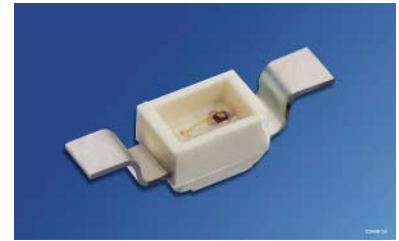


## Mini TOPLED® RG

LS M770, LO M770, LY M770, LG M770, LP M770

Abgekündigt nach PD\_078\_02 - werden durch Mini TOPLED Santana® ersetzt werden  
Obsolete acc. to PD\_078\_02 - will be replaced by Mini TOPLED Santana®



### Besondere Merkmale

- **Gehäusetyyp:** weißes SMT-Gehäuse
- **Besonderheit des Bauteils:** extrem breite Abstrahlcharakteristik; Bauteil wird top-down montiert und strahlt durch das PCB; ideal für Hinterleuchtungen und Einkopplungen in Lichtleiter
- **Wellenlänge:** 628 nm (super-rot), 606 nm (orange), 587 nm (gelb), 570 nm (grün), 560 nm (pure green)
- **Abstrahlwinkel:** Lambertscher Strahler (120°)
- **Technologie:** GaAlP (super-rot, orange, gelb, grün), GaP (pure green)
- **optischer Wirkungsgrad:** 1,5 lm/W (super-rot, orange, gelb), 2,5 lm/W (grün), 0,6 lm/W (pure green)
- **Gruppierungsparameter:** Lichtstärke, Wellenlänge
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** IR Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 12-mm Gurt mit 3000/Rolle, ø180 mm oder 11800/Rolle, ø330 mm

### Anwendungen

- optischer Indikator
- Einkopplung in Lichtleiter
- Hinterleuchtung (LCD, Handy, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung, u.ä.)

### Features

- **package:** white SMT package
- **feature of the device:** extremely wide viewing angle; LED is mounted top down and emits through the PCB; ideal for backlighting and coupling in light guides
- **wavelength:** 628 nm (super-red), 606 nm (orange), 587 nm (yellow), 570 nm (green), 560 nm (pure green)
- **viewing angle:** Lambertian Emitter (120°)
- **technology:** GaAlP (super-red, orange, yellow, green), GaP (pure green)
- **optical efficiency:** 1.5 lm/W (super-red, orange, yellow), 2.5 lm/W (green), 0.6 lm/W (pure green)
- **grouping parameter:** luminous intensity, wavelength
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** IR reflow soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 12-mm tape with 3000/reel, ø180 mm or 11800/reel, ø330 mm

### Applications

- optical indicators
- coupling into light guides
- backlighting (LCD, cellular phones, switches, keys, displays, illuminated advertising, general lighting)
- Interior automotive lighting (e.g. dashboard backlighting, etc.)

# LS M770, LO M770, LY M770, LG M770, LP M770

Type	Emissions- farbe	Farbe der Lichtaustritts- fläche	Lichtstärke	Lichtstrom	Bestellnumme r
Type	Color of Emission	Color of the Light Emitting Area	Luminous Intensity $I_F = 10 \text{ mA}$ $I_V \text{ (mcd)}$	Luminous Flux $I_F = 10 \text{ mA}$ $\Phi_V \text{ (lm)}$	Ordering Code
■LS M770-H2J2-1 ■LS M770-J2L1-1	super-red	colorless clear	3.55 ... 7.10 5.60 ... 14.00	15 (typ.) 28 (typ.)	Q62703Q5087 Q62703Q5088
■LO M770-H2J2-24 ■LO M770-J2L1-24	orange	colorless clear	3.55 ... 7.10 5.60 ... 14.00	15 (typ.) 28 (typ.)	Q62703Q5042 Q62703Q5043
■LY M770-J1K1-26 ■LY M770-K1L2-26	yellow	colorless clear	4.5 ... 9.0 7.1 ... 18.0	20 (typ.) 36 (typ.)	Q62703Q5125 Q62703Q5126
■LG M770-J2K2-1 ■LG M770-K2M1-1	green	colorless clear	5.6 ... 11.2 9.0 ... 22.4	25 (typ.) 45 (typ.)	Q62703Q5008 Q62703Q5009
■LP M770-F2G2-1 ■LP M770-G2J1-1	pure green	colorless clear	1.40 ... 2.80 2.24 ... 5.60	6 (typ.) 11 (typ.)	Q62703Q5062 Q62703Q5063

- Abgekündigt nach PD\_078\_02 - werden durch Mini TOPLED Santana® ersetzt werden  
 Obsolete acc. to PD\_078\_02 - will be replaced by Mini TOPLED Santana®  
 Letzte Bestellung / Last Order: 30.09.2003  
 Letzte Lieferung / Last Delivery: 31.03.2004

Anm.: -1 gesamter Farbbereich (siehe **Seite 4**)  
 -24 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)  
 -26 gesamter Farbbereich, Lieferung in Einzelgruppen (siehe **Seite 5**)

Die Standardlieferform von Serientypen beinhaltet eine untere bzw. eine obere Familiengruppe, die aus nur 3 bzw. 4 Halbgruppen besteht. Einzelne Halbgruppen sind nicht erhältlich.  
 In einer Verpackungseinheit / Gurt ist immer nur eine Halbgruppe enthalten.

Note: -1 Total color tolerance range (please see **page 4**)  
 -24 Total color tolerance range, delivery in single groups (please see **page 5**)  
 -26 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 of 3 or 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
		LS, LO, LY, LG	LP	
Betriebstemperatur Operating temperature range	$T_{op}$	- 40 ... + 100		°C
Lagertemperatur Storage temperature range	$T_{stg}$	- 40 ... + 100		°C
Sperrschichttemperatur Junction temperature	$T_j$	+ 100		°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	$P_{tot}$	95	90	mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/air	$R_{th JA}$	480		K/W
Sperrschicht/Lötpad Junction/soldering point Montage auf PC-Board FR 4 (Padgröße $\geq 5 \text{ mm}^2$ ) mounted on PC board FR 4 (pad size $\geq 5 \text{ mm}^2$ )	$R_{th JS}$	230		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	Wert Value					Einheit Unit
		LS	LO	LY	LG	LP	
Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 10\text{ mA}$	$\lambda_{\text{peak}}$	635	610	586	572	557	nm
Dominantwellenlänge <sup>1)</sup> (typ.) Dominant wavelength <sup>1)</sup> $I_F = 10\text{ mA}$	$\lambda_{\text{dom}}$	628 $\pm 6$	606 $\pm 6$	587 -7/+8	570 $\pm 6$	560 $\pm 6$	nm
Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 10\text{ mA}$	$\Delta\lambda$	45	40	45	25	22	nm
Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.) Viewing angle at 50 % $I_V$	$2\varphi$	120	120	120	120	120	Grad deg.
Durchlassspannung <sup>2)</sup> (typ.) Forward voltage <sup>2)</sup> (max.) $I_F = 10\text{ mA}$	$V_F$ $V_F$	2.0 2.5	2.0 2.5	2.0 2.5	2.0 2.5	2.0 2.5	V V
Sperrstrom (typ.) Reverse current (max.) $V_R = 12\text{ V}$	$I_R$ $I_R$	0.01 10	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 $\lambda_{\text{peak}}$ $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{peak}}}$	0.11	0.12	0.10	0.11	0.11	nm/K
Temperaturkoeffizient von $\lambda_{\text{dom}}$ (typ.) Temperature coefficient of $\lambda_{\text{dom}}$ $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_{\lambda_{\text{dom}}}$	0.07	0.07	0.07	0.07	0.05	nm/K
Temperaturkoeffizient von $V_F$ (typ.) Temperature coefficient of $V_F$ $I_F = 10\text{ mA}; -10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$TC_V$	-1.9	-1.9	-1.9	-1.4	-2.1	mV/K
Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 10\text{ mA}$	$\eta_{\text{opt}}$	1.5	1.5	1.5	2.5	0.6	lm/W

<sup>1)</sup> Wellenlängen werden mit einer Stromeinprägungsdauer 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 Stromeinprägungsdauer 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	yellow		orange		Einheit Unit
	min.	max.	min.	max.	
2	580	583	600	603	nm
3	583	586	603	606	nm
4	586	589	606	609	nm
5	589	592			nm
6	592	595			nm

Helligkeits-Gruppierungsschema  
Luminous Intensity Groups

Lichtgruppe Luminous Intensity Group	Lichtstärke Luminous Intensity $I_V$ (mcd)	Lichtstrom Luminous Flux $\Phi_V$ (lm)
F2	1.40 ... 1.80	5 (typ.)
G1	1.80 ... 2.24	6 (typ.)
G2	2.24 ... 2.80	8 (typ.)
H1	2.80 ... 3.55	10 (typ.)
H2	3.55 ... 4.50	12 (typ.)
J1	4.50 ... 5.60	15 (typ.)
J2	5.60 ... 7.10	19 (typ.)
K1	7.10 ... 9.00	24 (typ.)
K2	9.00 ... 11.20	30 (typ.)
L1	11.20 ... 14.00	38 (typ.)
L2	14.00 ... 18.00	48 (typ.)
M1	18.00 ... 22.40	60 (typ.)

Helligkeitswerte werden mit einer Stromeinprägungsdauer 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: L1-3

Example: L1-3

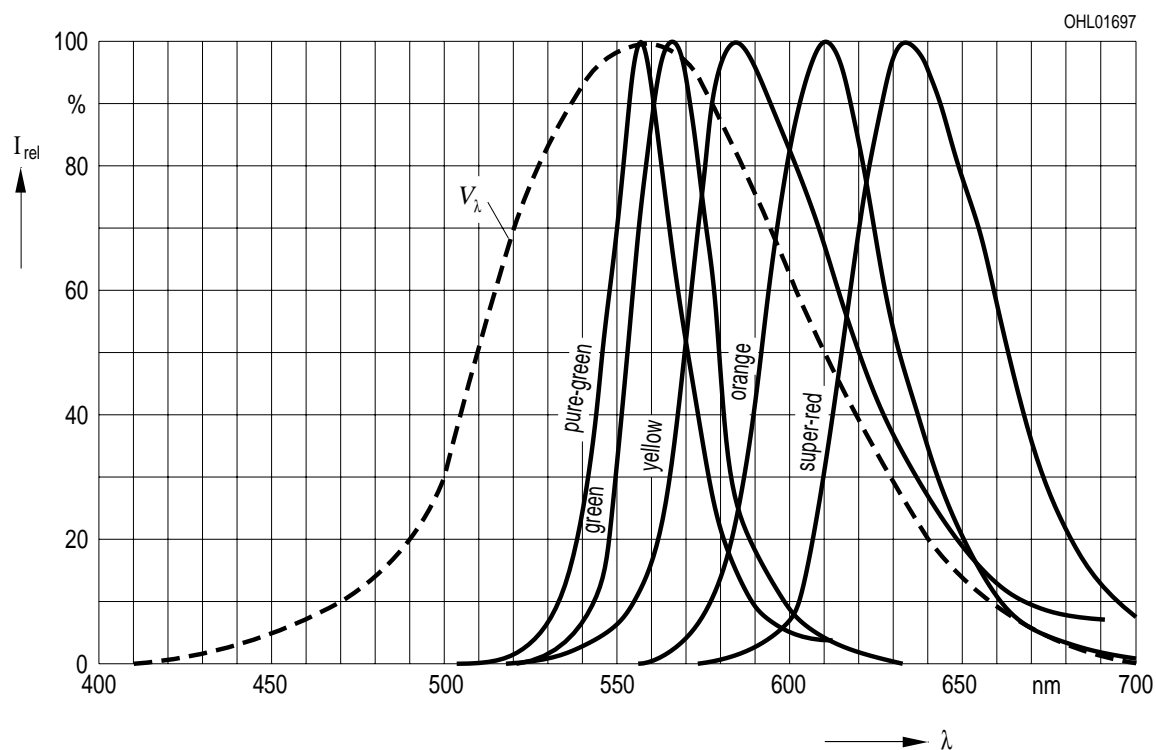
Lichtgruppe Luminous Intensity Group	Halbgruppe Half Group	Wellenlänge Wavelength
L	1	3

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

Relative Spectral Emission

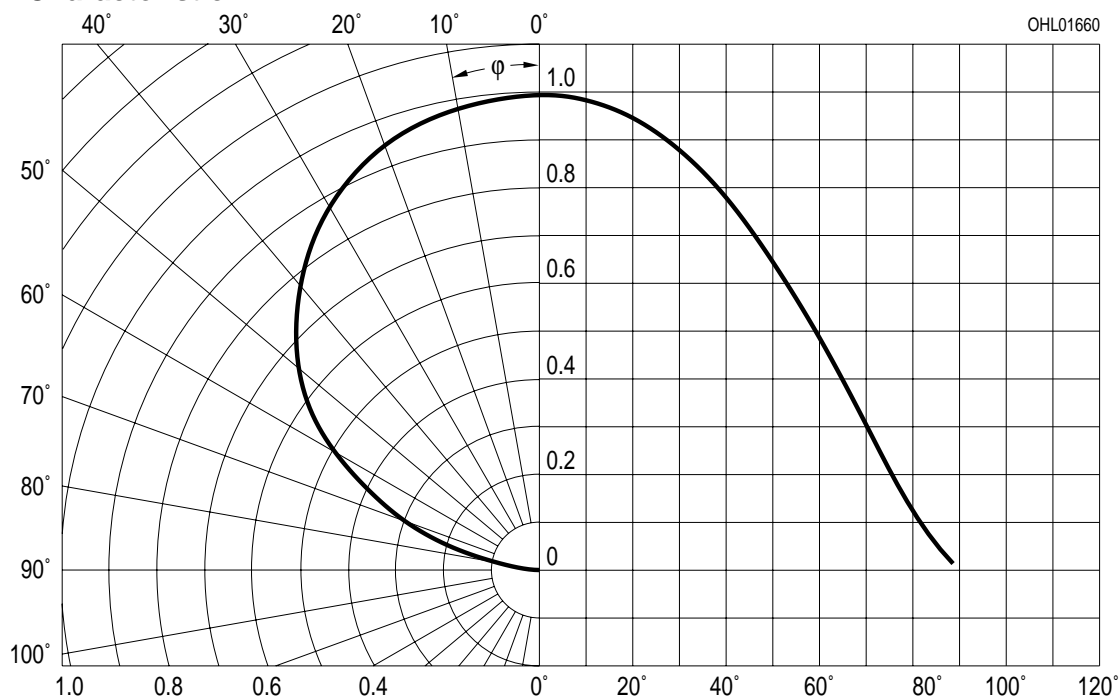
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



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

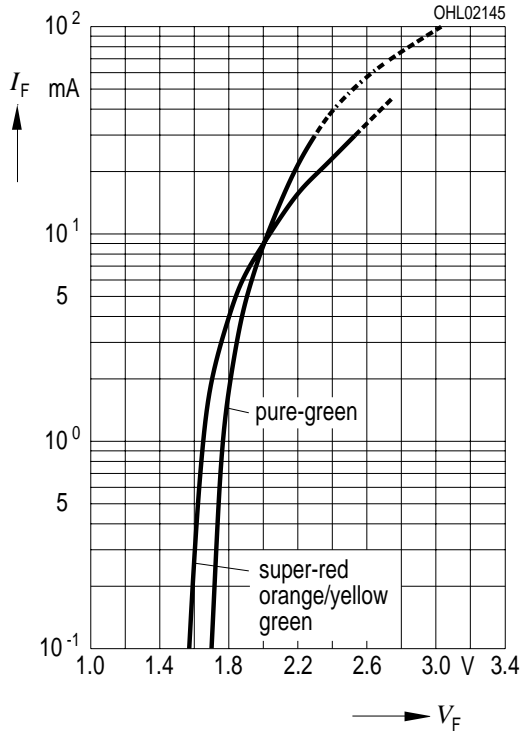
Radiation Characteristic



Durchlassstrom  $I_F = f(V_F)$

Forward Current

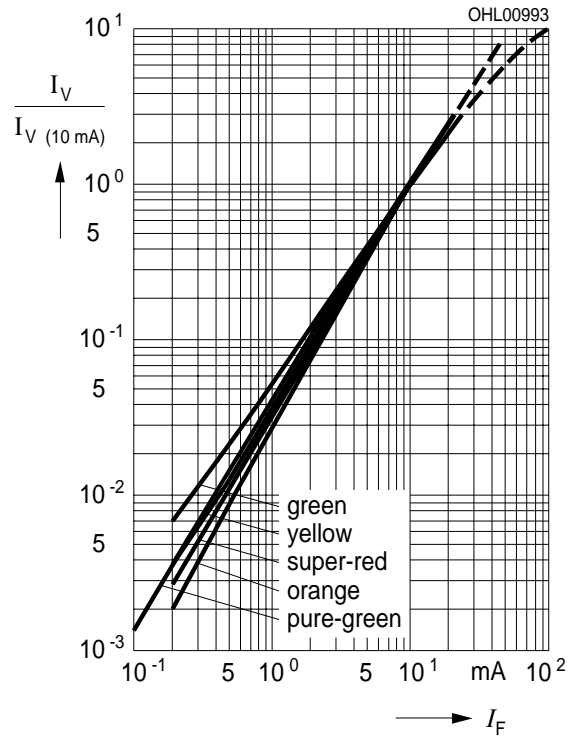
$T_A = 25^\circ\text{C}$



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

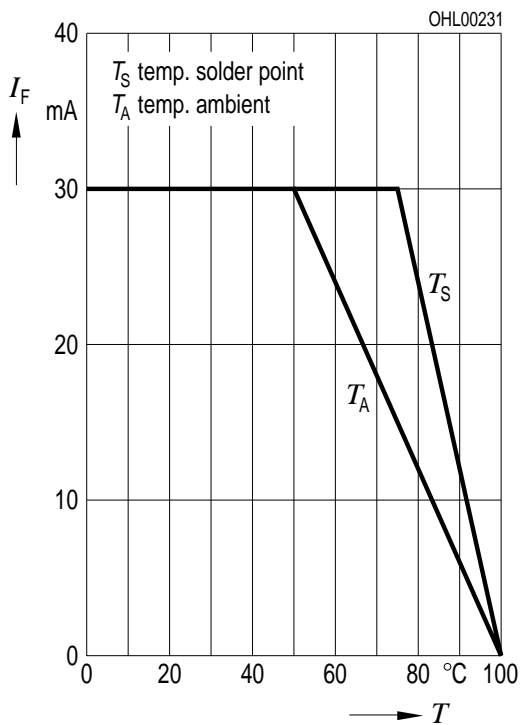
Relative Luminous Intensity

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



Maximal zulässiger Durchlassstrom  $I_F = f(T_A)$

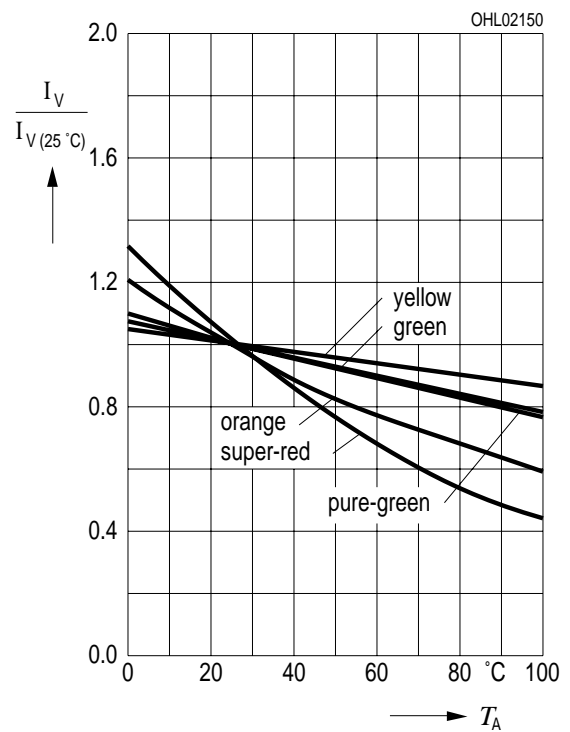
Max. Permissible Forward Current



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

Relative Luminous Intensity

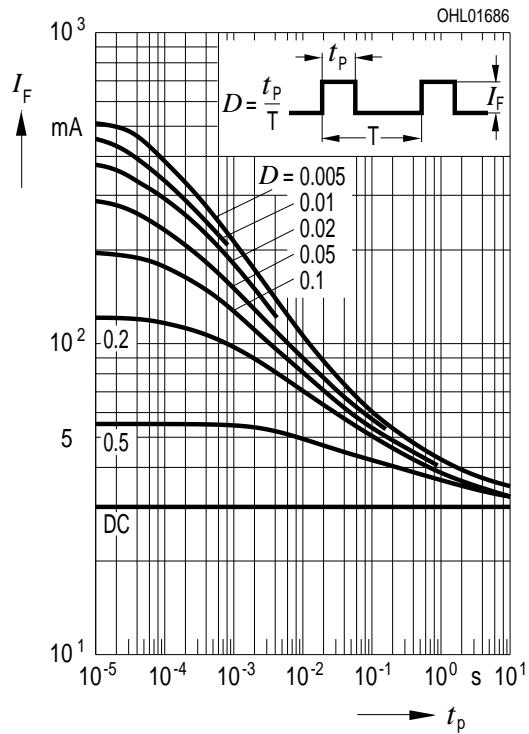
$I_F = 10\text{ mA}$



# Zulässige Impulsbelastbarkeit $I_F = f(t_p)$

## Permissible Pulse Handling Capability

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



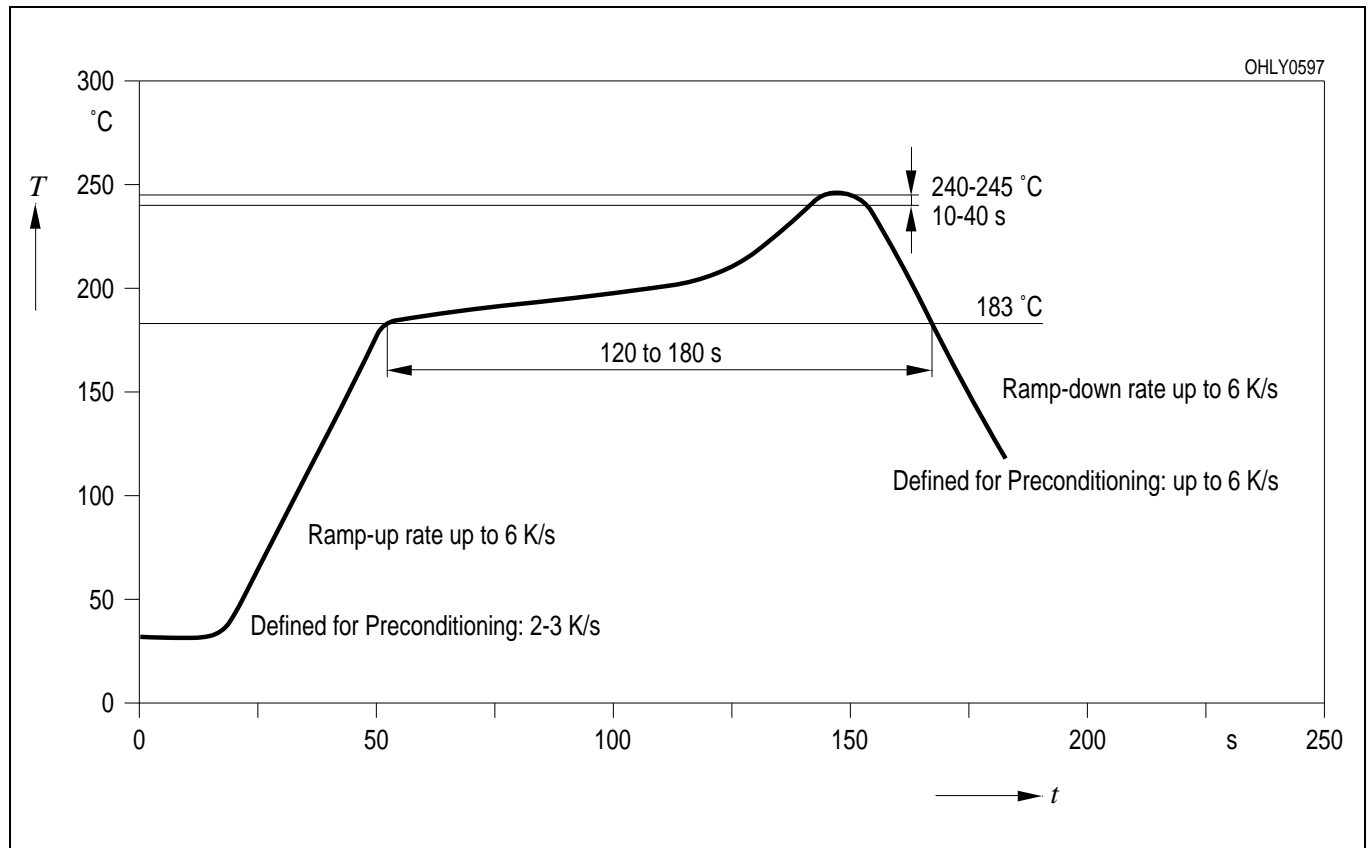




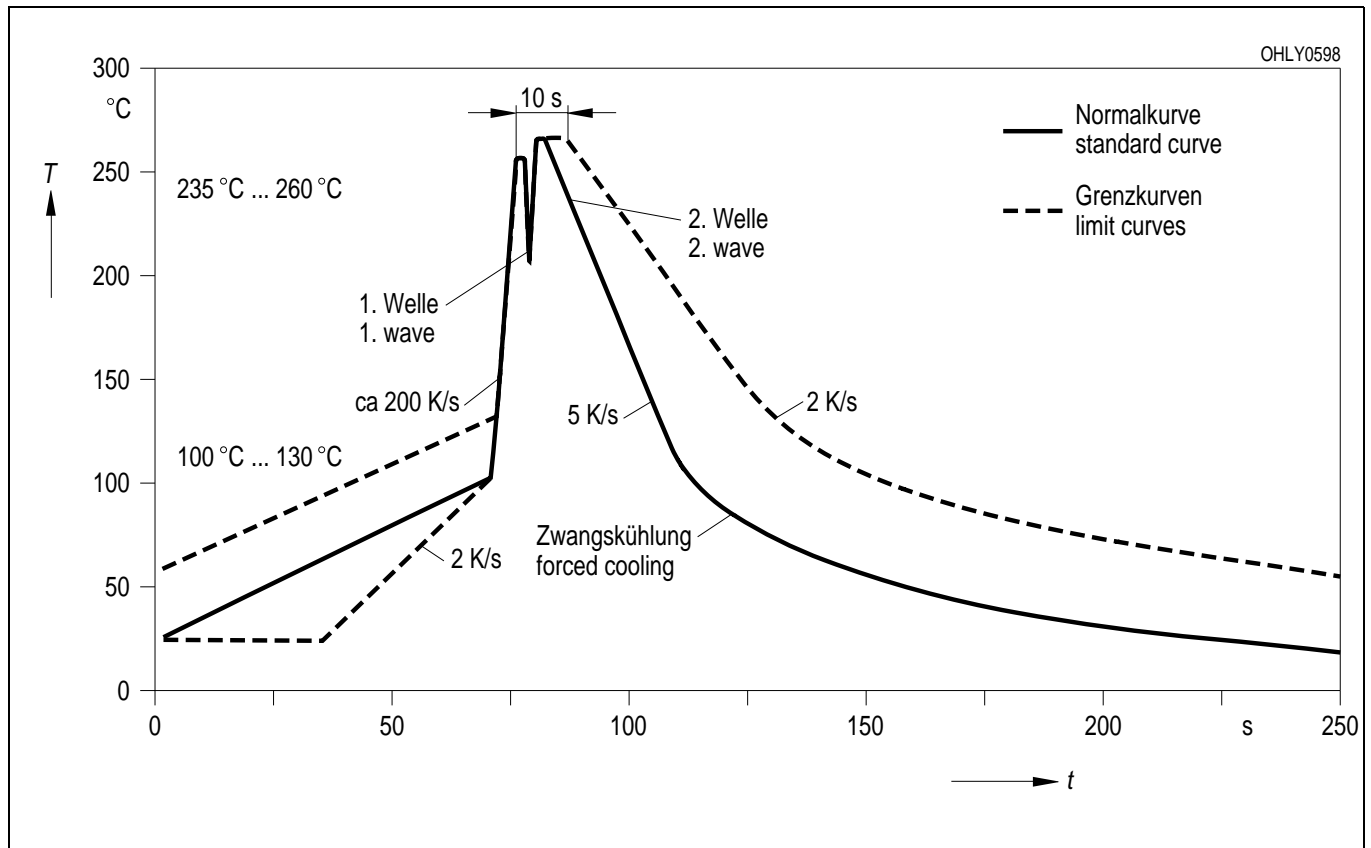
**Kathodenkennung:** abgeschrägte Ecke  
**Cathode mark:** bevelled edge  
**Gewicht / Approx. weight:** 10 mg

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

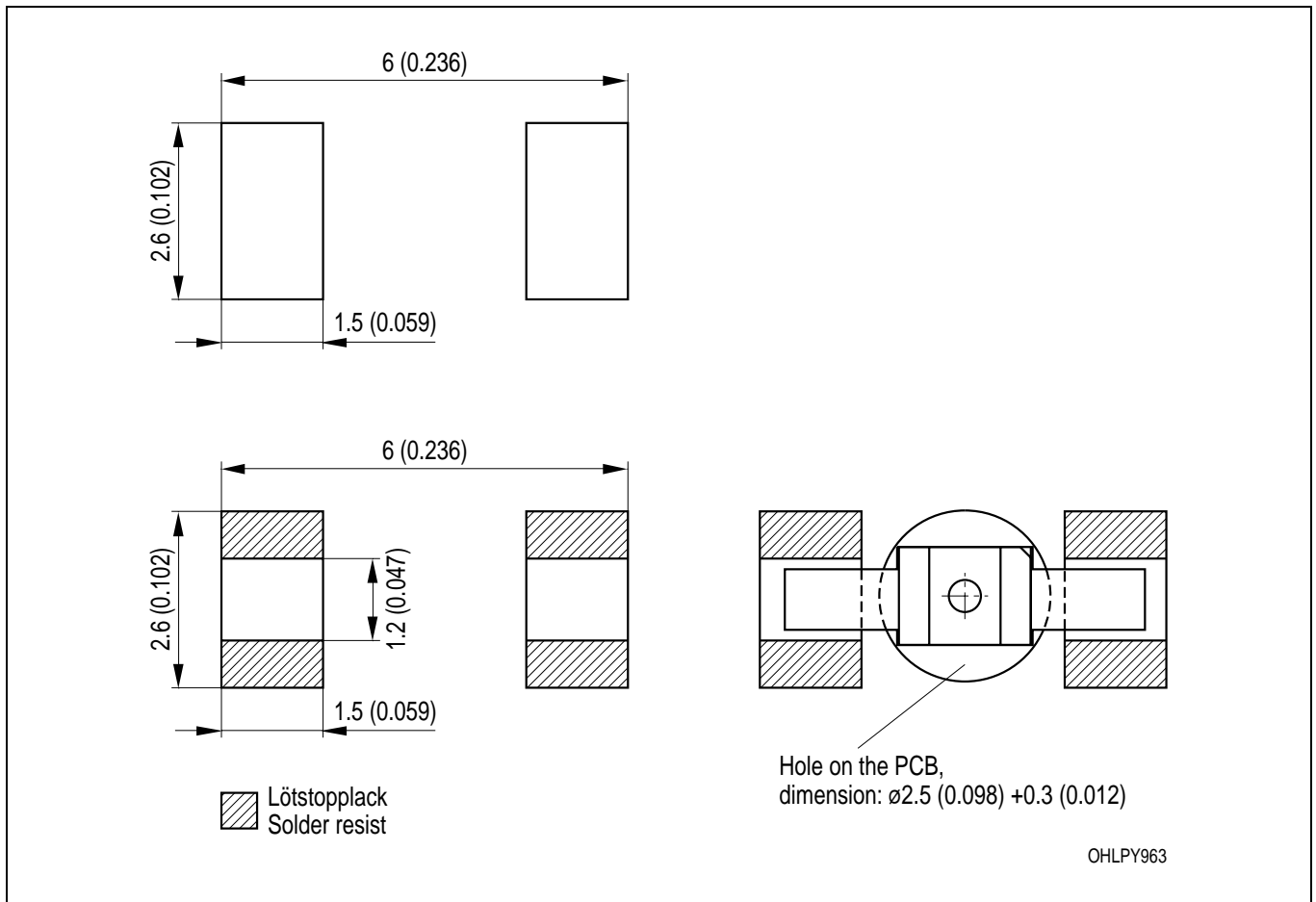
**IR-Reflow Lötprofil** (nach IPC 9501)  
**IR Reflow Soldering Profile** (acc. to IPC 9501)



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



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



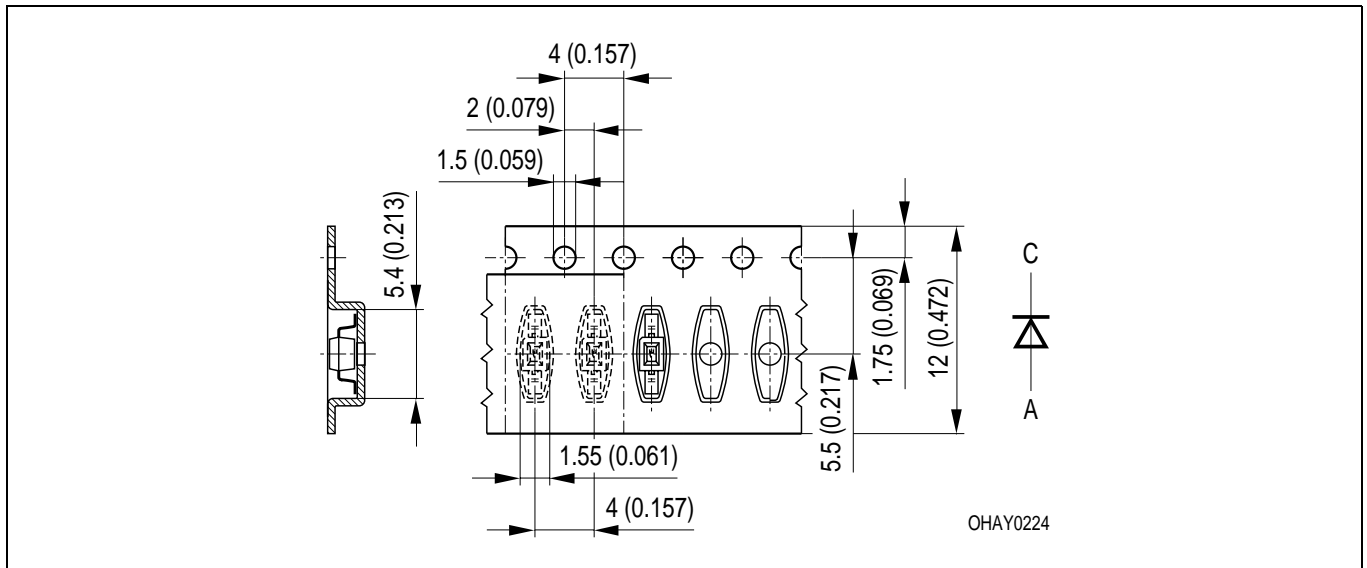
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).  
 Gehäuse hält TTW-Löthitze aus / Package able to withstand TTW-soldering heat

## Gurtung / Polarität und Lage

Verpackungseinheit 3000/Rolle, ø180 mm oder  
11800/Rolle, ø330 mm

## Method of Taping / Polarity and Orientation

Packing unit 3000/reel, ø180 mm or 11800/reel, ø330 mm



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

Revision History: 2003-08-04		Date of change
Previous Version: 2003-03-13		
Page	Subjects (major changes since last revision)	
5	wavelength groups	
2	wavelength grouping for yellow and orange	
3	pad size from 16 mm <sup>2</sup> to 5 mm <sup>2</sup>	
1	insertion of "Not for new designs..."	2002-06-14
13	annotations	2002-07-23
3, 4	value (reverse voltage from 5 V to 12 V)	2002-09-18
1, 12	removal: pad for TTW soldering	2002-09-30
5	new luminous flux $\Phi_V$ (mlm)	2003-02-17
7	diagram relative luminous intensity $f(I_F)$	2003-03-13
1, 2	Obsolete	2003-08-04

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**Attention please!**

The information describes the type of component and shall not be considered as assured characteristics.

All typical data and graphs are basing on representative samples, but don't represent the production range. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

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If printed or downloaded, please find the latest version in the Internet.

**Packing**

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

**Components used in life-support devices or systems must be expressly authorized for such purpose!** Critical components <sup>1</sup> may only be used in life-support devices or systems <sup>2</sup> with the express written approval of OSRAM OS.

<sup>1</sup> A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

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