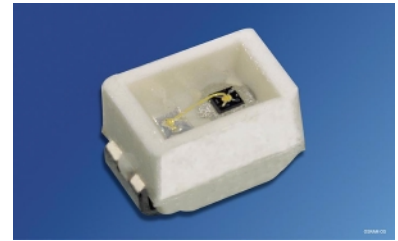


## Mini TOPLED

### LS M670, LO M670, LY M670, LG M670, LP M670



#### Besondere Merkmale

- **Gehäusotyp:** weißes SMT-Gehäuse
- **Besonderheit des Bauteils:** kleine Bauform 2,3 mm x 1,3 mm x 1,4 mm
- **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
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** IR Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 8-mm Gurt mit 3000/Rolle, ø180 mm oder 12000/Rolle, ø330 mm

#### Anwendungen

- Optischer Indikator
- Hinterleuchtung (LCD, Handy, Schalter, Tasten, Displays, Werbebeleuchtung, Allgemeinbeleuchtung)
- Einkopplung in Lichtleiter
- Informationsanzeigen im Innenbereich
- Innenbeleuchtung im Automobilbereich (z.B. Instrumentenbeleuchtung, u.ä.)
- Markierungsbeleuchtung (z.B. Stufen, Fluchtwege, u.ä.)

#### Features

- **package:** white SMT package
- **feature of the device:** small package 2.3 mm x 1.3 mm x 1.4 mm
- **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
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** IR reflow soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 8-mm tape with 3000/reel, ø180 mm or 12000/reel, ø330 mm

#### Applications

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

# LS M670, LO M670, LY M670, LG M670, LP M670

Typ	Emissions- farbe	Farbe der Lichtaustritts- fläche	Lichtstärke	Lichtstrom	Bestellnummer
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 M670-H2J2-1 LS M670-J2L1-1	super-red	colorless clear	3.55 ... 7.10 5.60 ... 14.00	15 (typ.) 28 (typ.)	Q62703-Q5083 Q62703-Q5084
LO M670-H2J2-1 LO M670-J2L1-1	orange	colorless clear	3.55 ... 7.10 5.60 ... 14.00	15 (typ.) 28 (typ.)	Q62703-Q5038 Q62703-Q5039
LY M670-H2J2-1 LY M670-J2L1-1	yellow	colorless clear	3.55 ... 7.10 5.60 ... 14.00	15 (typ.) 28 (typ.)	Q62703-Q5121 Q62703-Q5122
LG M670-J2K2-1 LG M670-K2M1-1	green	colorless clear	5.6 ... 11.2 9.0 ... 22.4	25 (typ.) 45 (typ.)	Q62703-Q5006 Q62703-Q5007
LP M670-F2G2-1 LP M670-G2J1-1	pure green	colorless clear	1.40 ... 2.80 2.24 ... 5.60	6.0 (typ.) 11.0 (typ.)	Q62703-Q5060 Q62703-Q5061

Anm.: -1 gesamter Farbbereich

*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

*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 Reverse voltage	$V_R$	5		V
Leistungsaufnahme Power consumption	$P_{tot}$	95	90	mW
Wärmewiderstand Thermal resistance Sperrschicht/Umgebung Junction/ambient	$R_{th JA}$	480		K/W
Sperrschicht/Lötpad Junction/soldering point Montage auf PC-Board FR 4 (Padgröße $\geq 16 \text{ mm}^2$ ) mounted on PC board FR 4 (pad size $\geq 16 \text{ mm}^2$ )	$R_{th JS}$	230		K/W

**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 $I_F = 10\text{ mA}$	$\lambda_{\text{dom}}$	628 $\pm 6$	606 $\pm 6$	587 +8/-7	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 (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.) $V_R = 5\text{ V}$	$I_R$ $I_R$	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 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  $\pm 0.1\text{ V}$ .

**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	60.0 (typ.)
G1	1.80 ... 2.24	75.0 (typ.)
G2	2.24 ... 2.80	95.0 (typ.)
H1	2.80 ... 3.55	120.0 (typ.)
H2	3.55 ... 4.50	150.0 (typ.)
J1	4.50 ... 5.60	190.0 (typ.)
J2	5.60 ... 7.10	240.0 (typ.)
K1	7.10 ... 9.00	300.0 (typ.)
K2	9.00 ... 11.20	380.0 (typ.)
L1	11.20 ... 14.00	480.0 (typ.)
L2	14.00 ... 18.00	600.0 (typ.)
M1	18.00 ... 22.40	760.0 (typ.)

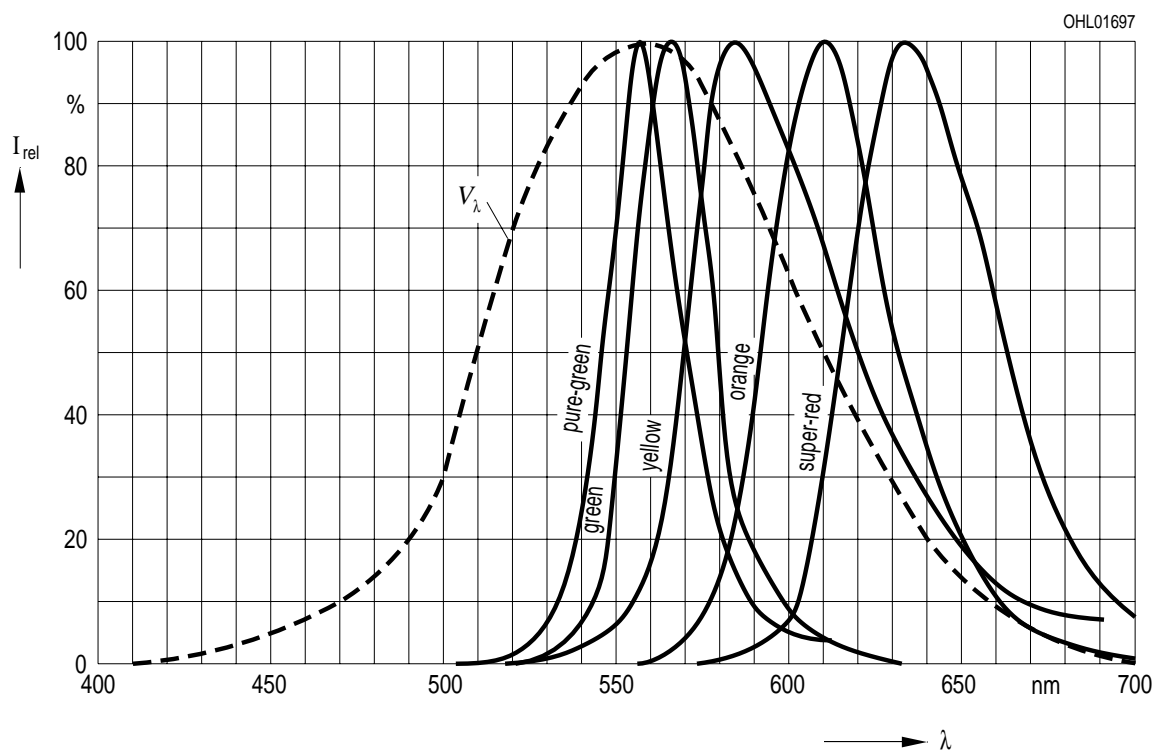
Helligkeitswerte werden mit einer Stromeinprägedauer von 25 ms und einer Genauigkeit von  $\pm 11\%$  ermittelt.  
 Luminous intensity is tested at a current pulse duration of 25 ms and a tolerance of  $\pm 11\%$ .

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

Relative Spectral Emission

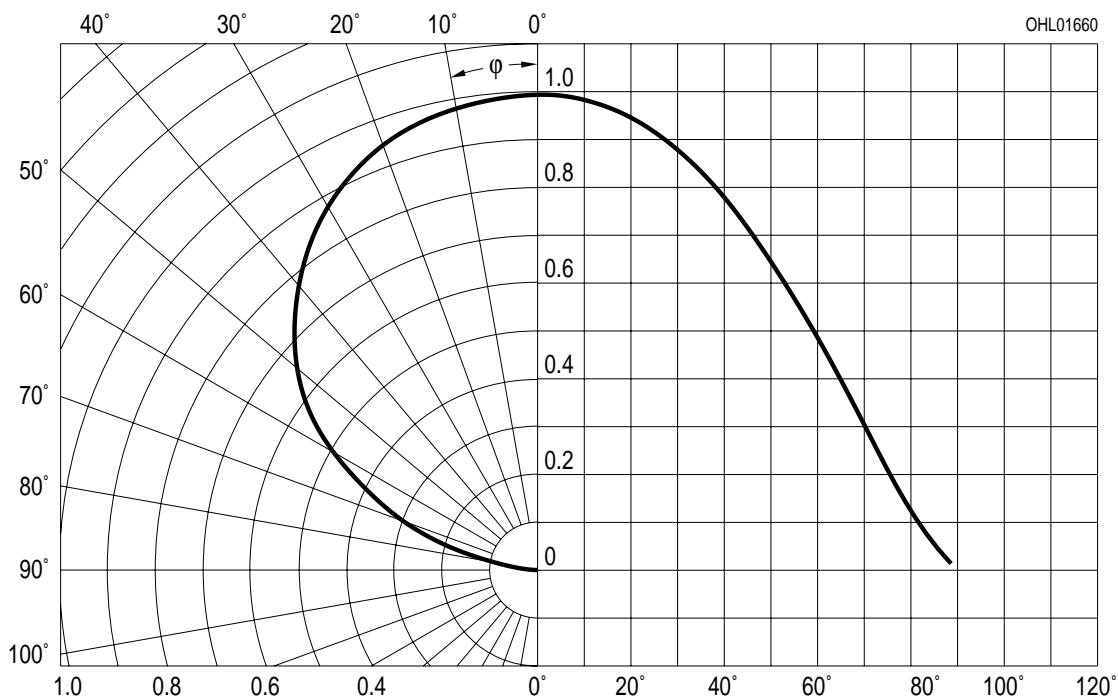
$V(\lambda)$  = spektrale Augenempfindlichkeit

Standard eye response curve



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

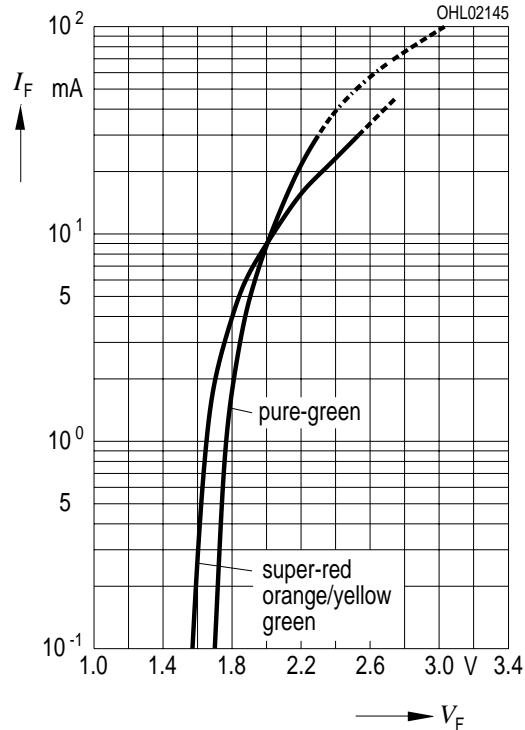
Radiation Characteristic



Durchlassstrom  $I_F = f(V_F)$

Forward Current

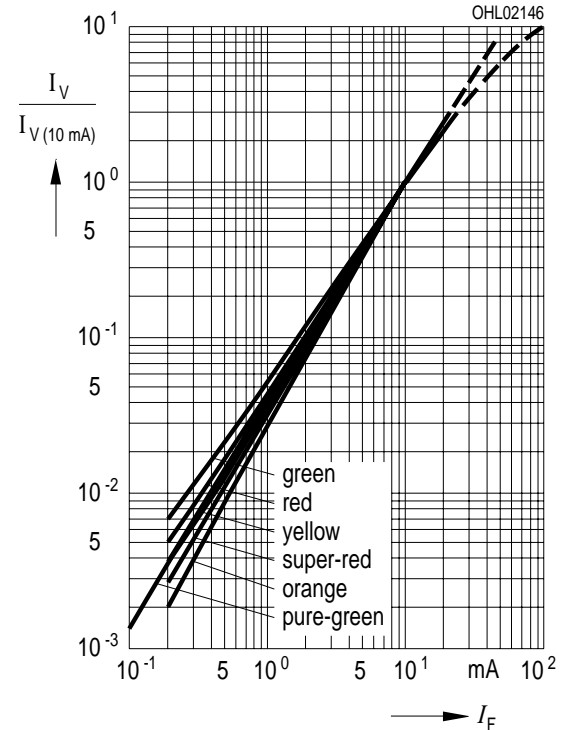
$T_A = 25^\circ\text{C}$



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

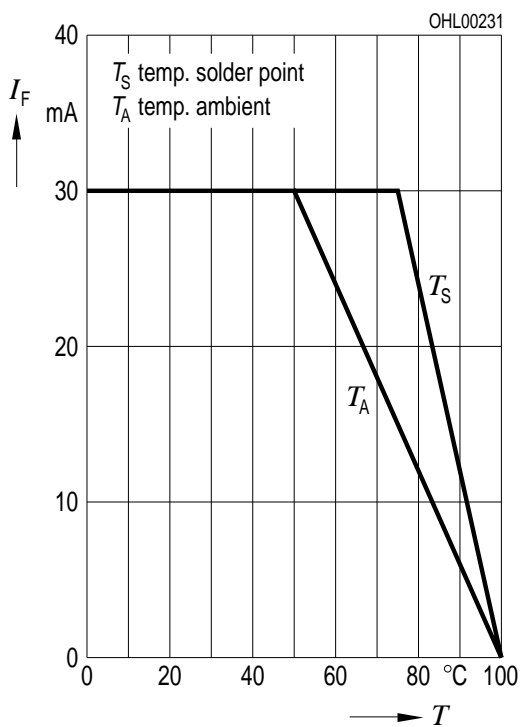
Relative Luminous Intensity

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



Maximal zulässiger Durchlassstrom  $I_F = f(T_A)$

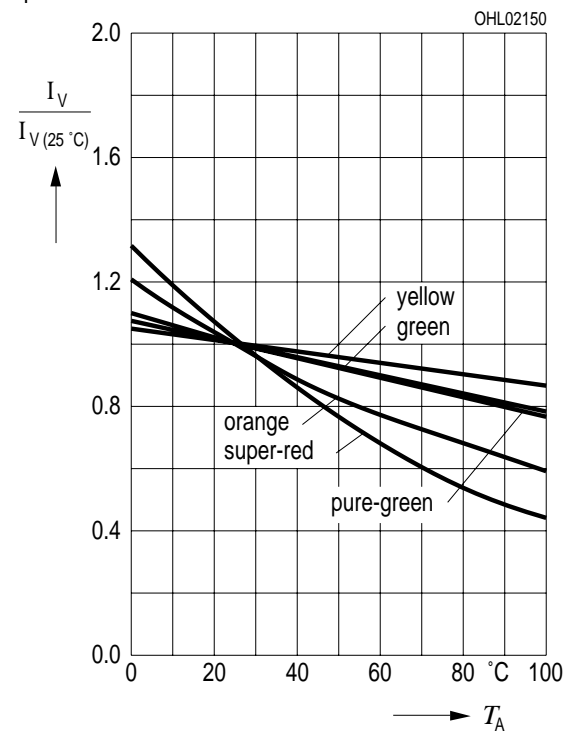
Max. Permissible Forward Current



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

Relative Luminous Intensity

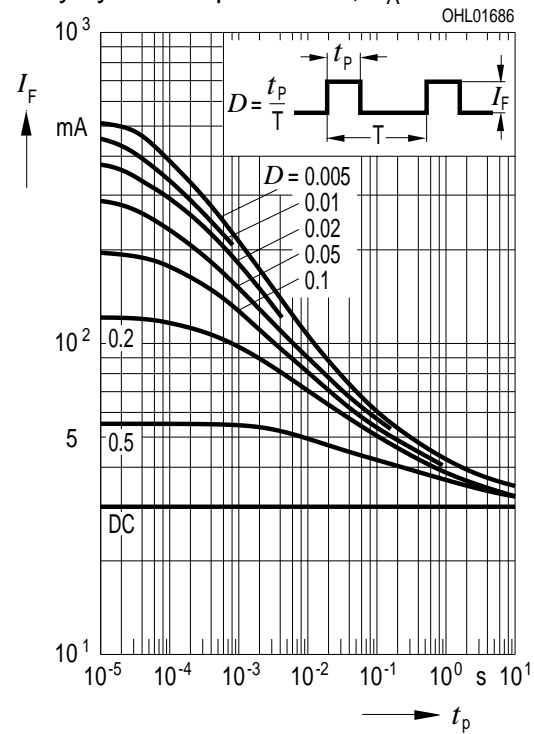
$I_F = 10\text{ mA}$



# Zulässige Impulsbelastbarkeit $I_F = f(t_p)$

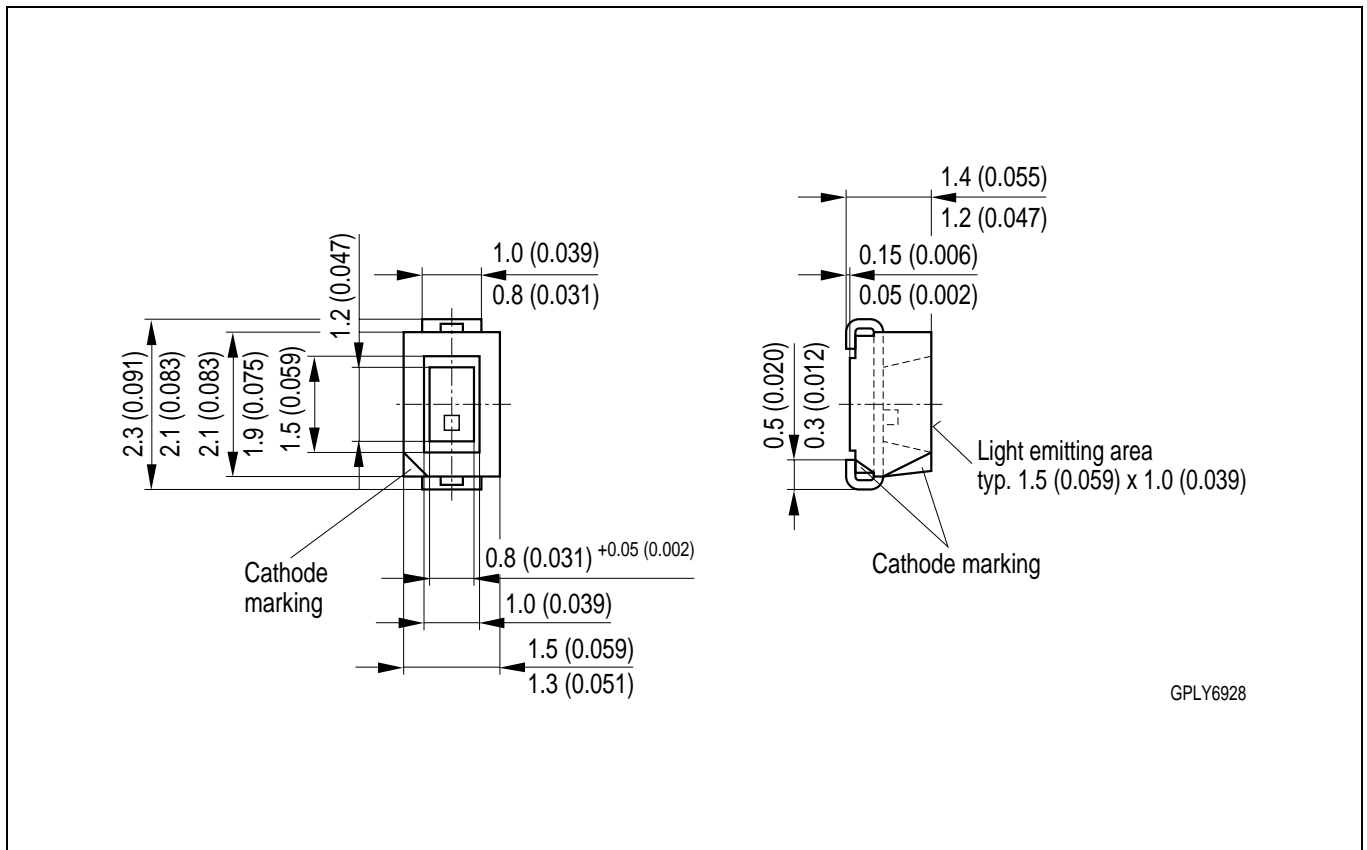
## Permissible Pulse Handling Capability

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





**Maßzeichnung  
Package Outlines**

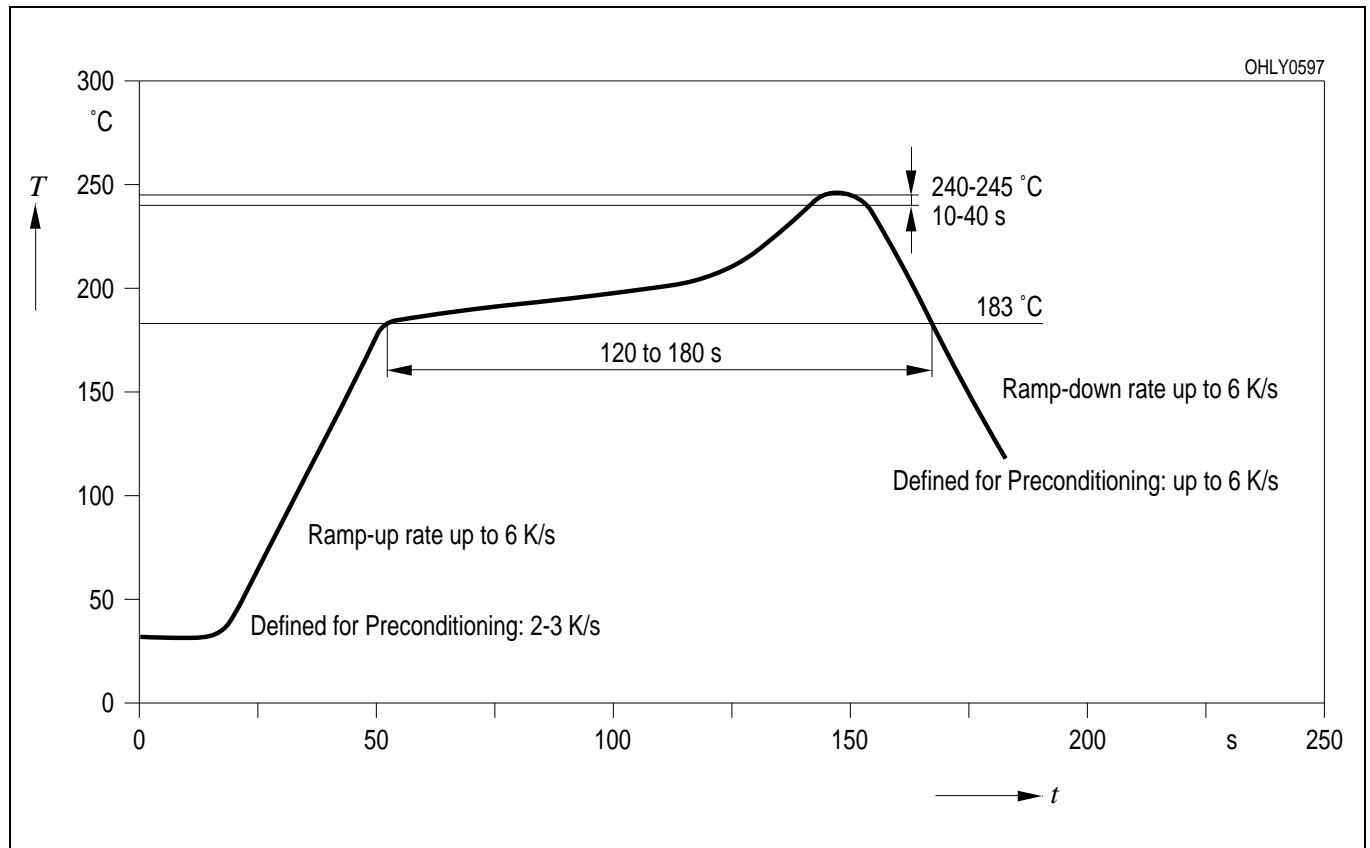


Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

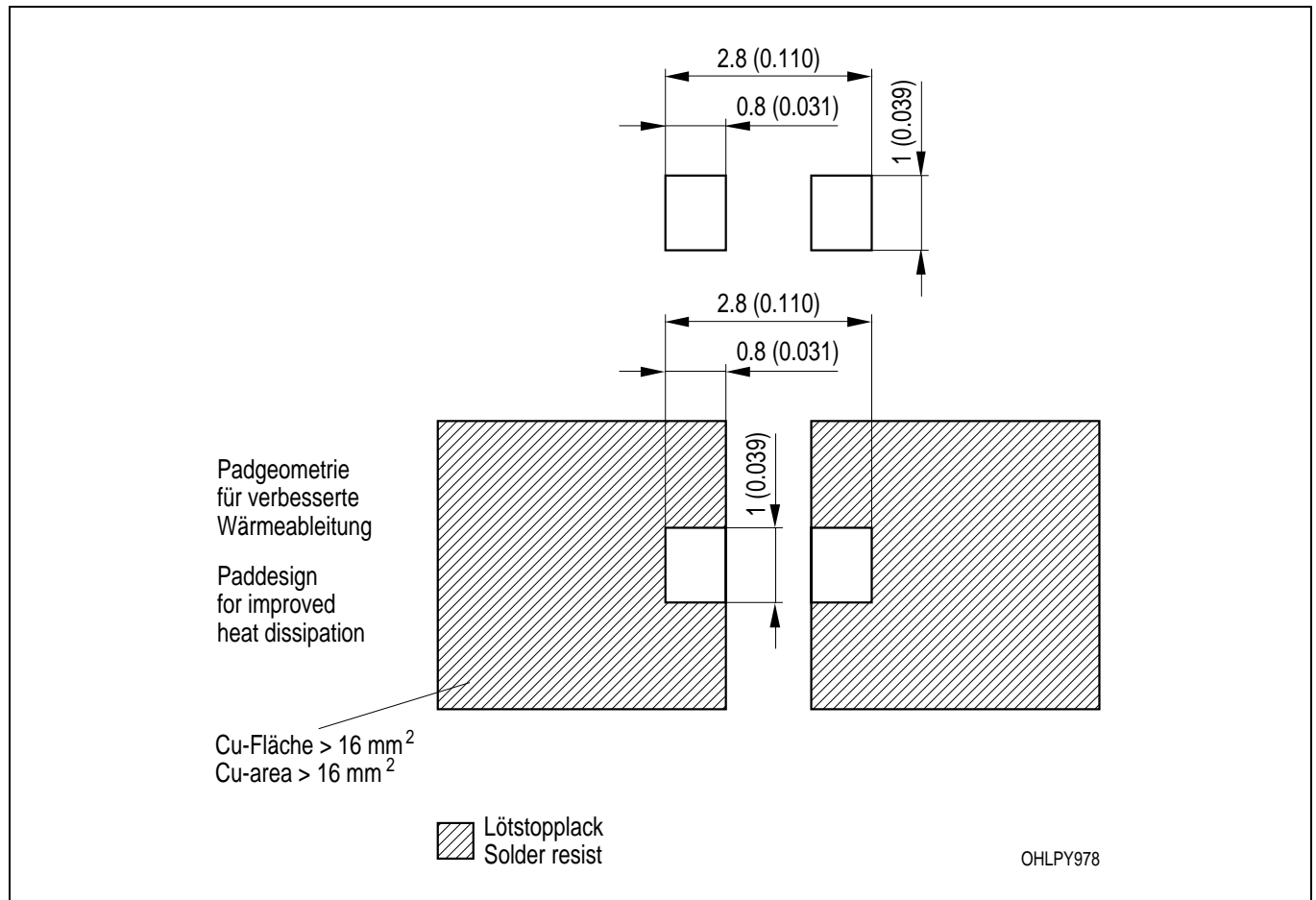
**Gewicht / Approx. weight:** 10 mg

**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)



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



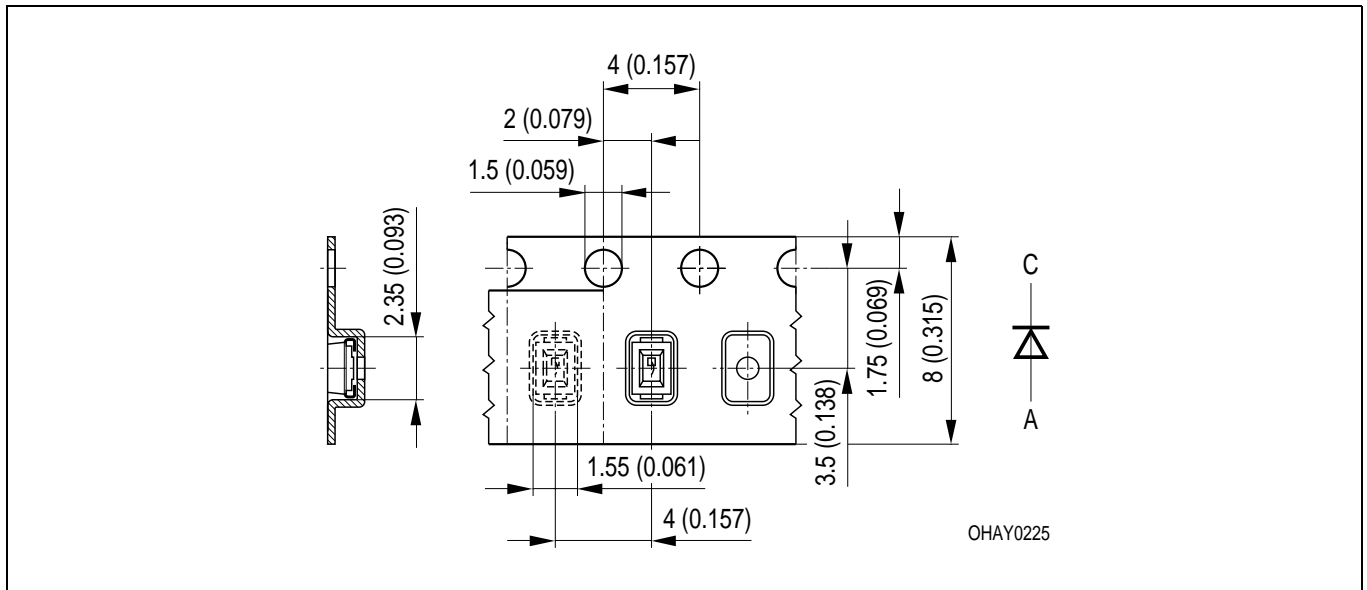
Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

**Gurtung / Polarität und Lage**

Verpackungseinheit 3000/Rolle, ø180 mm oder  
12000/Rolle, ø330 mm

**Method of Taping / Polarity and Orientation**

Packing unit 3000/reel, ø180 mm or 12000/reel, ø330 mm



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

**Revision History: 2001-03-15**

Previous Version: 2001-03-15

Page	Subjects (major changes since last revision)

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