SMT LED techniques from the professional - “the reverse mount”

Today's speakers :

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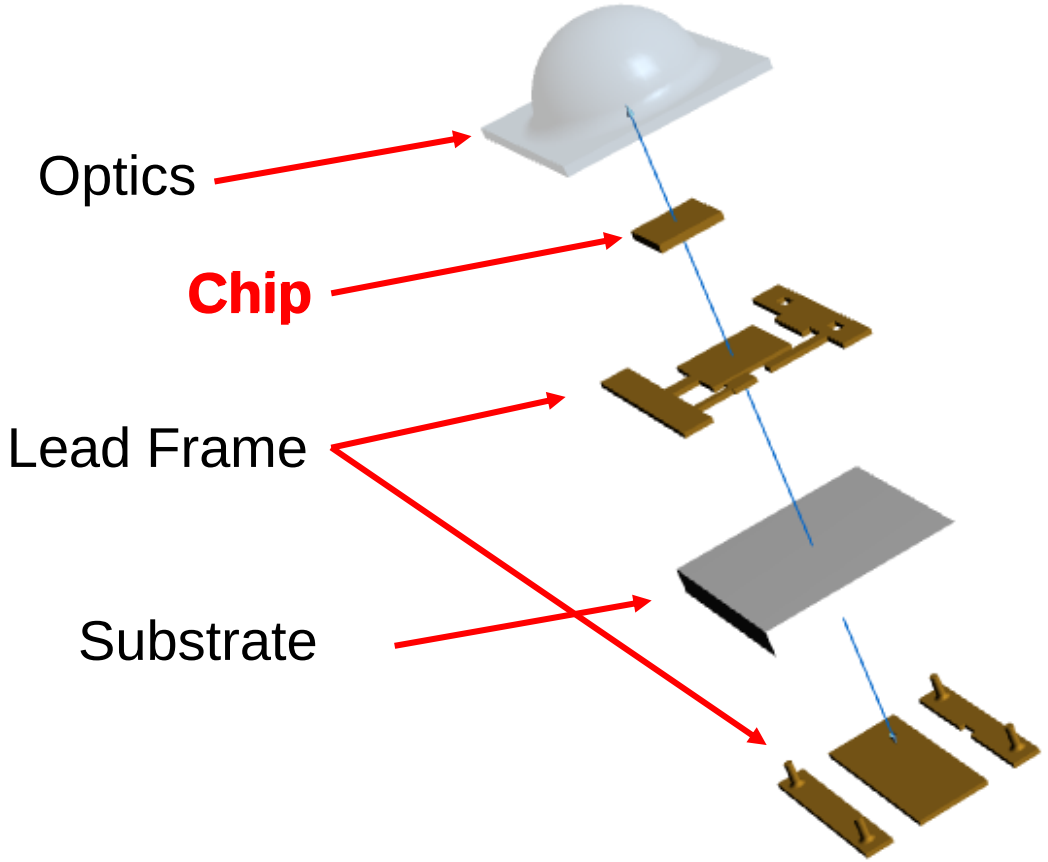
Overview

- **LED**
  - Introduction
  - Overview of LED package
- **Reverse mount LED**
  - What kind of reverse mount LED
  - Where is a reverse mount in use
  - The WE Product porfolio
- **Situation by using reverse mount LED**
- **Solution / Suggestion**

LED Introduction

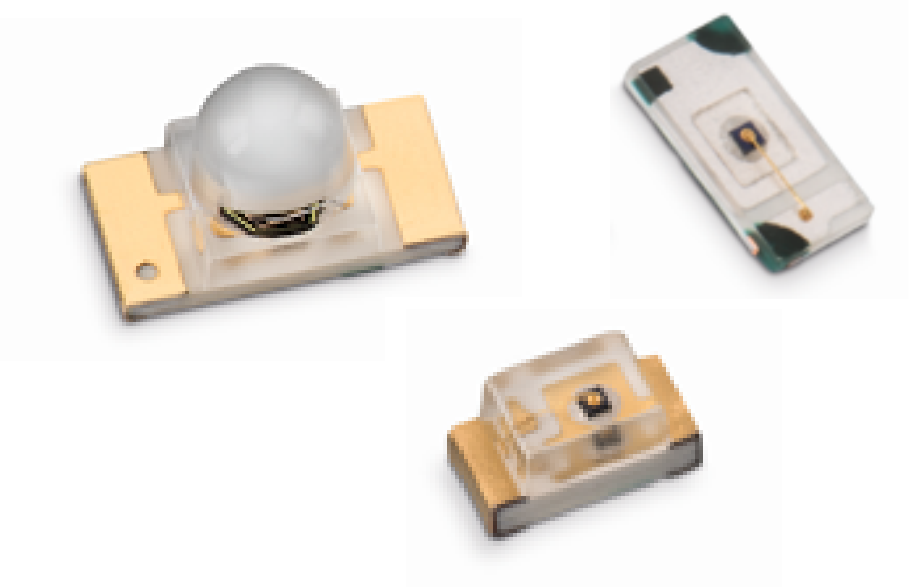
- **LED – Light-Emitting Diode**
- **Mechanical structure**
  - Lead frame
    - Metal contacts - leading current to the active part
    - Soldering position for the LED
  - Substrate
    - Material to hold the package together
    - Usually defines the LED size
  - Chip (Diode / Dice)
    - Active element of the LED
    - Emitting light
  - Out coupling optics
    - Waveguide to extract the light generated from the chip



Overview of LED Packages

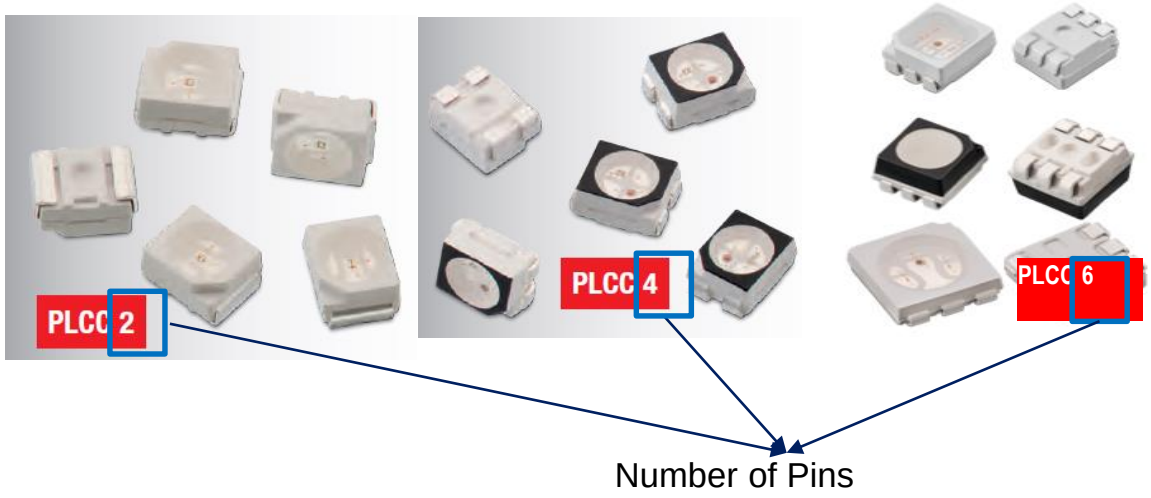
Chip LED

- Substrate is a PCB (Print circuit board)
- Chip enclosed by epoxy molding
- Small size – diversity of signal application



PLCC (Plastic Leaded Carrier Chip)

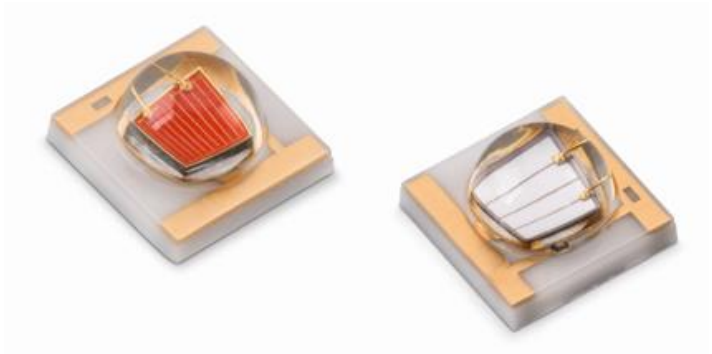
- Substrate is a PLCC housing
- Silicone encapsulation



Overview of LED Packages

Ceramic

- Low thermal resistivity substrate
  - Ceramic substrate – Al_2O_3
- Bigger chip size
- High power LEDs
  - Drive currents up to 1A
  - High light intensity
  - Silicon lens
- Standard size 3535

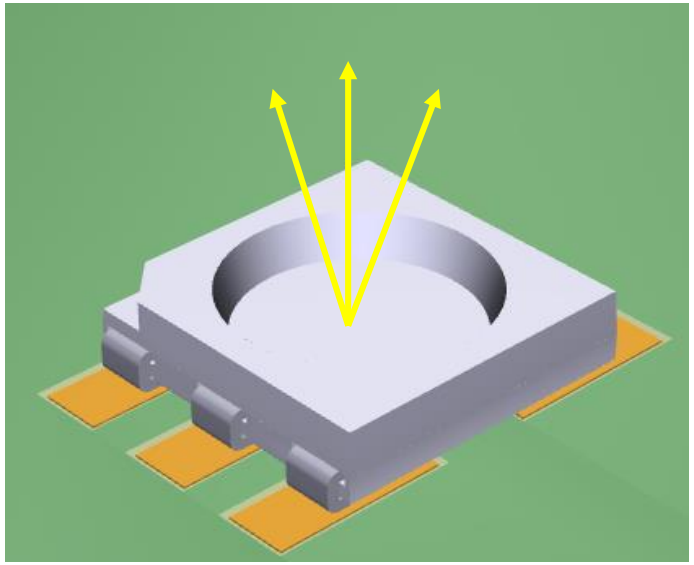


THT LED (Through Hole Technology)

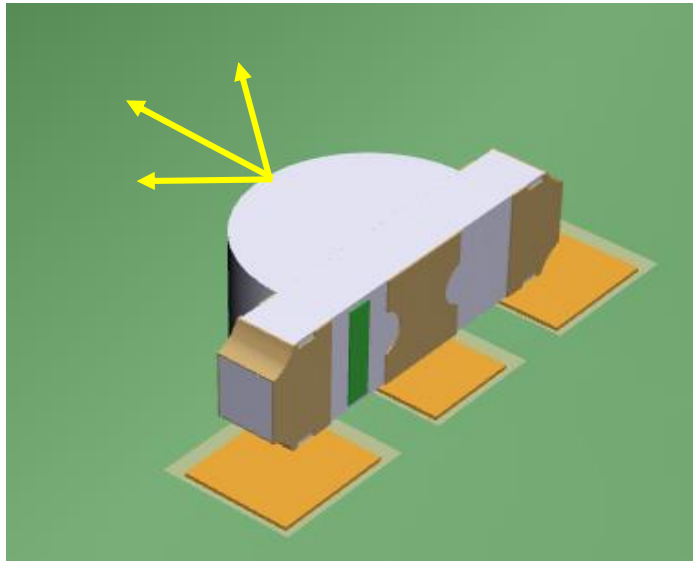
- Standard lead model
- Standard Size 3mm and 5mm (Lens Diameter)
- With and without stopper
- Colorless and color diffused lens

LED Mounting

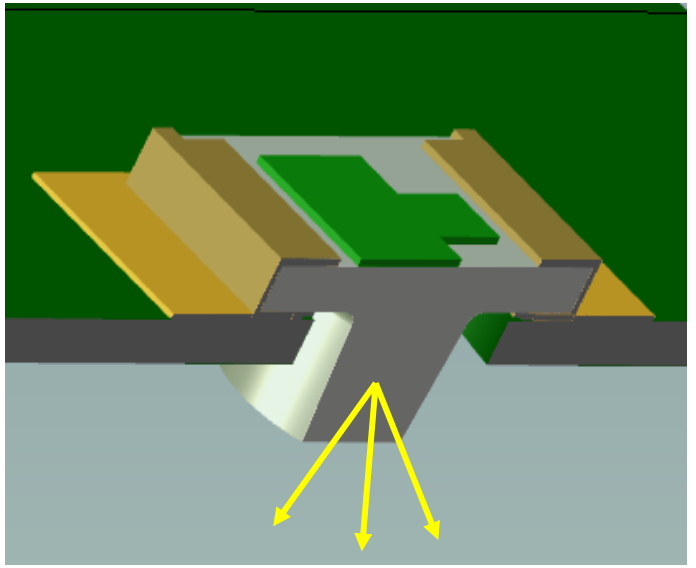
Top view



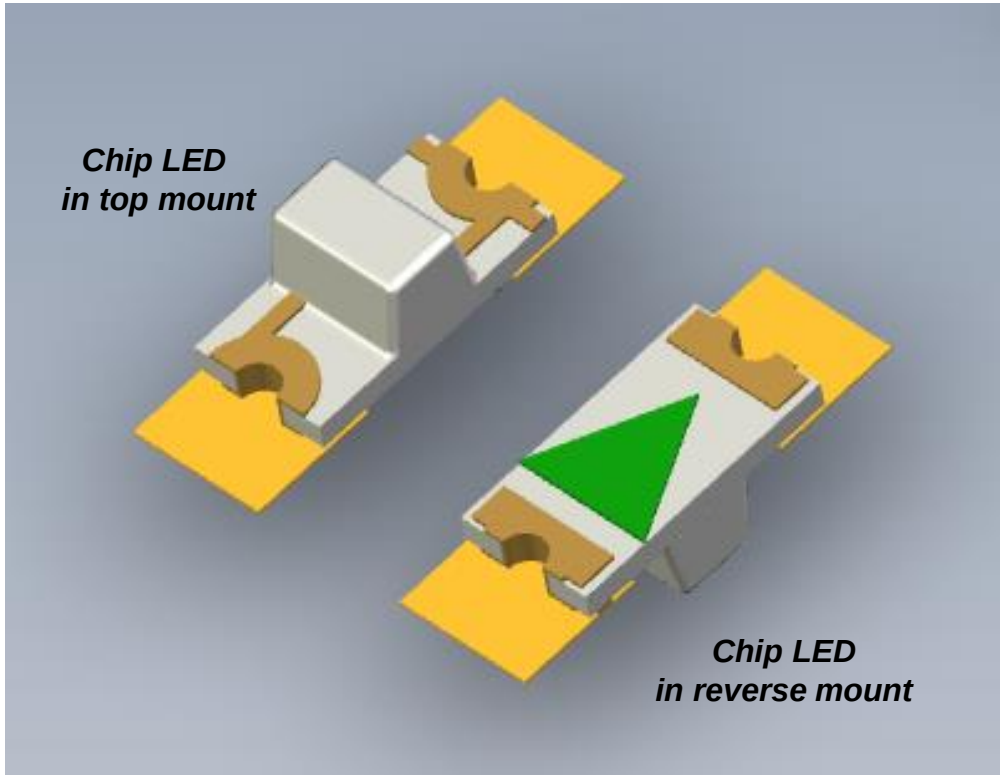
Side view



Reverse mount



Reverse Mount LED



SMT LED, which can be placed upside down on the PCB

Reverse mount LED is well-know as:

bottom entry

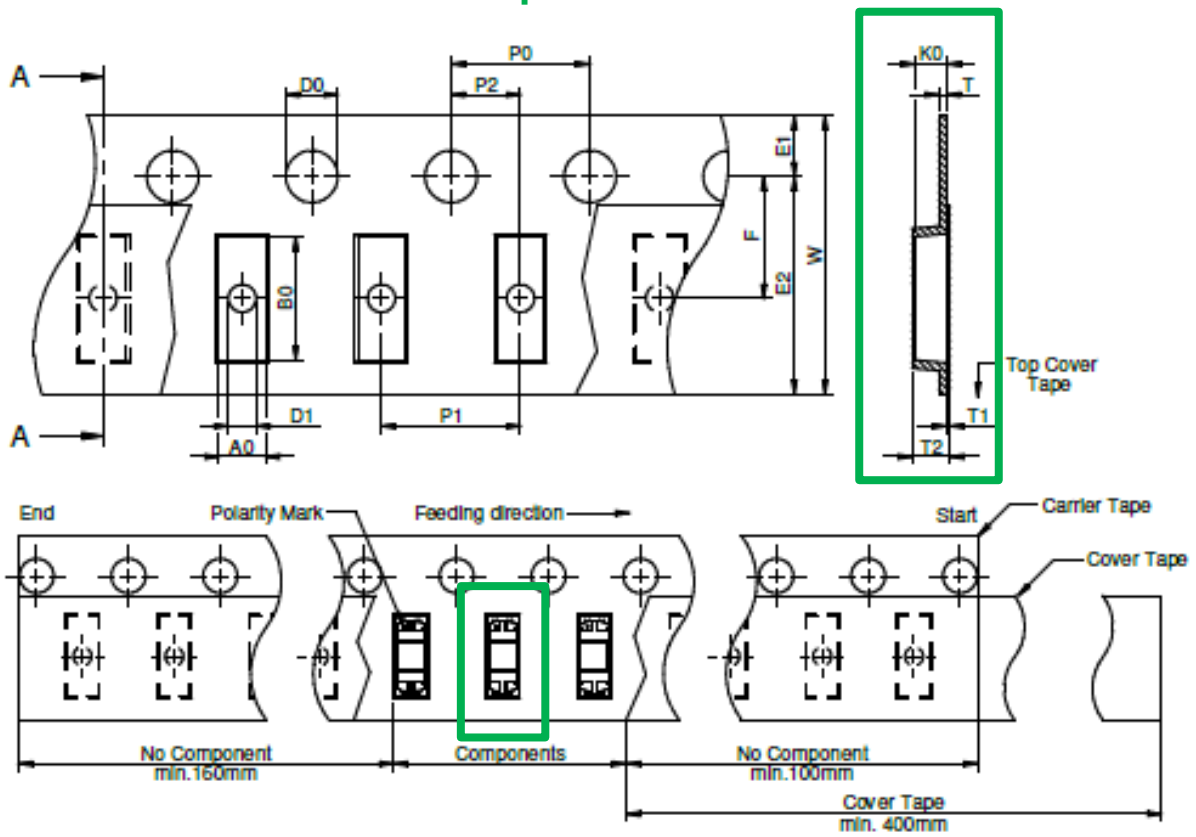
reverse package

rear-mounted

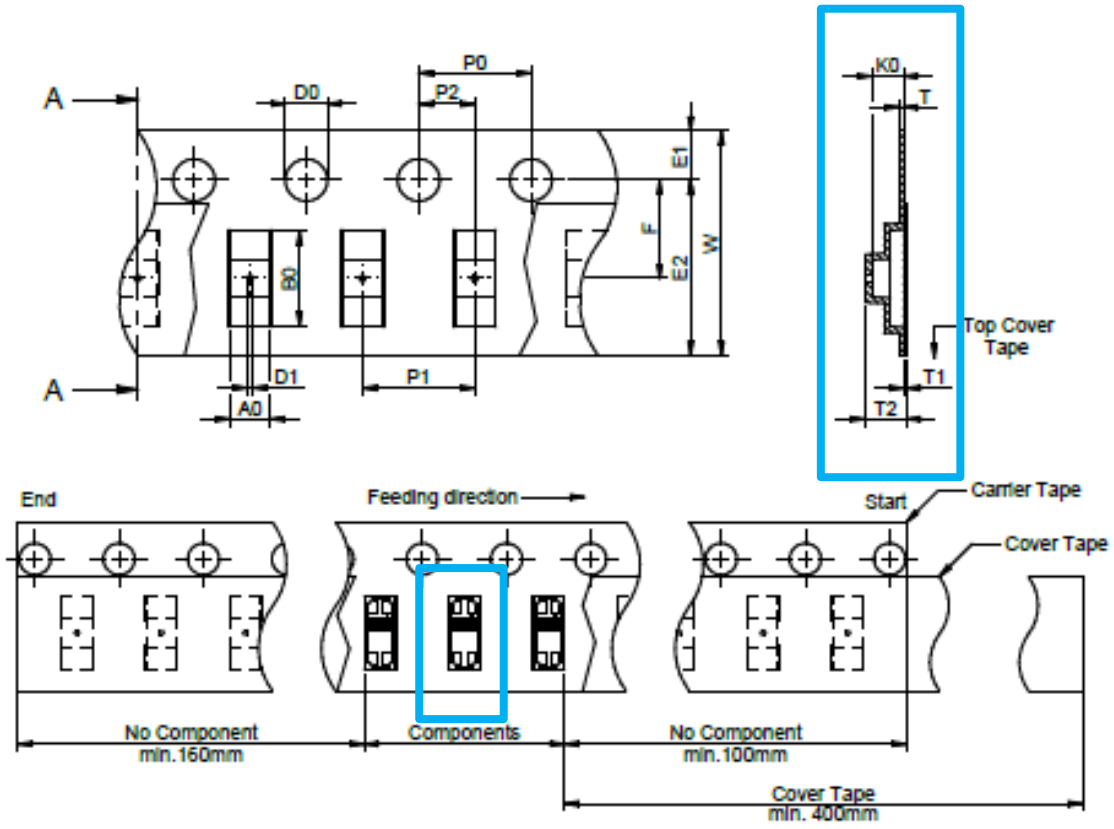
The reverse mount LED can be used as top mount, but not every top view LEDs can be used as reverse mount

Packaging

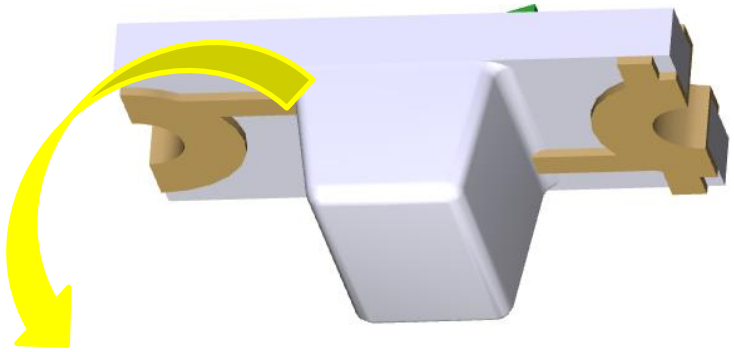
Top mount

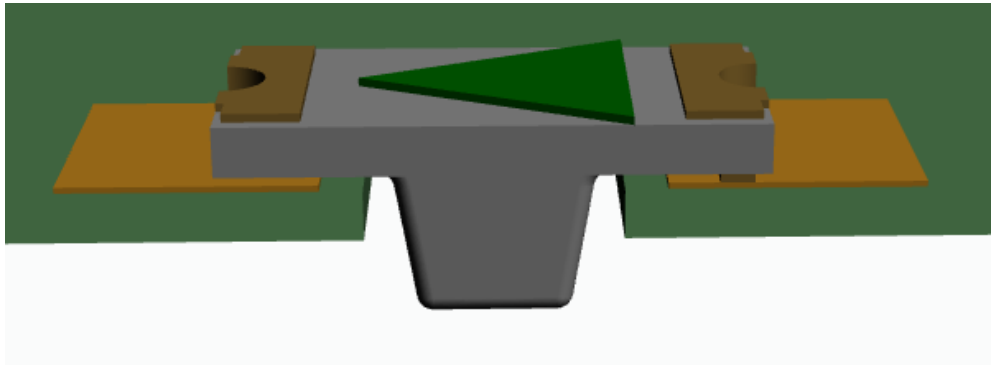


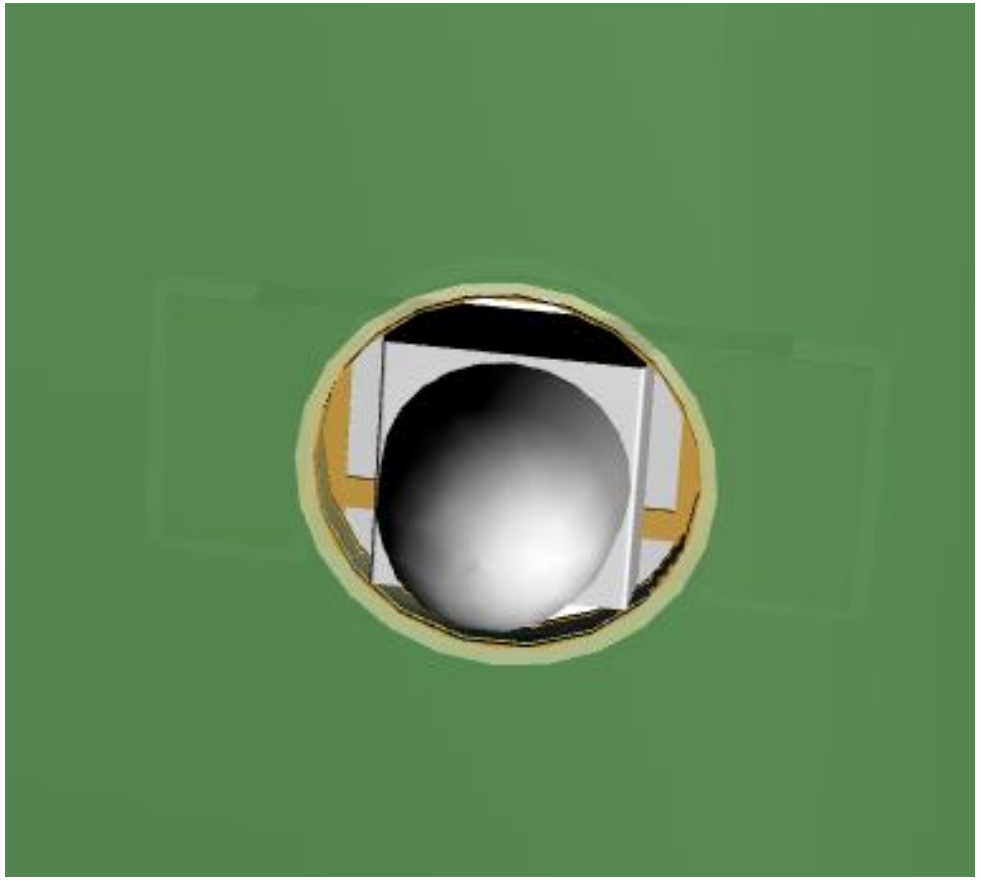
Reverse mount



Application

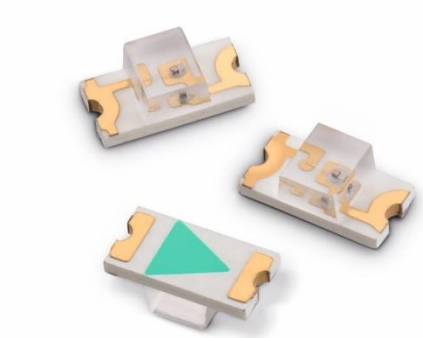




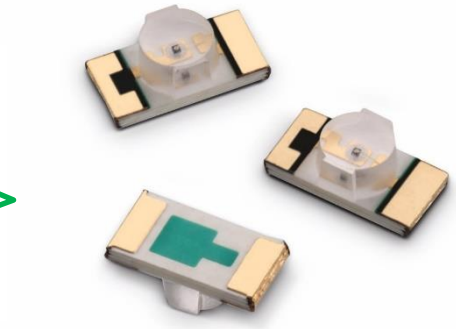


Porfolio

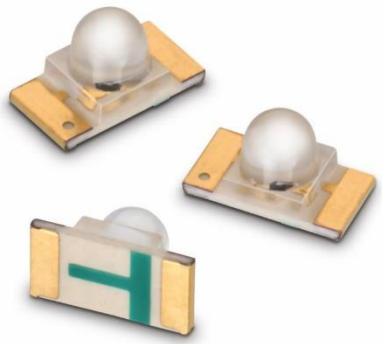
Chip LED reverse mount



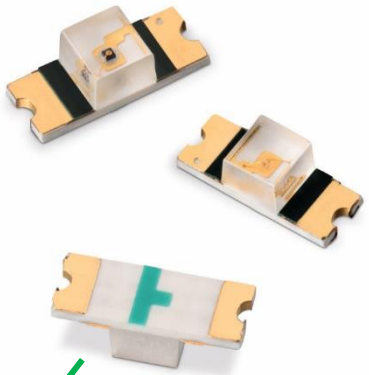
1206 with rectangular lens in mono-color



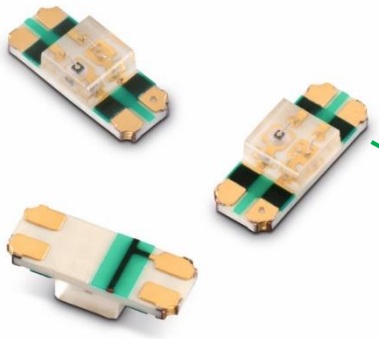
1206 with cylindrical lens in mono-color



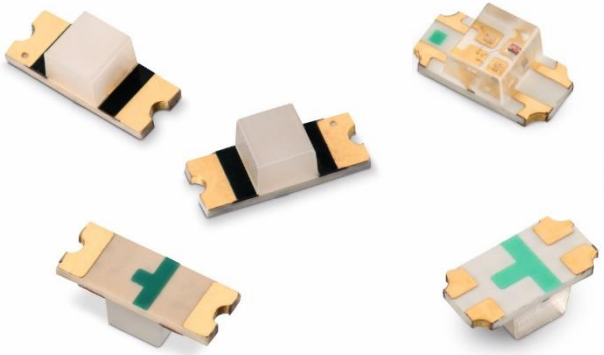
1206 with domed lens in mono-color



1205 with rectangular lens in mono-color



1205 with rectangular lens in bi-color & RGB



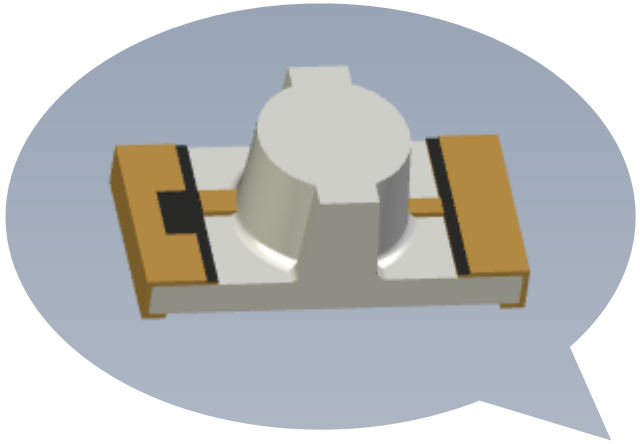
1206 with rectangular lens RGB

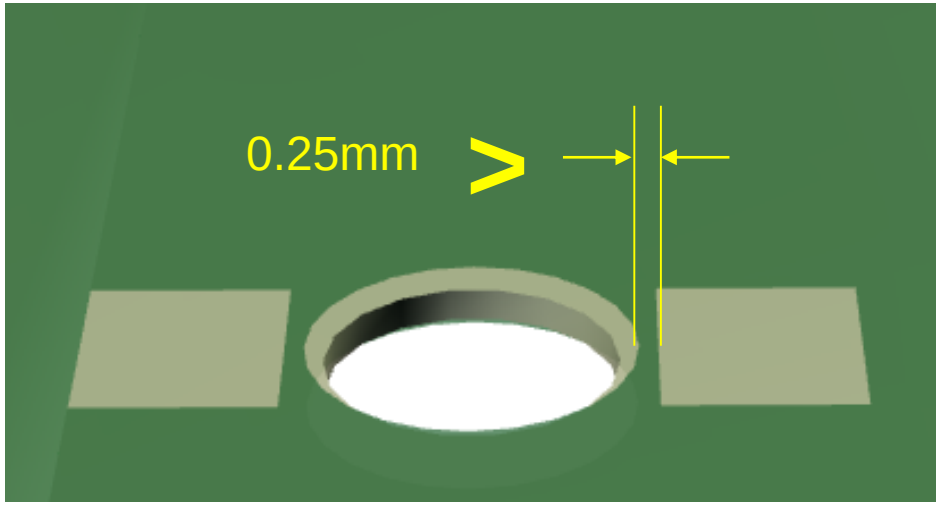
Situation

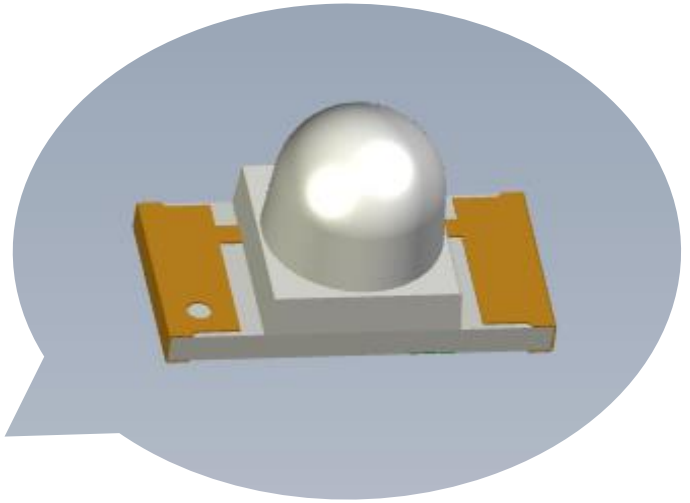
by using reverse mount LED

IPC 7351

Generic Requirements for Surface Mount
Design and Land Pattern Standard

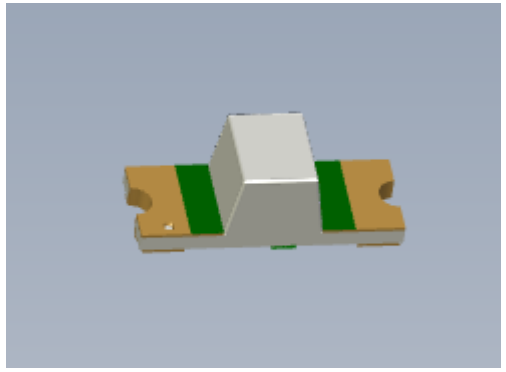


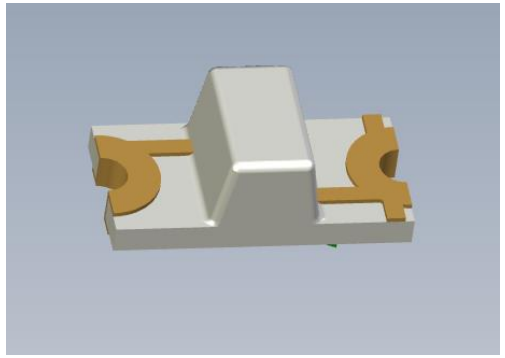


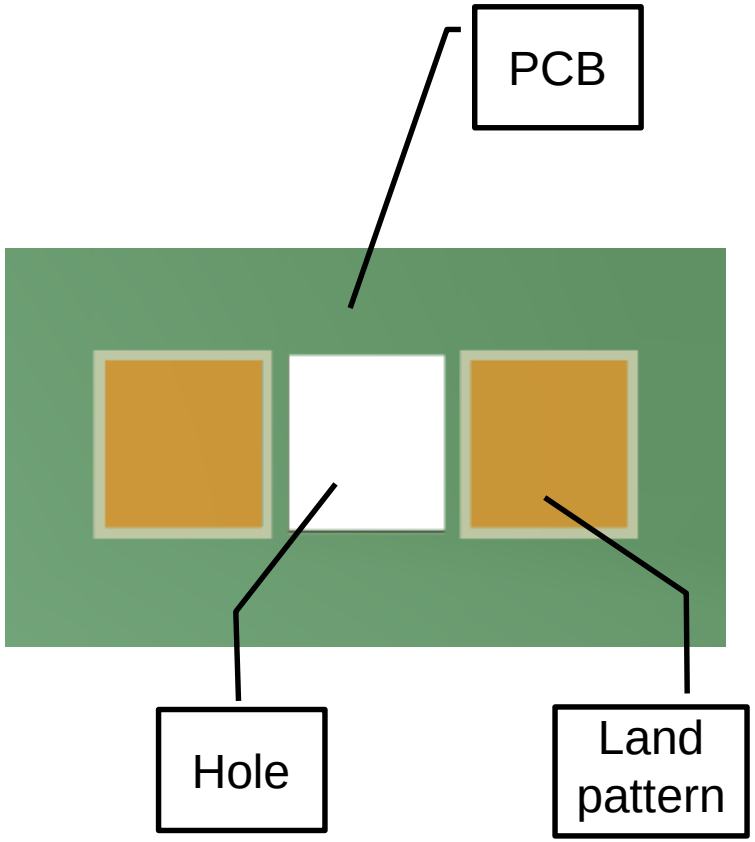


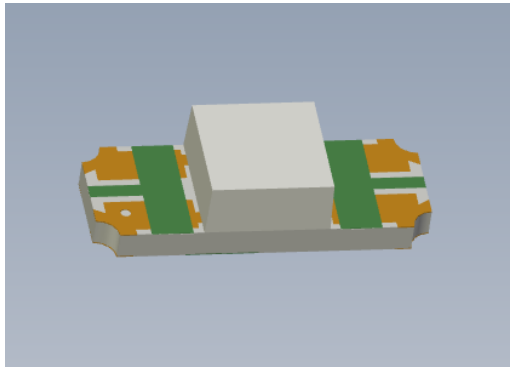
Situation

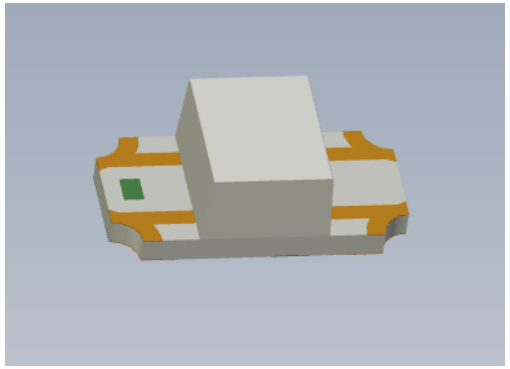
by using reverse mount LED





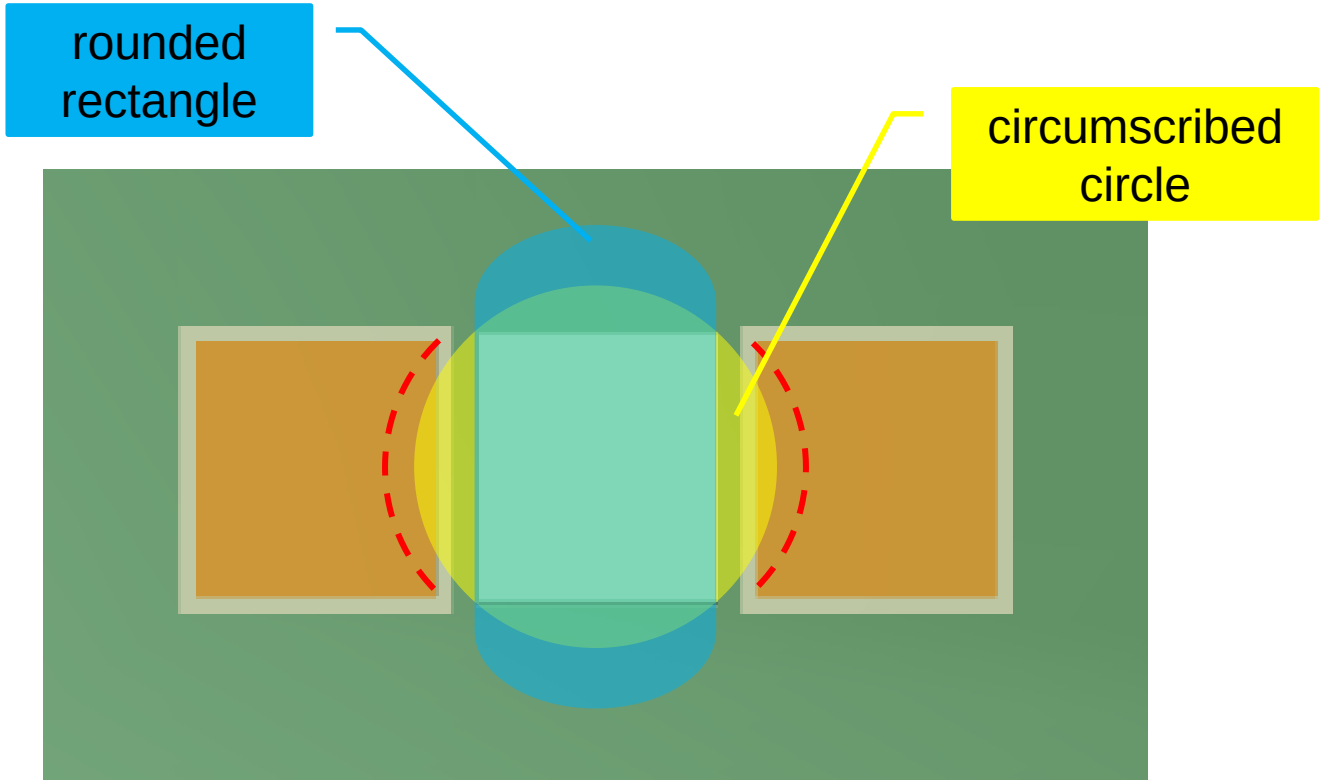






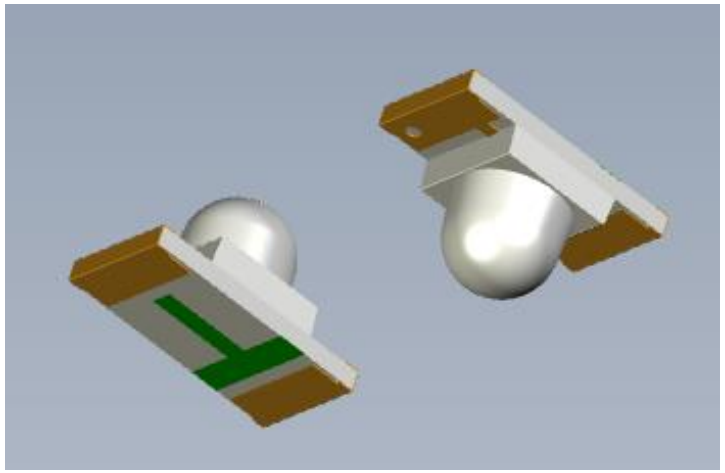
Suggestion

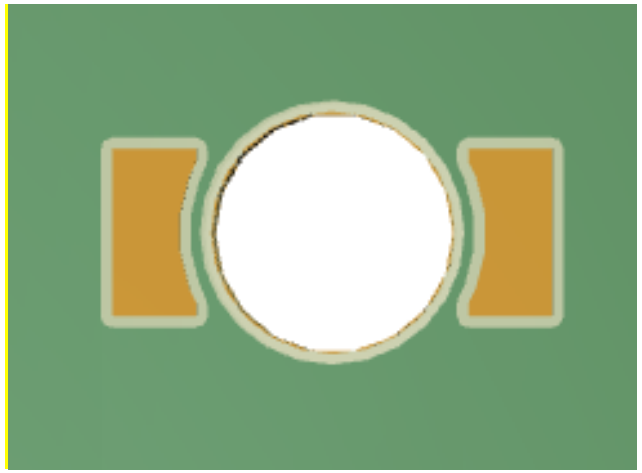
How to design the land pattern

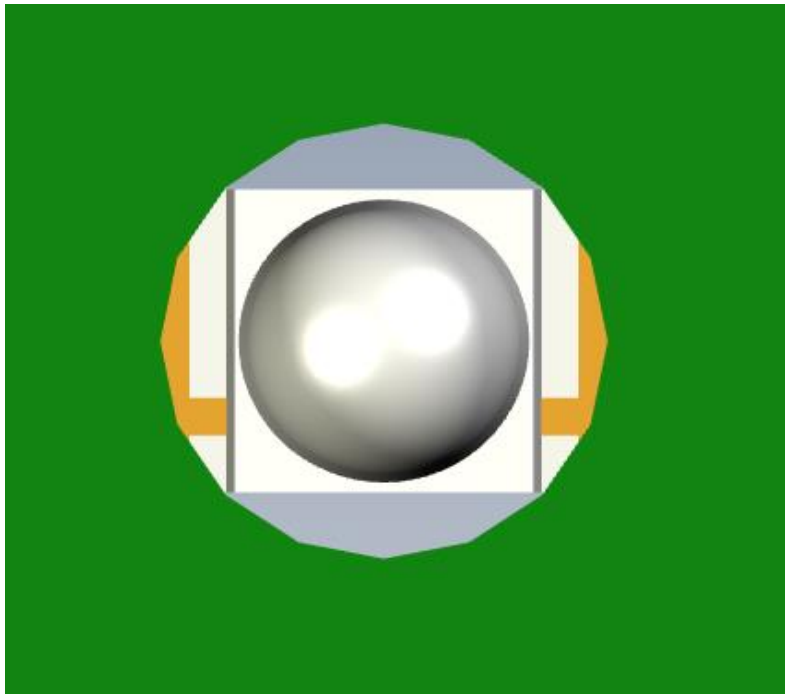


The reverse mount LED

Dome lens





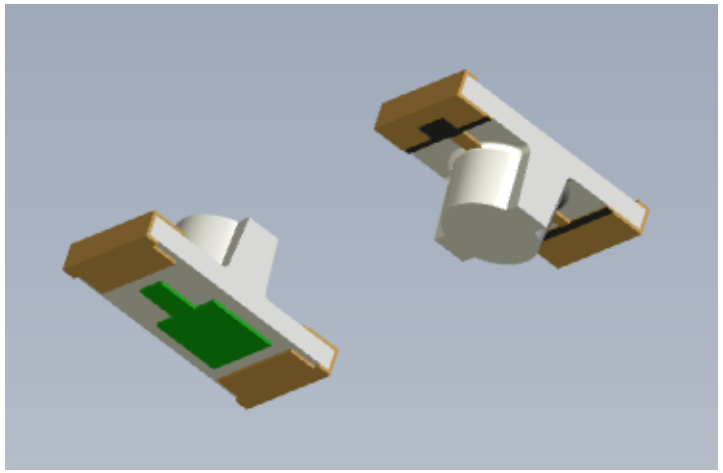


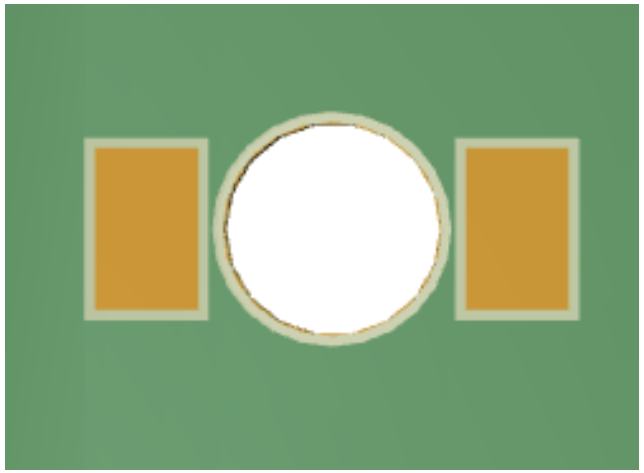
+ The dome lens for the small viewing angle: 20°
+ Very high intensity
+ Perfect for coupling in the optical fiber
+ Perfect soldering pads for reverse use

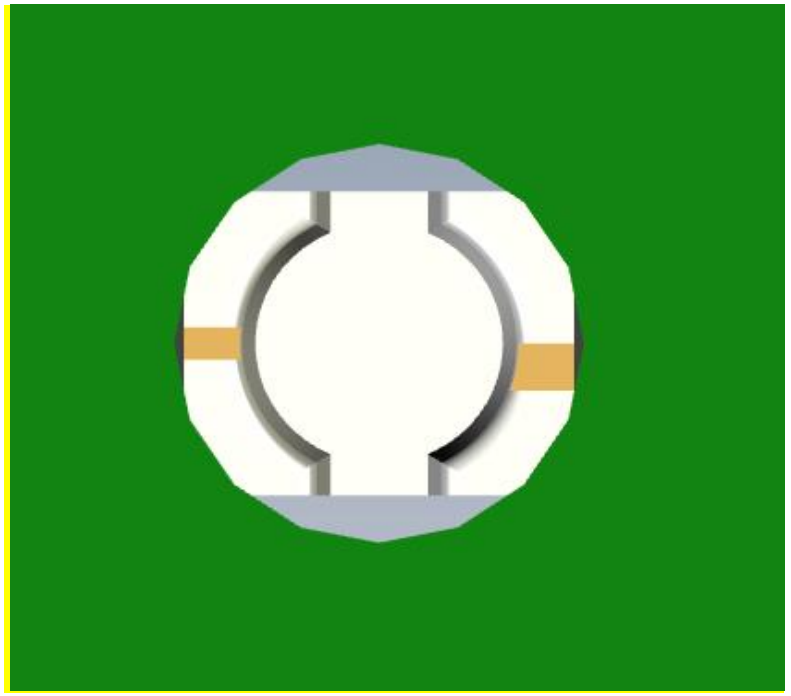
- Not suitable for bi-color and RGB LED

The reverse mount LED

Cylindrical lens







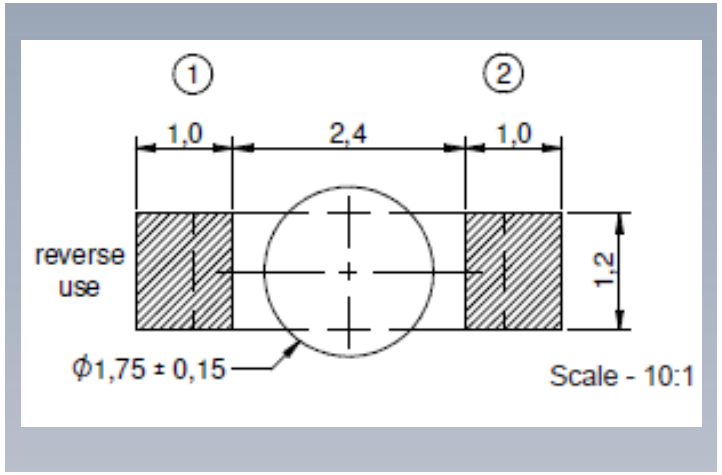
+ The cylindrical lens is perfect for PCB manufacturing
+ Wide viewing angle: 120°
+ Perfect soldering pads for reverse use

- Special molding for the lens
  ➔ high cost of production
- Not suitable for bi-color and RGB LED

The reverse mount LED

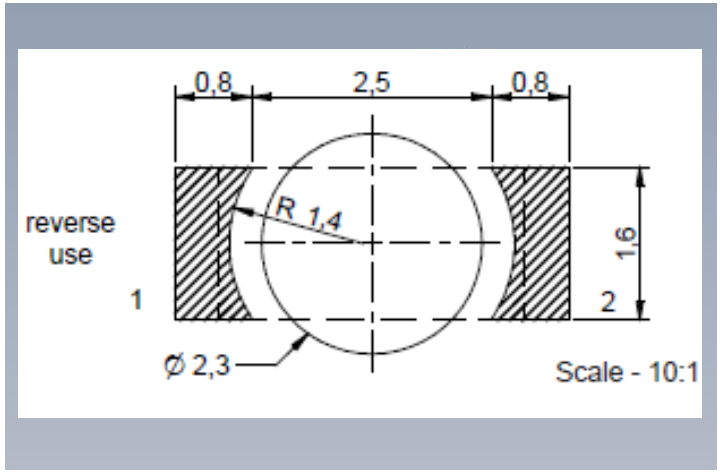
Rectangular lens, 1205 vs. 1206

1205



+ Slimmer: 3.2 x 1.2mm
+ Lens: 1.2 x 1.2 mm
+ The hole for land pattern: Φ = 1.9mm

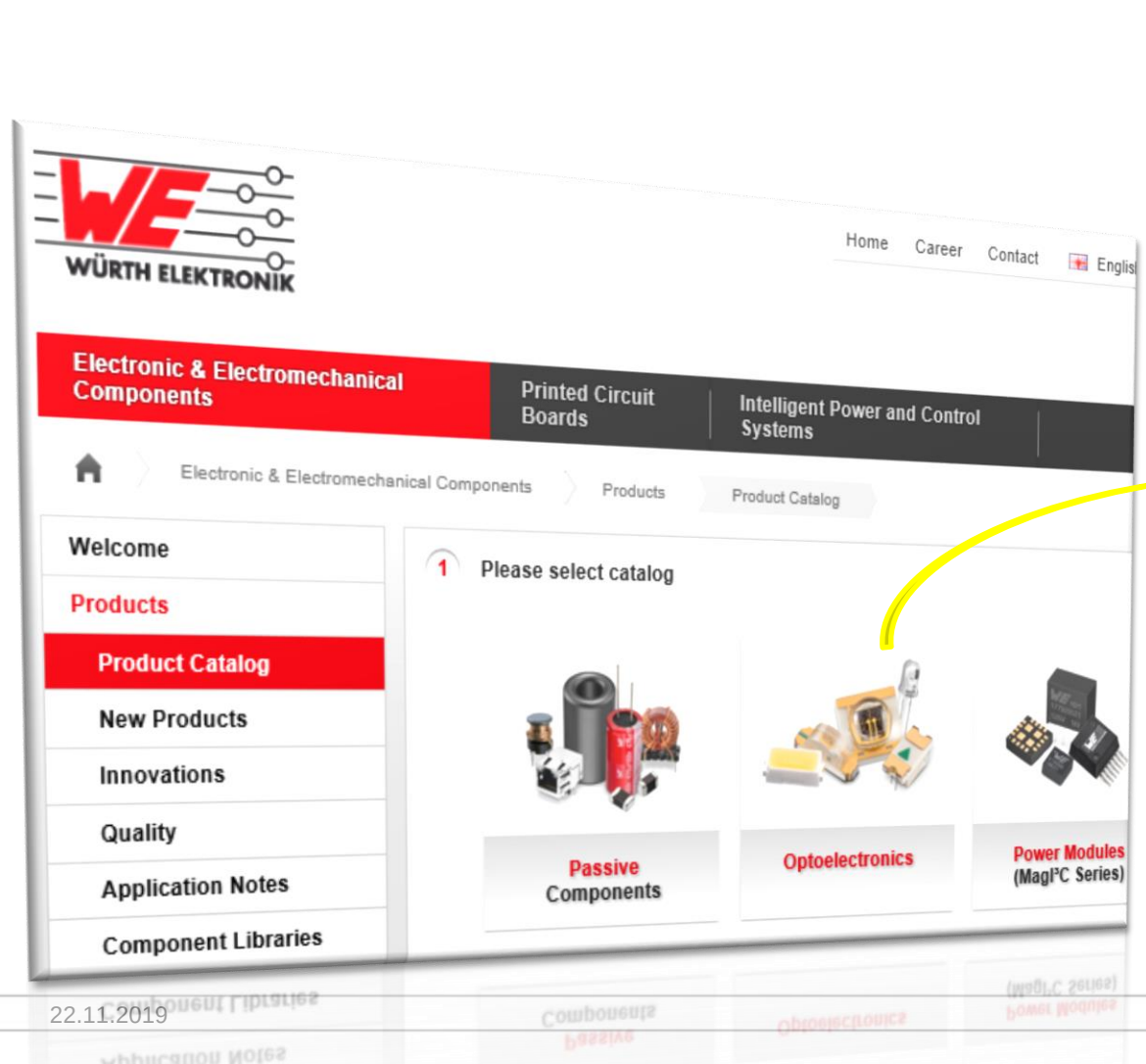
1206



3.2 x 1.6mm
Lens: 1.4 x 1.6mm
The hole for land pattern: Φ = 2.3mm

+ Perfect size for bi-color and RGB LED

E-Libraries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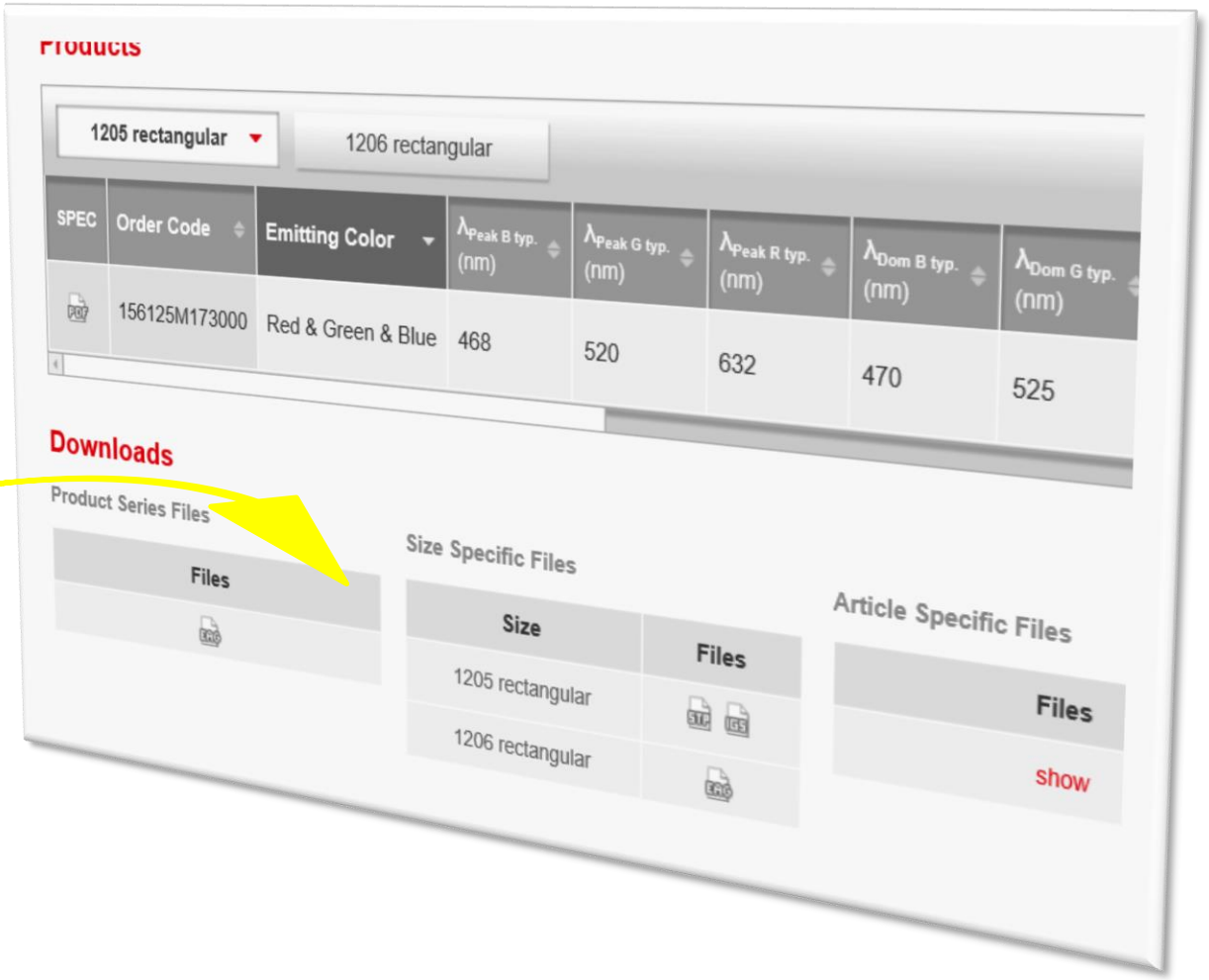
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Summary

- **WE welcomes you to the world of Visible Light**

- **Wide portfolio of reverse mount chip LED**
  - The standard footprints with the best solder ability
  - Available in mono-, bi-color and RGB
  - Available with waterclear and diffused lens
  - Variety of lens-form
- **A large field of applications**
  - The dome lens: for all applications, which required the small viewing angle
  - The cylindrical lens: best PCB usage for all applications which required the wide viewing angle
  - The rectangular lens: cost saving for all applications, which required both top view and reverse montage

- **For any questions – please contact your local sales**

Questions & Answers

We are here for you now!
Ask us your questions in the chat and we will answer them live.

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