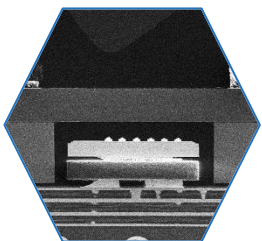
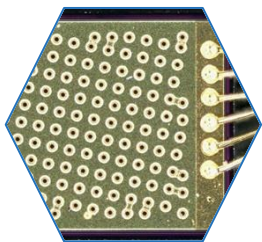


STMicroelectronics Proximity Sensor and Flood Illuminator

New time-of-flight and illumination device from the Apple iPhone 12.



Title:
STMicroelectronics Proximity Sensor and Flood Illuminator

Pages: 180

Date:
June 2021

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PDF & Excel file

Price:
EUR 3,990

Reference:
SPR21576

This full reverse costing study has been conducted to provide insights into technology data, the manufacturing cost and selling price of the STMicroelectronics Proximity Sensor and Flood Illuminator in the Apple iPhone 12.

Located in the front above the main speaker, the proximity sensor and flood illuminator use optical Land Grid Array (LGA) packaging. The device is a custom version for Apple, coming after STMicroelectronics also released a custom proximity sensor for the iPhone X. While being 15% smaller than the previous version overall, the new version's flood illuminator is twice as large. The sensor is still based on FlightSense™ technology.

The flood illuminator has a larger Vertical Cavity Surface Emitting Laser (VCSEL) die and VCSEL driver die. The diffuser is more sophisticated with a complexity close to a diffractive optical element.

To reduce the package size with larger components, STMicroelectronics has developed a 3D package with two stacked Printed Circuit Boards (PCBs). The 3D package manages the heat dissipation of the flood VCSEL thanks to a ceramic substrate, solder balls and PCB design.

This report analyzes the complete microsystem from the VCSEL illuminator of the proximity sensor manufactured by

Trumpf to the VCSEL of the flood illuminator manufactured by Lumentum. It also analyzes the two integrated circuits with VCSEL driver from Texas Instruments and the Single Photon Avalanche Diode (SPAD) developed by STMicroelectronics. It includes analyses of the package, the diffuser and the filters with optical and Scanning Electron Microscopy pictures and Energy Dispersive X-ray analyses of the main semiconductor components. The report also includes a complete cost analysis and price estimation of the device based on a detailed description of the package, the Time-of-Flight detector, and the two VCSELs.

The report features also a complete technology comparison with the proximity sensor from the Apple iPhone X.

COMPLETE TEARDOWN WITH

- Explanation of device operation
- Detailed optical and SEM photos
- Precise measurements
- Materials analysis
- Manufacturing process flow
- Supply chain evaluation
- Comparison between proximity sensor of iPhone 12 and iPhone X
- Manufacturing cost analysis
- Estimated sales price

TABLE OF CONTENTS

Overview / Introduction

Company Profile

- STMicroelectronics
- FlightSense™ Technology

Physical Analysis

- Summary of the Physical Analysis
- Package
 - ✓ Package view and dimensions
 - ✓ Package opening: overview, wire bonding, flood illuminator
 - ✓ Package cross-section: adhesives, ceramic substrate, PCB substrate diffuser, filters, FOV, heat sink
- VCSEL #1 & #2 Die
 - ✓ Die view and dimensions, overview and cavity, cross-section and process characteristic
- VCSEL Driver Die
 - ✓ Die view and dimensions, overview and marking, delayering and main block ID, cross-section and process characteristic

Comparison iPhone X and iPhone 12 Proximity Sensor

Manufacturing Process

- SPAD Detector Die Front-End Process and Fabrication Unit
- VCSEL Driver Die Front-End Process and Fabrication Unit
- VCSELS Die Front-End Process and Fabrication Unit
- OLGA Packaging Process and Fabrication Unit

Cost Analysis

- Summary of the Cost Analysis
- Yield Explanations and Hypotheses
- SPADs Detector and VCSEL Driver Die
 - ✓ Die front-end cost, wafer and die cost
- VCSEL Dies
 - ✓ Die front-end cost
 - ✓ Die front-end cost per process step
 - ✓ Die wafer and die cost
- Component Cost
- Proximity Sensor Selling Price

AUTHORS

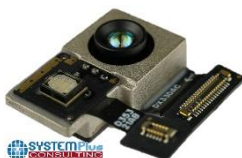


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RELATED REPORTS



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April 2021

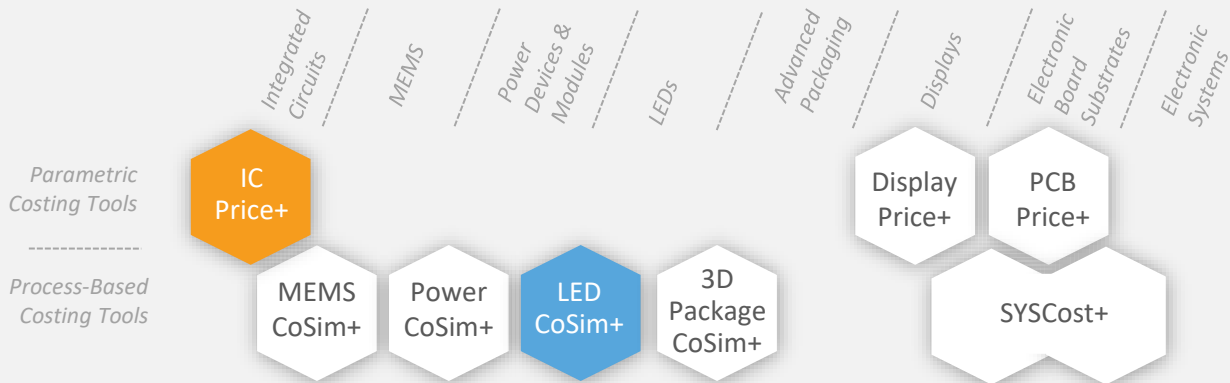


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COSTING TOOLS



Our analysis is performed with our costing tools LED CoSim+ and IC Price+.

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The process-based costing tool is used to evaluate the manufacturing cost per wafer using your own inputs or using the predefined parameters included in the tool. It is possible to enter any LED process flow.

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The tool performs the necessary cost simulation of any Integrated Circuit: ASICs, microcontrollers, DSP, memories, smartpower...

ABOUT SYSTEM PLUS CONSULTING

WHAT IS A REVERSE COSTING®?

Reverse Costing® is the process of disassembling a device (or a system) in order to identify its technology and calculate its manufacturing cost, using in-house models and tools.



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System Plus Consulting is specialized in the cost analysis of electronics from semiconductor devices to electronic systems. A complete range of services and costing tools to provide in-depth production cost studies and to estimate the objective selling price of a product is available.

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System Plus Consulting may change its prices whenever the company thinks it necessary. However, the company commits itself in invoicing at the prices in force on the date the order is placed.

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