OSRAM SFH 7018A

Datasheet

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MULTILED®

SFH 7018A

The SFH 7018A & SFH 7018B feature a highly reflective QFN package for significantly increased light output. Their sophisticated 2-cavity design reduces interferences between green chip on the one hand and red and IR chip on the other hand. Furthermore, the 2 cavities enables the light sources to be optimally placed relative to their respective photodiodes. Overall this leads to higher accuracy of measurement of vital signs (e.g. heart rate, SpO2).
The SFH 7018A is optimized for low Vf at high current allowing operation without voltage booster in many cases.

Applications

- Digital Diagnostic Devices
- Vital Sign Monitoring

Features

- Package: clear silicone
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- SMT package
- Suitable for SMT assembly
- Available on tape and reel
- Emitters can be controlled separately

Ordering Information

Type	Brightness [1)2)]	Ordering Code
SFH 7018A		Q65113A6157
• true green	• I_e = 6.00 ... 8.20 mW/sr (I_F = 20 mA)	
• hyper red	• I_e = 5.50 ... 7.30 mW/sr (I_F = 20 mA)	
• infrared (940 nm)	• I_e = 3.70 ... 5.10 mW/sr (I_F = 20 mA)	

Maximum Ratings

T_S = 25 °C

Parameter	Symbol		Values ● true green	Values ● hyper red	Values ● infrared (940 nm)
Operating temperature	T_{op}	min. max.	-40 °C 85 °C	-40 °C 85 °C	-40 °C 85 °C
Storage temperature	T_{stg}	min. max.	-40 °C 85 °C	-40 °C 85 °C	-40 °C 85 °C
Junction temperature	T_j	max.	125 °C	125 °C	125 °C
Forward current	I_F	max.	200 mA	40 mA	80 mA
Forward current pulsed t_p ≤ 2.5 ms; D ≤ 0.005 (true green) t_p ≤ 70 µs; D ≤ 0.005 (hyper red) t_p ≤ 60 µs; D ≤ 0.005 (infrared)	$I_{F\ pulse}$	max.	0.75 A	0.3 A	1 A
Reverse voltage [3]	V_R	max.	5 V	5 V	5 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	max.	2 kV	2 kV	2 kV

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

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Characteristics

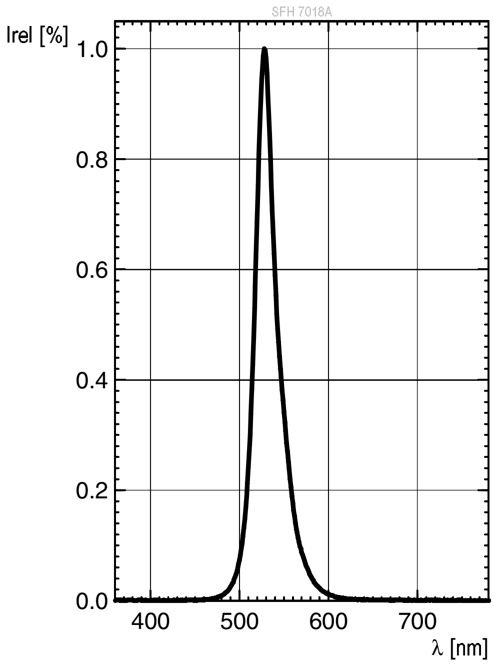
I_F = 20 mA; t_p = 20 ms; T_S = 25 °C

Parameter	Symbol		Values ● true green	Values ● hyper red	Values ● infrared (940 nm)
Peak wavelength	λ_{peak}	typ.	536.0 nm	660.0 nm	950.0 nm
Centroid wavelength [4]	$\lambda_{centroid}$	min. typ. max.	523.0 nm 532.0 nm 540.0 nm	652.5 nm 655.0 nm 657.5 nm	930.0 nm 940.0 nm 950.0 nm
Spectral bandwidth at 50% $I_{rel,max}$ (FWHM)	$\Delta\lambda$	typ.	27.0 nm	23.0 nm	41.0 nm
Half angle	φ	typ.	60 °	60 °	60 °
Dimensions of active chip area	L x W	typ.	0.75 x 0.75 mm x mm	0.3 x 0.3 mm x mm	0.3 x 0.3 mm x mm
Rise time (10% / 90%) I_F = 100 mA; R_L = 50 Ω	t_r	typ.	59 ns	17 ns	16 ns
Fall time (10% / 90%) I_F = 100 mA; R_L = 50 Ω	t_f	typ.	59 ns	17 ns	16 ns
Forward voltage [5]	V_F	min. typ. max.	1.85 V 2.30 V 2.60 V	1.70 V 1.90 V 2.20 V	1.10 V 1.30 V 1.50 V
Forward voltage I_F= 100 mA	V_F	typ.	2.50 V		
Forward voltage I_F = 200 mA	V_F	typ.	2.65 V		
Forward voltage I_F = 250 mA	V_F	typ.	2.70 V		
Reverse current [3] V_R = 5 V	I_R	typ. max.	0.01 µA 10 µA	0.01 µA 10 µA	0.01 µA 10 µA
Radiant intensity [1)2)] I_F = 20 mA; t_p = 20 ms	I_e	min. typ. max.	6.0 mW/sr 7.3 mW/sr 8.2 mW/sr	5.5 mW/sr 6.2 mW/sr 7.3 mW/sr	3.7 mW/sr 4.4 mW/sr 5.1 mW/sr
Total radiant flux [6] I_F = 20 mA; t_p = 20 ms	Φ_e	typ.	23 mW	20 mW	14 mW
Temperature coefficient of brightness	TC_I	typ.			-0.3 % / K
Temperature coefficient of wavelength	TC_λ	typ.			0.3 nm / K
Thermal resistance junction solder point real [7]	$R_{thJS\ real}$	typ. max.	17 K / W 20 K / W	45 K / W 54 K / W	50 K / W 62 K / W

The stated characteristic values refer to one chip, unless otherwise specified.

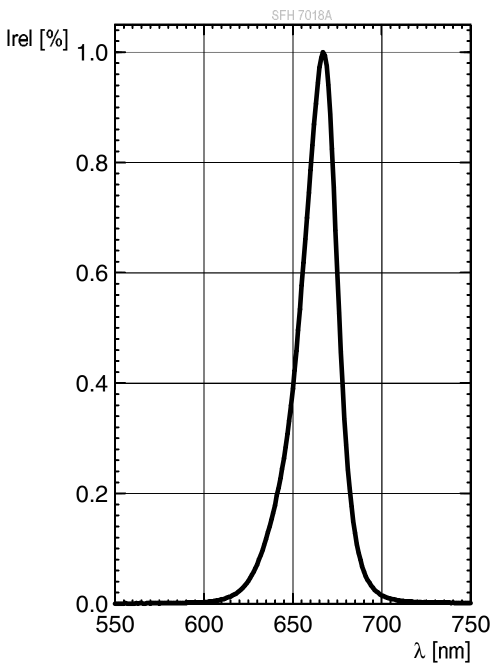
Relative Spectral Emission [8), 9)]

- true green: $I_{e,rel} = f(\lambda)$; I_F = 20 mA; t_p = 20 ms



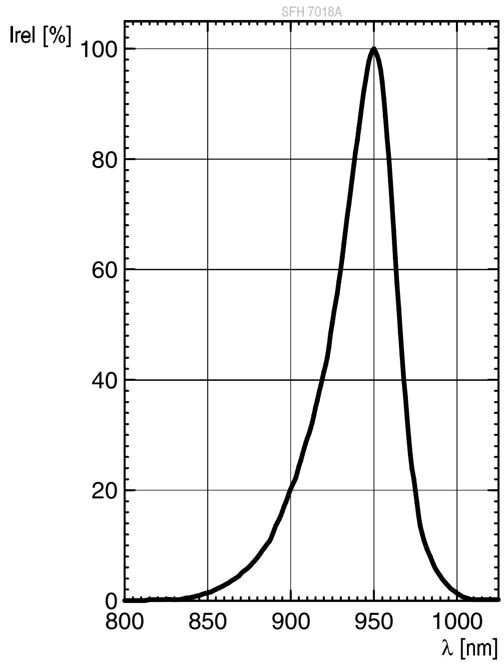
Relative Spectral Emission [8), 9)]

- hyper red: $I_{e,rel} = f(\lambda)$; I_F = 20 mA; t_p = 20 ms



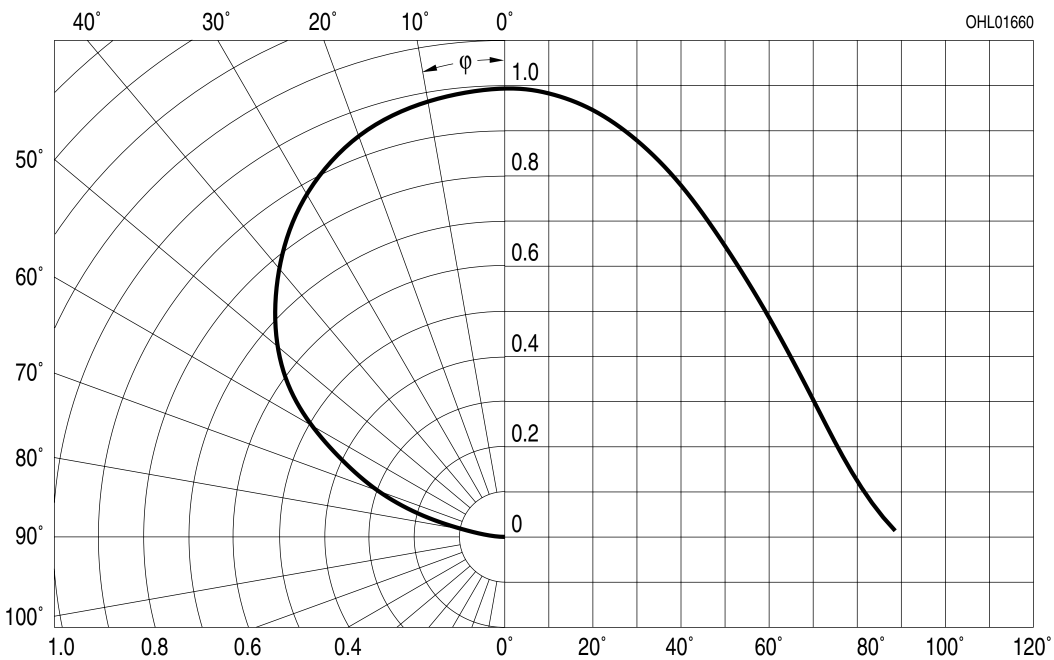
Relative Spectral Emission [8), 9)]

- infrared (940 nm): $I_{e,rel} = f(\lambda)$; I_F = 20 mA; t_p = 20 ms



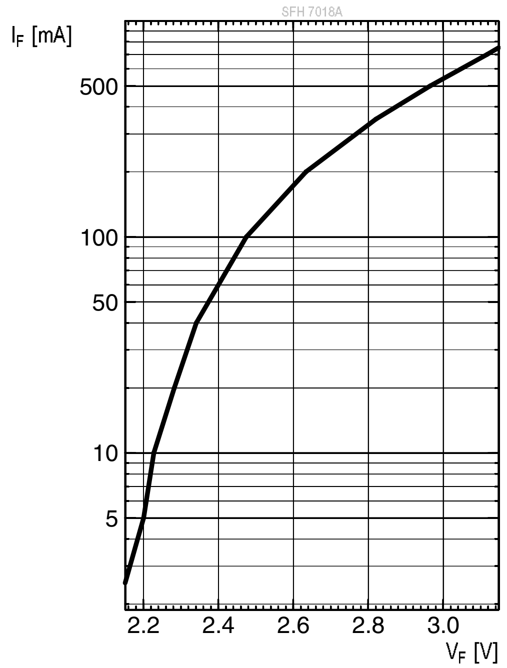
Radiation Characteristics [8), 9)]

true green/ hyper red/ infrared: Ie,rel = f(φ)



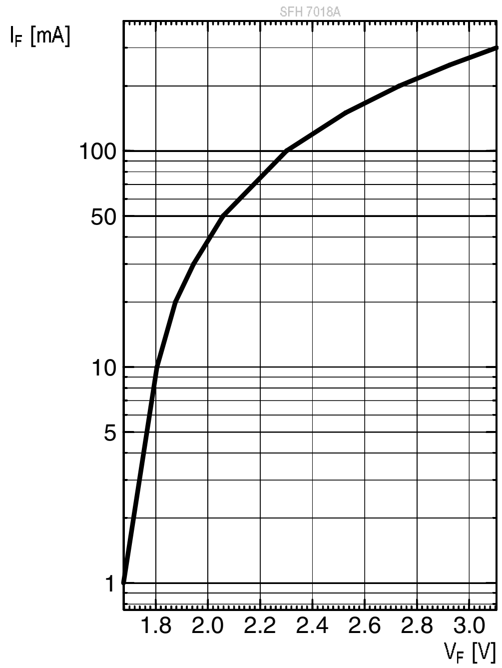
Forward current [8), 9)]

● true green: $I_F = f(V_F)$; single pulse; t_p = 100 µs



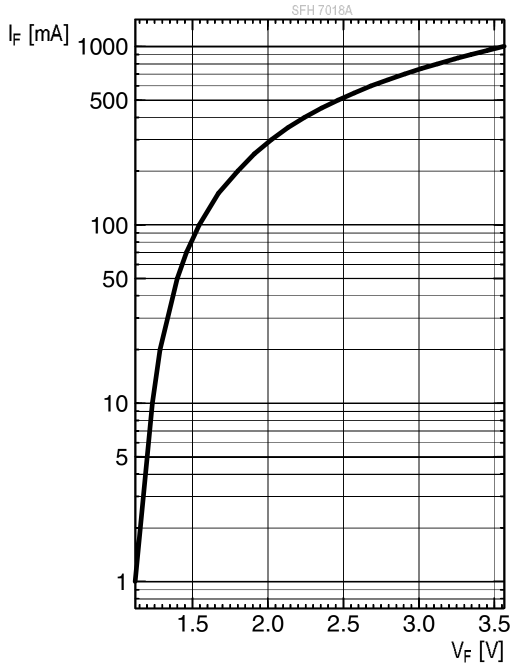
Forward current [8), 9)]

● hyper red: $I_F = f(V_F)$; single pulse; t_p = 100 µs



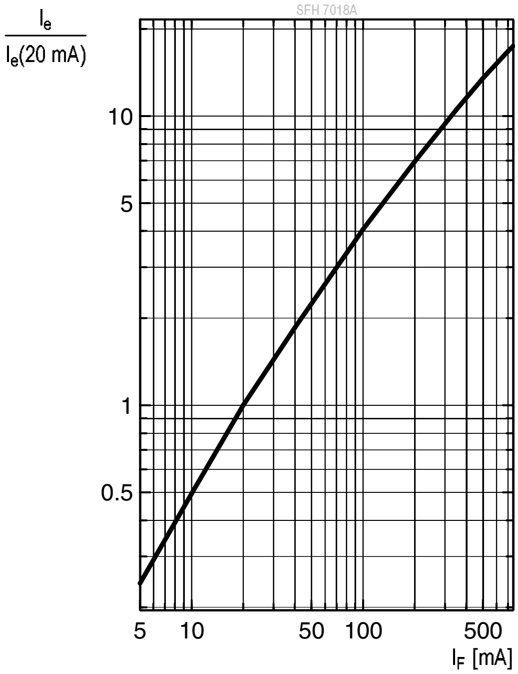
Forward current [8), 9)]

● infrared (940 nm): $I_F = f(V_F)$; single pulse; t_p = 100 µs



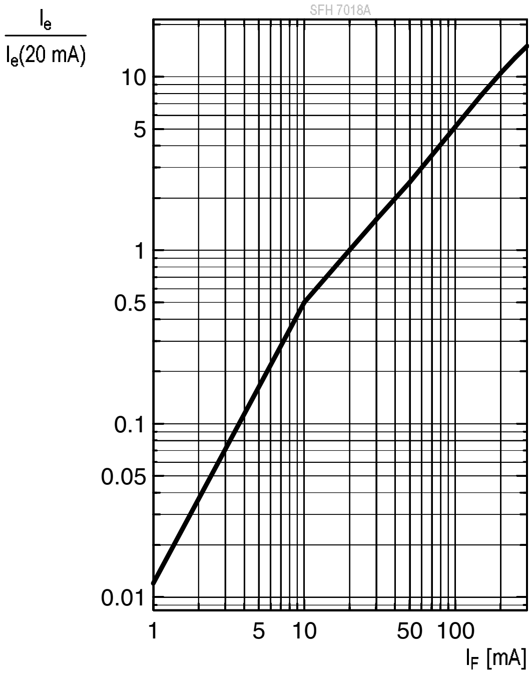
Relative Radiant Intensity [8), 9)]

- true green: $I_e/I_e(20mA) = f(I_F)$; single pulse; t_p = 100 µs



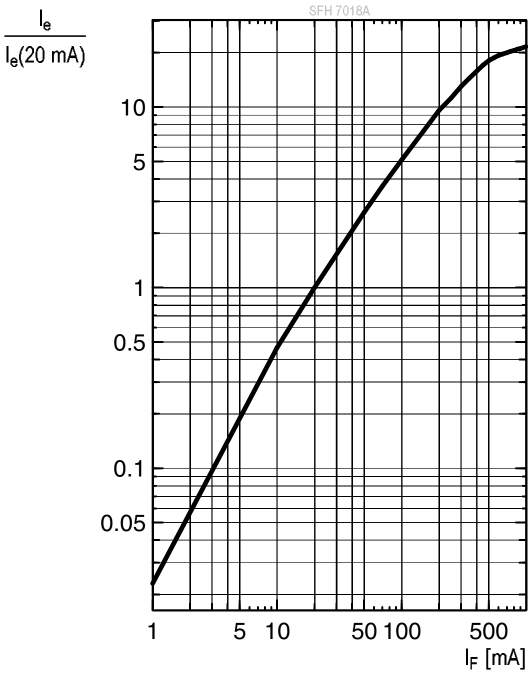
Relative Radiant Intensity [8), 9)]

- hyper red: $I_e/I_e(20mA) = f(I_F)$; single pulse; t_p = 100 µs



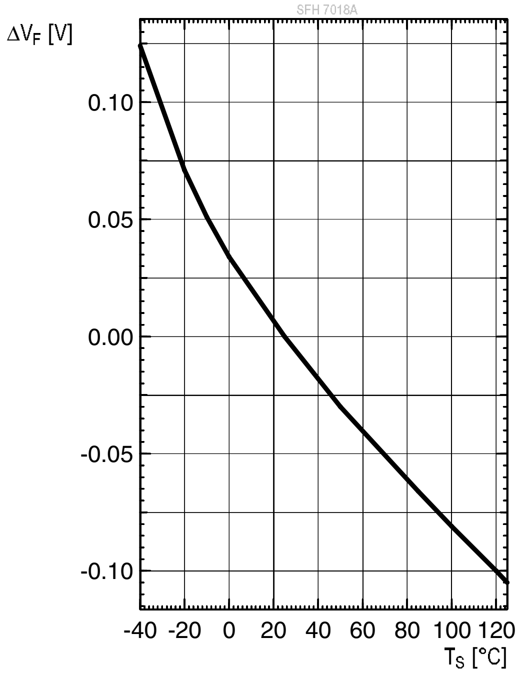
Relative Radiant Intensity [8), 9)]

- infrared (940 nm): $I_e/I_e(20mA) = f(I_F)$; single pulse; t_p = 100 µs



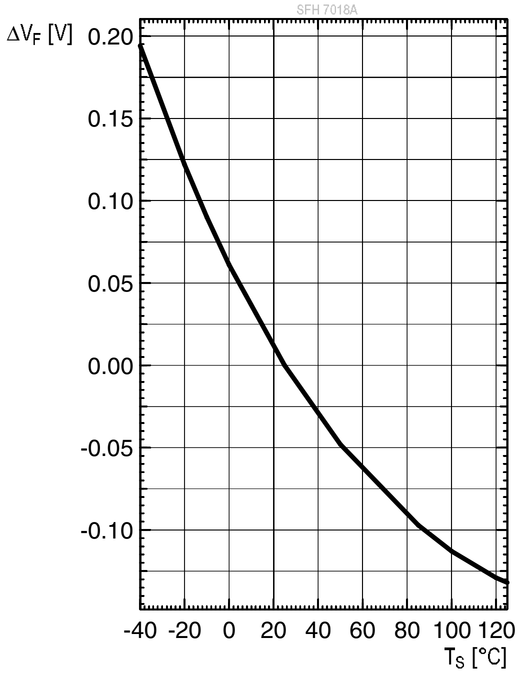
Forward Voltage 8)

- true green: $V_F = f(T_S)$; I_F = 20mA; t_p = 20ms



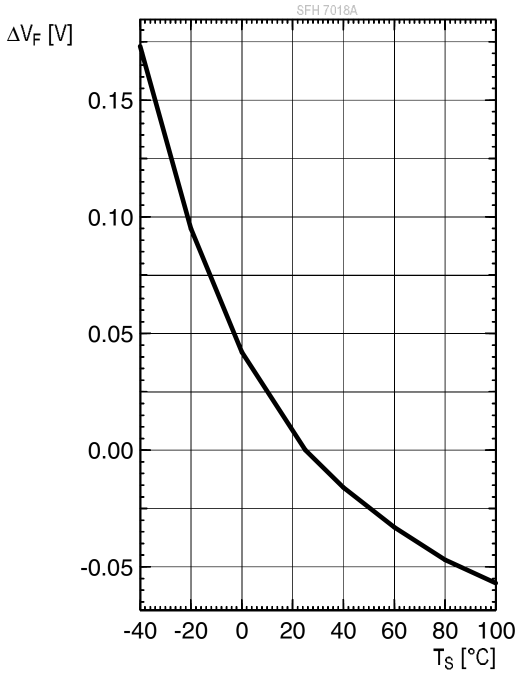
Forward Voltage 8)

- hyper red: $V_F = f(T_S)$; I_F = 20mA; t_p = 20ms



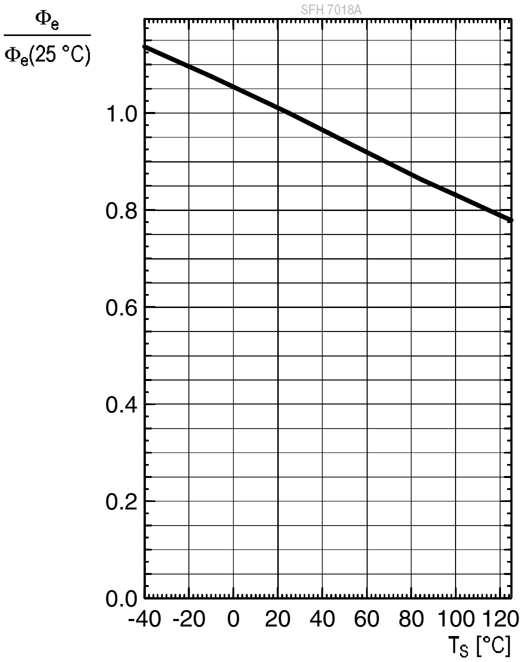
Forward Voltage 8)

- infrared (940 nm): $V_F = f(T_S)$; I_F = 20mA; t_p = 20ms



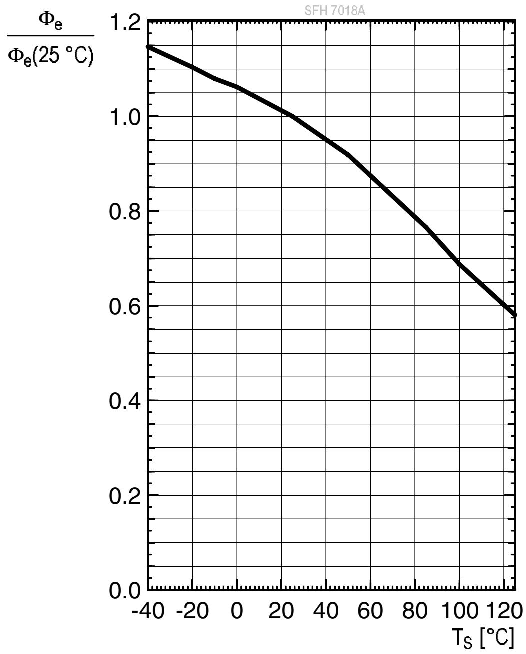
Relative Total Radiant Flux [8)]

- true green: $\Phi_{rel} = f(T_S)$; I_F = 20mA; t_p = 20ms



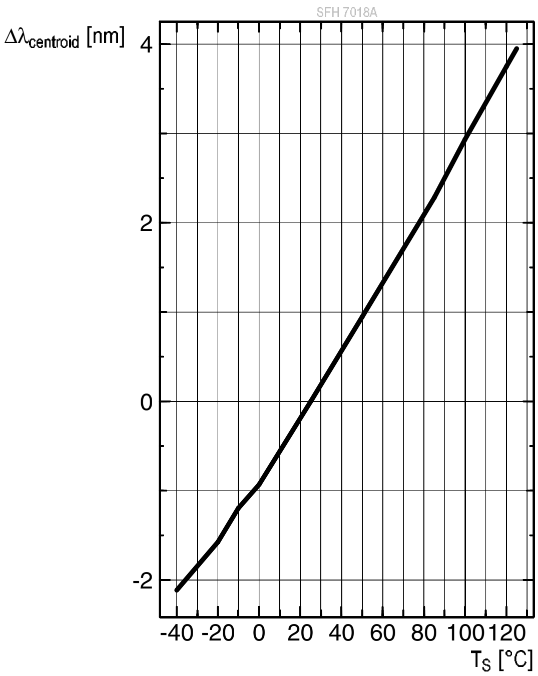
Relative Total Radiant Flux [8)]

- hyper red: $\Phi_{rel} = f(T_S)$; I_F = 20mA; t_p = 20ms



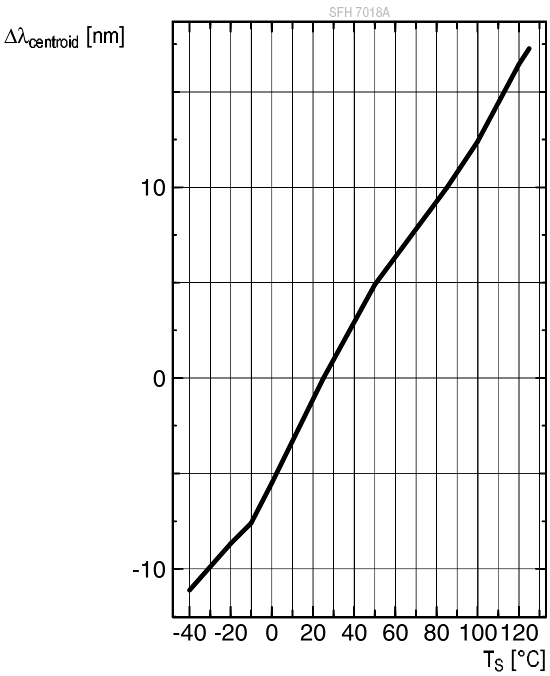
Centroid Wavelength [8)]

- true green: $\lambda_{centroid} = f(T_S)$; I_F = 20mA; t_p = 20ms



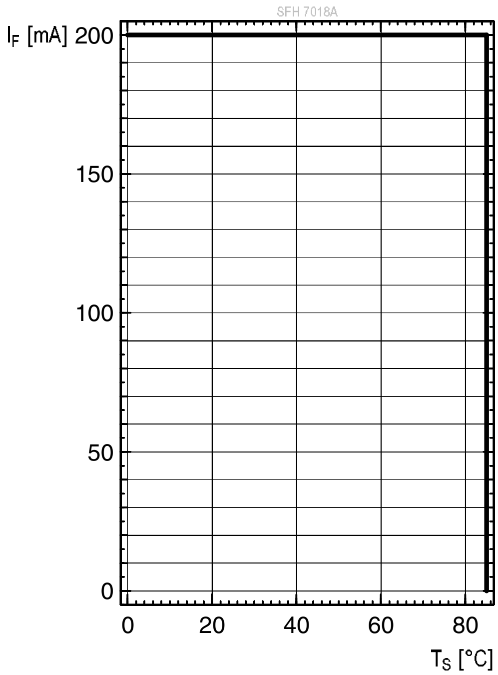
Centroid Wavelength [8)]

- hyper red: $\lambda_{centroid} = f(T_S)$; I_F = 20mA; t_p = 20ms; f = 1MHz



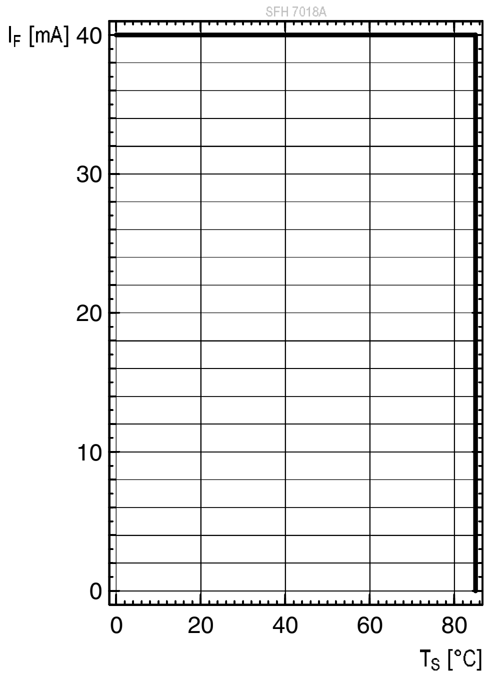
Max. Permissible Forward Current

● true green: I_F = f (T_S); Rth_{js} = 20 K / W



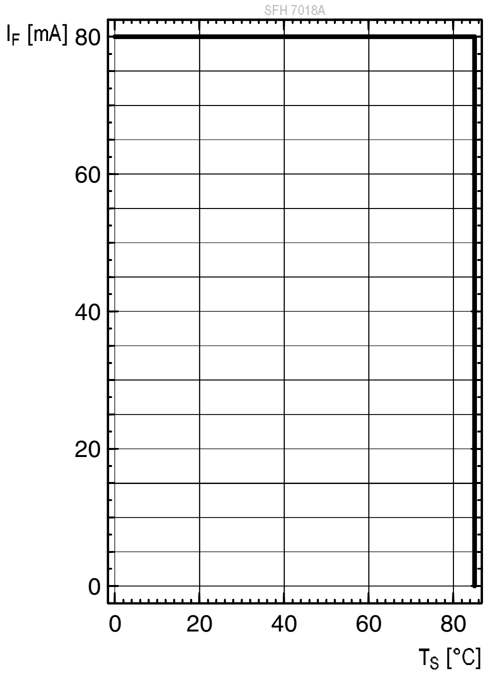
Max. Permissible Forward Current

● hyper red: I_F = f (T_S); Rth_{js} = 54 K / W



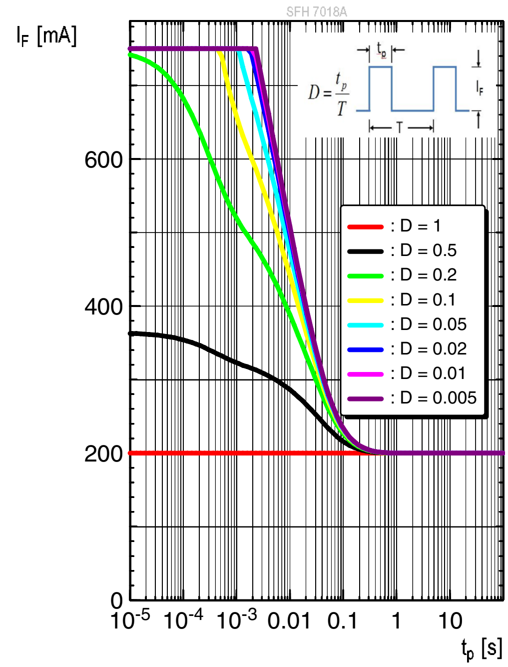
Max. Permissible Forward Current

● infrared (940 nm): I_F = f (T_S); Rth_{js} = 62 K / W



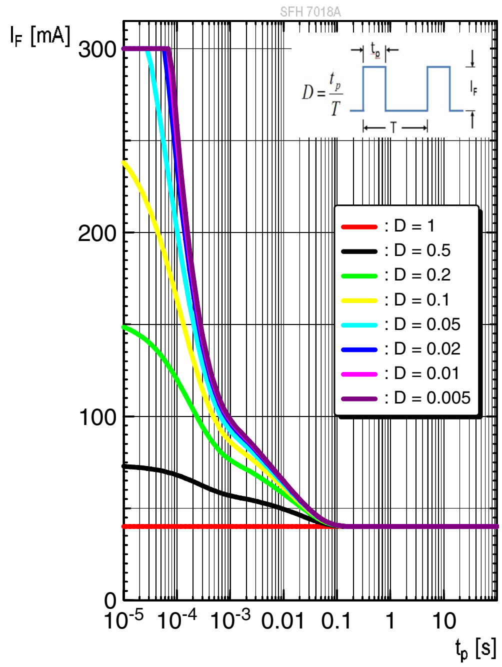
Permissible Pulse Handling Capability

● true green: $I_F = f(t_p)$; D = parameter; T_S = 85 °C



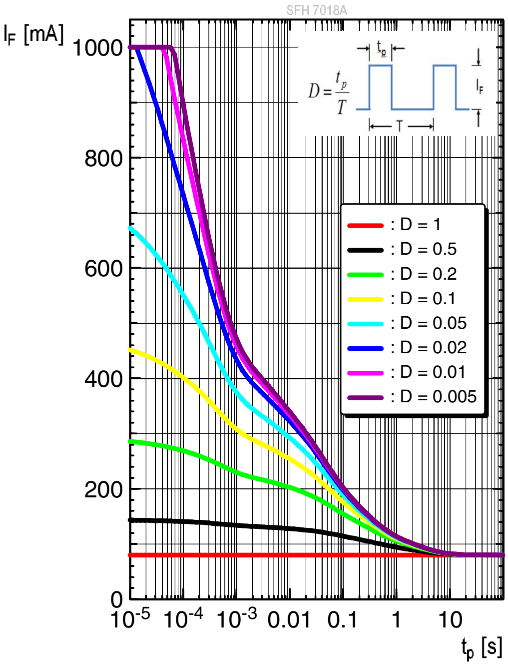
Permissible Pulse Handling Capability

● hyper red: $I_F = f(t_p)$; D = parameter; T_S = 85 °C

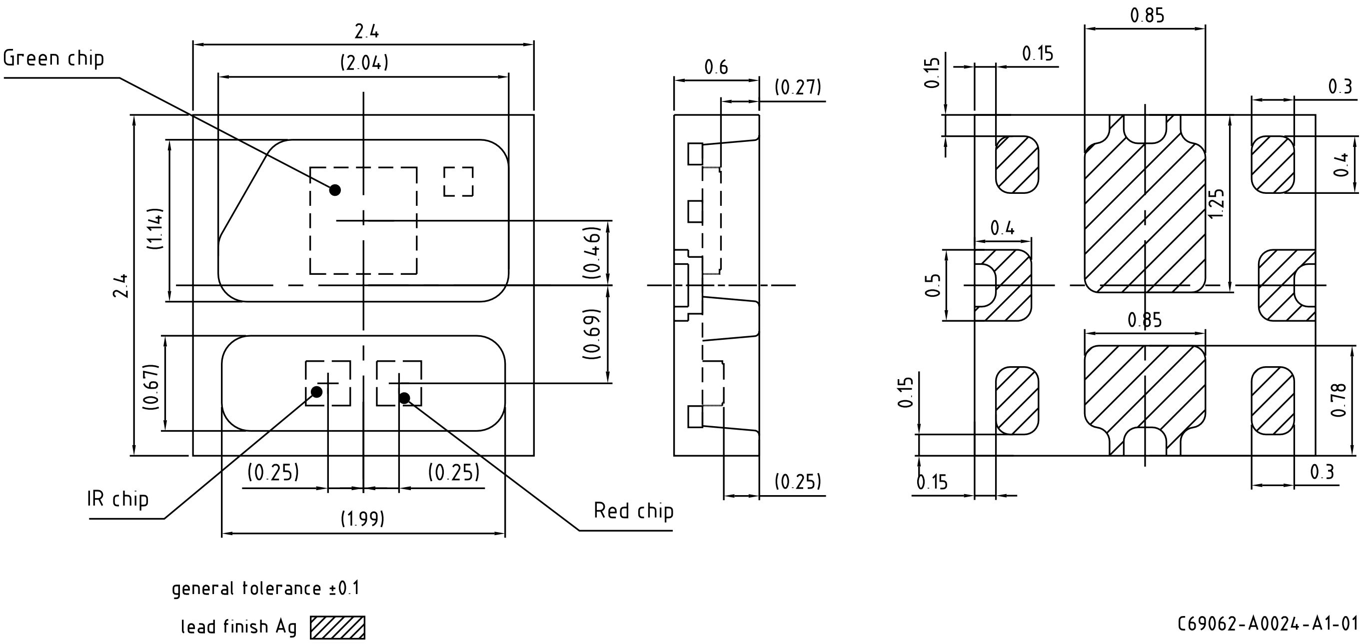


Permissible Pulse Handling Capability

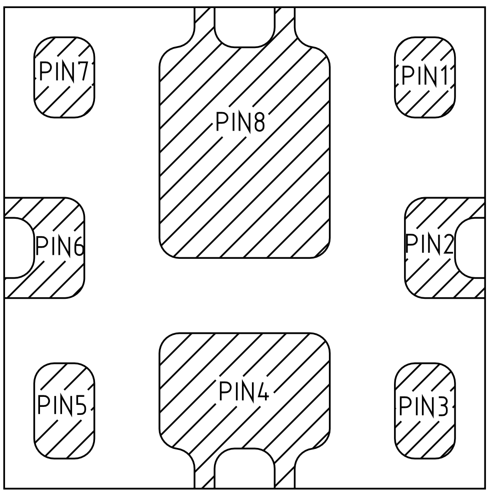
● infrared (940 nm): $I_F = f(t_p)$; D = parameter; T_S = 85 °C



Dimensional Drawing [10)]



Dimensional Drawing [10)]



PIN1/7/8	Cathode green emitter
PIN2/4	Anode IR & red emitters
PIN3	Cathode IR emitter
PIN5	Cathode red emitter
PIN6	Anode green emitter

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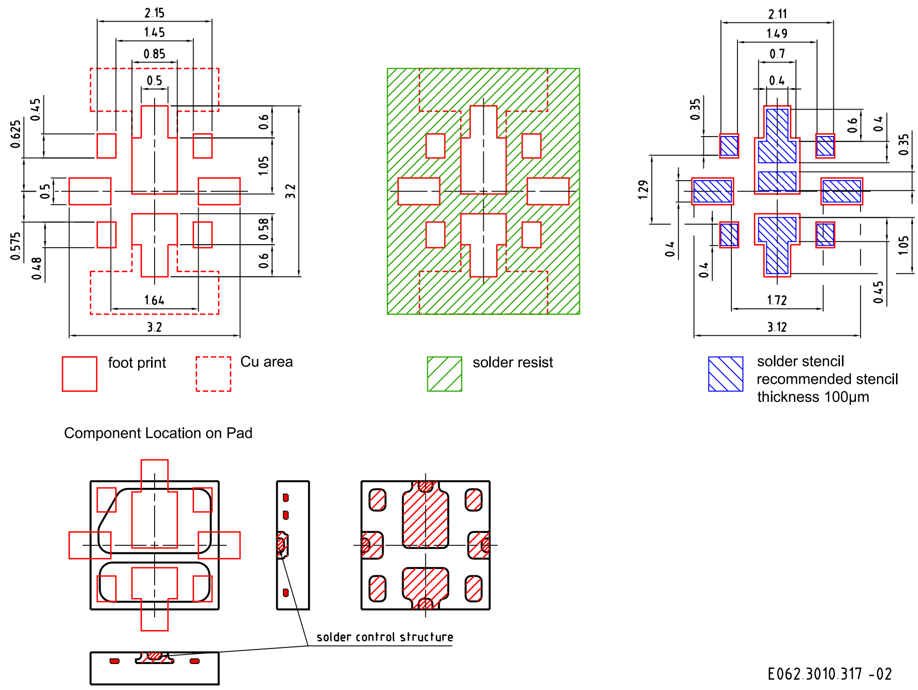
Further Information:

Approximate Weight: 12.0 mg

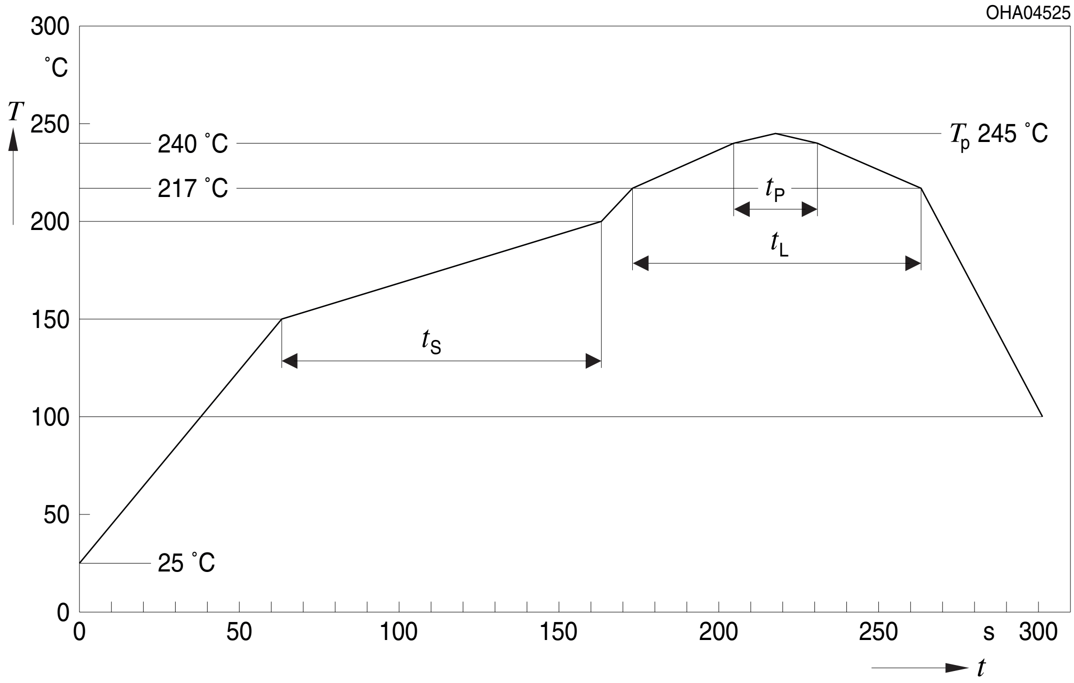
Recommended Solder Pad [10)]



For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.

Reflow Soldering Profile

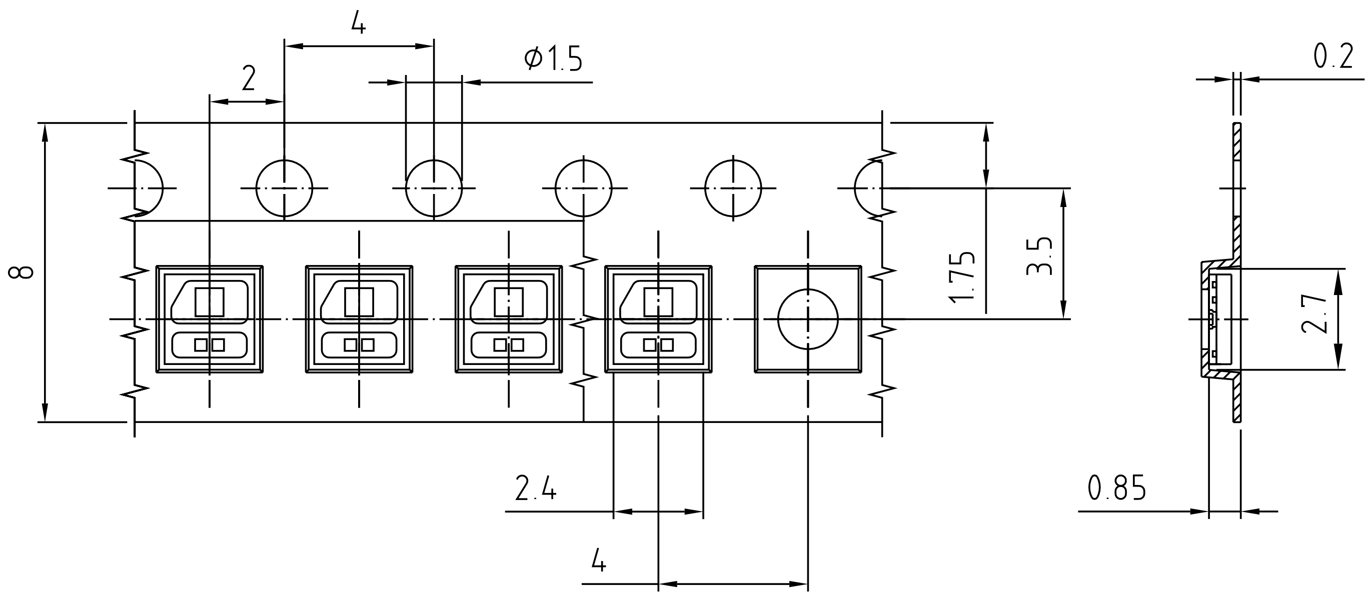
Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



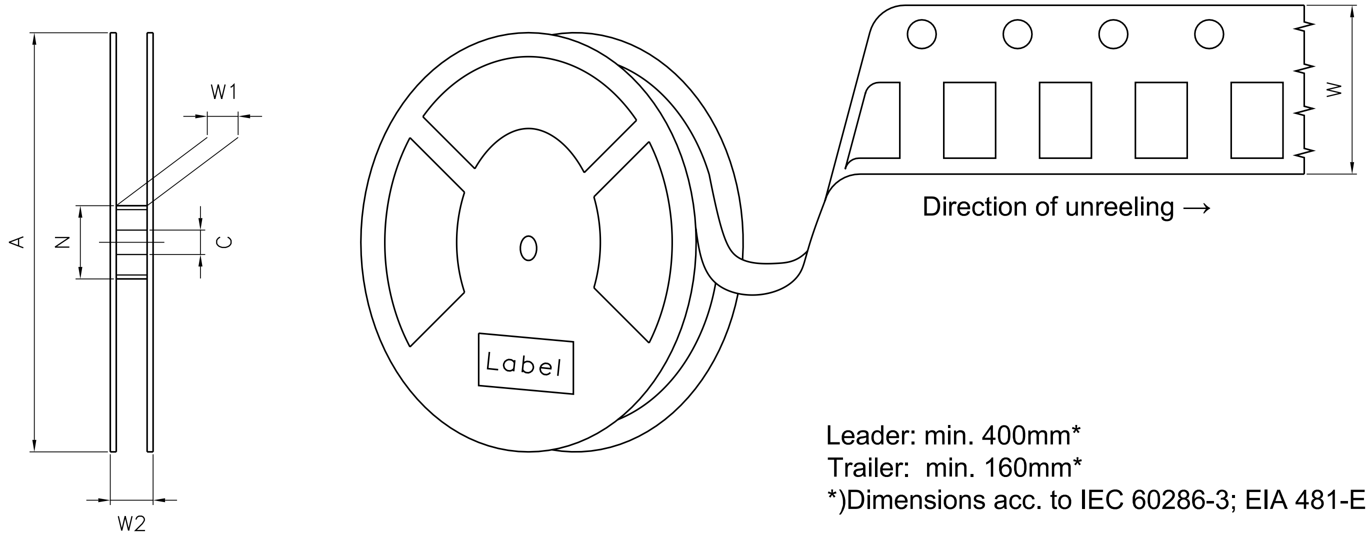
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	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 [10)]



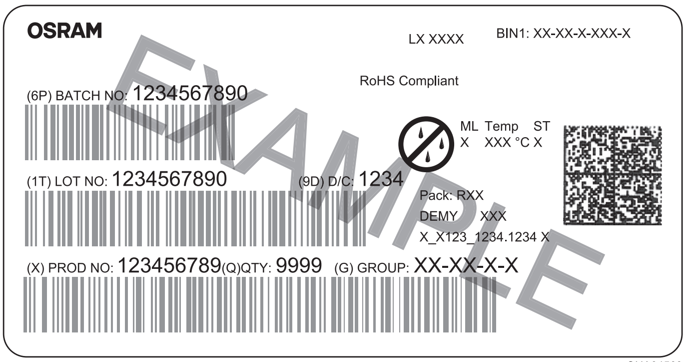
Tape and Reel [11)]



Reel Dimensions

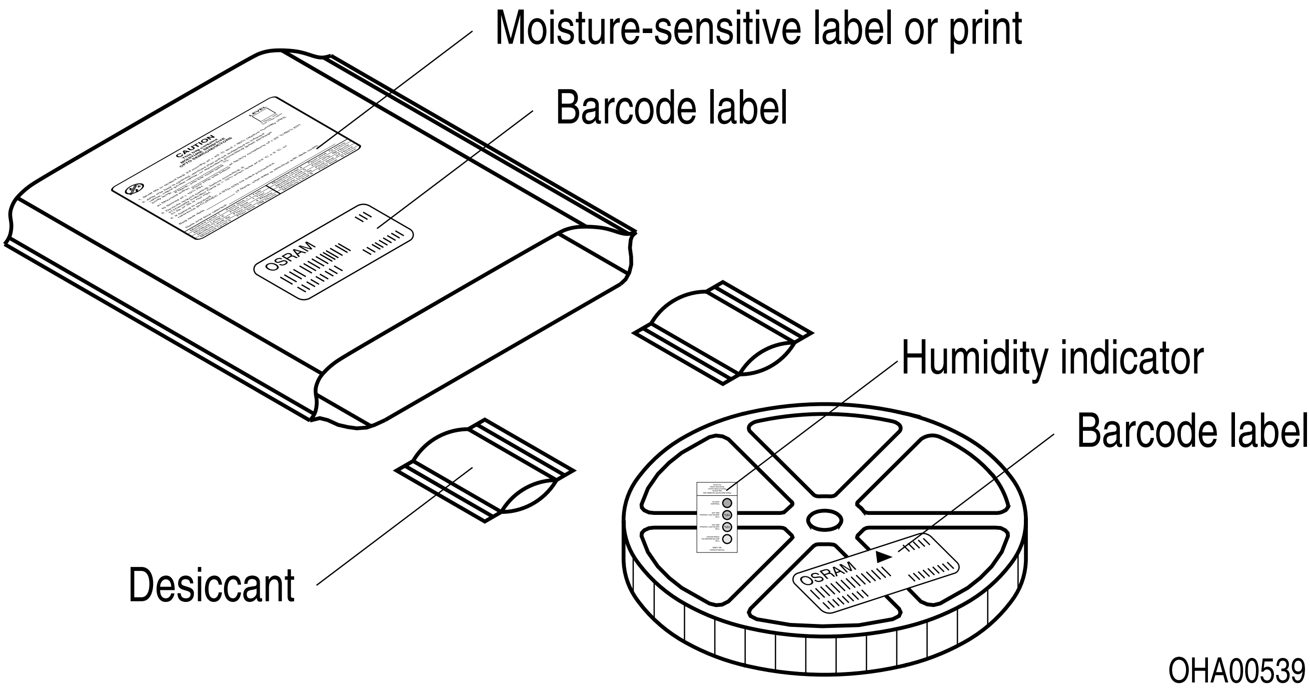
A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	8 + 0.3 / - 0.1 mm	60 mm	8.4 + 2 mm	14.4 mm	4500

Barcode-Product-Label (BPL)



OHA04563

Dry Packing Process and Materials [10)]



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Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet fall into the class exempt group (exposure time 10000 s). Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit https://ams-osram.com/support/application-notes

Disclaimer

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 our 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.

Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

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Glossary

[1] **Radiant intensity:** Measured at a solid angle of Ω = 0.01 sr

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

[3] **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.

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

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

[6] **Total radiant flux:** Measured with integrating sphere.

[7] **Thermal resistance:** junction - soldering point, of the device only, mounted on an ideal heatsink (e.g. metal block)

[8] **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, 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.

[9] **Testing temperature:** TA = 25°C (unless otherwise specified)

[10] **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ±0.1 and dimensions are specified in mm.

[11] **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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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