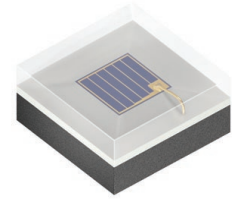


SFH 4170S

OSLON® P1616

High Power Infrared Emitter (850 nm)



Applications

- Access Control (IRIS/Vein Scan, Face Recognition)
- Eye Tracking
- Gesture Recognition
- Safety and Security, CCTV

Features:

- Package: clear silicone
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)
- IR lightsource with high efficiency
- Double stack emitter
- Centroid wavelength 850 nm

Ordering Information

| Type | Total radiant flux ¹⁾ $I_F = 1000 \text{ mA}; t_p = 10 \text{ ms}$ Φ_e | Total radiant flux ¹⁾ typ. $I_F = 1000 \text{ mA}; t_p = 10 \text{ ms}$ Φ_e | Ordering Code |
|-----------|--|--|---------------|
| SFH 4170S | 1000 ... 1400 mW | 1.15 W | Q65112A9014 |

The brightness values are measured during a current pulse of typically 10ms, with a tolerance of +/- 12%.

Maximum Ratings

$T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|---|-----------|------|---------|
| Operating temperature | T_{op} | min. | -40 °C |
| | | max. | 105 °C |
| Storage temperature | T_{stg} | min. | -40 °C |
| | | max. | 105 °C |
| Junction temperature | T_j | max. | 145 °C |
| Forward current | I_F | max. | 1000 mA |
| Surge current $t_p \leq 600\ \mu\text{s}; D = 0.005$ | I_{FSM} | max. | 2 A |
| Reverse voltage ²⁾ | V_R | max. | 12 V |
| Power consumption | P_{tot} | max. | 3600 mW |
| ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM) | V_{ESD} | max. | 2 kV |

Note: For the forward current and power consumption please see “maximum permissible forward current” diagram.

Characteristics

$I_F = 1000 \text{ mA}$; $T_A = 25 \text{ °C}$

| Parameter | Symbol | | Values |
|--|-----------------------------|--------------|--|
| Peak wavelength | λ_{peak} | typ. | 860 nm |
| Centroid wavelength | $\lambda_{\text{centroid}}$ | typ. | 850 nm |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$ (FWHM) | $\Delta\lambda$ | typ. | 30 nm |
| Half angle | φ | typ. | 65 ° |
| Dimensions of chip area | L x W | typ. | 0.75 x 0.75 mm x mm |
| Rise time (10% / 90%) $I_F = 2 \text{ A}$; $R_L = 5 \text{ }\Omega$ | t_r | typ. | 9 ns |
| Fall time (10% / 90%) $I_F = 2 \text{ A}$; $R_L = 5 \text{ }\Omega$ | t_f | typ. | 16 ns |
| Forward voltage | V_F | typ. max. | 3.25 V 3.6 V |
| Forward voltage $I_F = 2 \text{ A}$; $t_p = 100 \text{ }\mu\text{s}$ | V_F | typ. max. | 3.7 V 4.3 V |
| Reverse current ²⁾ $V_R = 5 \text{ V}$ | I_R | typ. max. | 0.01 μA 10 μA |
| Radiant intensity | I_e | typ. | 280 mW/sr |
| Temperature coefficient of voltage | TC_V | typ. | -2 mV / K |
| 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 electrical ³⁾ with efficiency $\eta_e = 38 \text{ %}$ | $R_{\text{thJS elec.}}$ | typ. max. | 6.8 K / W 8.1 K / W |
| Thermal resistance junction solder point real ³⁾ | $R_{\text{thJS real}}$ | typ. max. | 11.0 K / W 13.0 K / W |

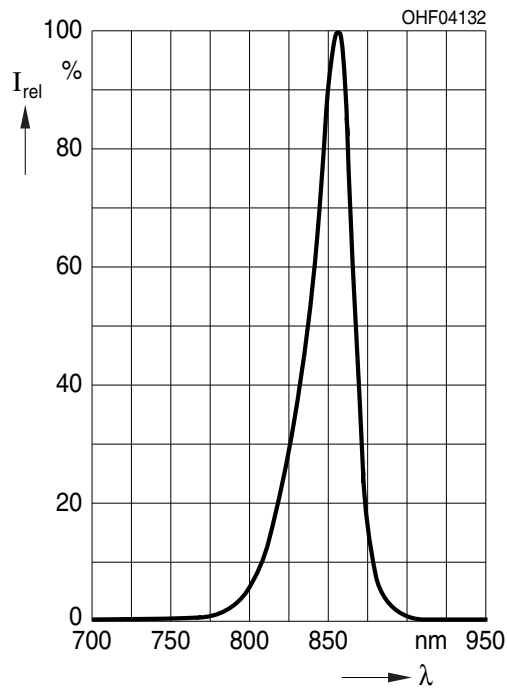
Brightness Groups

| Group | Total radiant flux ¹⁾ $I_F = 1 \text{ A}; t_p = 10 \text{ ms}$ min. Φ_e | Total radiant flux ¹⁾ $I_F = 1 \text{ A}; t_p = 10 \text{ ms}$ max. Φ_e |
|-------|--|--|
| | EB2 | 1000 mW |
| FA1 | 1120 mW | 1250 mW |
| FA2 | 1250 mW | 1400 mW |

The brightness values are measured during a current pulse of typically 10ms, with a tolerance of +/- 12%.

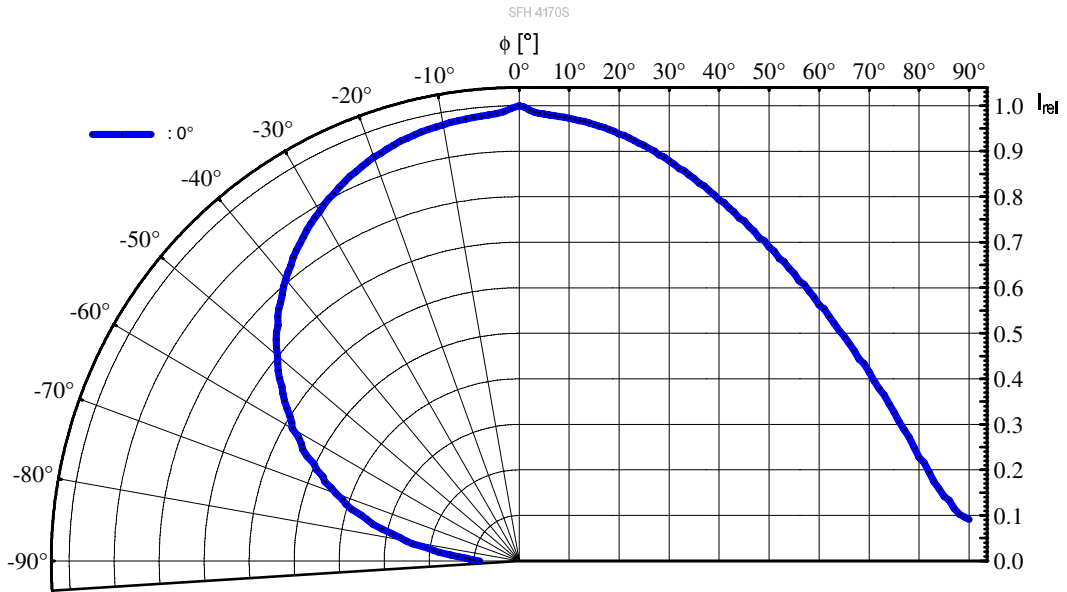
Relative Spectral Emission ^{4), 5)}

$I_{e,rel} = f(\lambda); I_F = 1000 \text{ mA}$



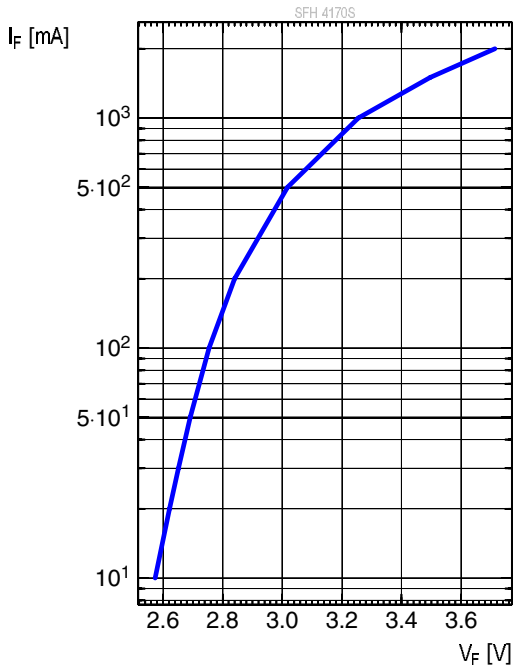
Radiation Characteristics 4), 5)

$I_{e,rel} = f(\varphi)$



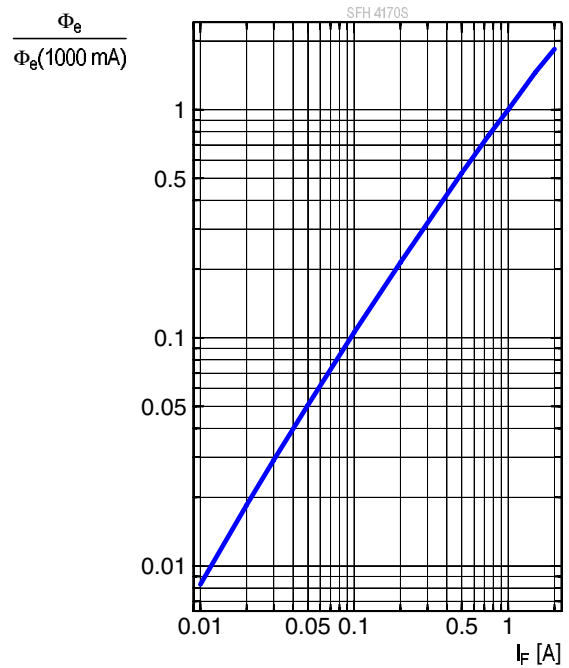
Forward current 4), 5)

$I_F = f(V_F)$; single pulse; $t_p = 100 \mu s$



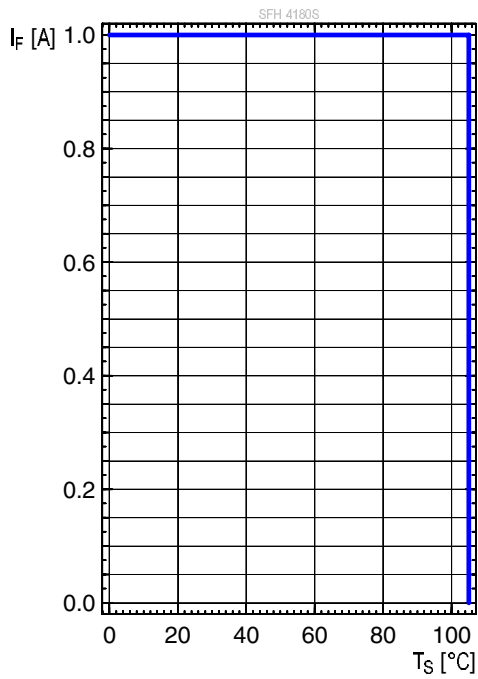
Relative Total Radiant Flux 4), 5)

$\Phi_e / \Phi_e(1000mA) = f(I_F)$; single pulse; $t_p = 100 \mu s$



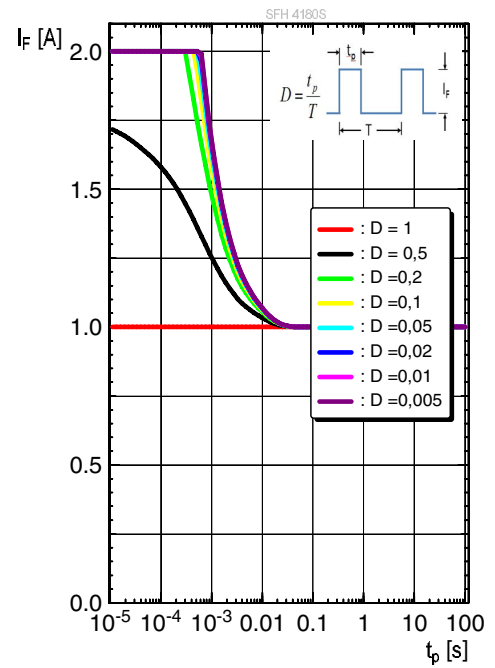
Max. Permissible Forward Current

$$I_{F,max} = f(T_A);$$

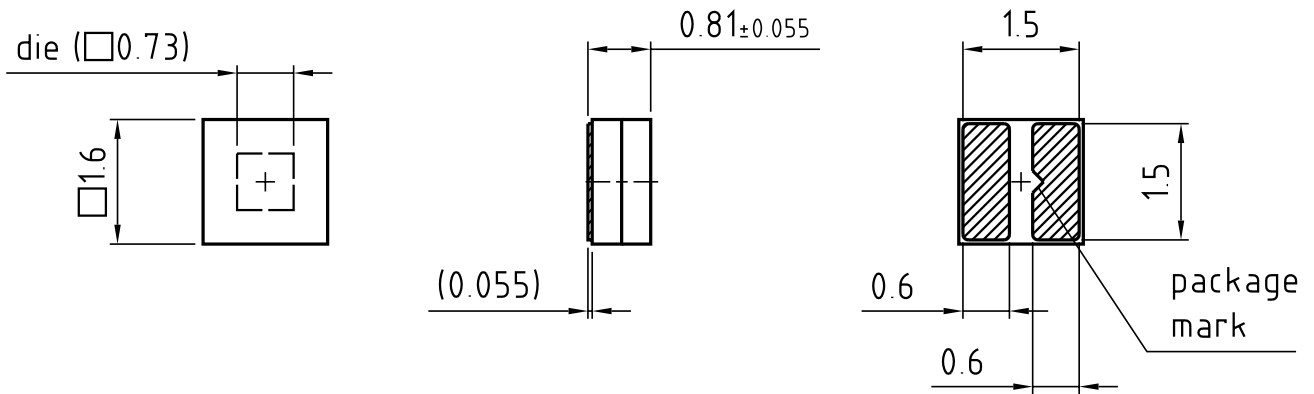



Permissible Pulse Handling Capability

$$I_F = f(t_p); \text{ duty cycle } D = \text{parameter}; T_S = 85^\circ\text{C}$$



Dimensional Drawing ⁶⁾



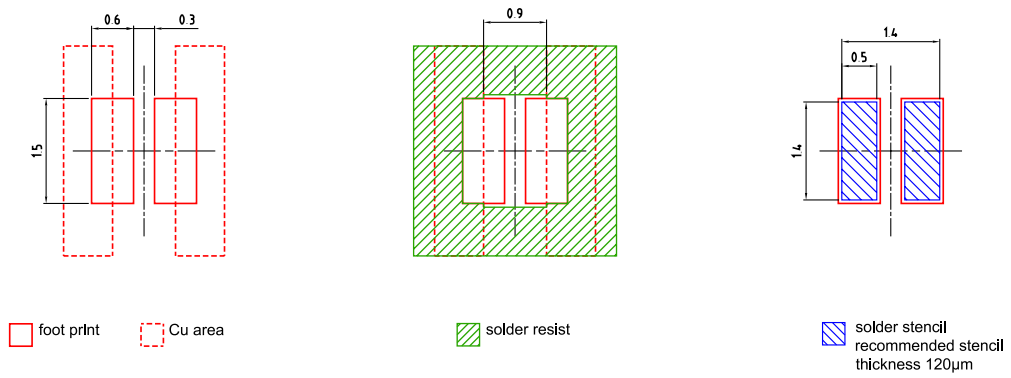
general tolerance ± 0.05
 lead finish Au 

C63062-A4399-A1-04

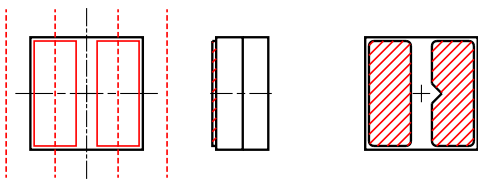
Further Information

- Approximate Weight:** 6.2 mg
- Package marking:** Cathode

Recommended Solder Pad ⁶⁾



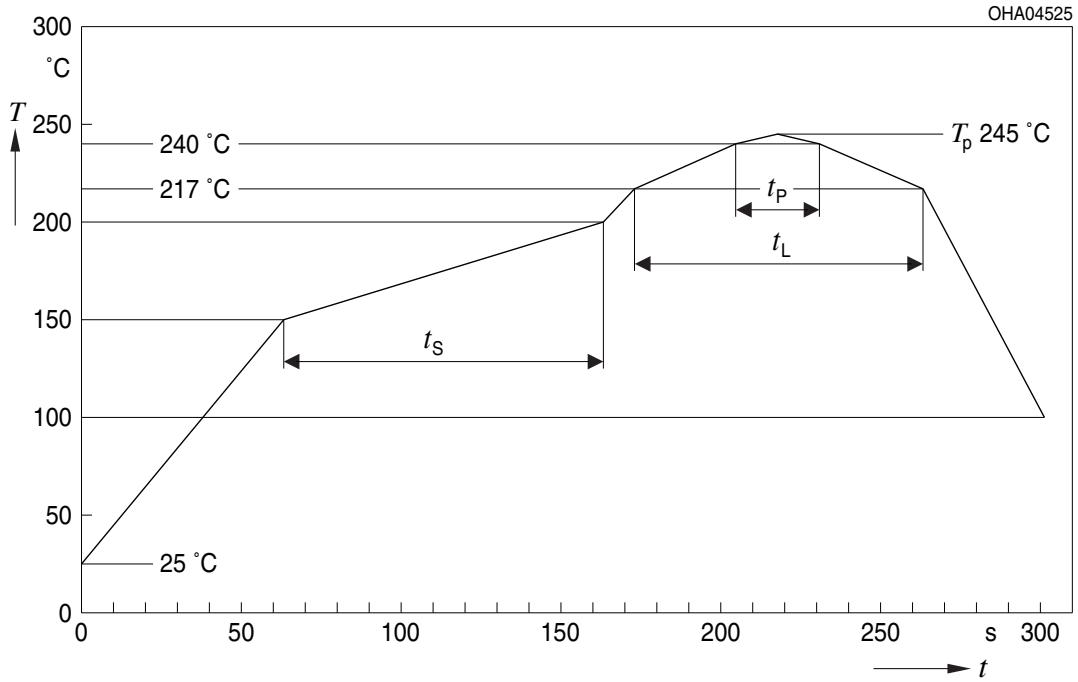
Component Location on Pad



E062.3010.272 -01

Reflow Soldering Profile

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

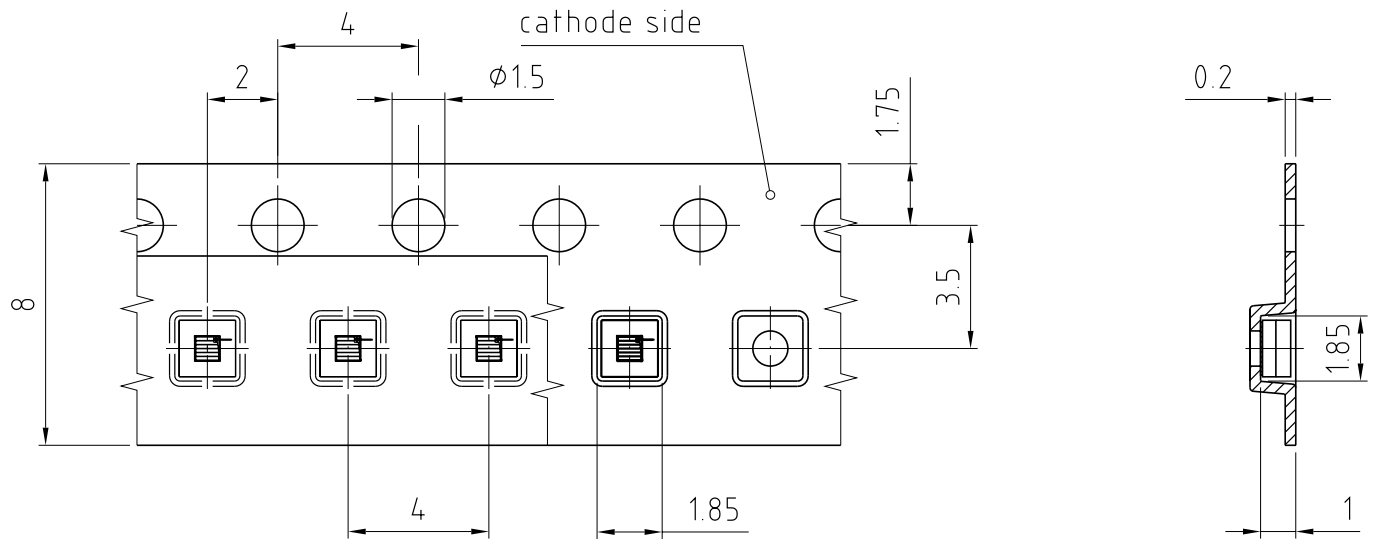


| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|--|--------|---------------------------|----------------|---------|------|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up rate to preheat ^{*)} 25 °C to 150 °C | | | 2 | 3 | K/s |
| Time t_s T_{Smin} to T_{Smax} | t_s | 60 | 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

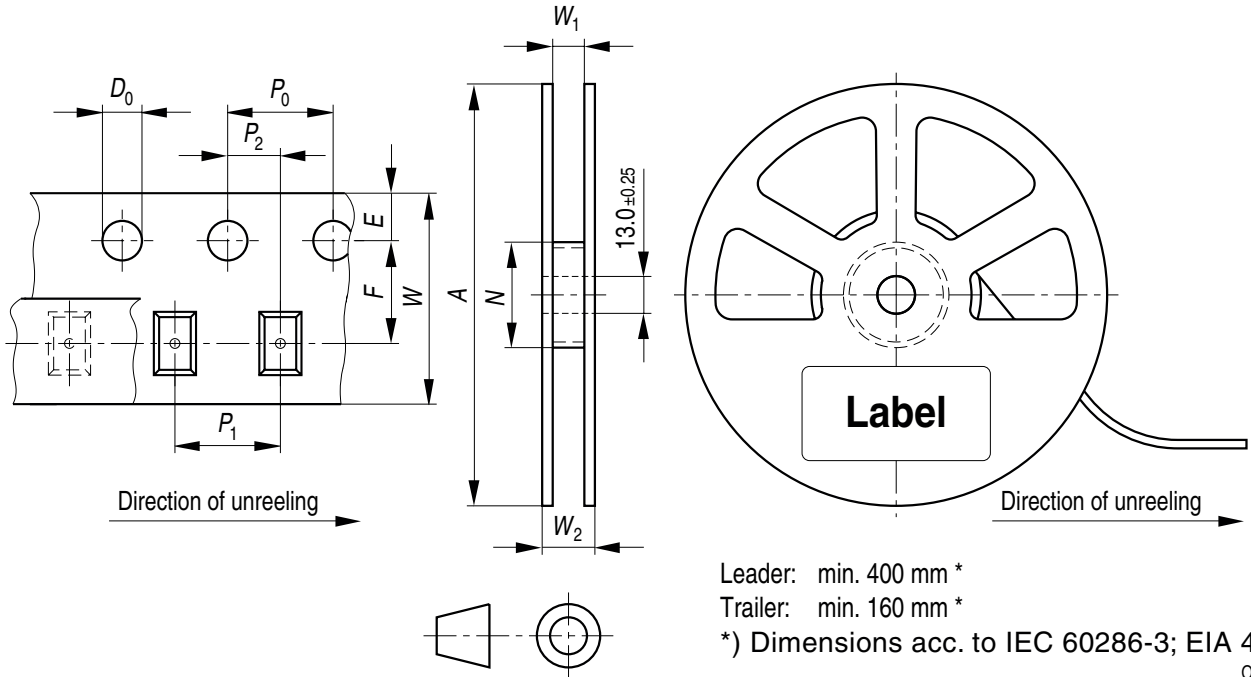
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁶⁾



C63062-A4 399-B6-03

Tape and Reel ⁷⁾



Leader: min. 400 mm *
 Trailer: min. 160 mm *
 *) Dimensions acc. to IEC 60286-3; EIA 481-D
 OHAY0324

Reel Dimensions

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

Barcode-Product-Label (BPL)

OSRAM Opto Semiconductors LX XXXX BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890

(1T) LOT NO: 1234567890 (9D) D/C: 1234

(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X

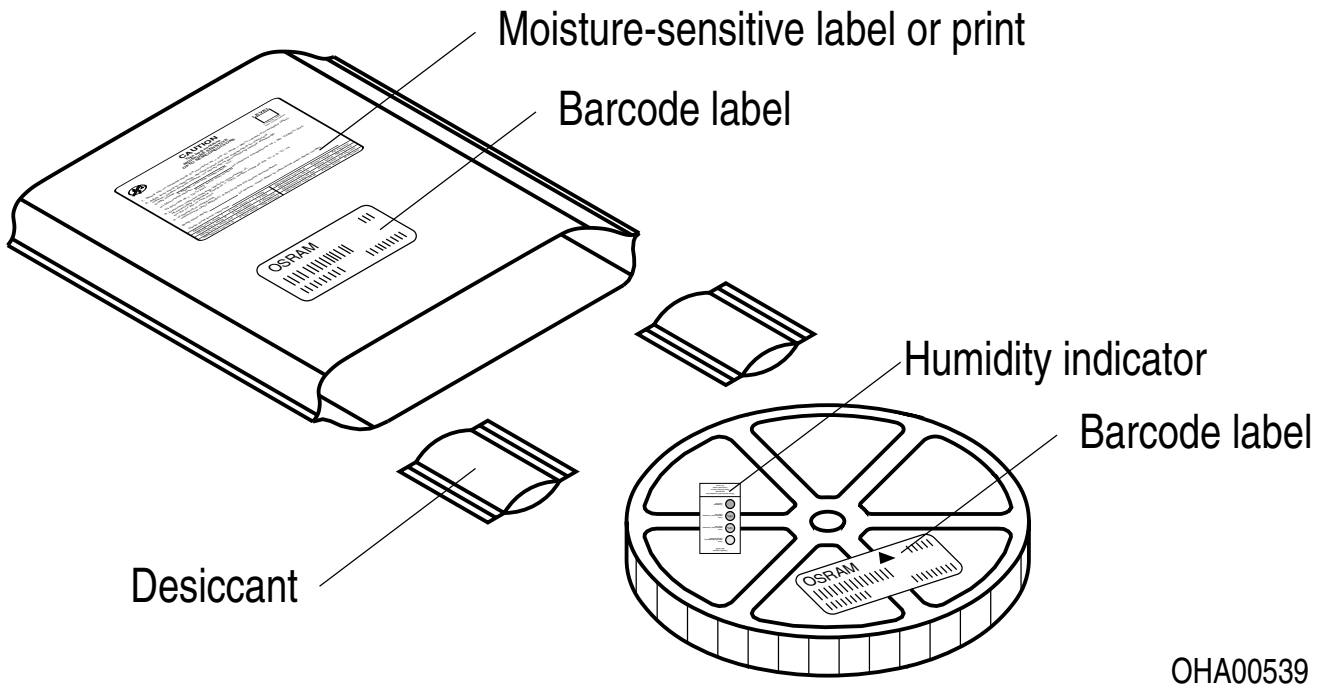
ML Temp ST
X XXX °C X

Pack: RXX
DEMY XXX
X_X123_1234.1234 X

The diagram shows a rectangular label with rounded corners. It contains the OSRAM logo and product name at the top left. To the right are fields for 'LX XXXX' and 'BIN1: XX-XX-X-XXX-X'. Below this is 'RoHS Compliant'. The main body of the label features three rows of data, each with a corresponding barcode: '(6P) BATCH NO: 1234567890', '(1T) LOT NO: 1234567890 (9D) D/C: 1234', and '(X) PROD NO: 123456789 (Q) QTY: 9999 (G) GROUP: XX-XX-X-X'. To the right of the second row is a 'Moisture Sensitive Device' symbol (a circle with a diagonal line and three drops) and 'ML Temp ST X XXX °C X'. Below that is 'Pack: RXX', 'DEMY XXX', and 'X_X123_1234.1234 X'. A square QR code is located on the right side of the label.

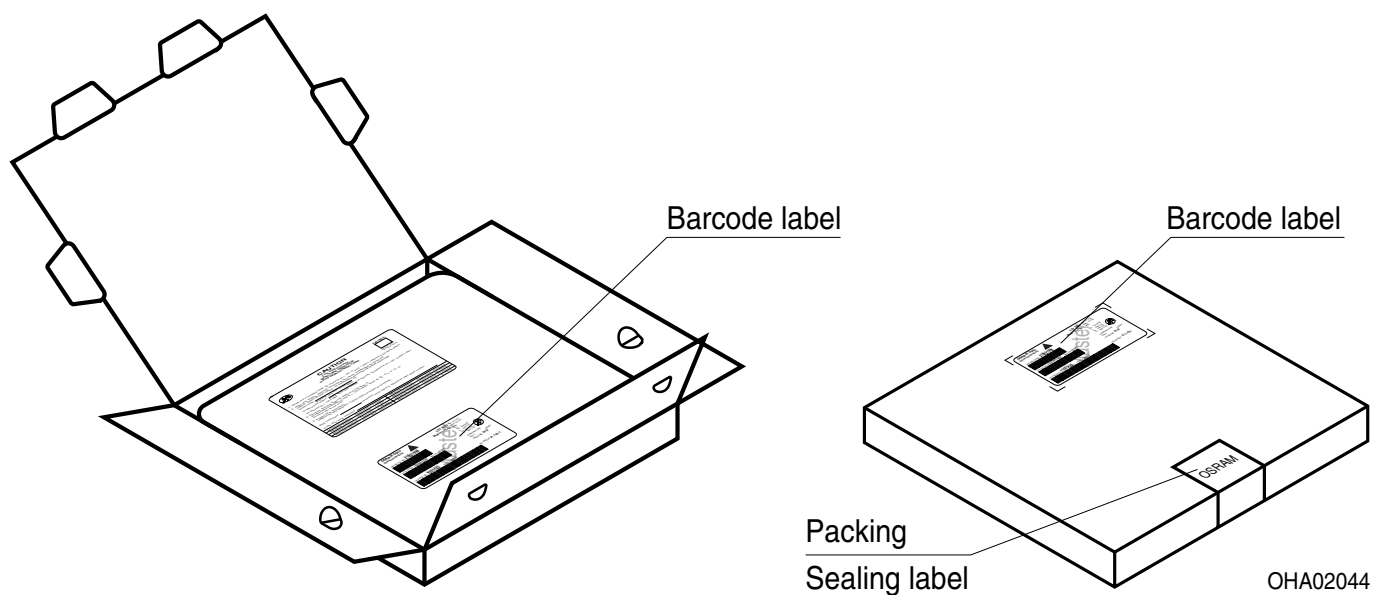
OHA04563

Dry Packing Process and Materials



OHA00539

Schematic Transportation Box ⁶⁾



Dimensions of Transportation Box

Width

Length

Height

200 ± 5 mm

195 ± 5 mm

30 ± 5 mm

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 falls 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.

Handling:

Solvents, water, liquids, non-conductive plastics and glues are not allowed near the device, because solvents and other liquids could emerge and damage the product.

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

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 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.

Product and functional 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.

OSRAM OS products are not qualified at module and system level for such application.

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) **Total radiant flux:** Measured with integrating sphere.
- 2) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 3) **Thermal resistance:** junction - soldering point, of the device only, mounted on an ideal heatsink (e.g. metal block)
- 4) **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.
- 5) **Testing temperature:** TA = 25°C (unless otherwise specified)
- 6) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 7) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

| Version | Date | Change |
|---------|------------|-----------------|
| 1.0 | 2019-09-12 | Initial Version |
| 1.0 | 2019-09-17 | Initial Version |

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