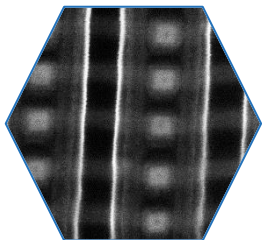
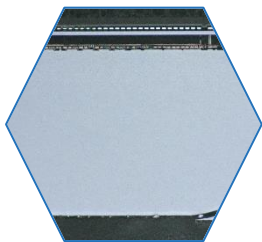


YMTC's 3D-NAND Flash Memory

Technology and cost analysis of YMTC's 64-layer 3D NAND with hybrid bonding.



NAND market revenue improved in the first quarter of 2020 due to the global lockdown, triggered by the COVID-19 pandemic compared to the previous quarter in 2019. Stronger storage demand was driven by increased remote work and online learning, which created a sudden demand for datacenter storage and PC solid state drives. This transition increased sales of NAND Flash memory. Yangtze Memory Technologies Co (YMTC) is expected to up pick a significant share of NAND market revenue.

YMTC launched the new 3D NAND Xtacking architecture that uses two wafers for its 64-layer 3D NAND memory instead of a single wafer used in conventional 3D NAND memories. The CMOS periphery and the NAND array wafer are manufactured separately. The wafers are connected by vertical interconnection. The bonding technique needs a high level of accuracy and alignment precision to perfectly join the metal layers from different wafers. This Xtacking process allows YMTC to increase its die density.

YMTC's memory enters the NAND flash market as a solution to cater for higher I/O (Input/Output) speed because of the use of advanced CMOS that can be manufactured on a different wafer from the NAND array. This memory provides the combination of high speed and large density characteristics.

Based on complete teardown analysis of the 3D NAND memory, this report will

provide the fabrication steps of YMTC's latest 64-layer NAND dies, the physical analysis will reveal the Xtacking architecture adopted by YMTC. A complete physical analysis will determine the die density, including the manufacturing process and cost estimation. The report also includes the impact of using two wafers on the NAND density and total manufacturing cost.

The manufacturing cost results are used to determine the cost per Gb for YMTC's 3D NAND memory.

Finally, this report features a technical comparison of YMTC's 64-layer NAND with the other 64-layer NAND memories from main NAND manufacturers like Samsung, Kioxia and Micron. This helps to compare the YMTC cell features and note the similarities and differences from other 64-layer NAND.

Title: YMTC 3D-NAND Flash Memory

Pages: 100

Date: July 2020

Format: PDF & Excel file

Price: EUR 3,990

Reference: SP20562

COMPLETE TEARDOWN WITH

- Detailed photos
- Precise measurements
- Materials analysis
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Estimated sales price

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AUTHORS



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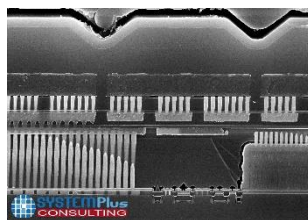
Véronique Le Troadec has joined System Plus Consulting as a laboratory engineer. Coming from Atmel Nantes, she has extensive knowledge in failure analysis of components and in deprocessing of integrated circuits.

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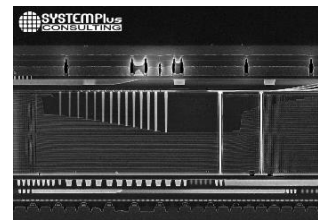
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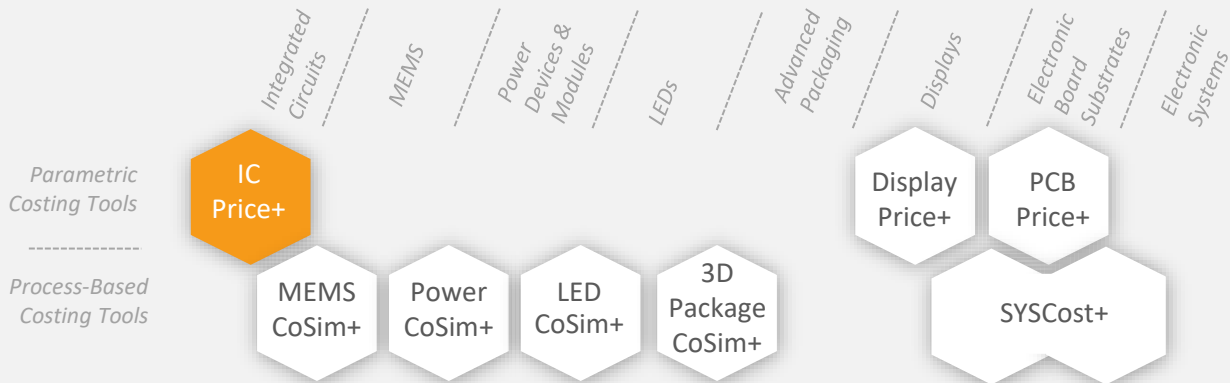
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COSTING TOOLS



Our analysis is performed with our costing tool IC Price+.

System Plus Consulting offers powerful costing tools to evaluate any process or device, the production cost and selling price, from single chip to complex structures. All these tools are on sale under corporate license.

IC Price+

The tool performs the necessary cost simulation of any Integrated Circuit: ASICs, microcontrollers, memories, DSP, 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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The present terms and conditions apply to the offers, sales and deliveries of services managed by System Plus Consulting except in the case of a particular written agreement.

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Prices of the purchased services are those which are in force on the date the order is placed. Prices are in Euros and worked out without taxes. Consequently, the taxes and possible added costs agreed when the order is placed will be charged on these initial prices.

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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System Plus Consulting delivered services are to be paid within 30 days end of month by bank transfer except in the case of a particular written agreement.

If the payment does not reach System Plus Consulting on the deadline, the Buyer has to pay System Plus Consulting a penalty for late payment the amount of which is three times the legal interest rate. The legal interest rate is the current one on the delivery date. This penalty is worked out on the unpaid invoice amount, starting from the invoice deadline. This penalty is sent without previous notice.

When payment terms are over 30 days end of month, the Buyer has to pay a deposit which amount is 10% of the total invoice amount when placing his order.

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System Plus Consulting remains sole owner of the delivered services until total payment of the invoice.

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