



Camera Module Comparison 2021 Vol. 2 – Apple iPhone Evolution

Apple's camera design choices from the iPhone 6S Plus to the 12 Pro Max.

Over 1.3B smartphones shipped in 2020, and 15% of those were iPhones. Apple is widely considered an innovation leader, and iPhone cameras are consistently ranked among the best in the industry. Continuing our series of camera module comparison reports, we summarize the results of detailed physical analyses and costing studies to compare the cameras of the iPhone 6S Plus, 7 Plus, 8 Plus, X, XS Max, 11 Pro Max, and 12 Pro Max. This report aims to offer insight into the physical and cost evolution of the camera modules and CMOS image sensors in the last six years of Apple flagship smartphones.

The analysis covers the rear and front-facing RGB camera modules as well as the front-facing Near Infrared (NIR) module. This includes the complete structure, design, and all components of the camera modules. It covers the dimensions, technology nodes and stacking technology in the CMOS image sensors. The rear-facing LiDAR camera in the 12 Pro Max is not covered, but the reader is encouraged to discover the essentially identical LiDAR module in the related report SP20557 - Apple iPad Pro LiDAR Module.

Over the years, the rear camera has evolved with the market trend from a single to dual and finally a triple camera system. The front camera has also evolved

from a single camera to the dual-camera TrueDepth system. The overall design of the AutoFocus/Optical Image Stabilisation (AF/OIS) system has remained very consistent until the introduction of Sensor-shift OIS in the iPhone 12 Pro Max. See our dedicated report SPR21611 - Apple iPhone 12 Pro Max Rear Camera for a deep dive into this technology.

All rear sensors have 12 megapixels (Mp) despite the trend among other leading OEMs to go as high as 108 Mp. This has allowed Apple to sometimes retain image sensors between iPhone generations while improving camera performance from module upgrades and algorithm tweaks.

COMPLETE TEARDOWN WITH

- Detailed photos
- Precise measurements
- Module cross-sections
- Sensor cross-sections
- Sensor measurements
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Physical comparisons
- Cost and price comparisons

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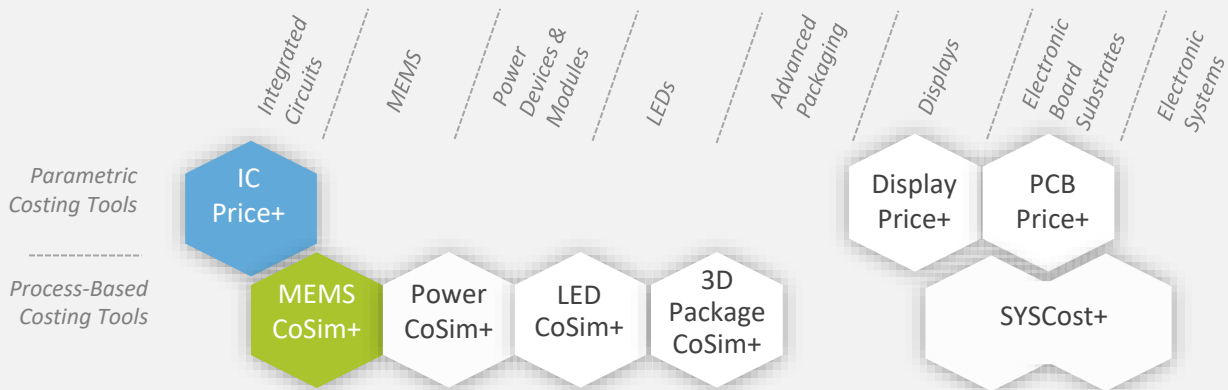


Industry for Consumer & Automotive 2020

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