

Handling of silicone resin LEDs

Application Note

Published by **ams-OSRAM AG**

Tobelbader Strasse 30,
8141 Premstaetten Austria

Phone +43 3136 500-0

ams-osram.com

© All rights reserved



Handling of silicone resin LEDs

Application Note No. AN024



Valid for:
silicone encapsulated LEDs

Abstract

In recent years, the brightness of LEDs has continually increased, allowing them to be used in completely new application areas and thus leading to an increased significance of the bonded system of chip and housing. As the lifetime of an LED is not due to the actual semiconductor chip itself, but is primarily determined by the housing ams-OSRAM AG has implemented a sealing compound consisting of silicone.

Within this application note the advantages of ams-OSRAM AG LEDs with a silicone sealing compound are described. The processing indications should help our customers to avoid incorrect handling and to prevent unnecessary damages to the LEDs.

Table of contents

1	Advantages of silicone resin LEDs.....	3
2	Handling indications	3
3	Processing indications	4
4	Foreign particle limits	4

1 Advantages of silicone resin LEDs

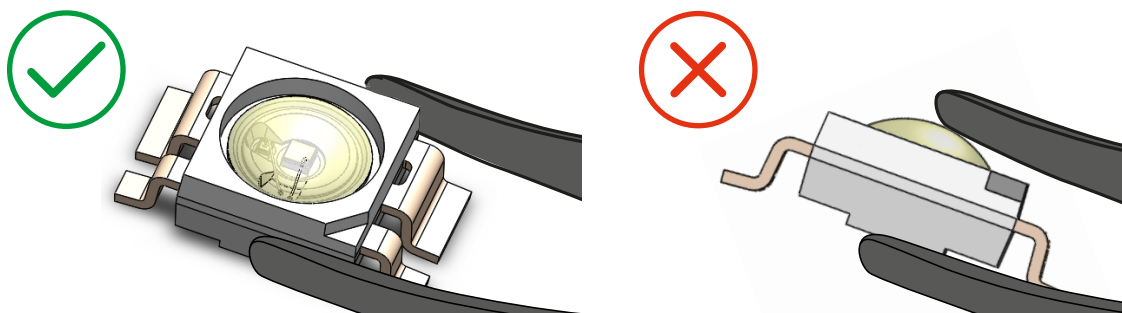
The “lifetime” refers to the period of time, whereby the brightness drops to half of its original value at a specific current. In order to achieve a lifetime in the range of 100,000 hours at room temperature for very bright LEDs, ams-OSRAM AG has implemented a new sealing compound consisting of silicone. The material properties of silicone provide many advantages which positively influence the lifetime as well as the maximum device temperature.

Housings using a silicone resin allow a higher junction temperature than housings based on epoxy resins. In addition, they exhibit high moisture and cycling reliability and are well suited for use in the automobile industry.

2 Handling indications

During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound. In general, LEDs should only be handled at the housing. This also applies to LEDs without a silicone sealant, since the surface can also become scratched (see Figure 1).

Figure 1: Handling of the LEDs



When populating boards in SMT production there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented. This is assured by choosing a pick and place nozzle which is larger than the LED's reflector area.

The silicone material used by ams-OSRAM AG is especially qualified for use within semiconductor devices and is suitable for automotive applications. In particular, the material used has an extremely low level of volatile content.

3 Processing indications

Silicone differs from materials conventionally used for the manufacturing of LEDs. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer and the surface is more likely to attract dust.

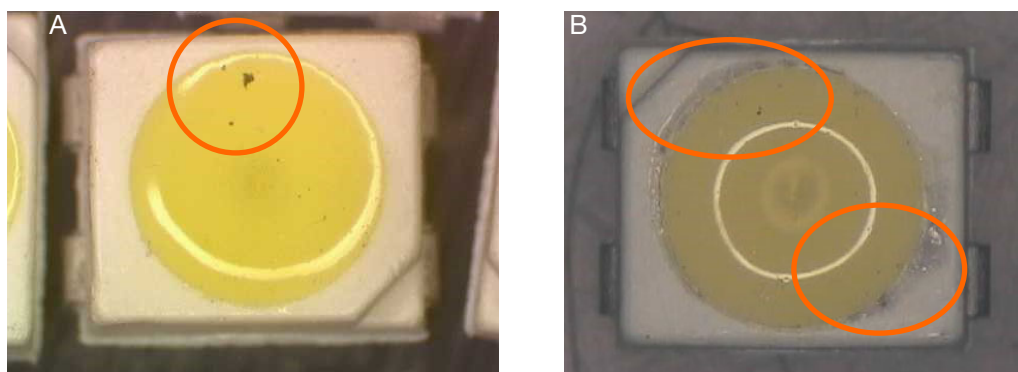
As mentioned previously, the increased sensitivity to dust requires special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

ams-OSRAM AG suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. We recommend rinsing the LEDs after soldering for 5-10 seconds, at most 15 seconds. Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.

4 Foreign particle limits

We also would like to make the customer aware that certain foreign particles on the LEDs, although noticeable from a cosmetic point of view, do not affect the quality, the lifetime or the brightness of the LEDs. Therefore, a small amount of particles on the surface of the LEDs can be ignored. The LEDs shown in Figure 2 are examples of possible contamination levels which can be neglected.

Figure 2: Contaminants on the surface (A) and deposits on the rim (B)



ABOUT ams OSRAM Group (SIX: AMS)

The ams OSRAM Group (SIX: AMS) is a global leader in optical solutions. By adding intelligence to light and passion to innovation, we enrich people's lives. This is what we mean by Sensing is Life. With over 110 years of combined history, our core is defined by imagination, deep engineering expertise and the ability to provide global industrial capacity in sensor and light technologies. Our around 24,000 employees worldwide focus on innovation across sensing, illumination and visualization to make journeys safer, medical diagnosis more accurate and daily moments in communication a richer experience. Headquartered in Premstaetten/Graz (Austria) with a co-headquarters in Munich (Germany), the group achieved over EUR 5 billion revenues in 2021. Find out more about us on <https://ams-osram.com>

DISCLAIMER

PLEASE CAREFULLY READ THE BELOW TERMS AND CONDITIONS BEFORE USING THE INFORMATION SHOWN HEREIN. IF YOU DO NOT AGREE WITH ANY OF THESE TERMS AND CONDITIONS, DO NOT USE THE INFORMATION.

The information provided in this general information document was formulated using the utmost care; however, it is provided by ams-OSRAM AG or its Affiliates* on an "as is" basis. Thus, ams-OSRAM AG or its Affiliates* does not expressly or implicitly assume any warranty or liability whatsoever in relation to this information, including – but not limited to – warranties for correctness, completeness, marketability, fitness for any specific purpose, title, or non-infringement of rights. In no event shall ams-OSRAM AG or its Affiliates* be liable – regardless of the legal theory – for any direct, indirect, special, incidental, exemplary, consequential, or punitive damages arising from the use of this information. This limitation shall apply even if ams-OSRAM AG or its Affiliates* has been advised of possible damages. As some jurisdictions do not allow the exclusion of certain warranties or limitations of liabilities, the above limitations and exclusions might not apply. In such cases, the liability of ams-OSRAM AG or its Affiliates* is limited to the greatest extent permitted in law.

ams-OSRAM AG or its Affiliates* may change the provided information at any time without giving notice to users and is not obliged to provide any maintenance or support related to the provided information. The provided information is based on special conditions, which means that the possibility of changes cannot be precluded.

Any rights not expressly granted herein are reserved. Other than the right to use the information provided in this document, no other rights are granted nor shall any obligations requiring the granting of further rights be inferred. Any and all rights and licenses regarding patents and patent applications are expressly excluded.

It is prohibited to reproduce, transfer, distribute, or store all or part of the content of this document in any form without the prior written permission of ams-OSRAM AG or its Affiliates* unless required to do so in accordance with applicable law..

* ("Affiliate" means any existing or future entity: (i) directly or indirectly controlling a Party; (ii) under the same direct, indirect or joint ownership or control as a Party; or (iii) directly, indirectly or jointly owned or controlled by a Party. As used herein, the term "control" (including any variations thereof) means the power or authority, directly or indirectly, to direct or cause the direction of the management and policies of such Party or entity, whether through ownership of voting securities or other interests, by contract or otherwise.)



For further information on our products please see the Product Selector and scan this QR Code.

Published by ams-OSRAM AG
Tobelbader Strasse 30, 8141 Premstaetten, Austria
ams-osram.com © All Rights Reserved.

Published by ams-OSRAM AG

Tobelbader Strasse 30,
8141 Premstaetten Austria

Phone +43 3136 500-0

ams-osram.com

© All rights reserved

