

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

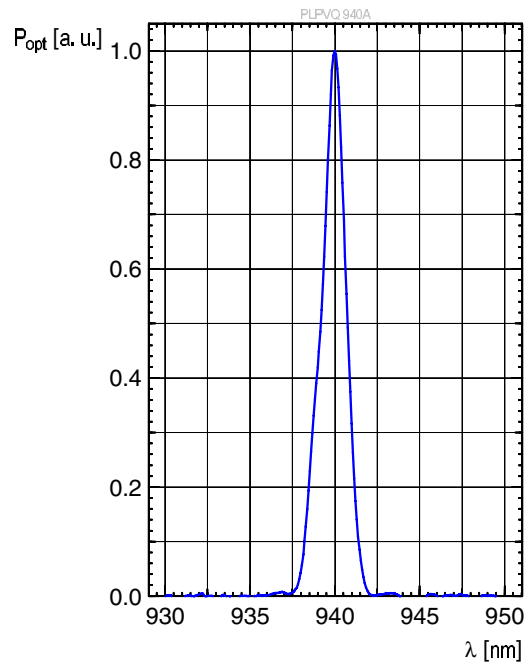
Characteristics

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

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

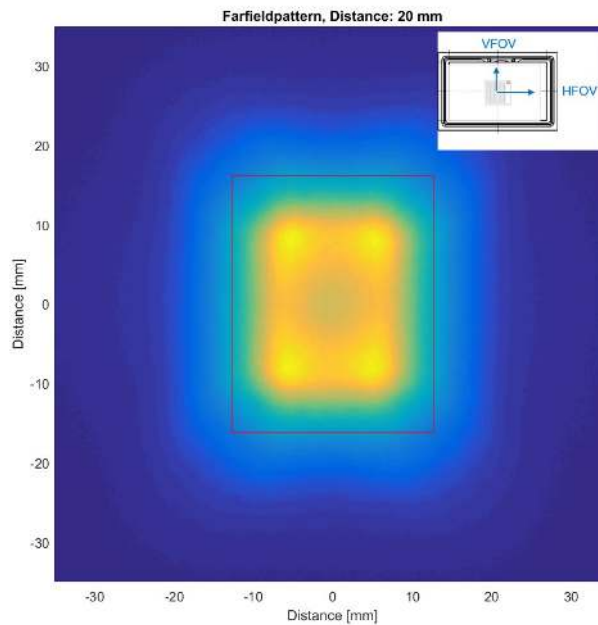
Relative Spectral Emission 4), 5)

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



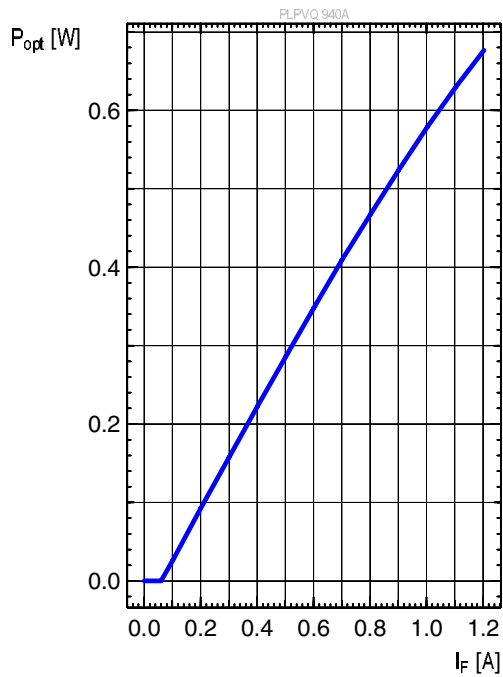
Far-Field Illumination Pattern 4), 5)

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



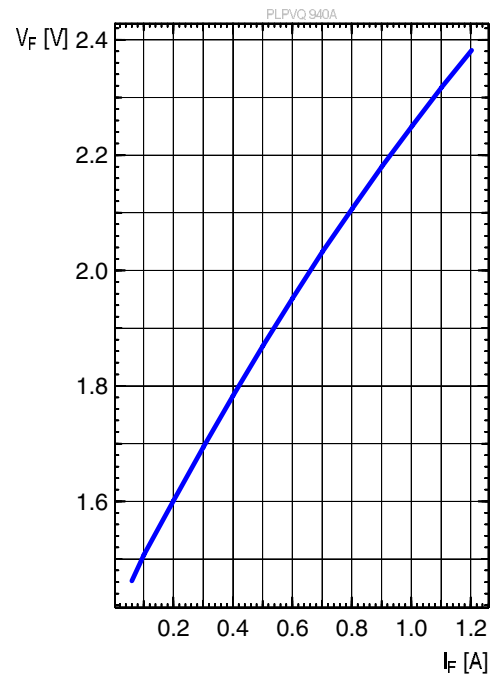
Optical Output Power ^{4), 5)}

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

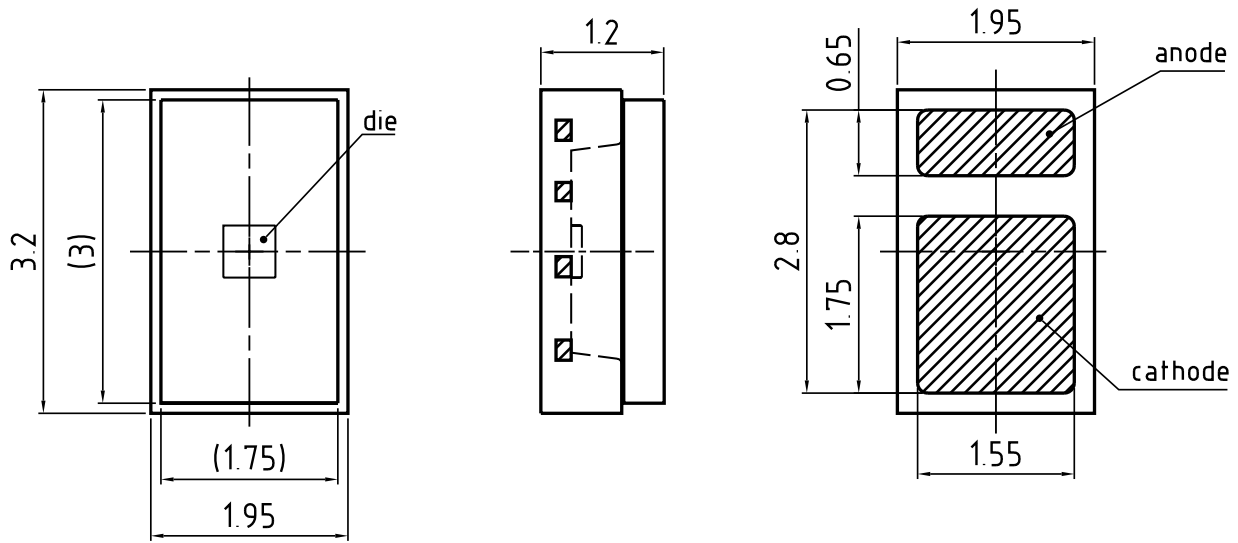


Forward Voltage ⁴⁾

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



Dimensional Drawing ⁶⁾

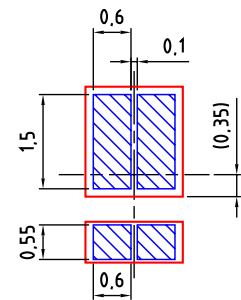
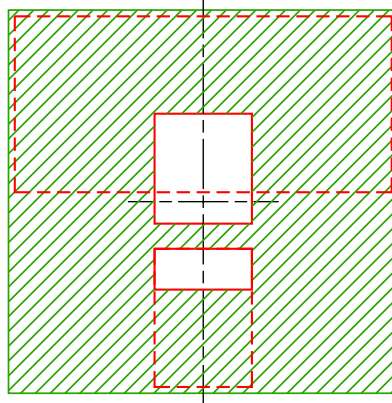
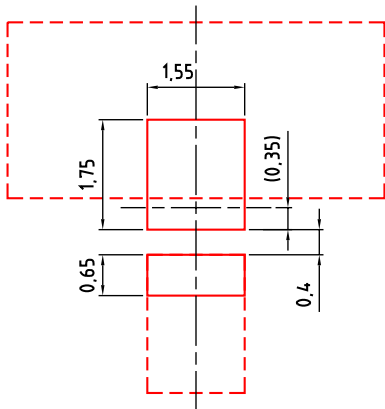



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
Further Information


Approximate Weight: 5.0 mg

Recommended Solder Pad ⁶⁾



 foot print  Cu area

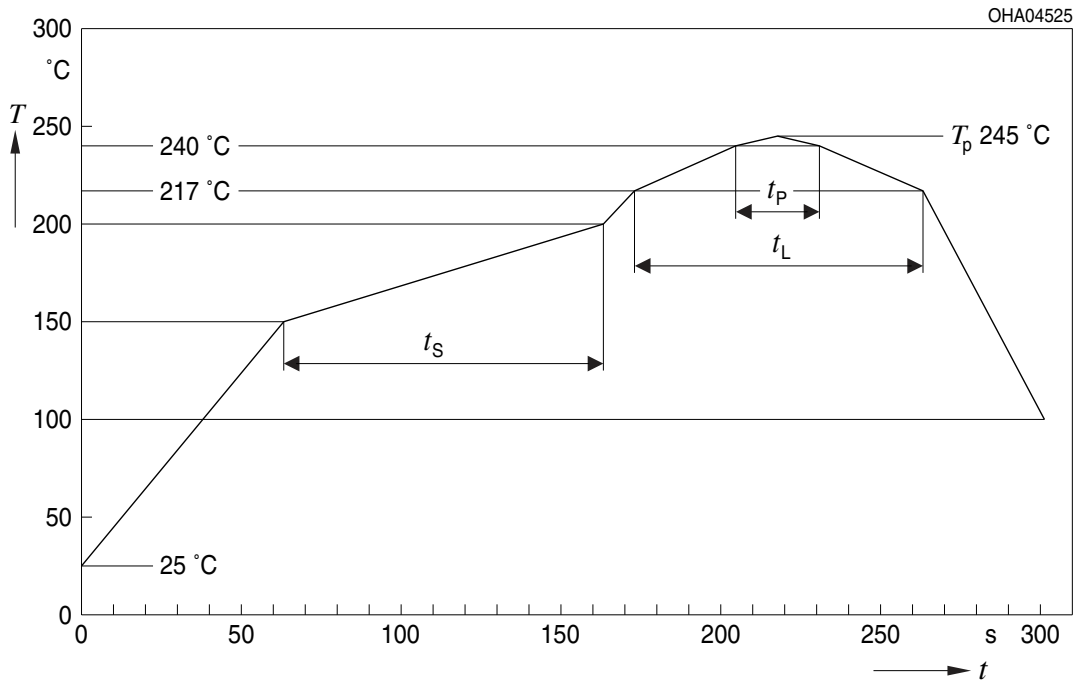
 solder resist

 solder stencil

E062.3010.271-01

Reflow Soldering Profile

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

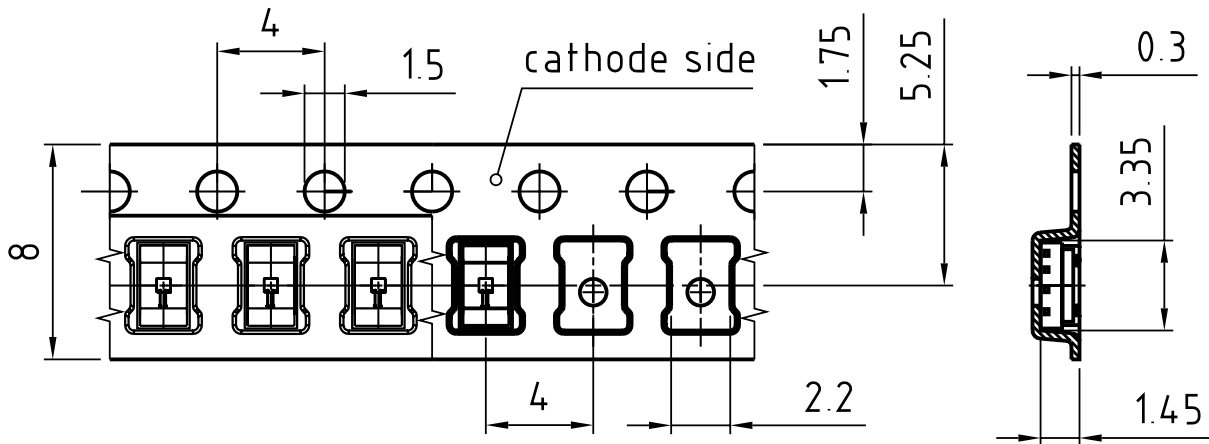


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat ^{*)} 25 °C to 150 °C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak ^{*)} T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature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

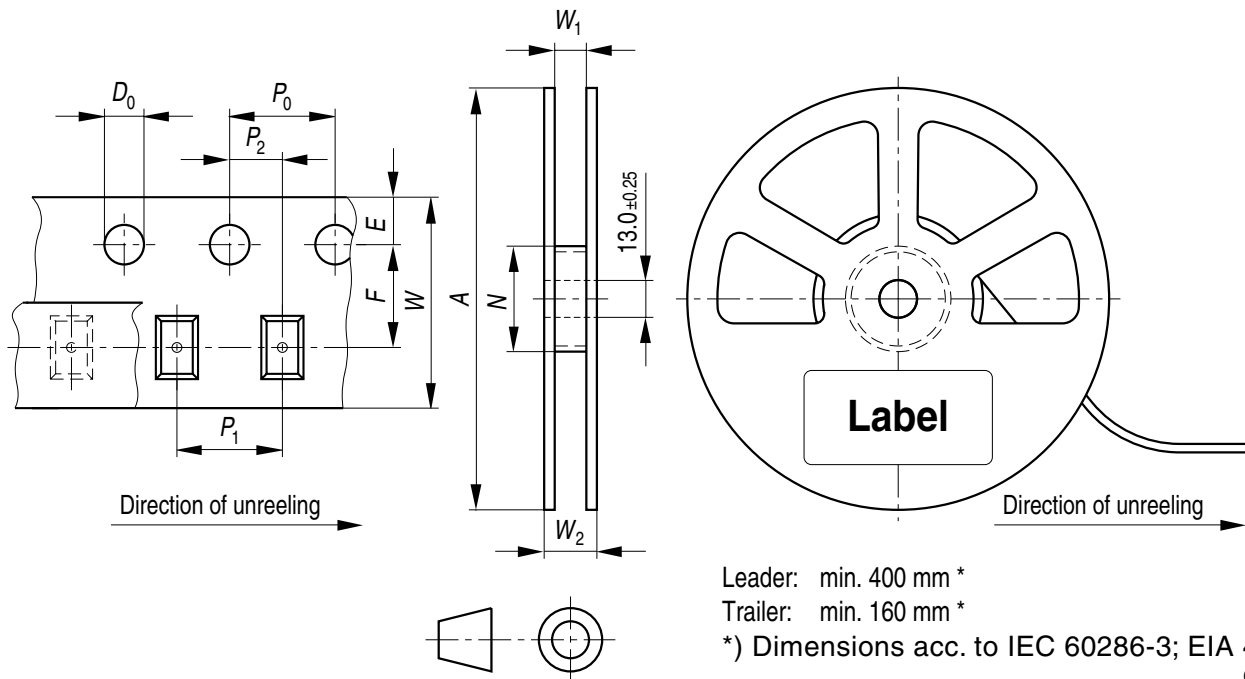
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

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_{2max}	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

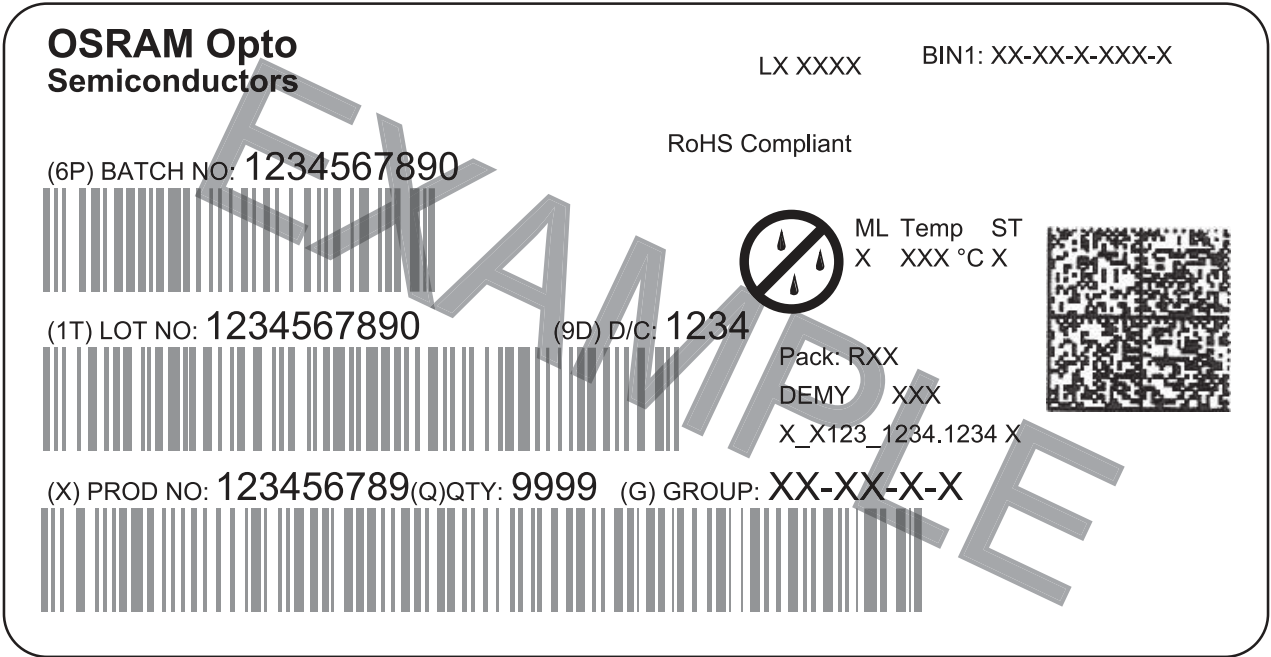
(6P) BATCH NO: 1234567890

(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

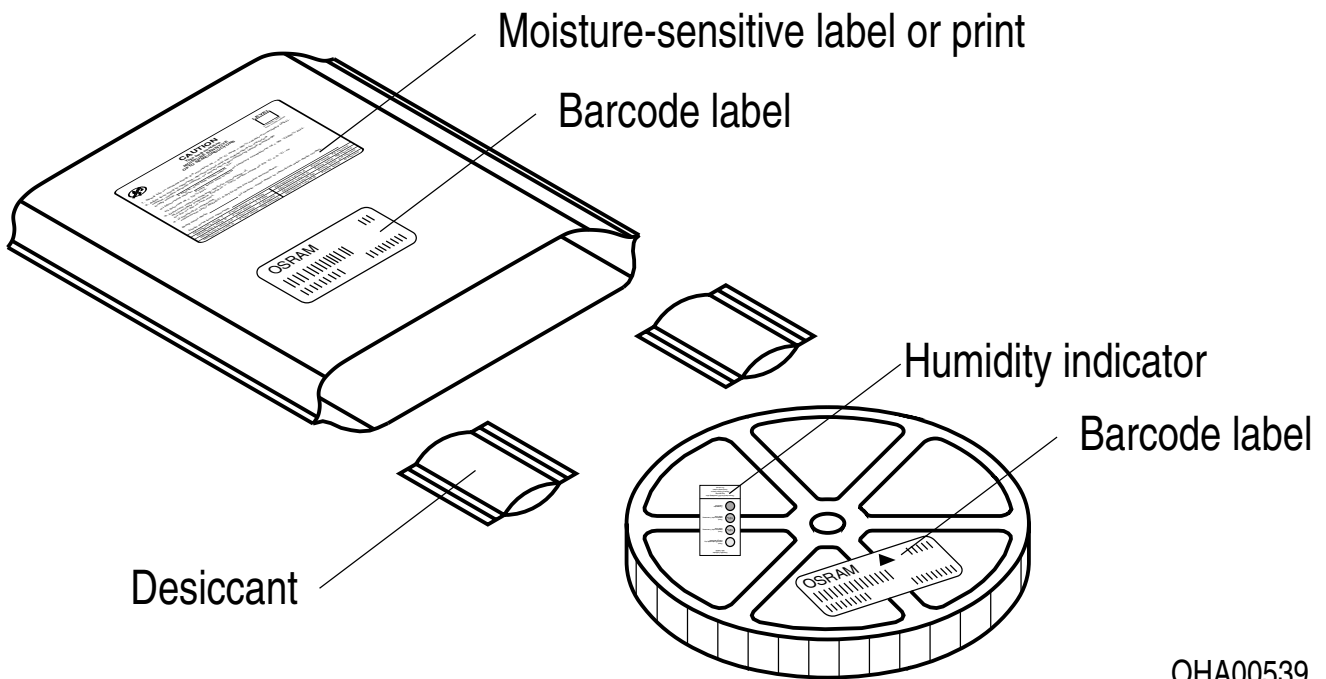
Pack: RXX
DEMY XXX
X_X123_1234.1234 X



The diagram shows a rectangular label with rounded corners. It contains the OSRAM logo and company name at the top left. To the right are fields for 'LX XXXX' and 'BIN1: XX-XX-X-XXX-X'. Below the logo is the text 'RoHS Compliant'. The label features three horizontal barcode sections. The first is labeled '(6P) BATCH NO: 1234567890'. The second is labeled '(1T) LOT NO: 1234567890' and '(9D) D/C: 1234'. The third is labeled '(X) PROD NO: 123456789(Q)QTY: 9999' and '(G) GROUP: XX-XX-X-X'. To the right of the second barcode is a circular icon with a crossed-out rain cloud and the text 'ML Temp ST X XXX °C X'. Below this is a square QR code. At the bottom right of the label area, there is text: 'Pack: RXX', 'DEMY XXX', and 'X_X123_1234.1234 X'. A large 'EXAMPLE' watermark is overlaid diagonally across the label.

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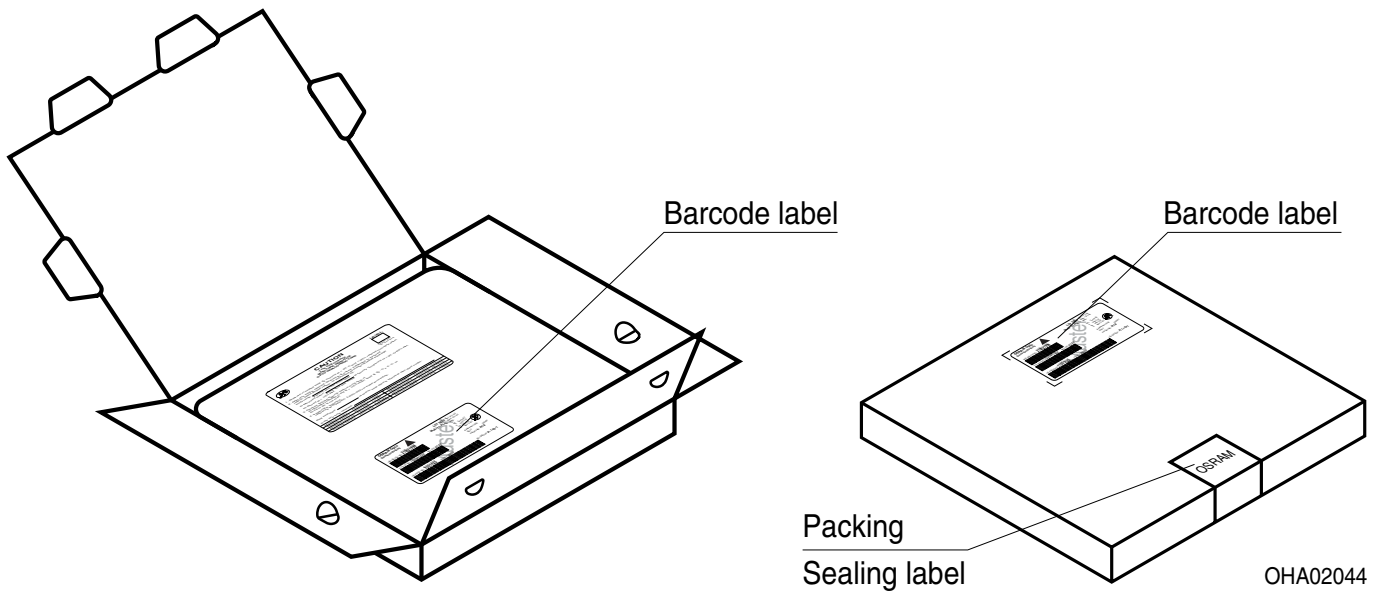
Dry Packing Process and Materials ⁶⁾



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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