

Freescale MPXY8300A - MEMS TPMS

Reverse Costing Analysis

by System Plus Consulting

July 2009

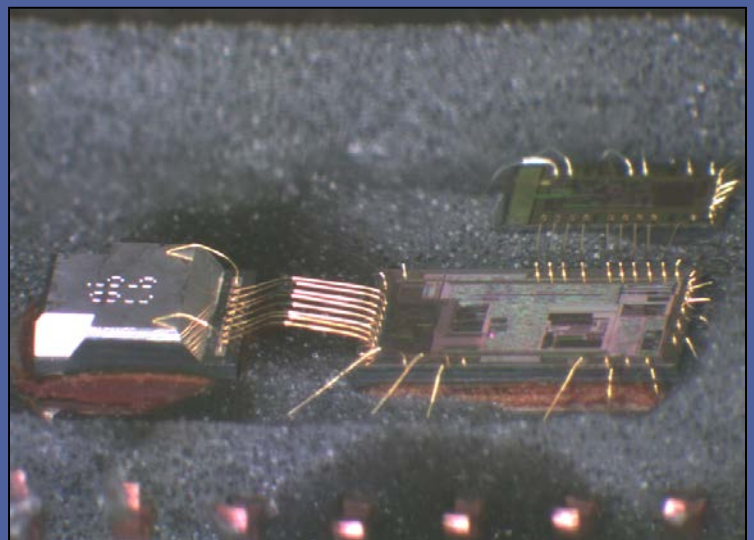
- Analyze the cost of projects at the R&D level
- Enhance the negotiation power of purchasing managers
- Benchmark competitor's products

System Plus Consulting is proud to publish the reverse costing report of the MEMS Tire Pressure Monitoring System (TPMS) MPXY8300A supplied by Freescale Semiconductor. Based on a complete teardown process the report provides an estimation of the production cost as well as the selling price of the circuit.

This Freescale MPXY8300A TPMS component is used in cars, trucks or buses to detect under-inflated or over-inflated tires. It uses a Multi-Chip Package containing 4 separate dies : 2 capacitive MEMS devices (pressure sensor, 2-axis accelerometer with X and Z axis) and 2 Integrated Circuits (8-bit microcontroller, radio frequency transmitter).

This report provides complete teardown and cost estimation of the component with :

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



July 2009

Freescale MPXY8300A - MEMS TPMS

Reverse Costing Analysis

by System Plus Consulting

TABLE OF CONTENTS 1/2

Glossary

Overview/Introduction

p4

- Executive Summary
- Reverse Costing Methodology

Freescale Company Profile

p8

Physical Analysis

p12

- Synthesis of the physical analysis
- Physical analysis methodology
- Tire Pressure Monitoring System (TPMS)
- Multi-Chip Package
- Package characteristics & markings
- Package opening – Bondings Number
- Package opening – Encapsulation
- MCU markings
- MCU dimensions
- MCU minimal dimension and metal layers
- MCU process characteristics
- RFX markings
- RFX dimensions
- RFX minimal dimension and metal layers
- RFX process characteristics
- G-die markings & dimensions
- G-die : cap opening
- G-die : sensors dimensions
- G-die : x-axis structure
- G-die : x-axis process characteristics
- G-die : z-axis structure
- G-die : z-axis process characteristics
- G-die process characteristics
- P-die markings
- P-die dimensions
- P-die minimal dimension and metal layers
- P-die : sensors dimensions
- P-die : “Sense” sensor process characteristics
- P-die : “Reference” sensor process characteristics
- P-die process characteristics

Multi-Chip Package

The MPXY8300A package contain 4 dies :

- >Microcontroller (MCU)
- >Pressure Sensor (P-die)
- >RF Transmitter (RFX)
- >Accelerometer (G-die)

From left to right:

1. Bottom of leadframe : MCU + RFX + G-die
2. Top of leadframe : P-die
3. SOIC-20 Package

Package Opening – Bondings number

Bondings:

- number: ■■
- material: Au

Bonding between :

- MCU & Accelerometer : ■■
- MCU & RFX : ■■
- MCU & Leadframe : ■■
- RFX & Leadframe : ■■
- P-die & Leadframe : ■■
- G-die & G-die : ■■

P-die : Sensors Dimensions

G-die : Sensors Dimensions

Sensors view after Cap opening

X-axis Sensor

Z-axis Sensor

Freescale MPXY8300A - MEMS TPMS

Reverse Costing Analysis

by System Plus Consulting

TABLE OF CONTENTS 2/2

Manufacturing Process Flow

p56

- Overview
- MCU process flow
- RFX process flow
- G-die process flow : sensor wafer
- G-die process flow : cap wafer
- P-die process flow : ASIC
- P-die process flow : Sensor
- Description of the Wafer Fabrication Units

Cost Analysis

p68

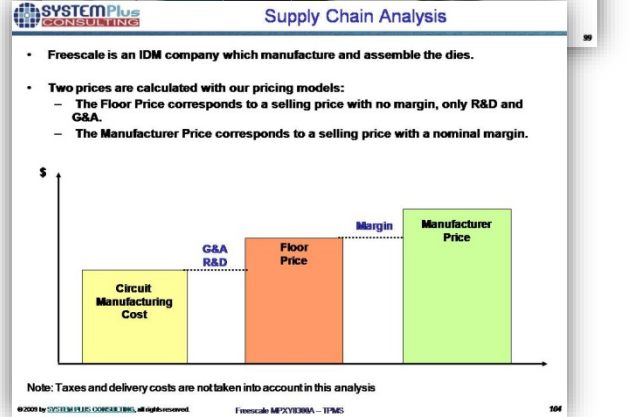
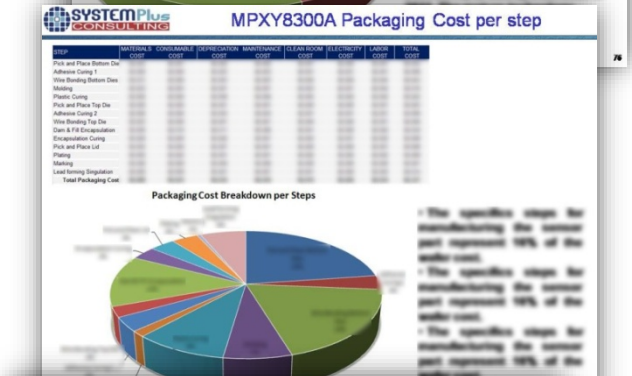
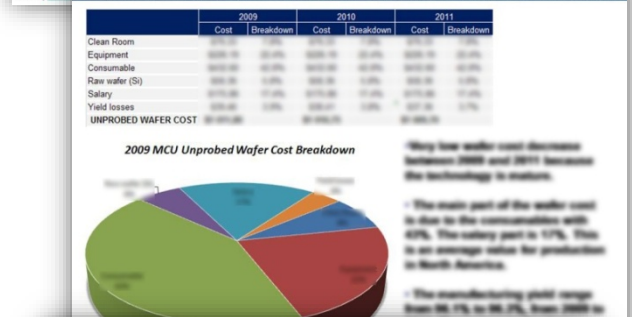
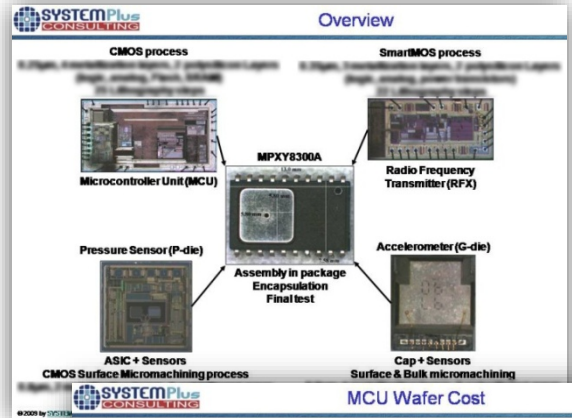
- Synthesis of the cost analysis
- Main steps of economic analysis
- Yields explanation
- MCU wafer cost
- MCU probe & dicing cost
- MCU die Cost
- RFX wafer cost
- RFX probe & dicing cost
- RFX die cost
- G-die wafer cost
- G-die wafer cost per step
- G-die probe & dicing cost
- G-die die cost
- P-die wafer cost
- P-die wafer cost per step
- P-die probe & dicing cost
- P-die die cost
- MPXY8300A packaging cost
- MPXY8300A final test cost
- MPXY8300A component manufacturing Cost
- Yield synthesis

Estimated Manufacturer Price Analysis

p100

- Supply Chain Analysis
- Manufacturer ratios
- Estimated manufacturer Price

Conclusion



ORDER FORM

Please enter my order for Freescale MPXY8300A TPMS Device Teardown and Reverse Costing Analysis by System Plus Consulting: SP09018

SP09018

Corporate user license price:

EUR 1990*

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

*For French customer, add 20% for VAT

Name (Mr/Ms/Dr/Pr):	
Title:	
Organization:	
Address:	
City:	State:
Postcode/Zip:	
Country*:	
*VAT ID Number for EU members:	
Tel:	
Email:	
Date:	
Signature :	

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 Noue Bras de Fer
44200 Nantes – France

Contact:

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

About System Plus Consulting

System Plus Consulting provides :

- on demand studies of Integrated Circuits (from Single Chip to MEMS and MultiChip Modules) and Electronic boards and systems ;
- training courses on the cost construction of integrated circuits an electronic boards, consulting services for cost improvement.

System Plus Consulting performs reverse costing analyses of

- Integrated circuits Electronic boards
- MEMS Electronic systems
- System In Package (SiP) Smartcards

For the R&D, Advanced Costing, Sourcing and Purchasing departments.

System Plus Consulting **catalog of available reports** includes a growing number of electronic applications.

System Plus Consulting provides Excel™ based costing tools specialized in a specific field of electronics :

The "System on Chip.XL" module : to calculate the die area and cost of a specific MCU or ASIC.

The "System in Package.XL" module : to calculate the cost of a multi chip module.

The "Assembly.XL" module: to calculate the added value of electronic boards..

The "Smart Card module.XL": to calculate the assembly cost of the chip in module, in-lay, and complete smart card.

NEW : MEMS-Cost simulation tool : the specific and flexible tool designed to work out the cost estimations the MEMS Community needs !

System Plus Consulting is the sole and unique European company offering such in-depth cost analysis of electronic products.

Our prices are subject to change. Please check our new releases and price changes on www.systemplus.fr. The present document is valid 3 months after its publishing date: 1 January 2012.