

STMicroelectronics LSM9DS0 9-Axis MEMS IMU

REVERSE COSTING ANALYSIS – DECEMBER 2013

*The smallest 9-Axis MEMS IMU from ST for Consumer Applications
Combines 3-Axis Gyroscope, 3-Axis Accelerometer and 3-Axis Magnetometer*

With a market share of more than 40%, STMicroelectronics leads the market of inertial sensors for consumer applications.

The LSM9DS0 is a 4x4mm system-in-package featuring a 3-axis gyroscope, a 3-axis accelerometer and a 3-axis magnetometer.

STMicroelectronics achieves this package footprint by integrating the 3-axis gyroscope and the 3-axis accelerometer functions on the same die. This new structure, combined with new designs for the gyroscope and the accelerometer allows ST to shrink the 6-axis function by more than 30%.

This report provides a complete teardown of the MEMS IMU with:

- Detailed photos
- Material analysis
- Schematic assembly description
- Manufacturing Process Flow
- In-depth manufacturing cost analysis
- Selling price estimation

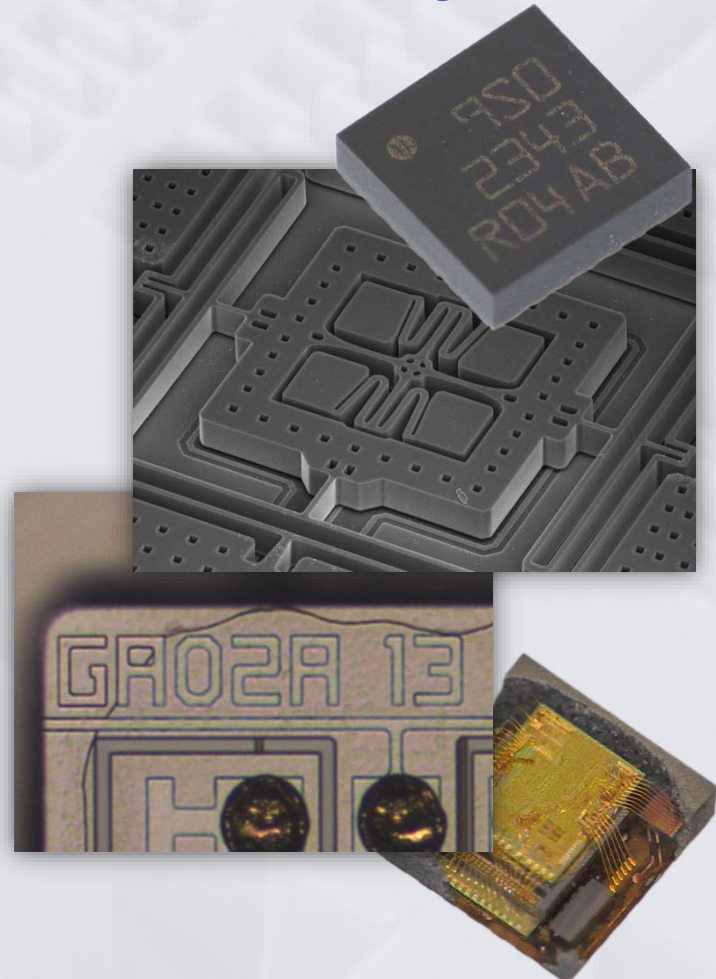


TABLE OF CONTENTS (~200 pages)

Introduction, STMicroelectronics Company Profile

Physical Analysis

- Package
 - ✓ Package Views, Dimensions & Pin Out
 - ✓ Package Opening
 - ✓ Wire Bonding Process
 - ✓ Package Cross-Section
- ASIC Dies
 - ✓ View, Dimensions & Marking
 - ✓ Delayering
 - ✓ Main Blocks Identification
 - ✓ Cross-Section
- MEMS Gyro/Accelero Die
 - ✓ View, Dimensions & Marking
 - ✓ Bond Pad Opening & Bond Pad
 - ✓ Cap Removed & Cap Details
 - ✓ Sensing Area Details
 - ✓ Cross-Section (Sensor, Cap & Bonding)
- X/Y-Axis Magnetometer die
 - ✓ View, Dimensions & Marking
 - ✓ Delayering
 - ✓ Cross-Section
- Z-Axis Magnetometer die
 - ✓ View, Dimensions & Marking
 - ✓ Delayering
 - ✓ Cross-Section

Manufacturing Process Flow

- ASICs Front-End & RDL Process
- ASIC Wafer Fabrication Unit
- MEMS Gyro/Accelero Process Flow
- MEMS Wafer Fabrication Unit
- Magnetometer Process Flow
- Magnetometer Wafer Fabrication Unit
- Packaging Process Flow
- Package Assembly Unit

Cost Analysis

- Main steps of economic analysis
- Yields Hypotheses
- ASICs Front-End Cost
- ASICs Back-End 0 : RDL, Probe Test & Dicing
- ASICs Wafer & Die Cost
- MEMS Gyro/Accelero Front-End Cost
- MEMS Gyro/Accelero Back-End 0 : Probe Test & Dicing
- MEMS Gyro/Accelero Wafer & Die Cost
- Magnetometer Front-End Cost
- Magnetometer Back-End 0 : Probe Test & Dicing
- X/Y-Axis & Z-Axis Magnetometer Wafer & Die Cost
- Back-End : Packaging Cost
- Back-End : Final Test & Calibration Cost
- LSM9DS0 Component Cost

Estimated Price Analysis

Distributed by



Performed by



ORDER FORM

Please process my order for "ST LSM9DS0 MEMS IMU" Reverse Costing Analysis:

Ref.: SP13153

Multi-User License Price: EURO 2,990*

*For price in dollars please use the day's exchange rate

*All reports are delivered electronically in pdf format

*For French customer, add 20 % for VAT

SHIP TO

Name (Mr/Ms/Dr/Pr):

.....

Job Title:

.....

Company:

.....

Address:

.....

City:

State:

.....

Postcode/Zip:

.....

Country*:

.....

*VAT ID Number for EU members:

.....

Tel:

.....

Email:

.....

Date:

.....

Signature :

.....

BILLING CONTACT

Name:

Email:

Phone:

ABOUT SYSTEM PLUS CONSULTING

System Plus Consulting specializes in the **cost analysis** of electronics, from **semiconductor devices** to **electronic systems**, and has developed 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.

COSTING SERVICES

- ✓ **On demand Reverse Costing studies** are performed on ICs, ASICs, MEMs, Power Devices, ECUs, electronic boards and full electronic systems.
- ✓ **The catalog of available reports** includes cost analyzes on MEMS, LEDs, Modules and Electronic systems.

All these analyses are performed using in-house developed, proprietary costing tools and their technological databases.

COSTING TOOLS

« Purchaser » tools

- ✓ IC Price+ to estimate the cost of any integrated circuit
- ✓ Power Price+ for any power component or module
- ✓ SYS.Cost

- ✓ PCB Price+ for printed circuit boards
- for electronic boards and systems

Cost Simulation Tools, process flow based

- ✓ MEMS CoSim+
- ✓ LED CoSim+
- ✓ Power CoSim+
- ✓ TSV CoSim+ (thru silicon vias)
- ✓ Sapphire CoSim+

Other costing models can be developed according to customer specifications

PAYMENT

DELIVERY on receipt of payment:

By credit card:

Number: _____ Expiration date: ___/___

Card Verification Value: _____



By bank transfer:

HSBC – CAE- Le Terminal -2 rue du Charron- 44800 St Herblain France
BIC code : CCFRFRPP

In EUR

Bank code : 30056 - Branch code : 00955 - Account : 09550003234
IBAN : FR76 3005 6009 5509 5500 0323 439

In USD

Bank code : 30056 - Branch code : 00955 - Account : 09550003247
IBAN : FR76 3005 6009 5509 5500 0324 797

Return order by:

FAX: +33 (0)253 55 10 59

MAIL: SYSTEM PLUS CONSULTING

21 rue La Nouë Bras de Fer

44200 Nantes – France

Contact:

sales@systemplus.fr - Tel: +33 (0)240 18 09 16

Our prices are subject to change.

Please check our new releases and price changes on www.systemplus.fr

Distributed by



Performed by



TERMS AND CONDITIONS OF SALES

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.

5. OWNERSHIP

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

6. DELIVERIES

The delivery schedule on the purchase order is given for information only and cannot be strictly guaranteed. Consequently any reasonable delay in the delivery of services will not allow the buyer to claim for damages or to cancel the order.

7. ENTRUSTED GOODS SHIPMENT

The transport costs and risks are fully born by the Buyer. Should the customer wish to ensure the goods against lost or damage on the base of their real value, he must imperatively point it out to System Plus Consulting when the shipment takes place. Without any specific requirement, insurance terms for the return of goods will be the carrier current ones (reimbursement based on good weight instead of the real value).

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.

If the dispute cannot be settled out-of-court, the competent Court will be the Tribunal de Commerce de Nantes.