Green (530 nm), Red (655 nm) and Infrared Emitter (940 nm)
Version 1.1

SFH 7016

Features:

- SMT package with green (530 nm), red (655 nm) and IR emitter (940 nm)
- Suitable for SMT assembly
- Available on tape and reel
- Emitters can be controlled separately
- Emitter 1= green, Emitter 2= red, Emitter 3= IR

Applications

- Biomonitoring

Notes

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 and IEC 62471.

Ordering Information

Type:	Package:	Ordering Code
SFH 7016	SMT Multi CHIPLED	Q65112A7849

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Maximum Ratings

Parameter	Symbol	Values	Unit
Operating and storage temperature range	T_{op}; T_{stg}	-40 ... 85	°C
Reverse voltage	V_R	5	V
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2	kV
Emitter 1 (green)			
Forward current	I_F (DC)	30	mA
Surge current ($t_p \leq 100$ µs, D = 0 .005)	I_{FSM}	0.75	A
Power consumption	P_{tot}	90	mW
Emitter 2 (red)			
Forward current	I_F (DC)	40	mA
Surge current ($t_p \leq 400$ µs, D = 0 .005)	I_{FSM}	0.6	A
Power consumption	P_{tot}	120	mW
Emitter 3 (IR)			
Forward current	I_F (DC)	60	mA
Surge current ($t_p \leq 200$ µs, D = 0.005)	I_{FSM}	1	A
Total power dissipation	P_{tot}	110	mW

Note: The stated maximum ratings refer to one chip, unless otherwise specified.

Characteristics (T_A = 25 °C)

Parameter		Symbol	Values	Unit
Emitter 1 (green)				
Peak emission wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	λ_{peak}	526	nm
Centroid wavelength [3) *page 19*] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	$\lambda_{centroid}$	522.5 530 541.5	nm
Spectral bandwidth at 50% of I_{max} (I_F = 20 mA, t_p = 20 ms)	(typ)	Δλ	32	nm
Half angle	(typ)	φ	± 60	°

Parameter		Symbol	Values	Unit
Dimensions of active chip area	(typ)	L x W	0.5 x 0.5	mm x mm
Rise and fall times of I_e (10% and 90% of $I_{e\,max}$) (I_F = 100 mA, R_L = 50 Ω)	(typ)	t_r / t_f	59	ns
Forward voltage [4) *page 19*] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	V_F	1.6 2.5 2.8	V
Reverse current (V_R = 5 V)	(typ (max))	I_R	not designed for reverse operation	µA
Total radiant flux (I_F = 20 mA, t_p = 20 ms)	(typ)	Φ_e	14	mW
Radiant intensity [5) *page 19*] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	I_e	2.2 4 5.4	mW/sr
Temperature coefficient of I_e or Φ_e (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_I	-0.35	% / K
Temperature coefficient of V_F (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_V	-3.6	mV / K
Temperature coefficient of wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_λ	0.03	nm / K
Thermal resistance junction - ambient, mounted on PC-board (FR4) [1) *page 19*]	(max)	R_{thJA}	660	K / W
Emitter 2 (red)				
Peak wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	λ_{peak}	660	nm
Centroid wavelength [3) *page 19*] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	$\lambda_{centroid}$	652.5 655 657.5	nm
Spectral bandwidth at 50% of I_{max} (I_F = 20 mA, t_p = 20 ms)	(typ)	Δλ	17	nm
Half angle	(typ)	φ	± 60	°
Dimensions of active chip area	(typ)	L x W	0.3 x 0.3	mm x mm
Rise and fall time of I_e (10% and 90% of $I_{e\,max}$) (I_F = 100 mA, R_L = 50 Ω)	(typ)	t_r, t_f	17	ns
Forward voltage [4) *page 19*] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	V_F	1.75 2.10 2.4	V

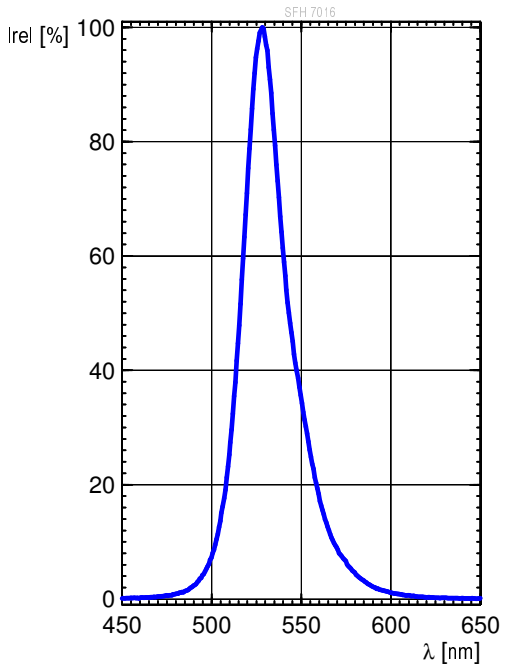
Parameter		Symbol	Values	Unit
Reverse current (V_R = 5 V)		I_R	not designed for reverse operation	µA
Total radiant flux (I_F = 20 mA, t_p = 20 ms)	(typ)	Φ_e	13	mW
Radiant intensity [5) page 19] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	I_e	2.2 4 6.75	mW/sr
Temperature coefficient of I_e or Φ_e (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_I	-0.7	% / K
Temperature coefficient of V_F (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_V	-1.7	mV / K
Temperature coefficient of wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_λ	0.18	nm / K
Thermal resistance junction - ambient, mounted on PC-board (FR4) [1) page 19]	(max)	R_{thJA}	590	K / W
Emitter 3 (IR)				
Peak emission wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	λ_{peak}	950	nm
Centroid wavelength [3) page 19] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	$\lambda_{centroid}$	930.5 940 949.5	nm
Spectral bandwidth at 50% of I_{max} (I_F = 20 mA, t_p = 20 ms)	(typ)	$\Delta\lambda$	42	nm
Half angle	(typ)	φ	± 60	°
Dimensions of active chip area	(typ)	L x W	0.3 x 0.3	mm x mm
Rise and fall times of I_e (10% and 90% of $I_{e\,max}$) (I_F = 100 mA, R_L = 50 Ω)	(typ)	t_r / t_f	16	ns
Forward voltage [4) page 19] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	V_F	1.1 1.3 1.5	V
Reverse current	(typ (max))	I_R	not designed for reverse operation	µA
Total radiant flux (I_F = 20 mA, t_p = 20 ms)	(typ)	Φ_e	11	mW
Radiant intensity [5) page 19] (I_F = 20 mA, t_p = 20 ms)	(min) (typ) (max)	I_e	1.65 3 4.05	mW/sr

Parameter		Symbol	Values	Unit
Temperature coefficient of I_e or Φ_e (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_I	-0.3	% / K
Temperature coefficient of V_F (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_V	-0.8	mV / K
Temperature coefficient of wavelength (I_F = 20 mA, t_p = 20 ms)	(typ)	TC_λ	0.3	nm / K
Thermal resistance junction - ambient, mounted on PC-board (FR4) [1] *page 19*	(max)	R_{thJA}	670	K / W

Diagrams
Emitter 1 (green)

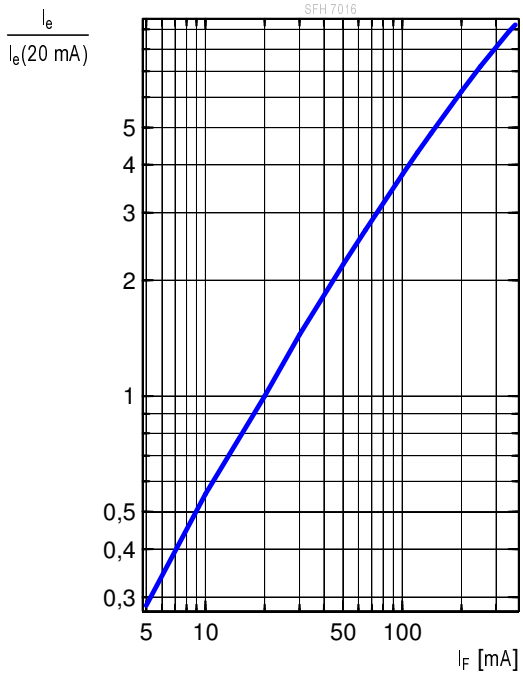
Relative Spectral Emission 2) *page 19*

$I_{rel} = f(\lambda)$, $T_A = 25°C$



Radiant Intensity 2) *page 19*

$I_e / I_e(20\ mA) = f(I_F)$, single pulse, $t_p = 25\ \mu s$, $T_A = 25°C$



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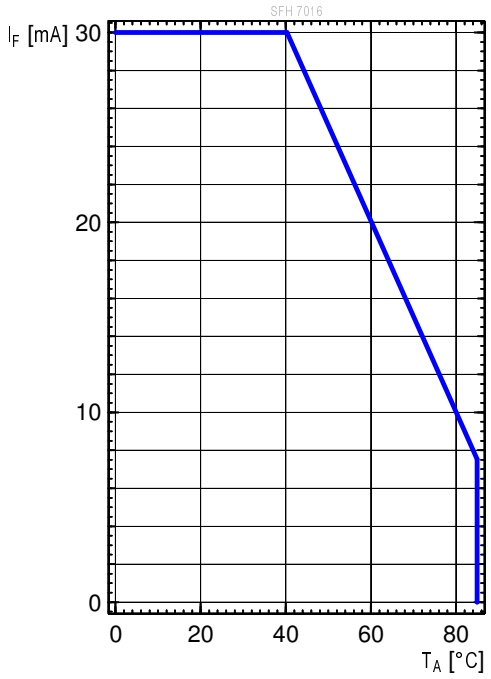
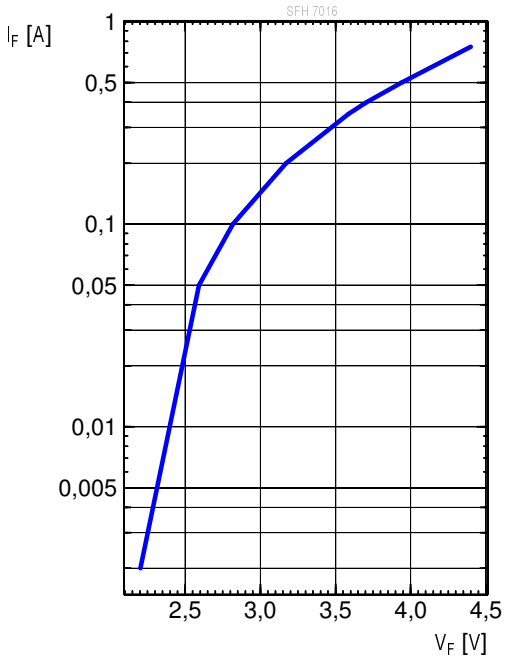
Max. Permissible Forward Current

$I_{F, max} = f(T_A)$, R_{thJA} = 660 K / W



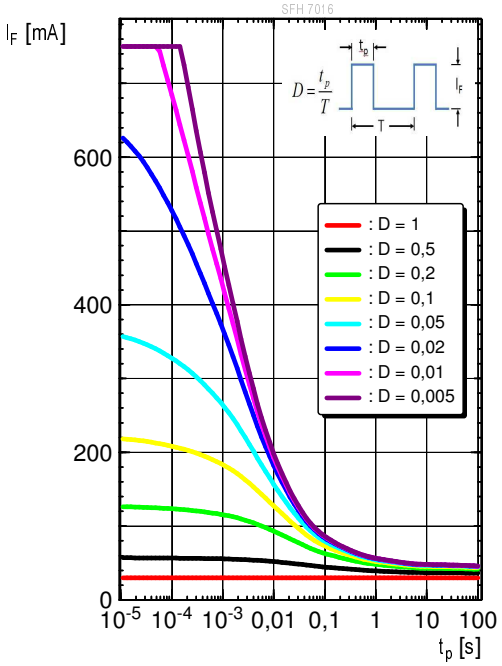
Forward Current [2) page 19]

$I_F = f(V_F)$, single pulse, t_p = 100 µs, T_A= 25°C



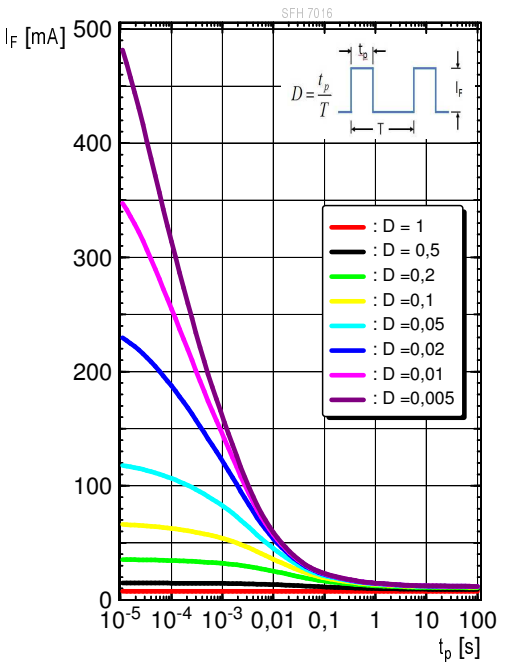
Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 25 °C, duty cycle D = parameter



Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 85 °C, duty cycle D = parameter



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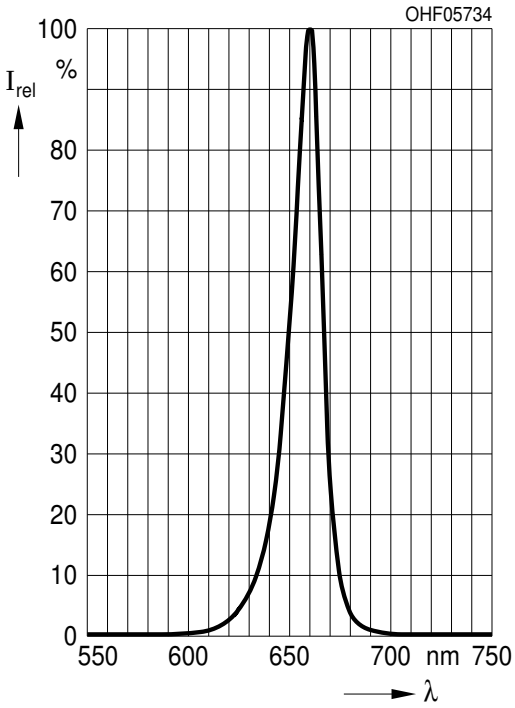
Diagrams
Emitter 2 (red)

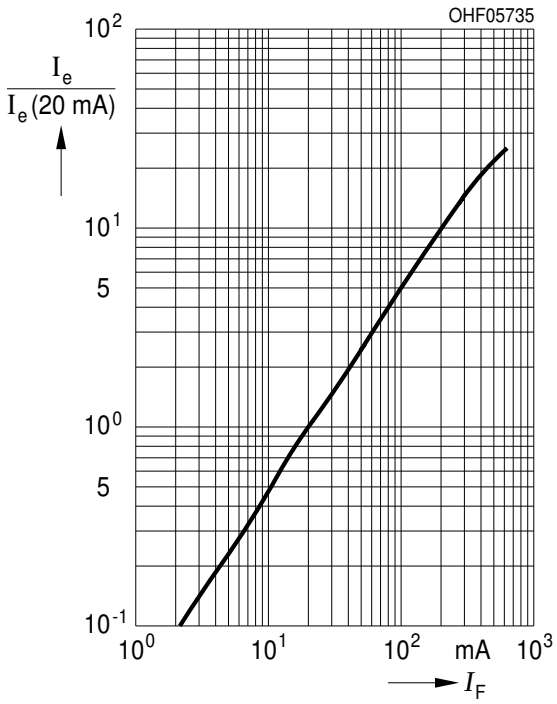
Relative Spectral Emission 2) *page 19*

$I_{rel} = f(\lambda)$, $T_A = 25°C$



Radiant Intensity 2) *page 19*

$I_e / I_e(20\ mA) = f(I_F)$, single pulse, $t_p = 25\ \mu s$, $T_A = 25°C$



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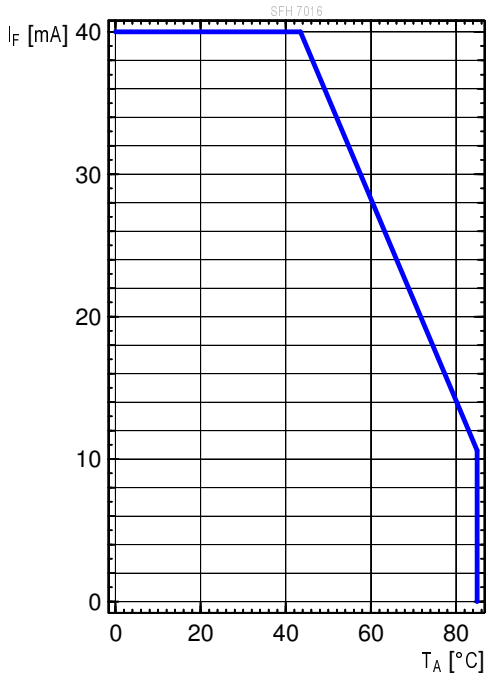
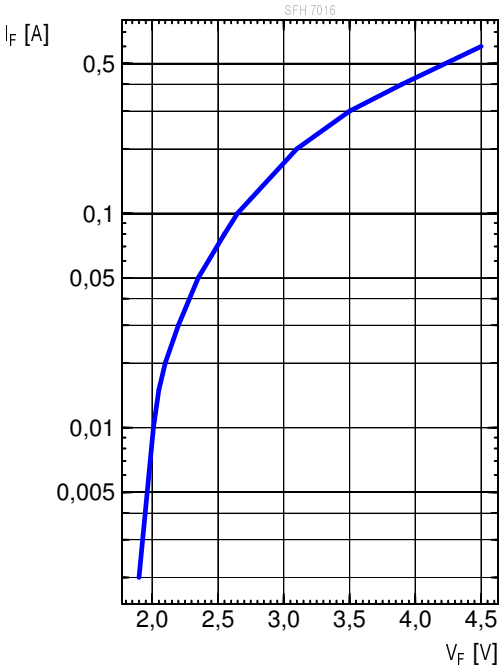
Max. Permissible Forward Current

$I_{F, max} = f(T_A)$, R_{thJA} = 590 K / W



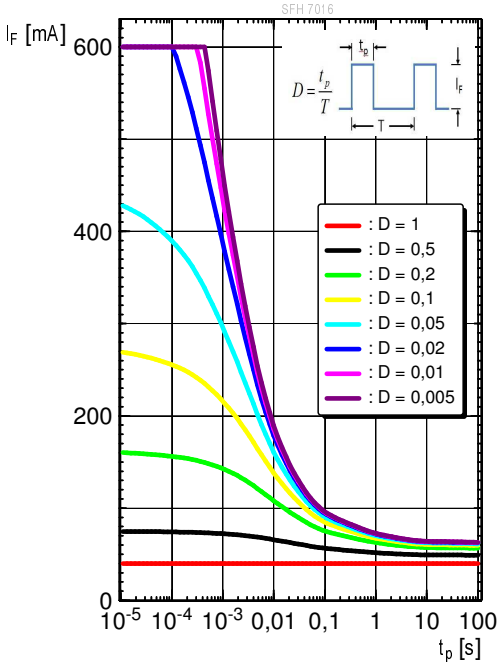
Forward Current 2) *page 19*

$I_F = f(V_F)$, single pulse, t_p = 100 µs, T_A= 25°C



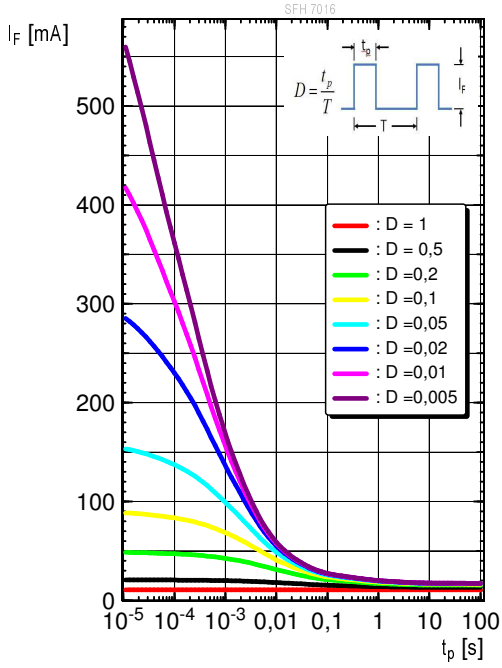
Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 25 °C, duty cycle D = parameter



Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 85 °C, duty cycle D = parameter



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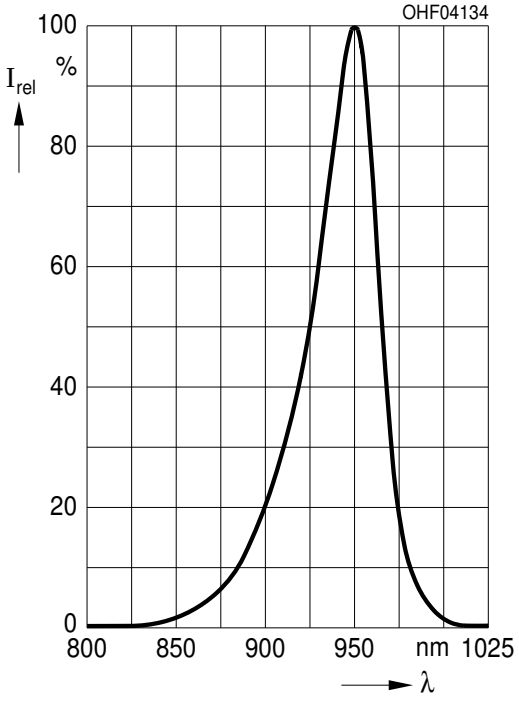
Diagrams
Emitter 3 (IR)

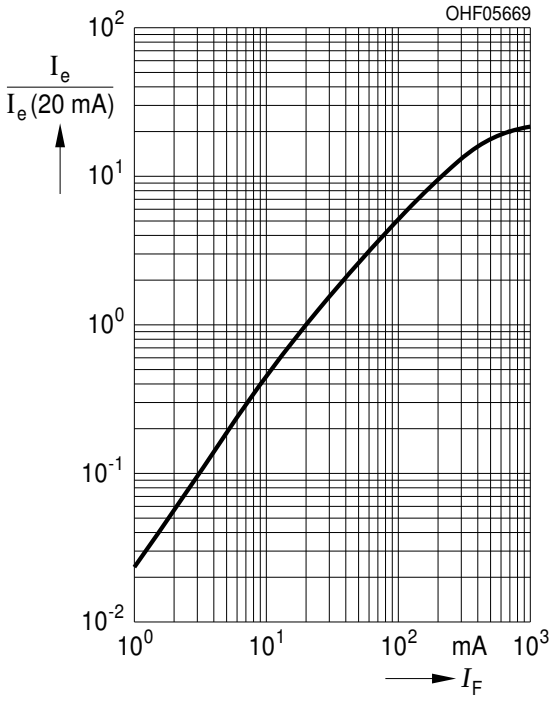
Relative Spectral Emission 2) *page 19*

$I_{rel} = f(\lambda)$, $T_A = 25°C$



Radiant Intensity 2) *page 19*

$I_e / I_e(20\ mA) = f(I_F)$, single pulse, $t_p = 100\ \mu s$, $T_A = 25°C$



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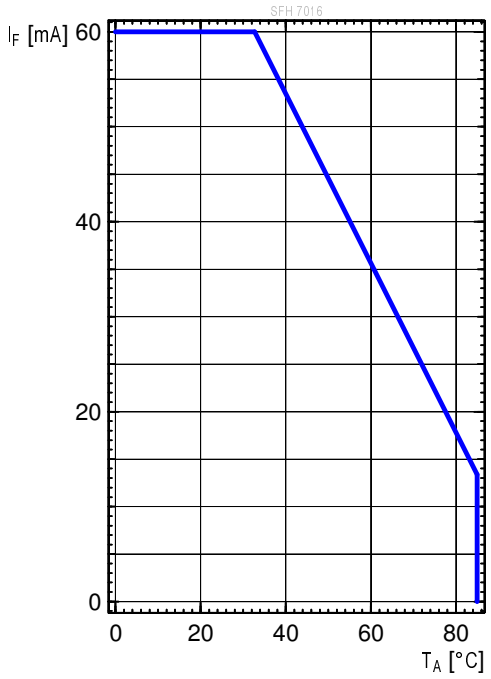
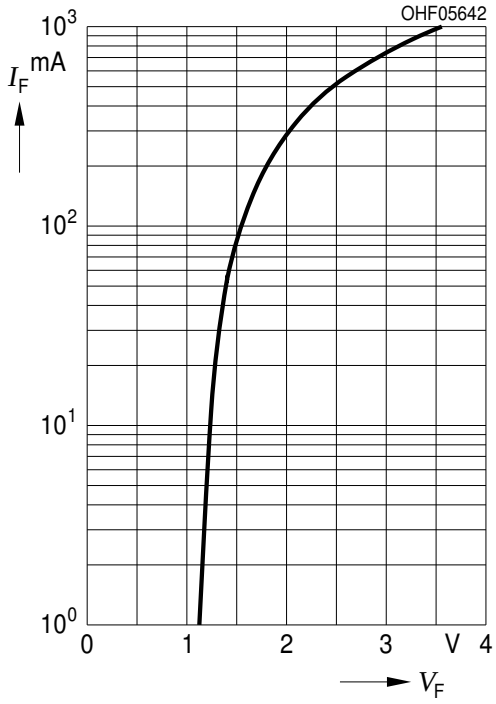
Max. Permissible Forward Current

$I_{F,\,max} = f(T_A)$, R_{thJA} = 670 K / W



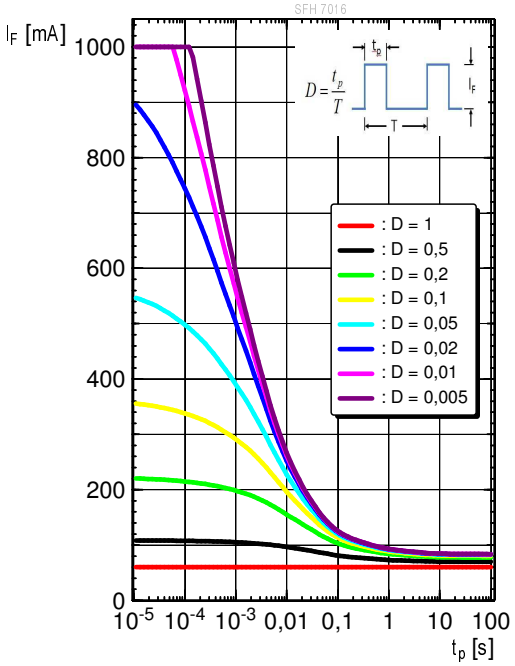
Forward Current [2) page 19]

$I_F = f(V_F)$, single pulse, t_p = 100 µs, T_A= 25°C



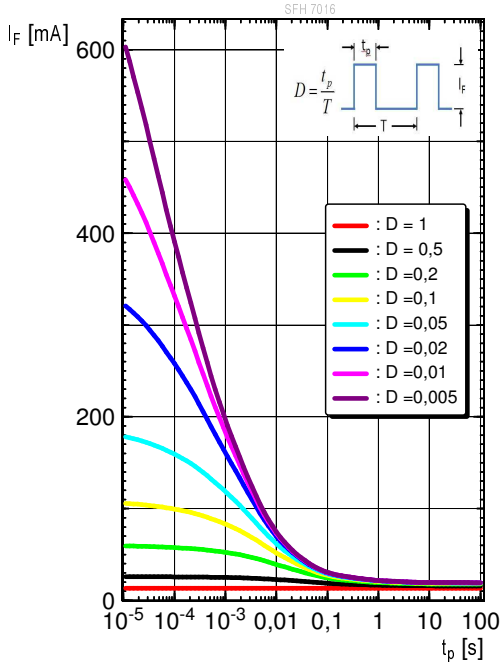
Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 25 °C, duty cycle D = parameter



Permissible Pulse Handling Capability

$I_F = f(t_p)$, T_A = 85 °C, duty cycle D = parameter



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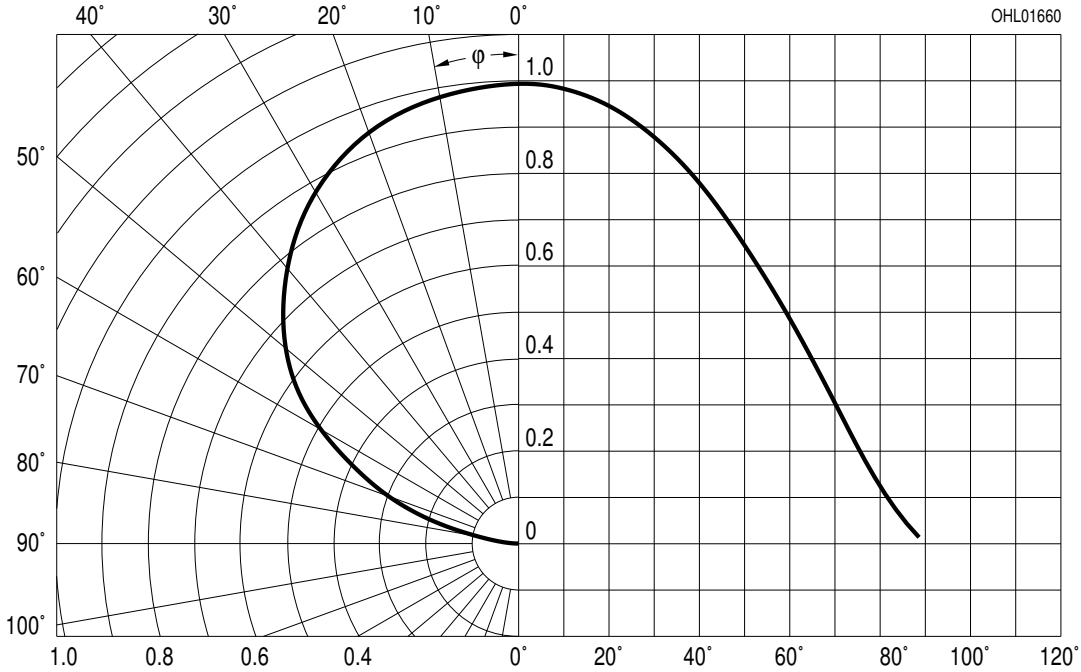
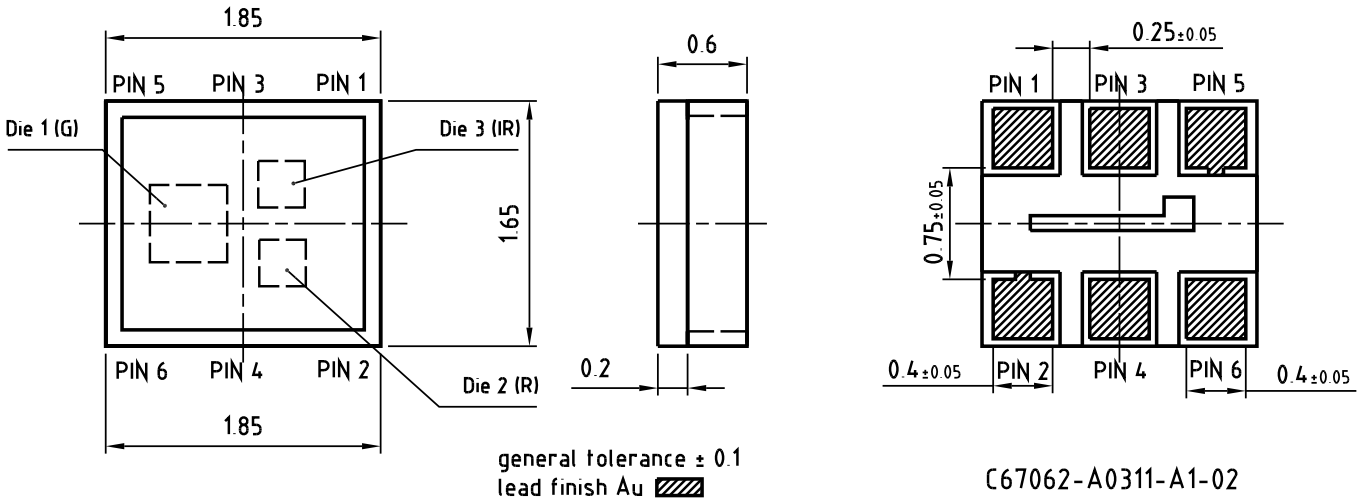
Radiation Characteristics 2) *page 19*

$I_{rel} = f(\phi)$, $T_A = 25°C$



Package Outline



Dimensions in mm.

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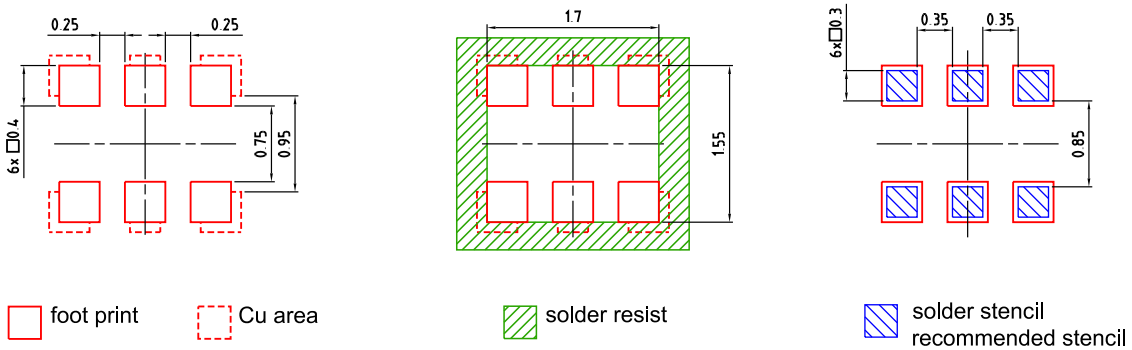
Pinning

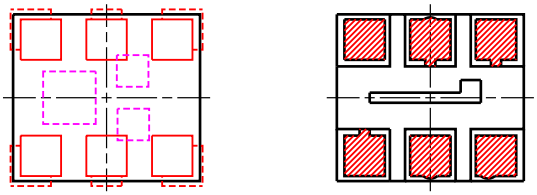
Pin	Description
1	Cathode Emitter 3 (940 nm)
2	Anode Emitter 1/2/3
3	Cathode Emitter 1(530 nm)
4	Cathode Emitter 2(655 nm)
5	Anode Emitter 1/2/3
6	NA

Approximate Weight:
3 mg

Recommended Solder Pad



Component Location on Pad



E062.3010.244 -03

Dimensions in mm.

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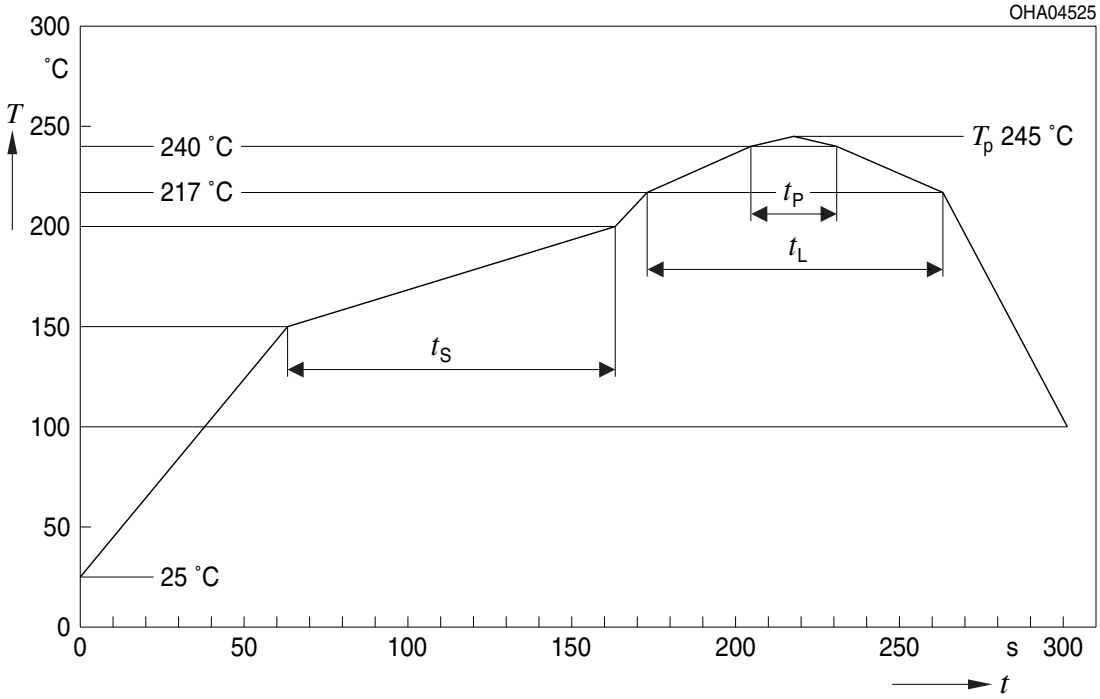
Reflow Soldering Profile

Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



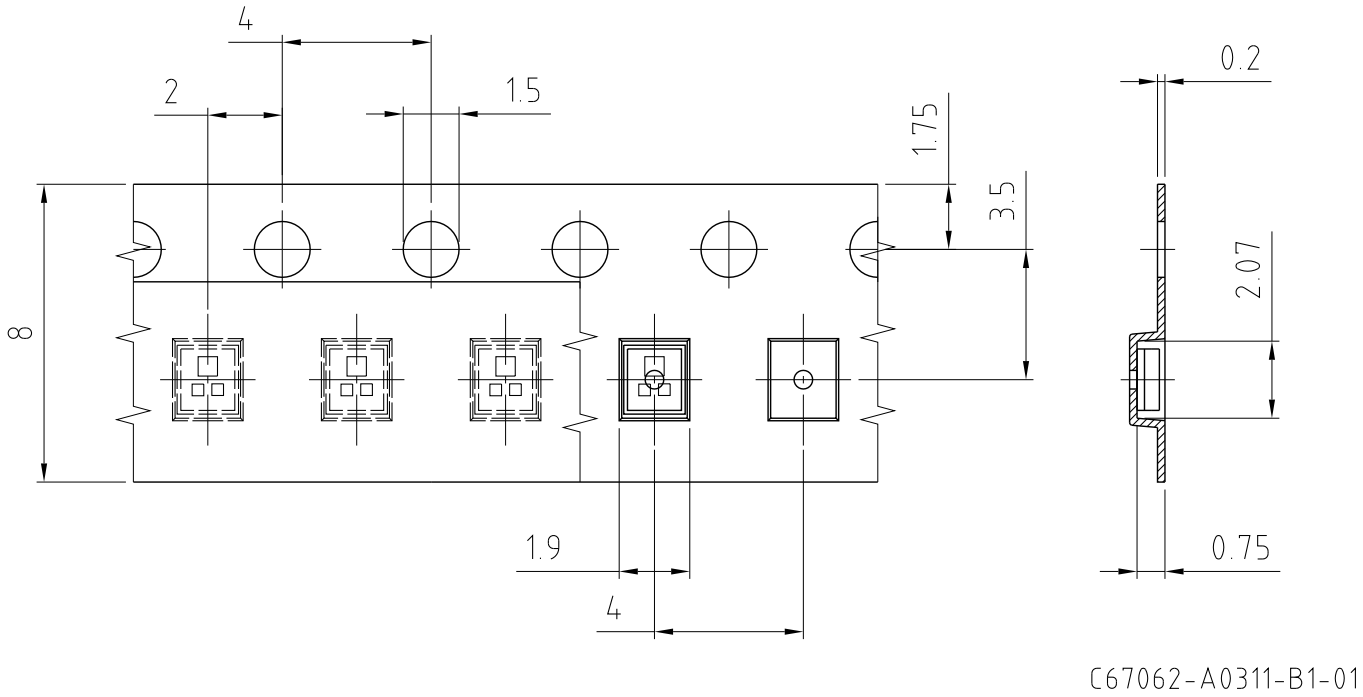
OHA04612

Profil-Charakteristik Profile Feature	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Einheit Unit
		Minimum	Recommendation	Maximum	
Ramp-up Rate to Preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up Rate to Peak*) T_{Smax} to T_P			2	3	K/s
Liquidus Temperature	T_L		217		°C
Time above Liquidus temperature	t_L		80	100	s
Peak Temperature	T_P		245	260	°C
Time within 5 °C of the specified peak temperature T_P - 5 K	t_P	10	20	30	s
Ramp-down Rate* T_P to 100 °C			3	6	K/s
Time 25 °C to T_P				480	s

All temperatures refer to the center of the package, measured on the top of the component

* slope calculation DT/Dt: Dt max. 5 s; fulfillment for the whole T-range

Taping

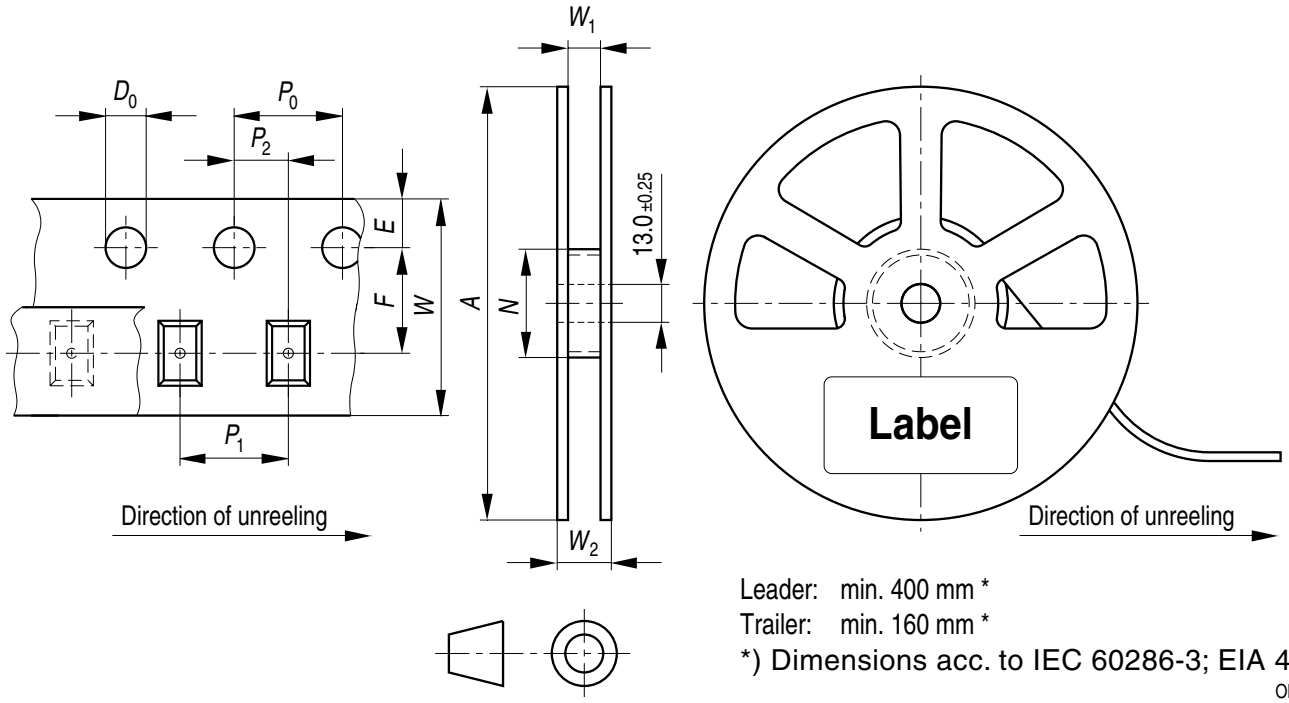


C67062-A0311-B1-01

Dimensions in mm.

Tape and Reel

8 mm tape with 3000 pcs. on ∅ 180 mm reel



Leader: min. 400 mm *
Trailer: min. 160 mm *
*) Dimensions acc. to IEC 60286-3; EIA 481-D

OHAY0324

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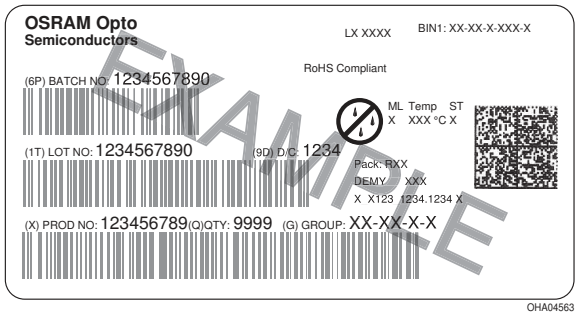
Tape dimensions [mm]

W	P_0	P_1	P_2	D_0	E	F
8 + 0.3 / -0.1	4 ± 0.1	2 ± 0.05 or 4 ± 0.1	2 ± 0.05	1.5 ± 0.1	1.75 ± 0.1	3.5 ± 0.05

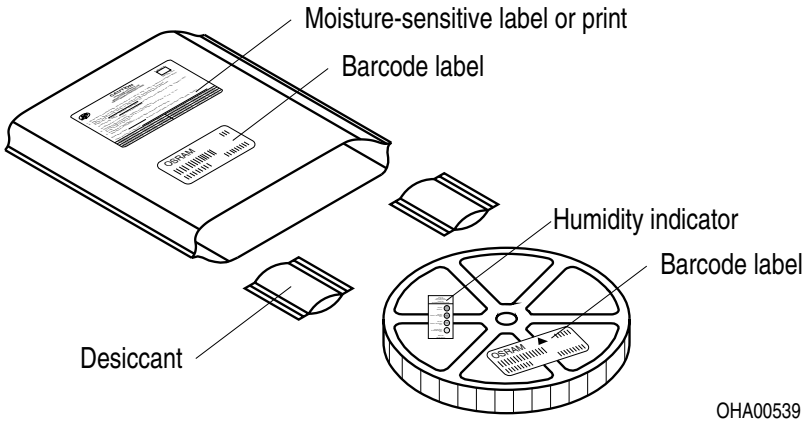
Reel dimensions [mm]

A	W	N_{min}	W_1	W_{2max}
180	8	60	9	11.4

Barcode-Product-Label (BPL)

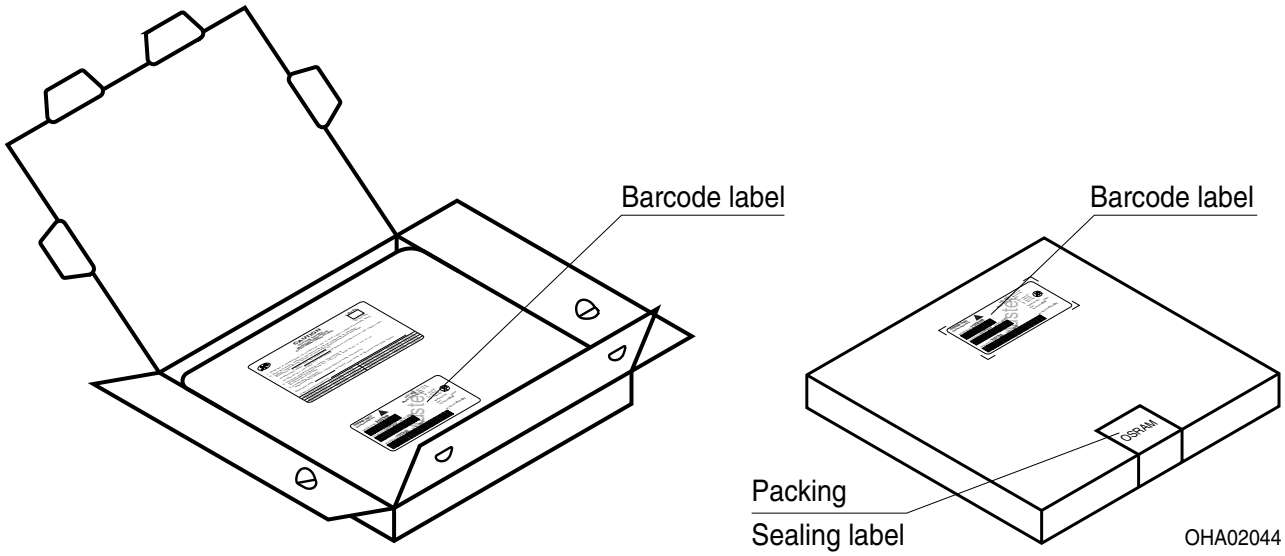


Dry Packing Process and Materials



Note:
Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card.
Regarding dry pack you will find further information in the internet. Here you will also find the normative references like JEDEC.

Transportation Packing and Materials



Dimensions of transportation box in mm

Width	Length	Height
191 ± 5	195 ± 5	30 ± 5

Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

Attention please!
The information describes the type of component and shall not be considered as assured characteristics.
Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.
For information on the types in question please contact our Sales Organization.
If printed or downloaded, please find the latest version on the OSRAM OS website.

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.

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Glossary

[1] only one chip on

[2] **Typical Values:** Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

[3] **Wavelength:**: The wavelengths are measured with a tolerance of ±1nm.

[4] **Forward Voltage:**: The forward voltages are measured with a tolerance of ±0.1V.

[5] **Brightness:**: The brightness values are measured with a tolerance of ±11 %.

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Leibnizstraße 4, D-93055 Regensburg

EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；
按照中国的相关法规和标准，不含有毒有害物质或元素。

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