Customer Information V20.05-3

Optical Devices Selection Criteria (Sensors and LEDs)

Quality Acceptance Level for Optical Devices

Zero failure quality requirement can only be targeted for optical devices when imperfections and rejects are sorted by AOI for 100% within a batch in accordance with the foregoing definitions and classes of failures. Due to its somewhat technical limitations, criteria and effects of optical imperfections the related products are subject to an AQL agreement according to ISO-Standard. A typical AQL value for such optical sensors is 0.1, i.e. a batch containing ca. 1 ‰ of faulty components is acceptable, verified by the client during his obligatory inspection of (incoming) goods. If the number of rejects exceed the criteria of the given AQL, the client is eligible to return the batch in the state of delivery which is then replaced by an error-free batch either in its entirety or by exchanging the faulty components.

Optical imperfections like outer scratches or dirt cannot be accepted for devices already unpacked or mounted. Imperfections of cosmetic nature like small dimples in molded surfaces, color shading outside optical sensors, flawed marking shall be minimized by continues improvement, but are not accepted as quality claims or return of material.

To assure an early detection of lot dependent or statistically distributed distinctive features or faults, the client shall in a modified FIFO procedure perform the inspections for new delivery lots – especially for changed production batches – far ahead of using up a foregoing lot, in order to avoid delivery delays for replacing goods.

Further liability for direct or indirect damages is excluded, particularly with reference to the specifications of parameters not tested. This also applies specifically to costs for disassembly, testing and analysis and in principle to costs for not commissioned actions pertaining to the aversion of damages and the compensation of divergent parameters.

Complaints and samples of rejects are to be send free of charge together with a failure description to iC-Haus for analysis. For refusal and return of a batch a RMA number must be requested. On receipt iC-Haus shall then perform an analysis of the goods and document the process in 8D-format.

Optically Relevant Reference Areas

Optical sensor chips are equipped with integrated photodiodes whose optically sensitive areas are inspected for defects (e.g. shadowing impurities or refractive inclusions) in visible inspections (OI or AOI) during production.
Based on this Customer Information, product-specific selection criteria are classified in the respective product specifications or are provided by iC-Haus through TECHNICAL SUPPORT (http://ichaus.de/support).

- For optical sensors with transparent or diffuse/matt-transparent covering of the chip surface, the active total area of the integrated photodiode is the relevant parameter.
- For optical sensors with an assembled reticle (e.g. chrome on glass), only the overlapping area between an opening and the active area of an integrated photodiode is relevant (see Figure 1).

- According to the definition in the respective specification, different optically relevant areas can be assigned to different sections or selection classes.

Definition of Selection Classes

Criteria for reject

Class M60: Defects or fiber with smallest side > **60 µm**
OR covering > **10%** of the optically relevant area it is on
Class M30: Defects or fiber with smallest side > **30 µm**
OR covering > **5%** of the optically relevant area it is on

Class A63: Imperfections of accumulated area > **(63 µm)²** (*)
Class A40: Imperfections of accumulated area > **(40 µm)²** (*)
Class A25: Imperfections of accumulated area > **(25 µm)²** (*)
Class A16: Imperfections of accumulated area > **(16 µm)²** (*)
(*) under condition smallest side > 10 µm, any scratches on glass surface excluded (out of focus)

The following is applicable unless otherwise stated:
Selection class M30 for optically relevant sensor surfaces

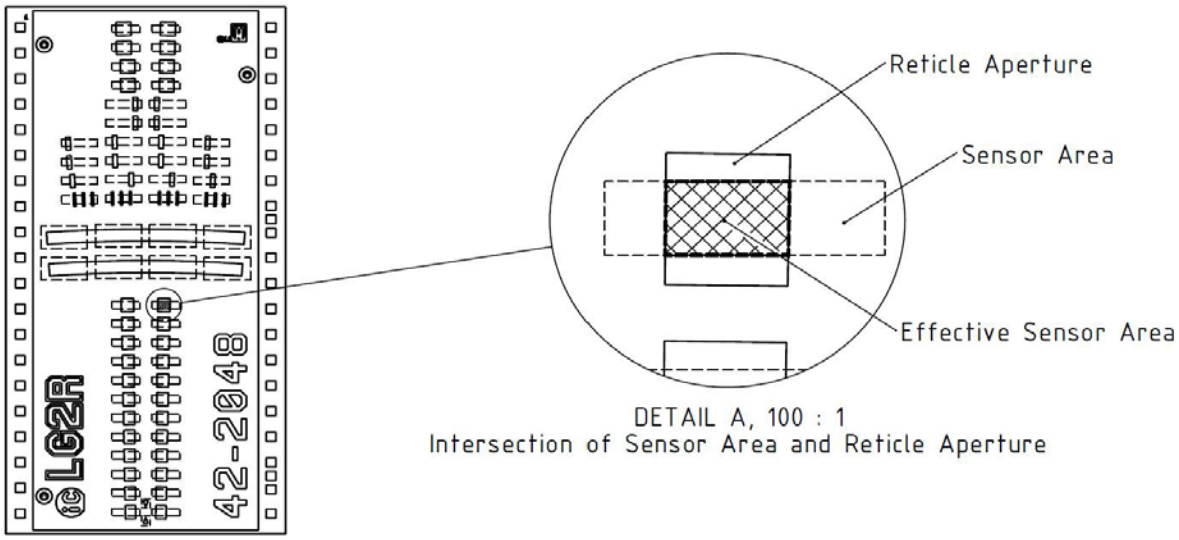

Figure 1: Example of the relevant overlap area (Effective Sensor Area) between an aperture and the active area of an integrated photodiode.

Selection Classes for LEDs

LEDs covered by window glass, glass or plastic lenses might exhibit optical imperfections also like impurities and inclusions. Tests are performed on sample basis to qualify a batch and processing and incoming materials are controlled. Within an encoder application imperfections of up to 50µm size proves acceptable. Larger imperfections have to be accepted according to the specifications given by the suppliers of optical lenses with an AQL = 1.5.

Please contact us for further questions.
iC-Haus GmbH
https://www.ichaus.de/contact