LT VH9G



FIREFLY® 0402

The FIREFLY is designed for use in mobile communication applications. Due to its low height and optical characteristics it is optimized for flat backlighting of keypads.

Applications

- Gaming, Amusement, Gambling
- Textile illumination

Features:

- Package: SMT package, standard SMT footprint 0402, colorless diffused resin
- Chip technology: InGaN on Sapphire
- Typ. Radiation: 110° (horizontal), 155° (vertical)
- Color: λ_{dom} = 530 nm (• true green)
- Optical efficacy: 38 lm/W
- Corrosion Robustness Class: 3B
- ESD: 1 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)

Ordering Information

Type	Luminous Intensity [1] I_F = 5 mA I_v	Ordering Code
LT VH9G-Q2OO-25-1	≥ 90 mcd	Q65110A9228

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min. max.	-40 °C 85 °C
Storage Temperature	T_{stg}	min. max.	-40 °C 85 °C
Junction Temperature	T_j	max.	90 °C
Forward current T_S = 25 °C	I_F	max.	15 mA
Surge Current t ≤ 10 µs; D = 0.005 ; T_S = 25 °C	I_{FS}	max.	100 mA
Reverse voltage [2] T_S = 25 °C	V_R	max.	5 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM)	V_{ESD}		1 kV

Characteristics

I_F = 5 mA; T_S = 25 °C

Parameter	Symbol		Values
Peak Wavelength [3]	λ_{peak}	typ.	525 nm
Dominant Wavelength [3]	λ_{dom}	min. typ. max.	520 nm 530 nm 540 nm
Spectral Bandwidth at 50% $I_{rel,max}$	$\Delta\lambda$	typ.	20 nm
Viewing angle at 50 % I_V values for 0°, 90°	2φ	typ. typ.	110 ° 155 °
Forward Voltage [4] I_F = 5 mA	V_F	min. typ. max.	2.60 V 2.85 V 3.10 V
Reverse current [2] V_R = 5 V	I_R	typ. max.	0.01 µA 10 µA
Real thermal resistance junction/solderpoint [5]	$R_{thJS\ real}$	typ.	280 K / W

Brightness Groups

Group	Luminous Intensity [1] I_F = 5 mA min. I_v	Luminous Intensity. [1] I_F = 5 mA max. I_v	Luminous Flux [6] I_F = 5 mA typ. Φ_V
Q2	90 mcd	112 mcd	300 mlm
R1	112 mcd	140 mcd	380 mlm
R2	140 mcd	180 mcd	480 mlm
S1	180 mcd	224 mcd	610 mlm
S2	224 mcd	280 mcd	760 mlm
T1	280 mcd	355 mcd	950 mlm
T2	355 mcd	450 mcd	1210 mlm

Forward Voltage Groups

Group	Forward Voltage [4] I_F = 5 mA min. V_F	Forward Voltage [4] I_F = 5 mA max. V_F
3X	2.60 V	2.70 V
3Y	2.70 V	2.80 V
3Z	2.80 V	2.90 V
4X	2.90 V	3.00 V
4Y	3.00 V	3.10 V

Wavelength Groups

Group	Dominant Wavelength [3] min. λ_{dom}	Dominant Wavelength [3] max. λ_{dom}
2	520 nm	525 nm
3	525 nm	530 nm
4	530 nm	535 nm
5	535 nm	540 nm

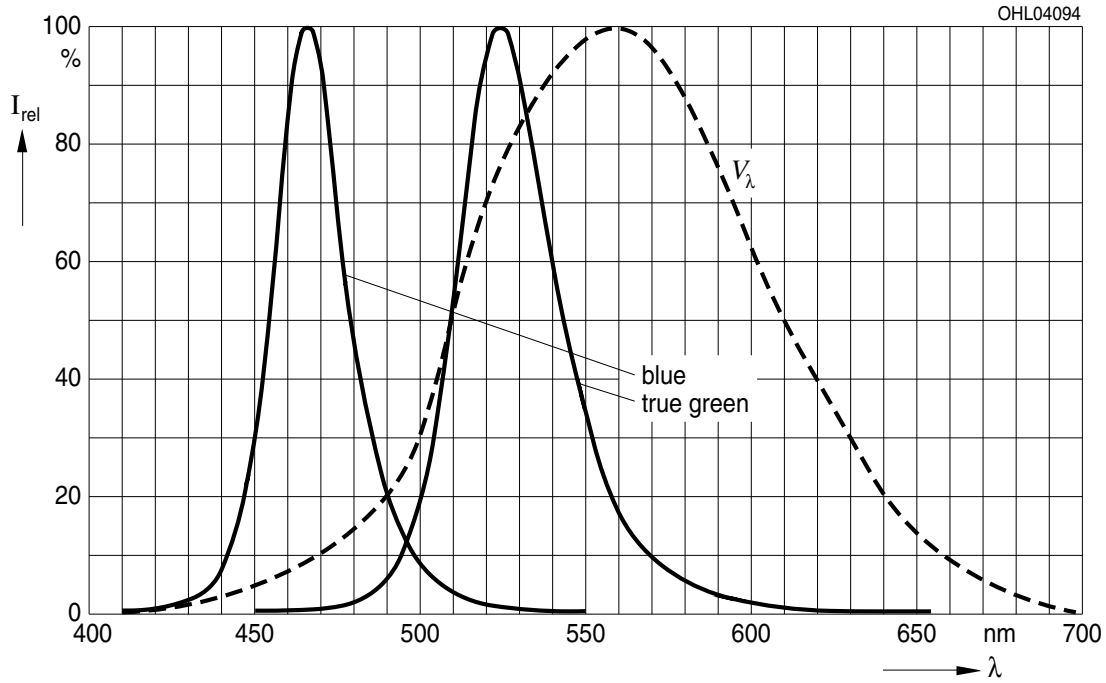
Group Name on Label

Example: Q2-2-3X

Brightness	Wavelength	Forward Voltage
Q2	2	3X

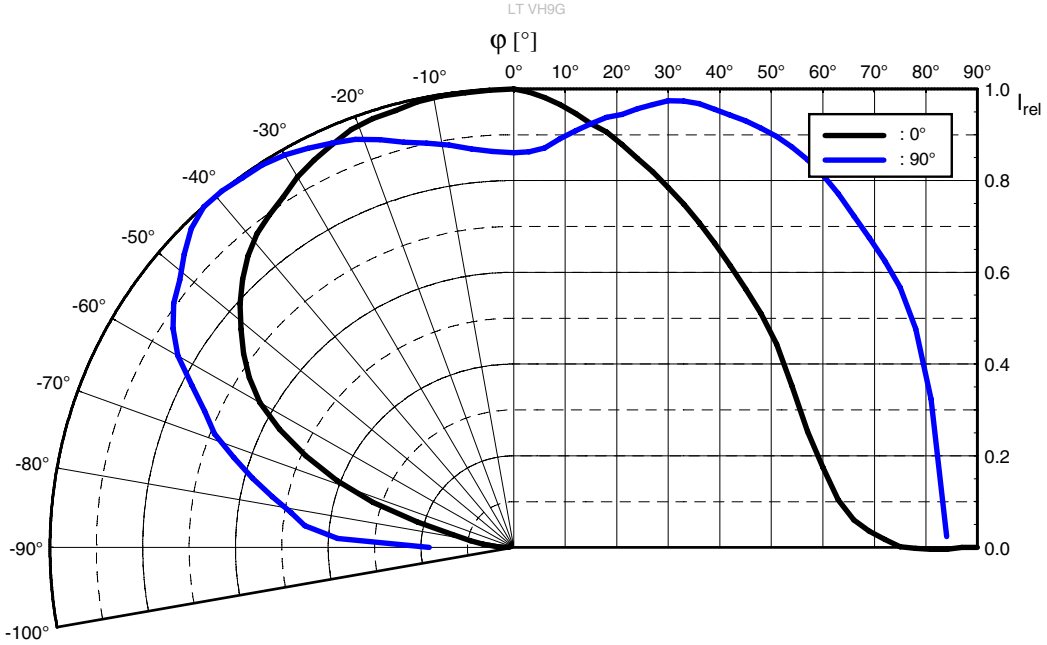
Relative Spectral Emission [6]

$I_{rel} = f(\lambda)$; I_F = 5 mA; T_A = 25 °C



Radiation Characteristics [6]

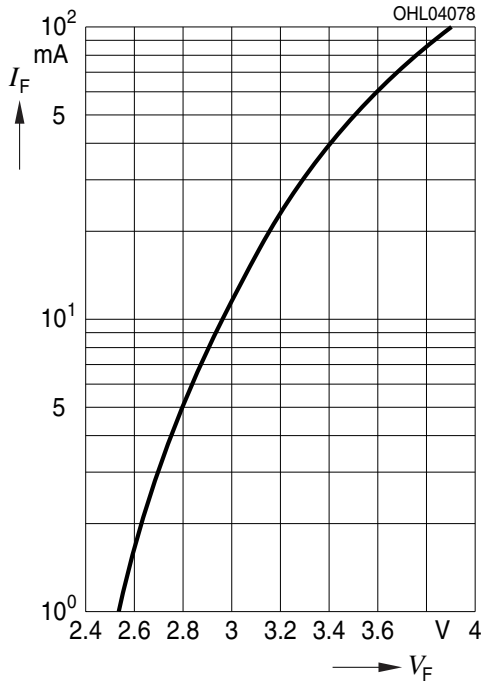
$I_{rel} = f(\phi)$; T_A = 25 °C



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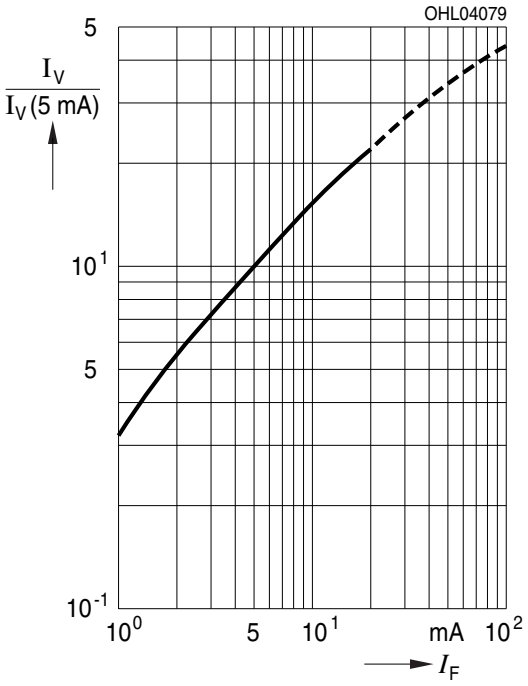
Forward current [6), 7)]

$I_F = f(V_F)$; $T_A = 25$ °C



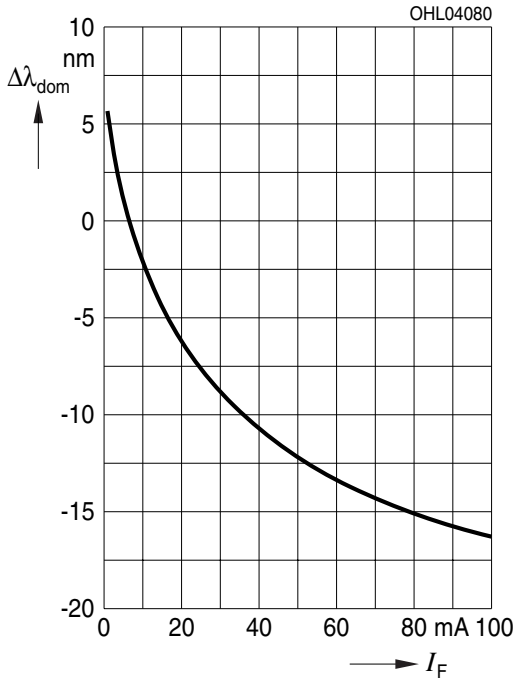
Relative Luminous Intensity [6), 7)]

$I_v/I_v(5\ mA) = f(I_F)$; $T_A = 25$ °C



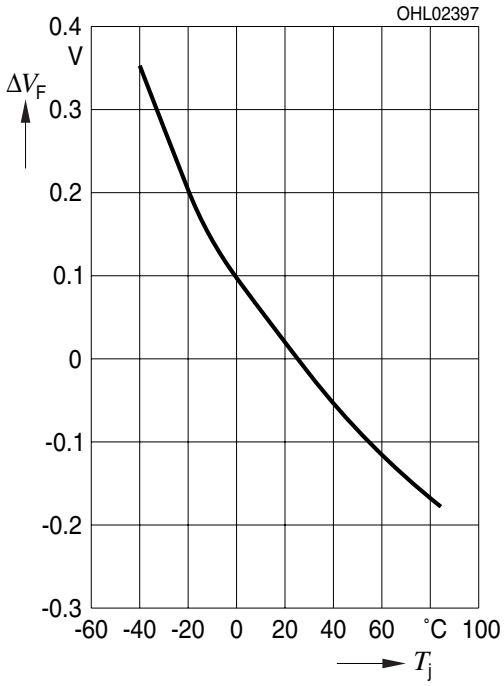
Dominant Wavelength [6)]

$\Delta\lambda_{dom} = f(I_F)$; $T_A = 25$ °C



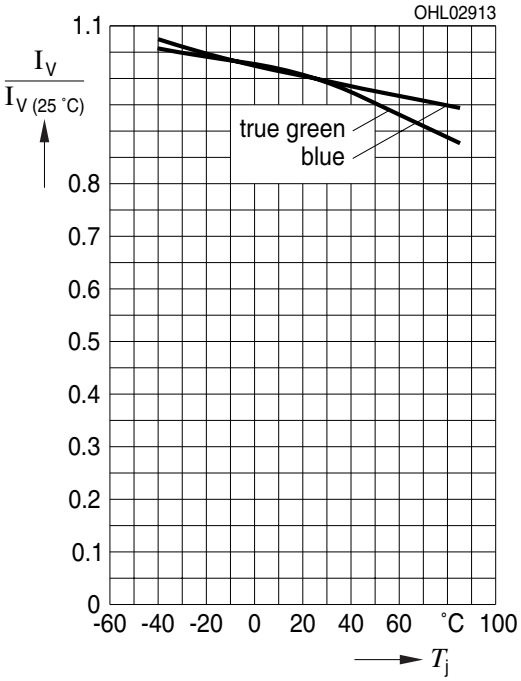
Forward Voltage [6]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j);\ I_F = 5\ mA$



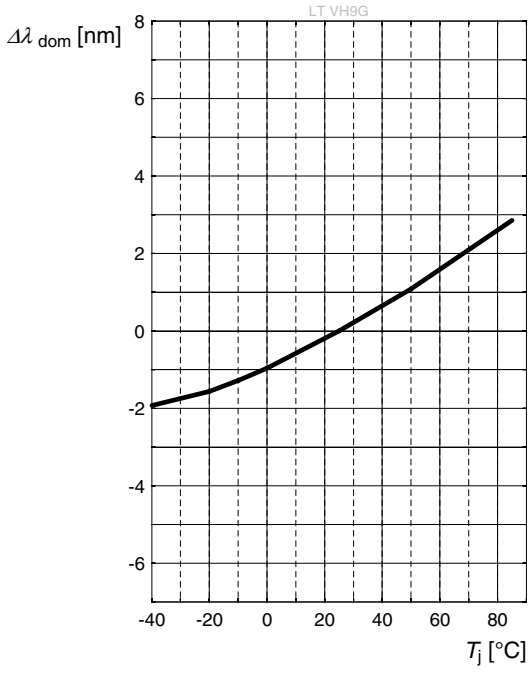
Relative Luminous Intensity [6]

$I_v/I_v(25\ °C) = f(T_j);\ I_F = 5\ mA$



Dominant Wavelength [6]

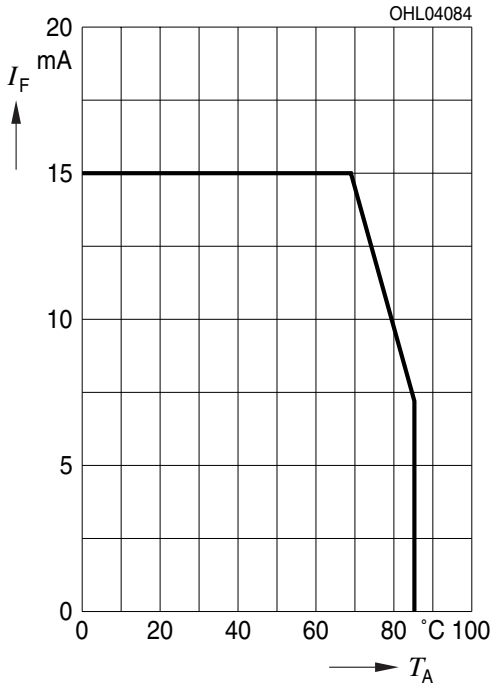
$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25\ °C) = f(T_j);\ I_F = 5\ mA$



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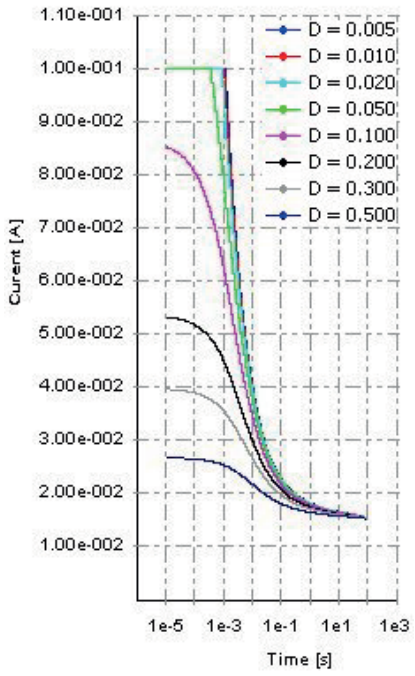
Max. Permissible Forward Current

$I_F = f(T)$



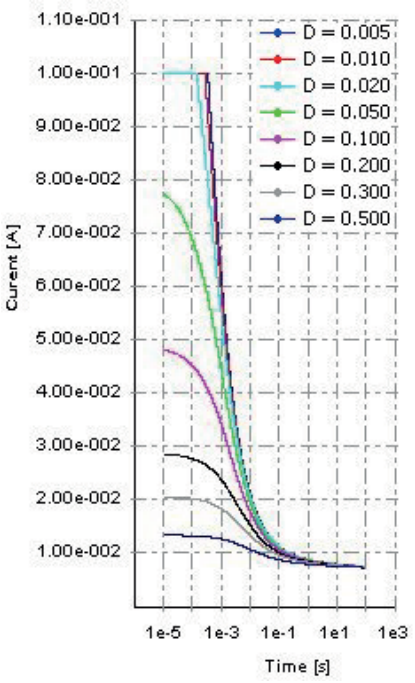
Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; T_A = 25 °C



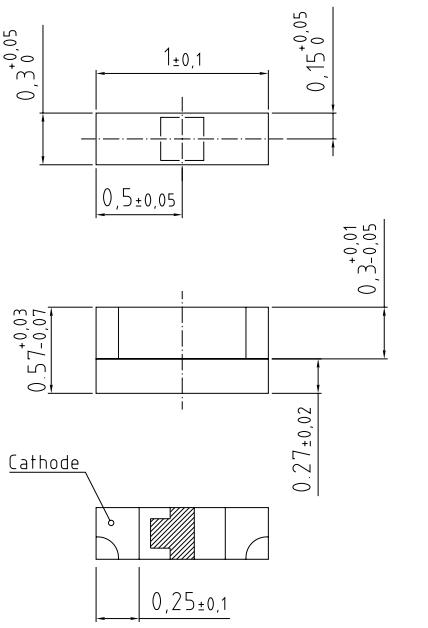
Permissible Pulse Handling Capability

$I_F = f(t_p)$; D: Duty cycle; T_A = 85 °C



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Dimensional Drawing [8)]

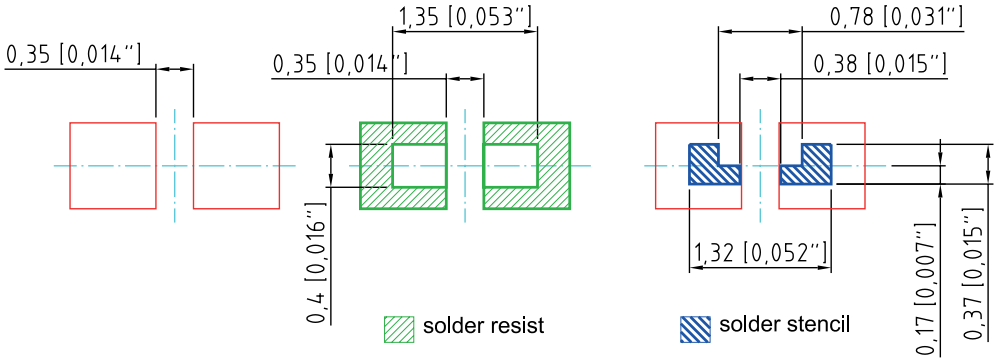


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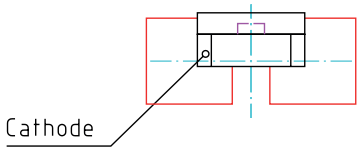
Approximate Weight: 0.6 mg

Corrosion test: Class: 3B
Test condition: 40°C / 90 % RH / 15 ppm H_2S / 14 days (stricter then IEC 60068-2-43)

Recommended Solder Pad [8)]



Component Location on Pad

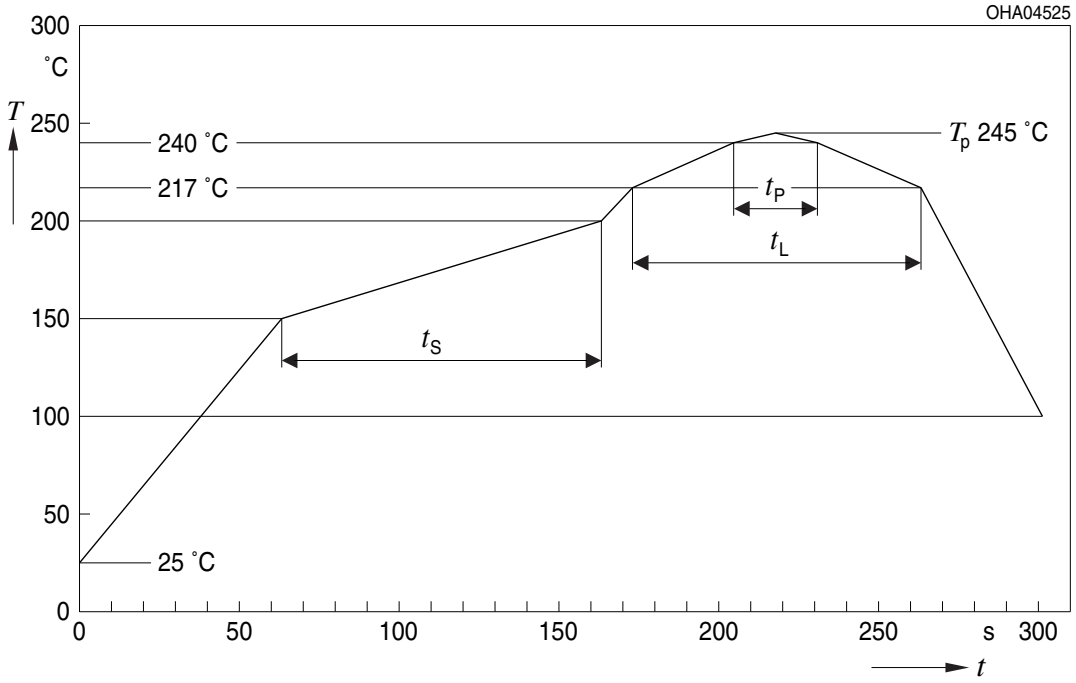


E062.3010.66 -03

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

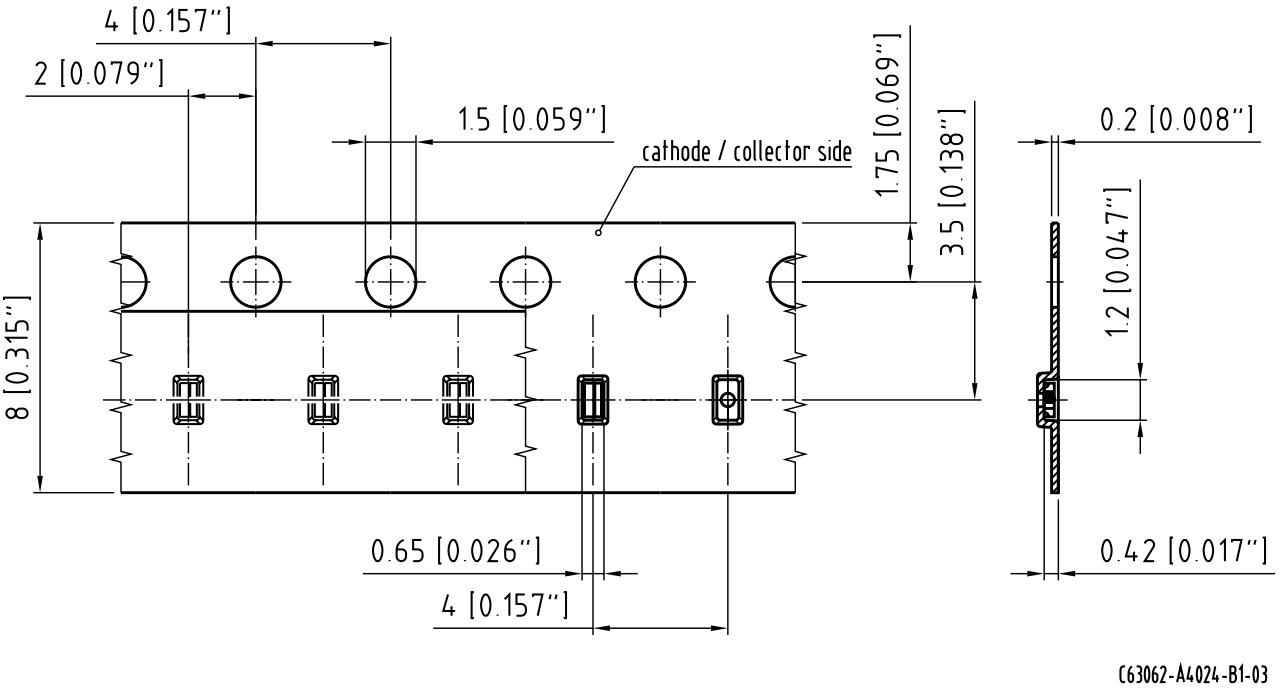
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



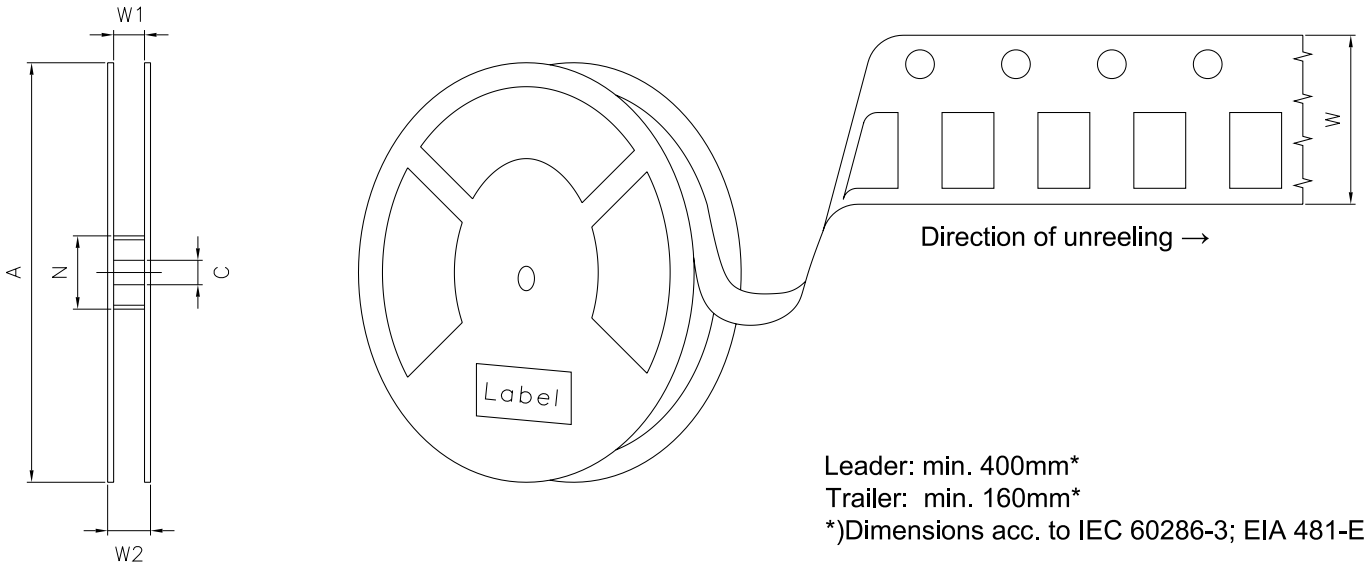
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	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 [8)]


4 [0.157"]
2 [0.079"]
1.5 [0.059"]
cathode / collector side
1.75 [0.069"]
3.5 [0.138"]
0.2 [0.008"]
1.2 [0.047"]
8 [0.315"]
0.65 [0.026"]
4 [0.157"]
0.42 [0.017"]
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Tape and Reel [9)]

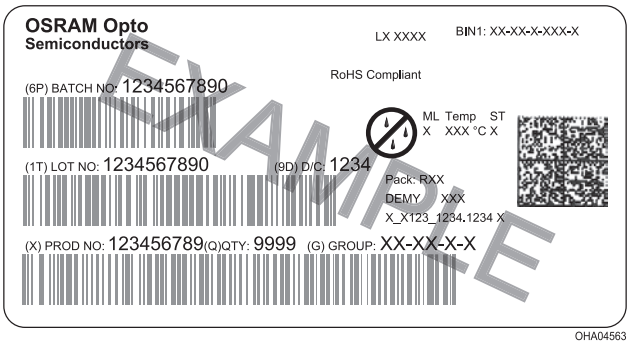


Leader: min. 400mm*
Trailer: min. 160mm*
*)Dimensions acc. to IEC 60286-3; EIA 481-E

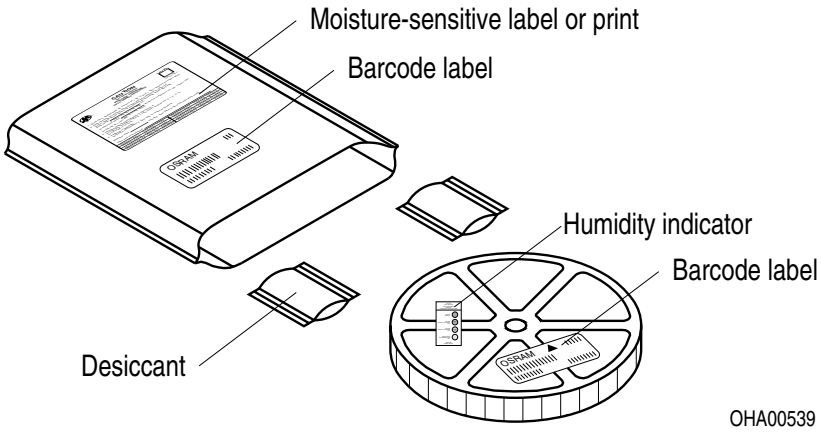
Reel dimensions [mm]

A	W	N_{min}	W_1	$W_{2\,max}$	Pieces per PU
180 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	4000

Barcode-Product-Label (BPL)

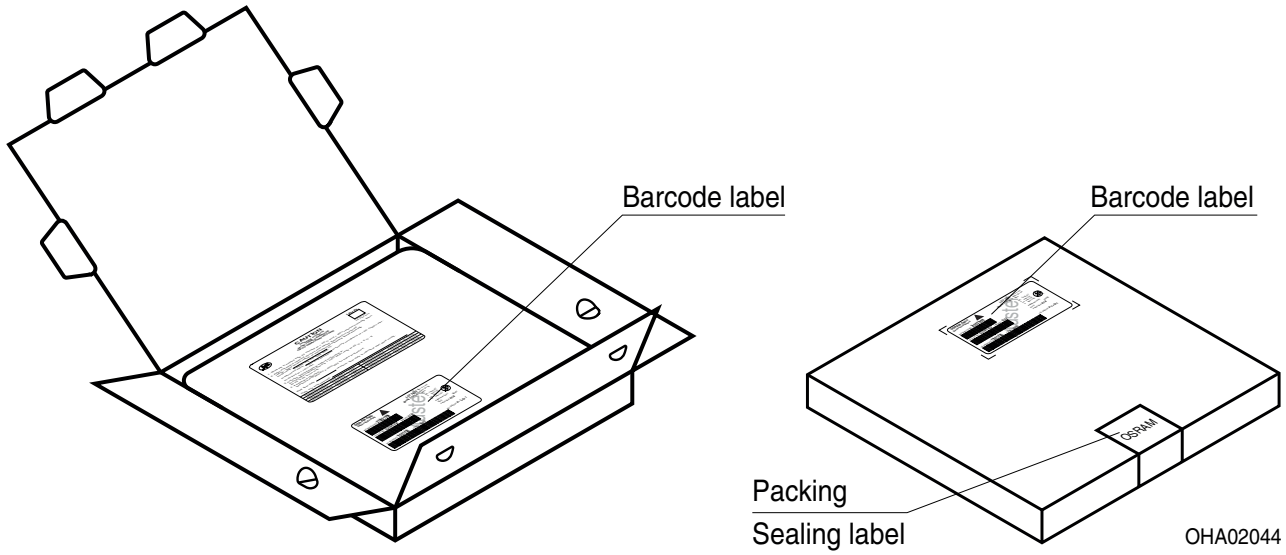


Dry Packing Process and Materials [8)]



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

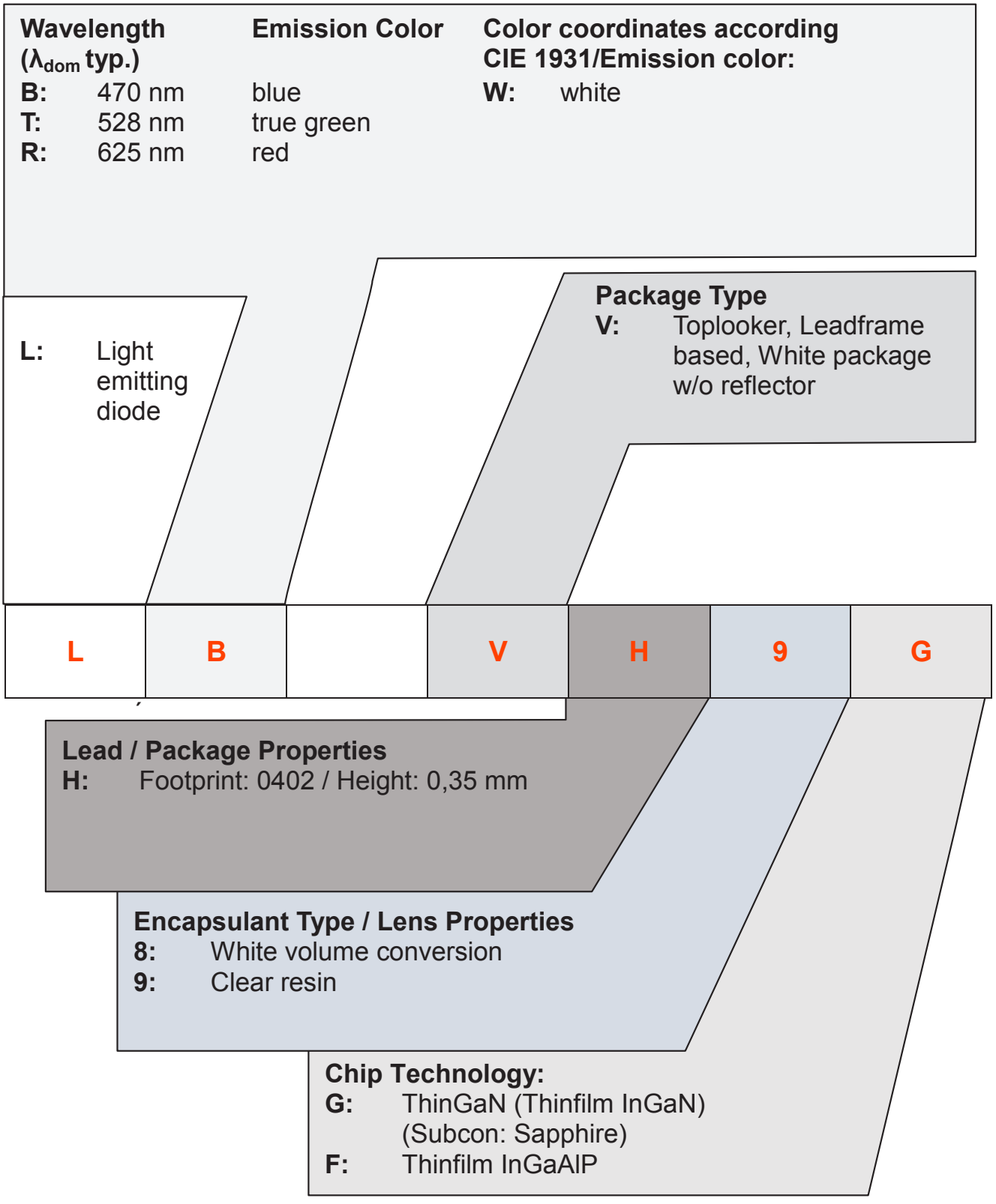
Transportation Packing and Materials [8)]



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm

Type Designation System



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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 LED specified in this data sheet fall into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, 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. As is also true when viewing other 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 LED 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 LED exposure to aggressive substances during storage, production, and use. LEDs 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.

Based on very short life cycle times in chip technology this component is subject to frequent adaption to the latest chip technology.

For further application related informations please visit www.osram-os.com/appnotes

Disclaimer

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 webside.

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 safety devices/applications or medical devices/applications
OSRAM OS components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

In case Buyer – or Customer supplied by Buyer– considers using OSRAM OS components in product safety devices/applications or medical devices/applications, Buyer and/or Customer has to inform the local sales partner of OSRAM OS immediately and OSRAM OS and Buyer and /or Customer will analyze and coordinate the customer-specific request between OSRAM OS and Buyer and/or Customer.

Glossary

1) **Brightness**: Brightness groups are tested at a current pulse duration of 25 ms and a tolerance of ±11 %.

2) **Reverse Operation**: Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.

3) **Wavelength**: Wavelengths are tested at a current pulse duration of 25 ms and a tolerance of ±1 nm.

4) **Forward Voltage**: Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ±0.1 V.

5) **Thermal Resistance**: Rth max is based on statistic values (6σ).

6) **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.

7) **Characteristic curve**: In the range where the line of the graph is broken, you must expect higher differences between single LEDs within one packing unit.

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

9) **Tape and Reel**: All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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EU RoHS and China RoHS compliant product

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按照中国的相关法规和标准，不含有毒有害物质或元素。