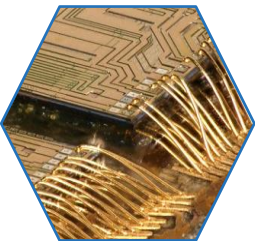
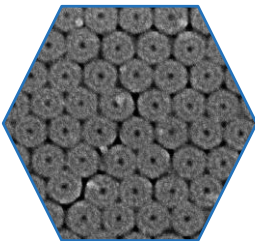
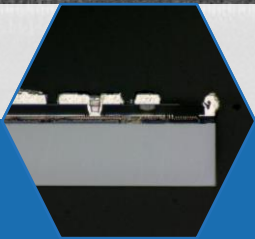


## Micron LPDDR5 12GB Mobile Memory

*Physical and cost analysis of Micron's fifth-generation low-power DRAM memory.*



**Title:** Micron LPDDR5 12GB Mobile Memory

**Pages:** 95

**Date:** Octobre 2020

**Format:** PDF & Excel file

**Price:** EUR 3,990

**Reference:** SP20566

Last year, Micron had the third largest share in the DRAM market after Samsung and SK Hynix. This year, Micron recently announced a high FQ4-20 revenue driven by high DRAM shipments in the second half of the year. This revenue increase will sustain Micron's competitiveness and leadership in the DRAM market.

Mobile computing content is rising sharply, creating higher demand in mobile memory solutions. Manufacturers of DRAM memory are positioning themselves to meet the aggressive demand of high-speed processing memories and power-efficient memories with higher capacity, through constant innovation in their DRAM manufacturing process. The increasing demand for memory storage continues to be driven by trends like artificial intelligence, 5G applications, and the Internet of Things (IoT).

Micron's LPDDR5 memory is characterized by its higher power efficiency (20% less power compared to the previous-generation low-power DRAM) and faster data processing (at peak speeds of up to 6.4Gbps), compared to previous low-power DRAM.

The increase in the area occupied by transistors on the DRAM die results in a significant area reduction of the capacitors on the DRAM die. Thus, DRAM manufacturers are decreasing the

dimension of the capacitors, including the process technology used in DRAM manufacture. This scaling decrease aims to meet the capacity demand but increases manufacturing complexity.

This report constitutes an exhaustive analysis of Micron's LPDDR5 memory dies, including a full review of the ultra-thin DRAM package. This report also includes high-resolution images of the die and focuses on the capacitor dimension and word line structures. The physical analysis and process are used to estimate the manufacturing steps in order to estimate the low-power DRAM wafer cost and die cost. Also included in this report is a comparison between Micron's previous generation of low-power DRAM LPDDR4X and the LPDDR5. The die size, density, and physical features are compared, with a focus on the physical characteristics and the manufacturing process differences.

### COMPLETE TEARDOWN WITH

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

## TABLE OF CONTENTS

### Overview/Introduction

- Executive Summary
- Reverse Costing Methodology

### Company Profile

- Micron Financial Results
- Micron Products & LPDDR5

### Technology & Market

- DRAM Revenue & Market Share
- DRAM Mobile Market Share
- DRAM Shipments

### Physical Analysis

- Synthesis of the Physical Analysis
- Physical Analysis Methodology
- Motorola Edge+ Teardown
- Package
  - ✓ Package views, dimensions and opening
- Memory Die
  - ✓ View, dimensions and marking
  - ✓ Die cross-section and die delayering
- Micron DRAM Patents

### Comparison

- Micron's LPDDR4X vs Micron's LPDDR5

### Manufacturing Process Flow

- Global Overview
- Wafer Fabrication Unit and Front-End Process

### Cost Analysis

- Synthesis of the Cost Analysis
- Yield Explanations and Hypotheses
- LPDDR5 DRAM
  - ✓ Memory front-end cost
  - ✓ Memory front-end cost per process step
- Component
  - ✓ Front-end cost
  - ✓ Memory wafer and die cost
  - ✓ Back-end: Final test cost
  - ✓ LPDDR5 component cost

### Estimated Price and Gross Margin Analysis

## AUTHORS

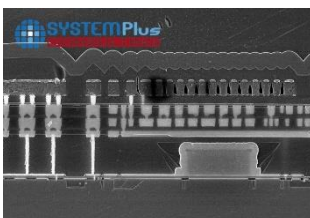


**Belinda Dube** is working for System Plus Consulting as an Engineer & Analyst, Semiconductor Memories. Belinda is also engaged in the development of reverse engineering & costing analyses. With an expertise focused on Micro & Nano Electronics, Belinda graduated from INSA (Lyon, France) with a master degree in Instrumentation & Nanotechnology 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.

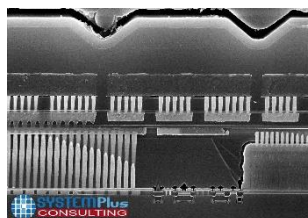
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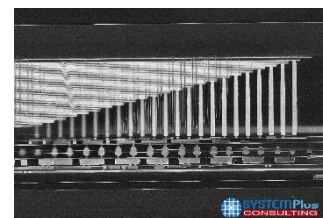
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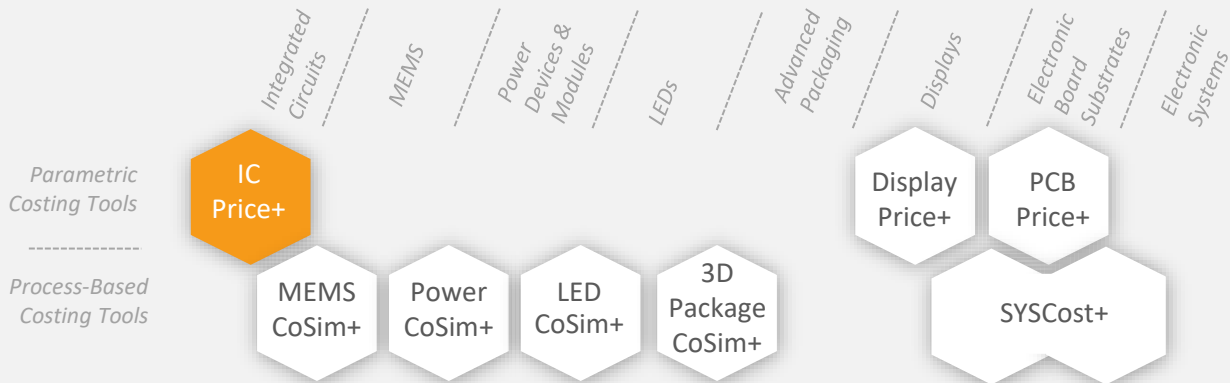


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## COSTING TOOLS



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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# TERMS AND CONDITIONS OF SALES

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## 1. INTRODUCTION

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.

Buyer must note that placing an order means an agreement without any restriction with these terms and conditions.

## 2. PRICES

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.

## 3. REBATES and DISCOUNTS

The quoted prices already include the rebates and discounts that System Plus Consulting could have granted according to the number of orders placed by the Buyer, or other specific conditions. No discount is granted in case of early payment.

## 4. TERMS OF PAYMENT

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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## 8. FORCE MAJEURE

System Plus Consulting responsibility will not be involved in non execution or late delivery of one of its duties described in the current terms and conditions if these are the result of a force majeure case. Therefore, the force majeure includes all external event unpredictable and irresistible as defined by the article 1148 of the French Code Civil?

## 9. CONFIDENTIALITY

As a rule, all information handed by customers to system Plus Consulting are considered as strictly confidential.

A non-disclosure agreement can be signed on demand.

## 10. RESPONSABILITY LIMITATION

The Buyer is responsible for the use and interpretations he makes of the reports delivered by System Plus Consulting. Consequently, System Plus Consulting responsibility can in no case be called into question for any direct or indirect damage, financial or otherwise, that may result from the use of the results of our analysis or results obtained using one of our costing tools.

## 11. APPLICABLE LAW

Any dispute that may arise about the interpretation or execution of the current terms and conditions shall be resolved applying the French law.

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