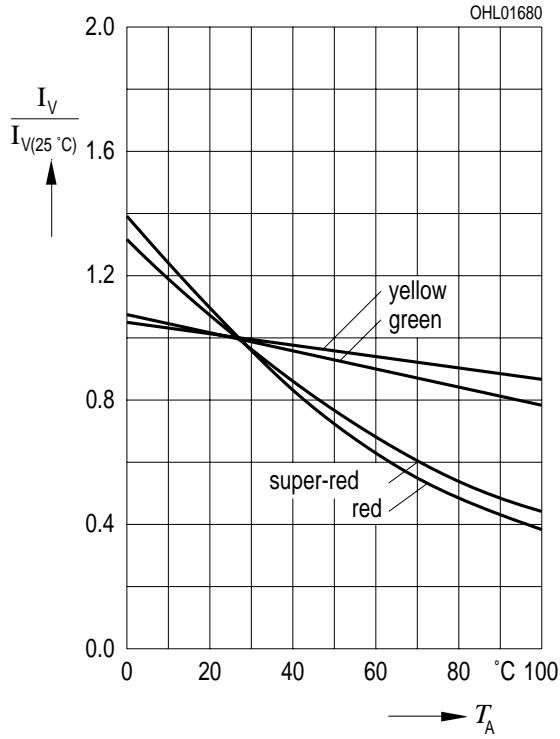


**Maximal zulässiger Durchlassstrom  $I_F = f(T)$**   
**Max. Permissible Forward Current**  
**LR**



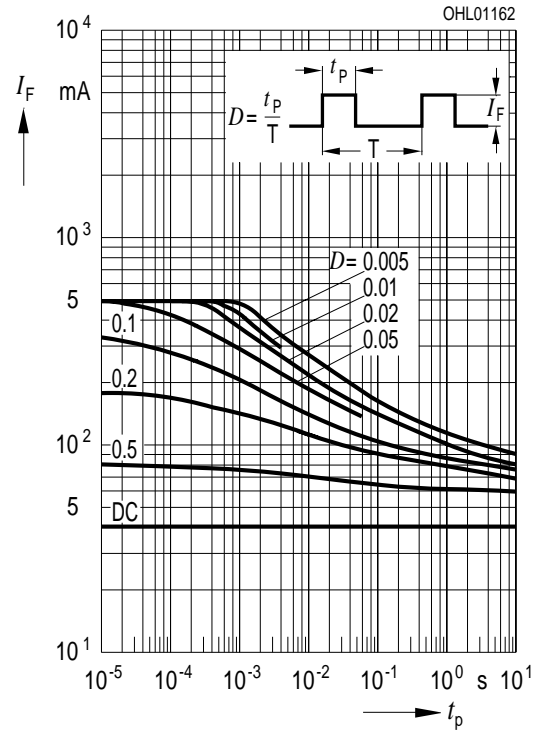
**Relative Lichtstärke  $I_V/I_{V(25\text{ °C})} = f(T_A)$**   
**Relative Luminous Intensity**

$I_F = 10\text{ mA}$

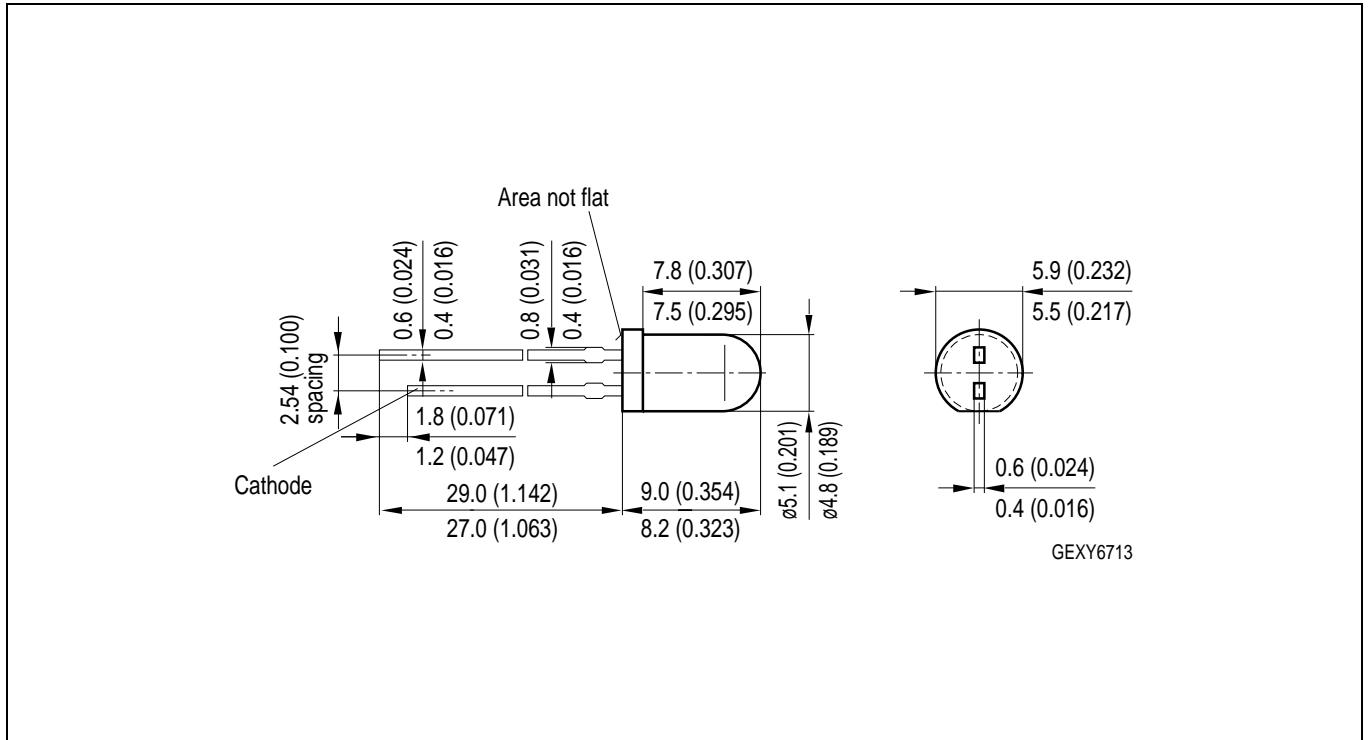


**Zulässige Impulsbelastbarkeit  $I_F = f(t_p)$**   
**Permissible Pulse Handling Capability**

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



**Maßzeichnung**  
**Package Outlines**

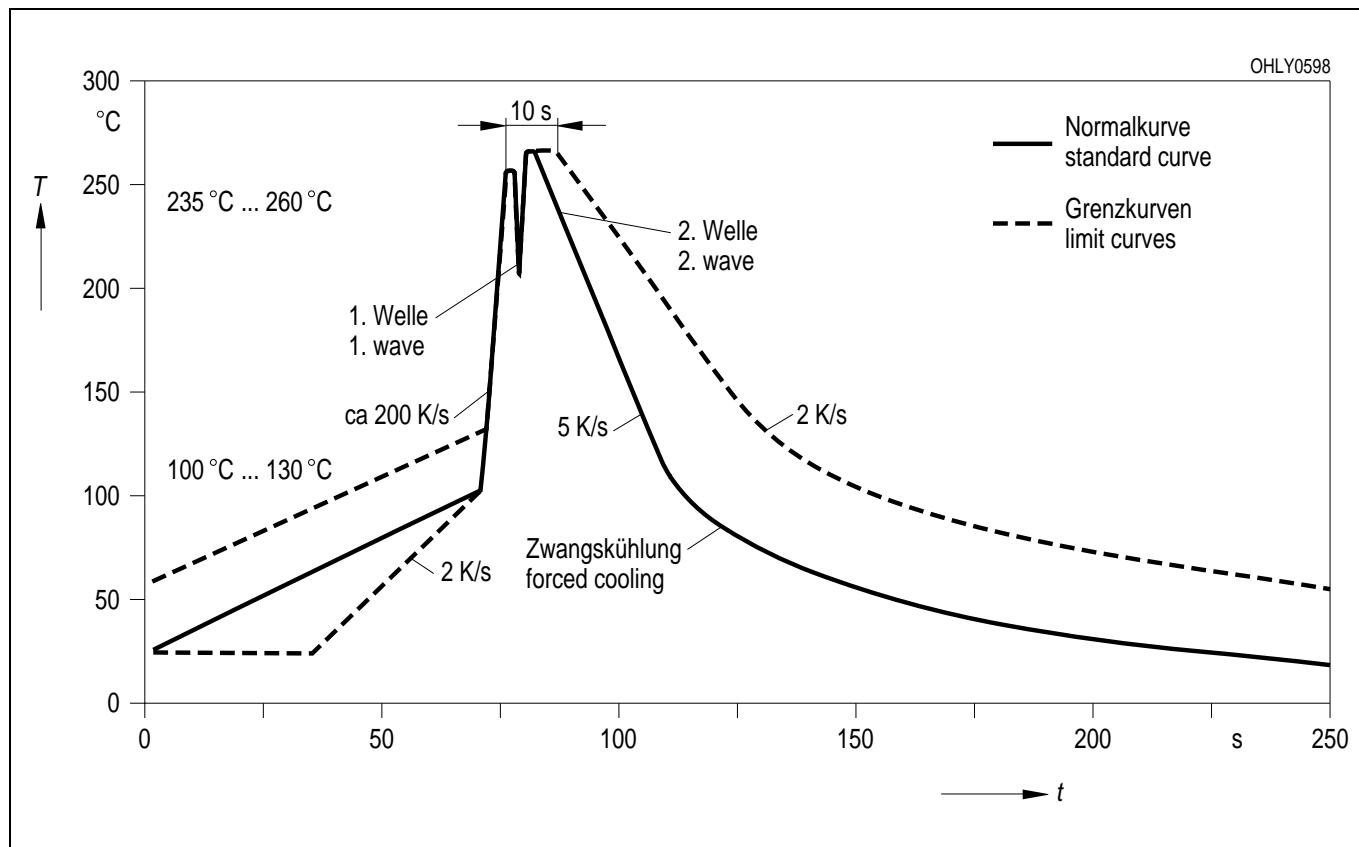


Maße in mm, wenn nicht anders angegeben / Dimensions in mm, unless otherwise specified.

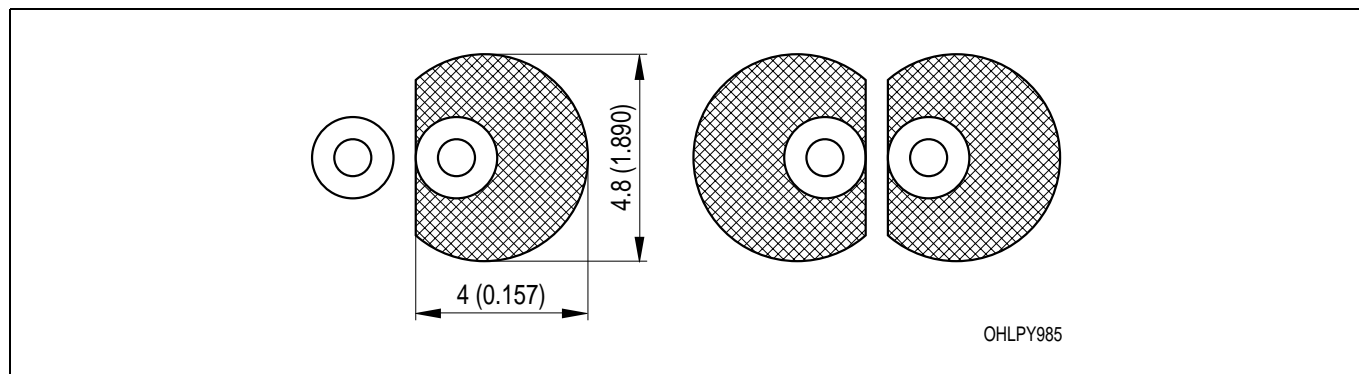
**Kathodenkennung:** kürzerer Lötspieß  
**Cathode mark:** short solder lead  
**Gewicht / Approx. weight:** 0.35 g

**Lötbedingungen**  
**Soldering Conditions**

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



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



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

**Revision History: 2002-04-03**

Previous Version: 2001-03-12

<b>Page</b>	<b>Subjects (major changes since last revision)</b>
3	thermal resistance (footnote)

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