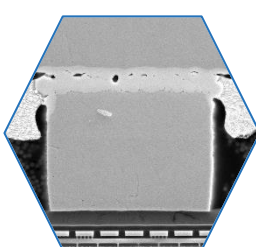


Qualcomm Snapdragon 888 System on Chip with 5G Modem

Deep dive analysis of Qualcomm’s SoC architecture using Samsung 5nm process technology.



Qualcomm has introduced its latest and most advanced system-on-chip (SoC), the Snapdragon 888, a powerful processor chip targeting flagship mobile phones. The Xiaomi Mi11 is the first smartphone to use the Snapdragon 888 5G Mobile Platform, and many others will follow. The Snapdragon 888 is the first SoC to integrate 5G modem functionality with processing cores rather than being a separate component.

Qualcomm switched its foundry supply back to Samsung for the Snapdragon 888 SoC. This device is the first Qualcomm product produced on the latest 5 nm process technology. The foundry shift by Qualcomm will continue the competition between Samsung and TSMC.

The 5 nm patterning process is advantageous for power efficiency, exceptional 5G multi gigabit speeds and improved battery life. The Snapdragon 888 architecture is complex, designed to cater to machine learning, image processing, gaming and 5G modem applications. Qualcomm claims that devices powered by the chip can capture multiple high resolution video streams simultaneously.

To reveal the details of Qualcomm’s SoC, this report includes a detailed physical analysis that reveals the SoC floorplan to understand the chip architecture and the IP block areas. Significant die area is devoted to the GPU, 5G Modem and machine learning core. The report includes

a complete construction analysis using SEM cross-sections, material analyses and delayering. Also, a front-end of line analysis uses high-resolution TEM images to provide detail of the channel structure and materials. For the 5nm technology generation, the channel material is critical and a switch to a high mobility channel for the PMOS finFETs is underway for all wafer foundries. The back-end analysis uses CT scan 3D X-Ray to reveal the layout structure of the package including an external LPDDR5 memory package that is attached over the Snapdragon 888 package. The cost estimation includes the SoC front end process, packaging, and the component cost.

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COMPLETE TEARDOWN WITH

- Detailed photos
- Die floor plan analysis
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Don Scansen has partnered with System Plus Consulting to launch the new die architecture & front-end process analysis of advanced SoC devices including APU, CPU, GPU, and FPGA. He holds a PhD in electrical engineering.



Véronique Le Troadec has joined System Plus Consulting as a laboratory engineer. Coming from Atmel Nantes, she has extensive knowledge in failure analysis of components and in deprocessing of integrated circuits.

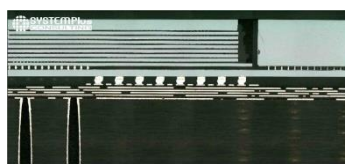
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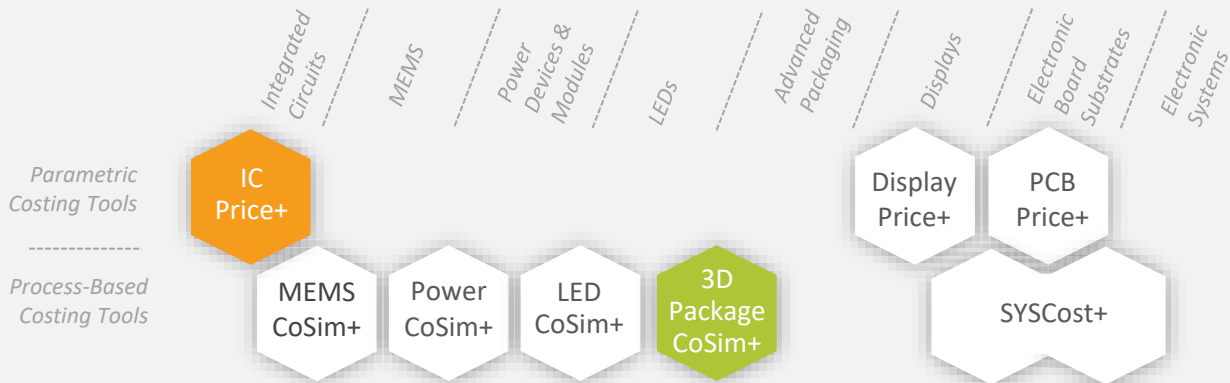


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