

PLPVQ 940A

BIDOS®

VCSEL pulsed laser in small footprint QFN



Applications

- Access Control (IRIS/Vein Scan, Face Recognition)
- Gesture Recognition

Features:

- Multimode VCSEL
- Laser aperture 10 μm (diameter) x 40 μm (pitch)
- Cost effective package for high volume applications

Ordering Information

| Type | Peak output power typ. $I_F = 1 \text{ A}; t_p = 200 \text{ }\mu\text{s}; f = 500 \text{ Hz}; T_A = 25 \text{ }^\circ\text{C}$ P_{opt} | Ordering Code |
|------------|---|---------------|
| PLPVQ 940A | 0.58 W | Q65112A6002 |

Maximum Ratings

 $T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|------------------------------------|-----------|------|--------|
| Operating temperature | T_{op} | min. | 0 °C |
| | | max. | 60 °C |
| Storage temperature | T_{stg} | min. | -40 °C |
| | | max. | 85 °C |
| Junction temperature ¹⁾ | T_j | max. | 110 °C |
| Output power (continuous wave) | P_{cw} | max. | 0.48 W |
| Forward current | I_F | max. | 0.75 A |
| Surge current D = 0.1 | I_{FSM} | max. | 1.2 A |
| Reverse voltage ²⁾ | V_R | max. | 5 V |

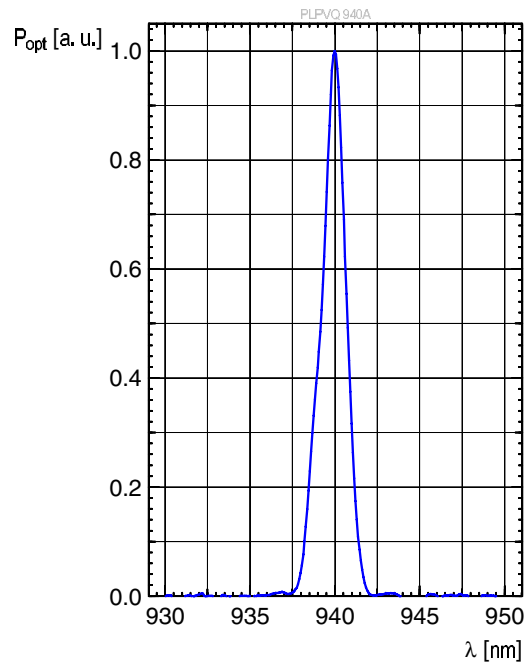
Characteristics

$I_F = 1 \text{ A}$; $t_p = 200 \text{ } \mu\text{s}$; $f = 500 \text{ Hz}$; $T_A = 25 \text{ }^\circ\text{C}$

| Parameter | Symbol | | Values |
|---|-------------------------|------|------------------|
| Peak wavelength | λ_{peak} | min. | 932.0 nm |
| | | typ. | 940.0 nm |
| | | max. | 948.0 nm |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$ (FWHM) | $\Delta\lambda$ | typ. | 1.5 nm |
| Peak output power | P_{opt} | min. | 0.5 W |
| | | typ. | 0.58 W |
| | | max. | 0.75 W |
| Field of view (HFOV) | Θ | typ. | 65 ° |
| Field of view (VFOV) | Θ_{\perp} | typ. | 78 ° |
| Wall plug efficiency (after diffusor) | WPE | typ. | 27 % |
| Threshold current | I_{th} | typ. | 0.06 A |
| Forward voltage | V_F | min. | 1.5 V |
| | | typ. | 2.3 V |
| | | max. | 2.7 V |
| Rise time | t_r | typ. | 1 ns |
| Fall time | t_f | typ. | 1 ns |
| Aperture size (diameter) | | typ. | 10 μm |
| Temperature coefficient of wavelength | TC_{λ} | typ. | 0.07 nm / K |
| | | max. | 0.1 nm / K |
| Thermal resistance junction solder point real ³⁾ | R_{thJS} | typ. | 27 K / W |
| | | max. | 33 K / W |

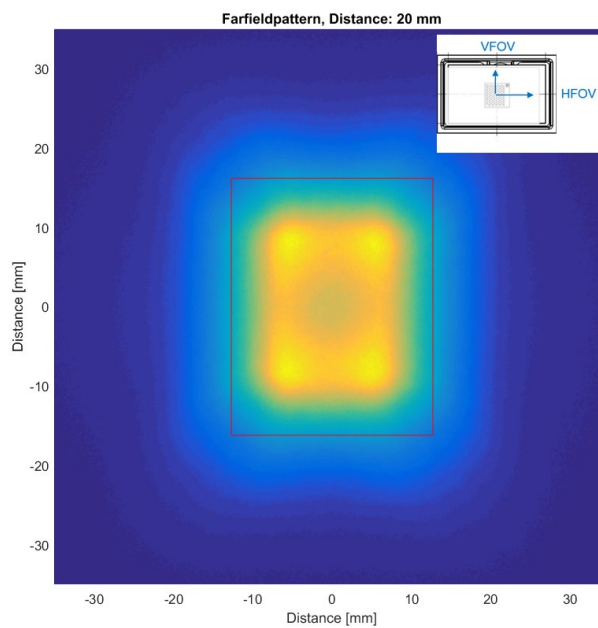
Relative Spectral Emission 4), 5)

$P_{opt} = f(\lambda)$; $P_{opt} = 0.58 \text{ W}$; $t_p = 200 \mu\text{s}$; $T_A = 25 \text{ }^\circ\text{C}$



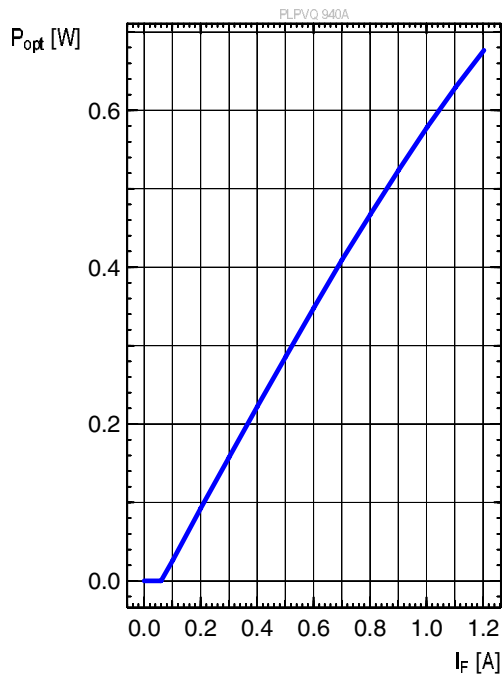
Far-Field Illumination Pattern 4), 5)

$P_{opt} = 0.58 \text{ W}$; $d = 20 \text{ mm}$ (distance to flat screen); rectangle shows HFOV and VFOV



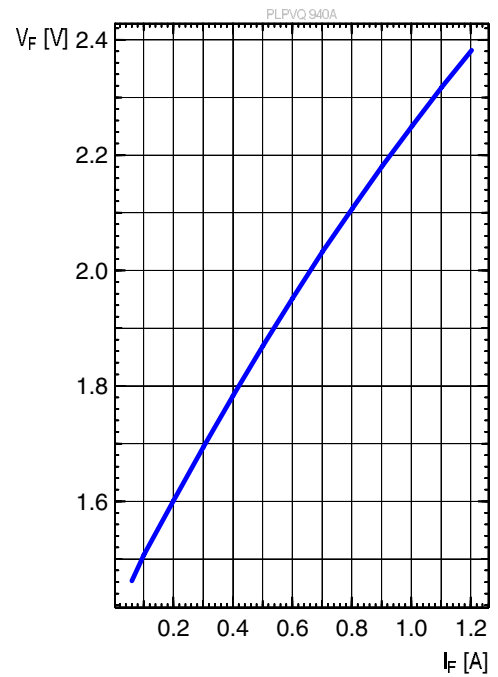
Optical Output Power 4), 5)

$P_{opt} = f(I_F)$, $t_p = 200 \mu s$, $f = 500 \text{ Hz}$, $T_A = 25 \text{ }^\circ\text{C}$

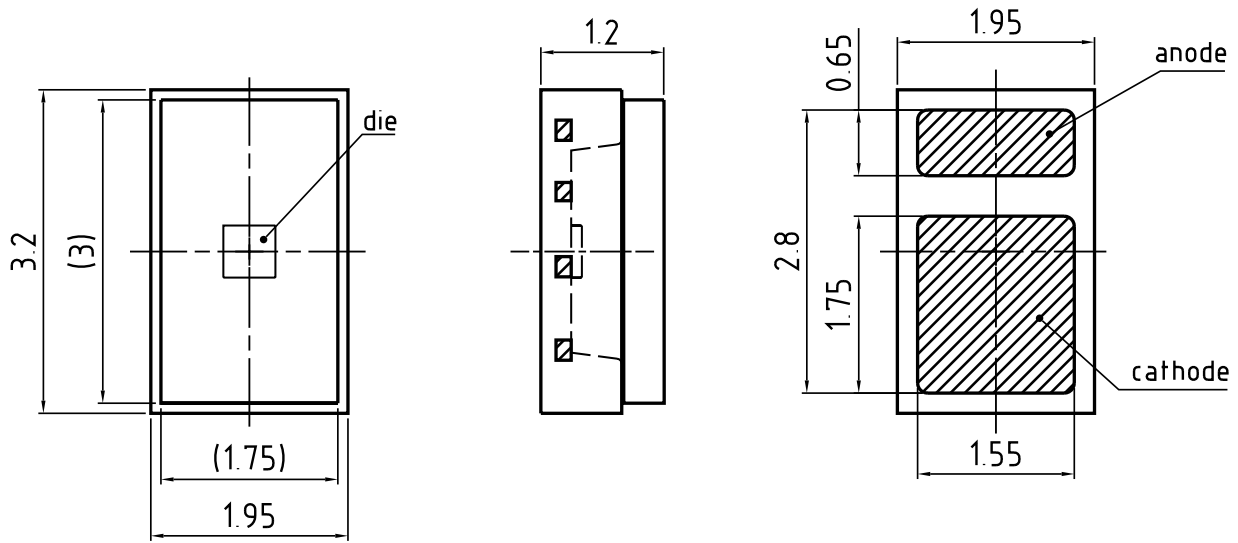


Forward Voltage 4)

$V_F = f(I_F)$; $t_p = 200 \mu s$; $f = 500 \text{ Hz}$; $T_A = 25 \text{ }^\circ\text{C}$



Dimensional Drawing ⁶⁾

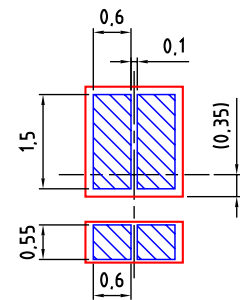
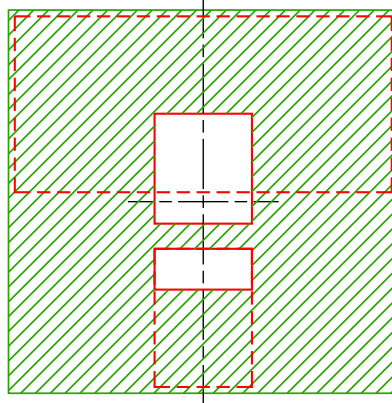
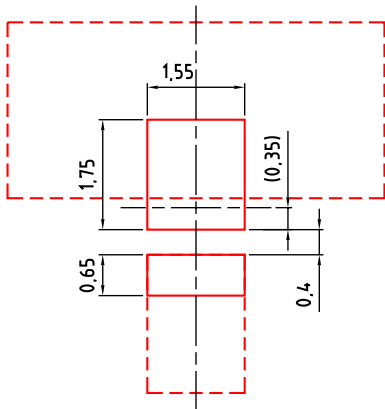



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
Further Information


Approximate Weight: 5.0 mg

Recommended Solder Pad ⁶⁾



 footprint  Cu area

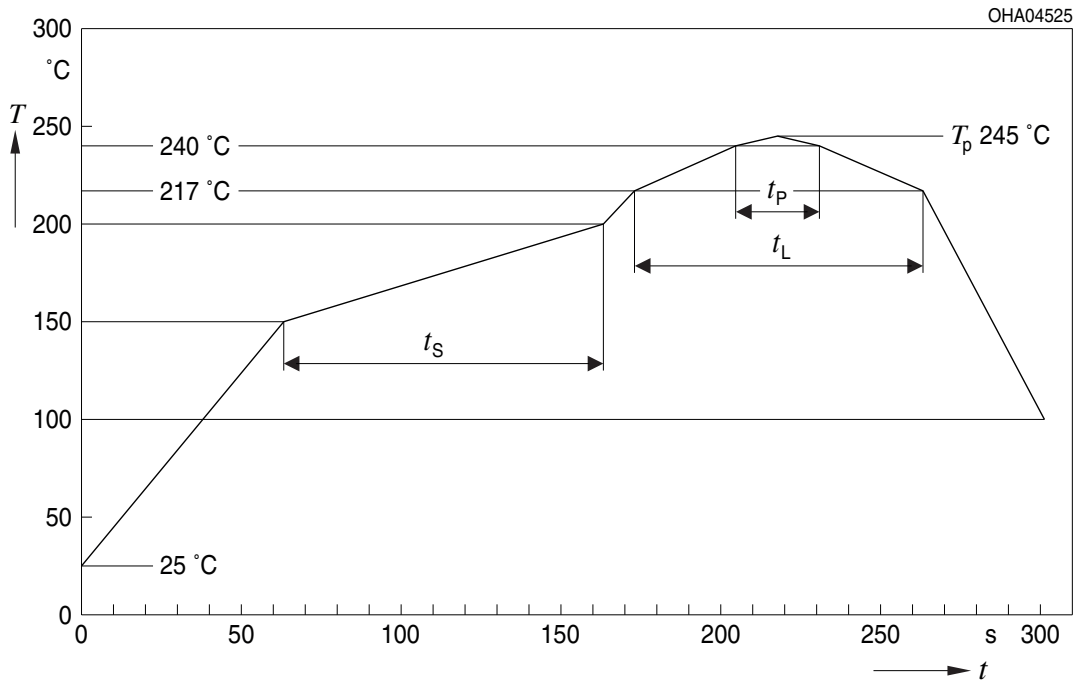
 solder resist

 solder stencil

E062.3010.271-01

Reflow Soldering Profile

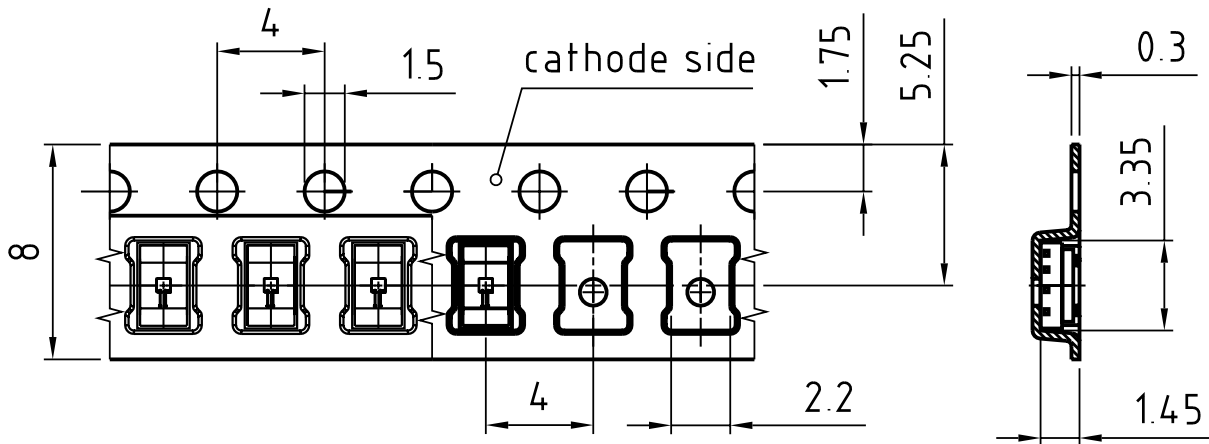
Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



| 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 |

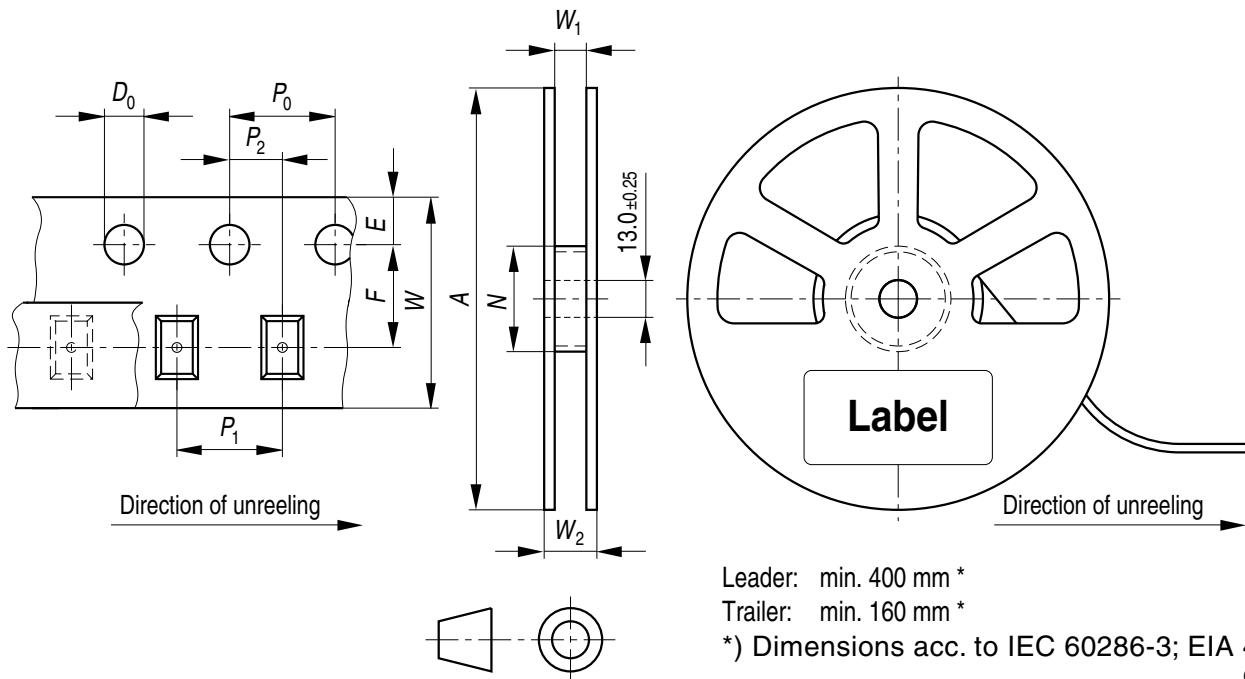
All temperatures refer to the center of the package, measured on the top of the component
 *) slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁶⁾



C67062-A0276-B6-01

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 | $W_{2 \max}$ | Pieces per PU |
|--------|----------------------|------------|--------------|--------------|---------------|
| 180 mm | $8 + 0.3 / - 0.1$ mm | 60 mm | $8.4 + 2$ mm | 14.4 mm | 2500 |

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

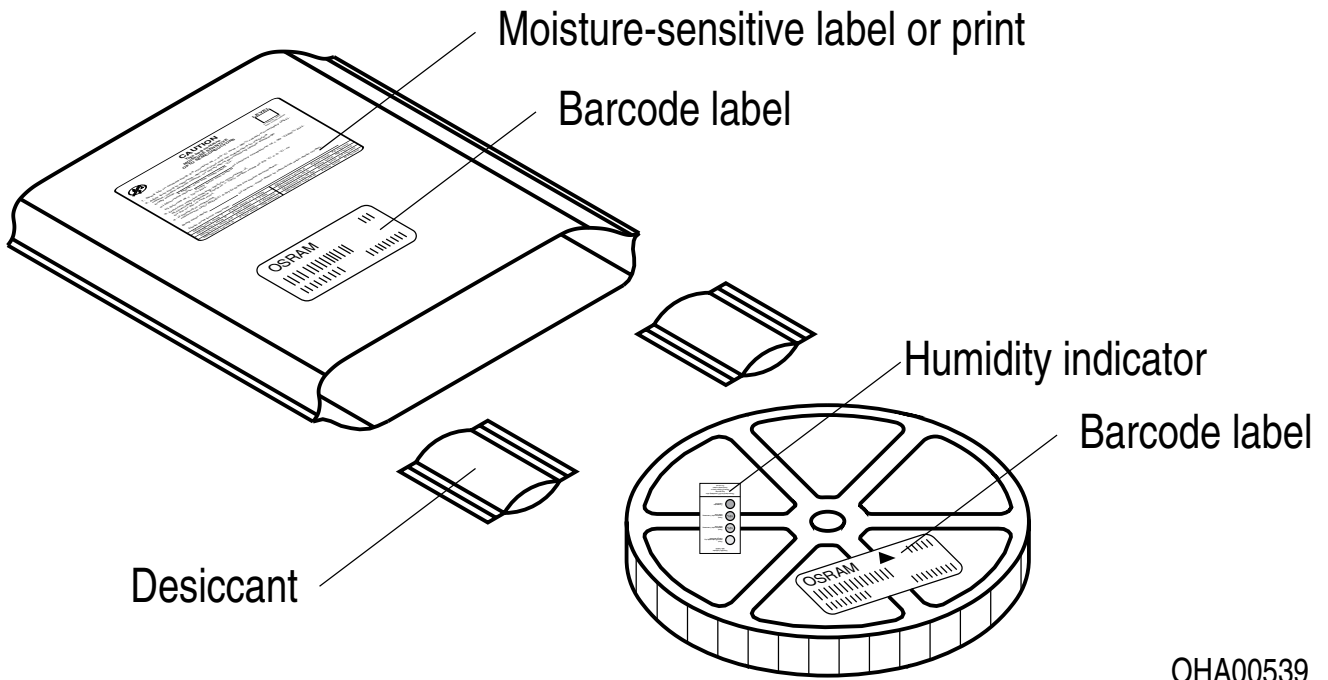
ML Temp ST
X XXX °C X

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 is divided into three horizontal sections, each with a barcode and associated text: (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 section is a 'No Moisture' symbol (a circle with a diagonal line and three droplets) 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

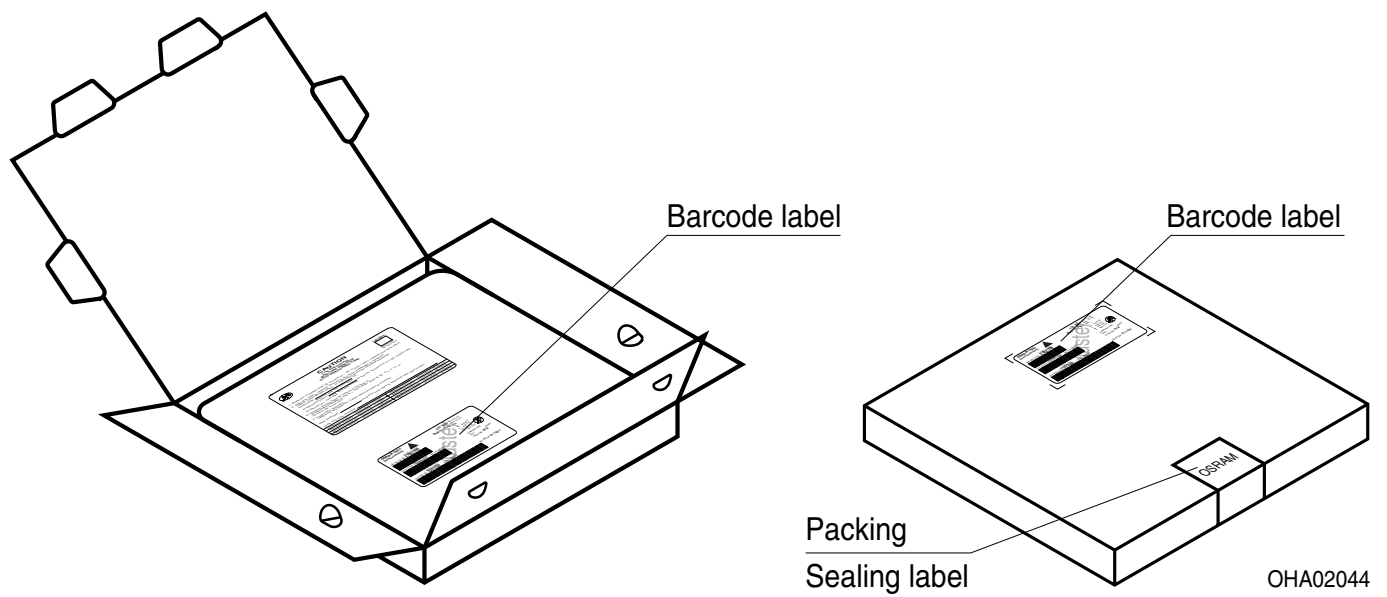
Dry Packing Process and Materials ⁶⁾



OHA00539

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

Schematic Transportation Box ⁶⁾



Dimensions of Transportation Box

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

Notes

Depending on the mode of operation, these devices emit highly concentrated visible and non visible 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.

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 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 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) **Junction temperature:** Limited due to plastic package, not due to laser chip.
- 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
- 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 | 2019-02-14 | Initial Version |
| 1.1 | 2019-03-25 | Recommended Solder Pad |
| 1.2 | 2019-04-03 | Ordering Information Characteristics Electro - Optical Characteristics (Diagrams) |

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