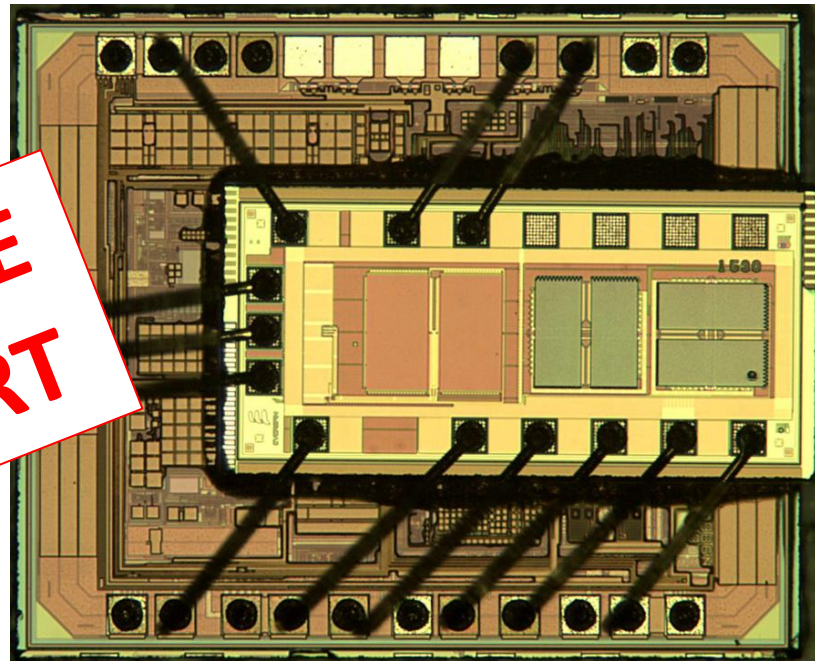


Reverse Costing analysis

**SAMPLE
REPORT**



Freescale MAG3110 3-Axis Electronic Compass

May 2012 – Version 1

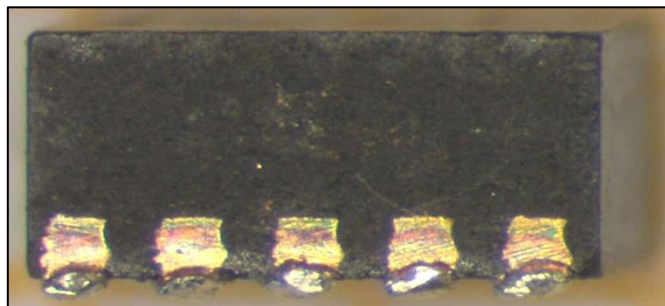
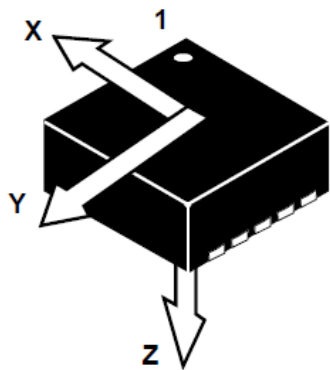
Written by: Romain FRAUX

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- **This full reverse costing study has been conducted to provide insight on technology data, manufacturing cost and selling price of the Freescale MAG3110 component.**
- **The MAG3110 is a 3-Axis digital magnetometer using Magnetic Tunnel Junction (MTJ) principle.**
- **The MAG3110 is suitable for various applications including Electronic Compass, Dead-reckoning assistance for GPS backup and Location-based Services.**
- **Compatible with SMD process, the MAG3110 is provided in a standard 2.00x2.00x0.85mm DFN 10-pin package.**

- Package type: **10-pin DFN**
- Dimensions: **2.00mm x 2.00mm x 0.85mm**
- Marking:
MXL
215



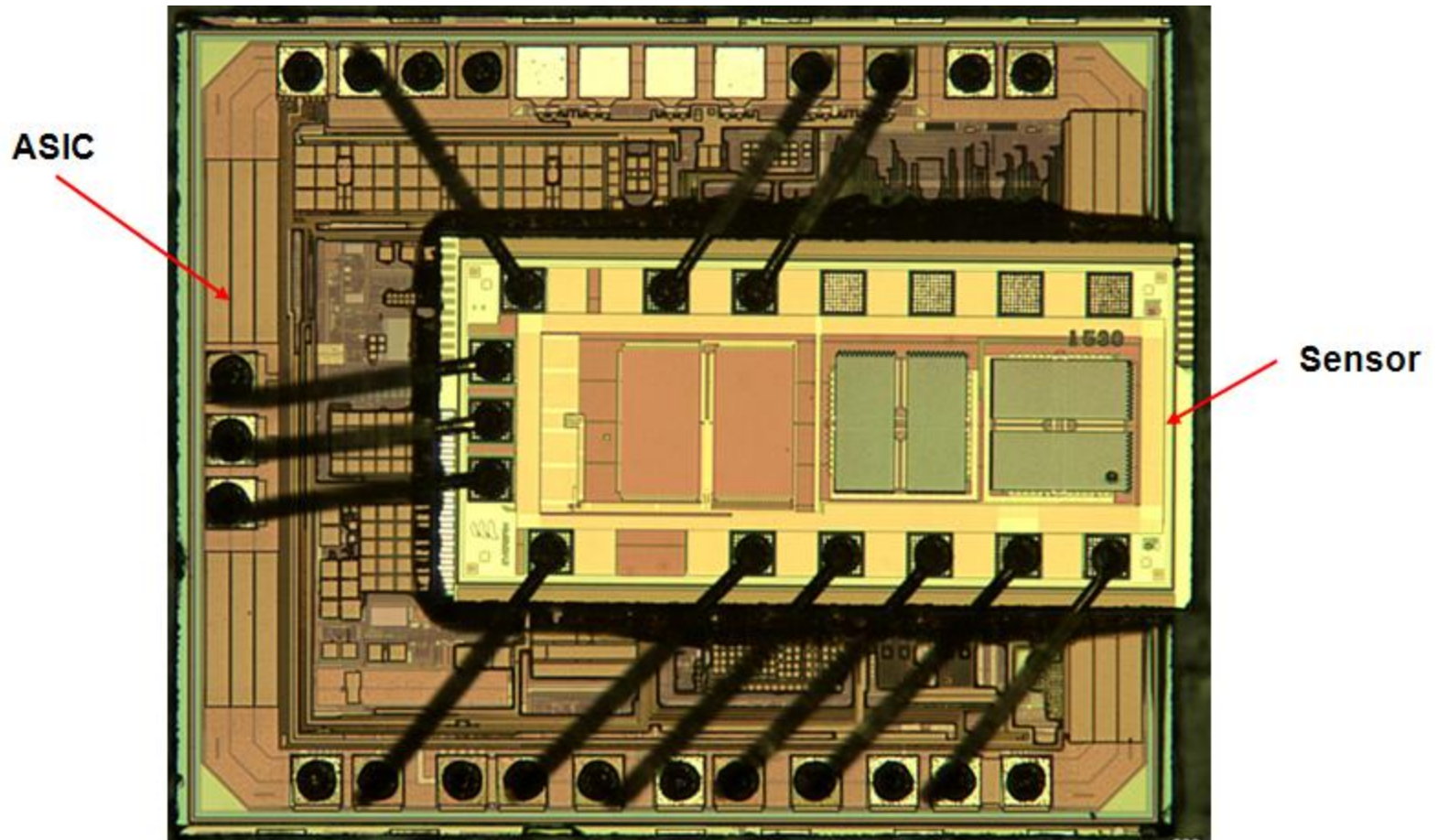
Package side view



Package Top view



Package back view

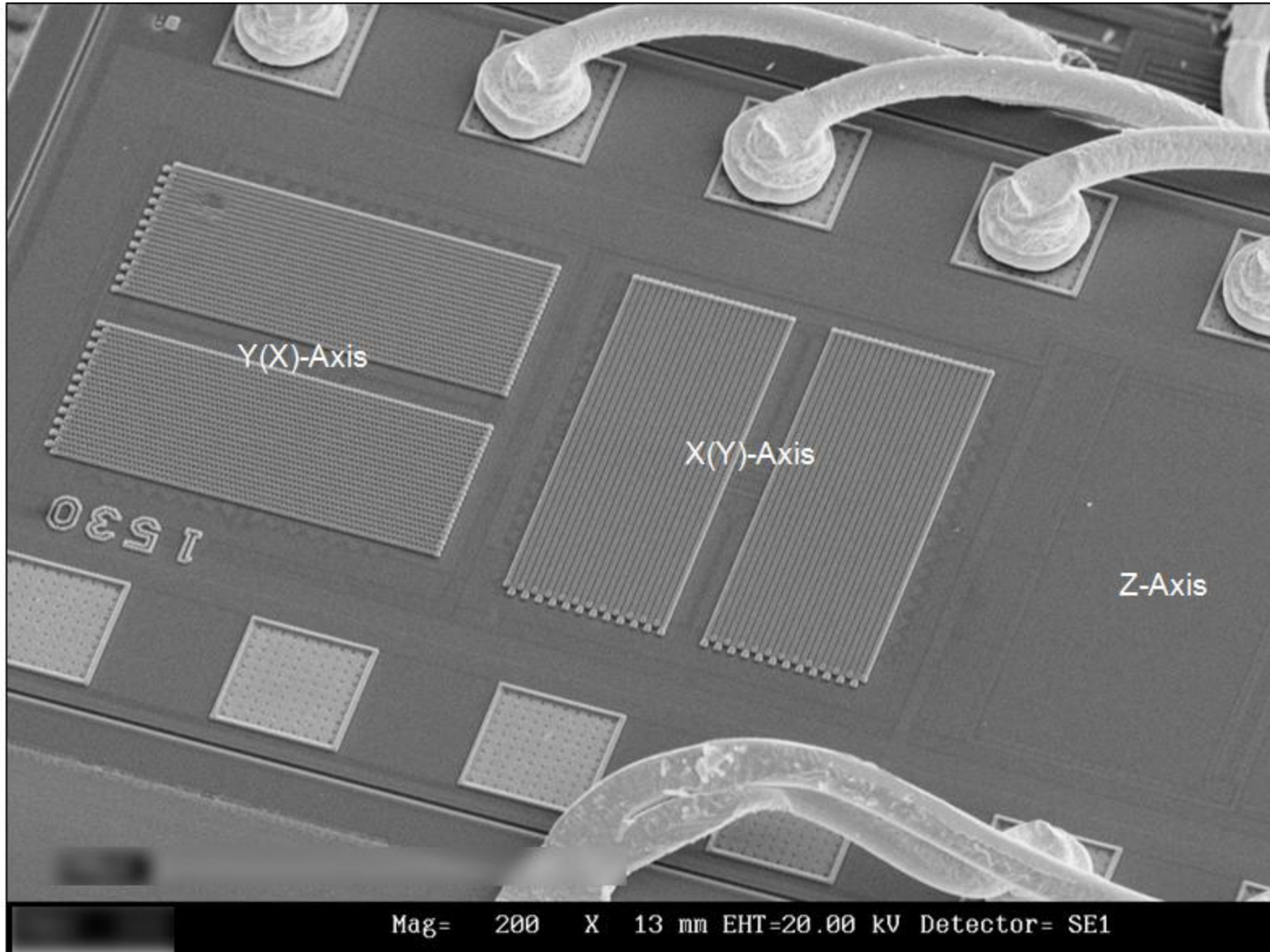


Package Opening – Optical view

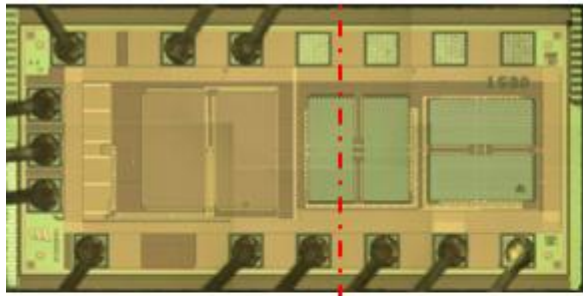
Bonding material:
Bonding diameter:

Bonding number: 22

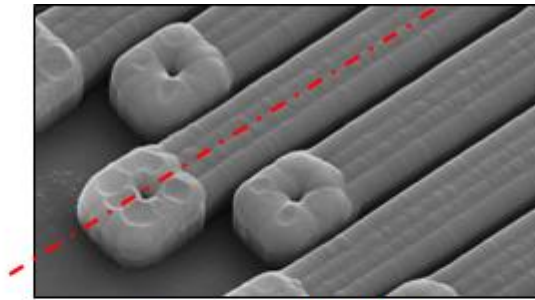
- ✓ Between ASIC & Package: 10
- ✓ Between ASIC & Sensor: 12



Sensor Overview – SEM view



Cross-section plane



Cross-section plane

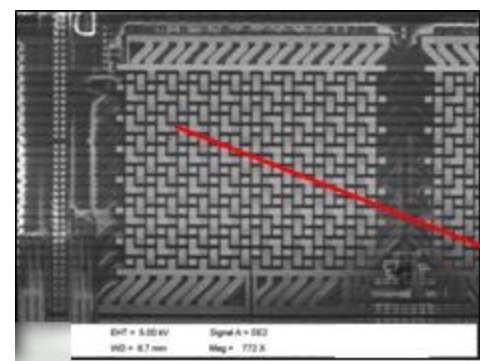
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Pictures are blurred for sample report



Mag= 5.00 K X 9 mm EHT=20.00 kV Detector= SE1

Sensor Metal Layers

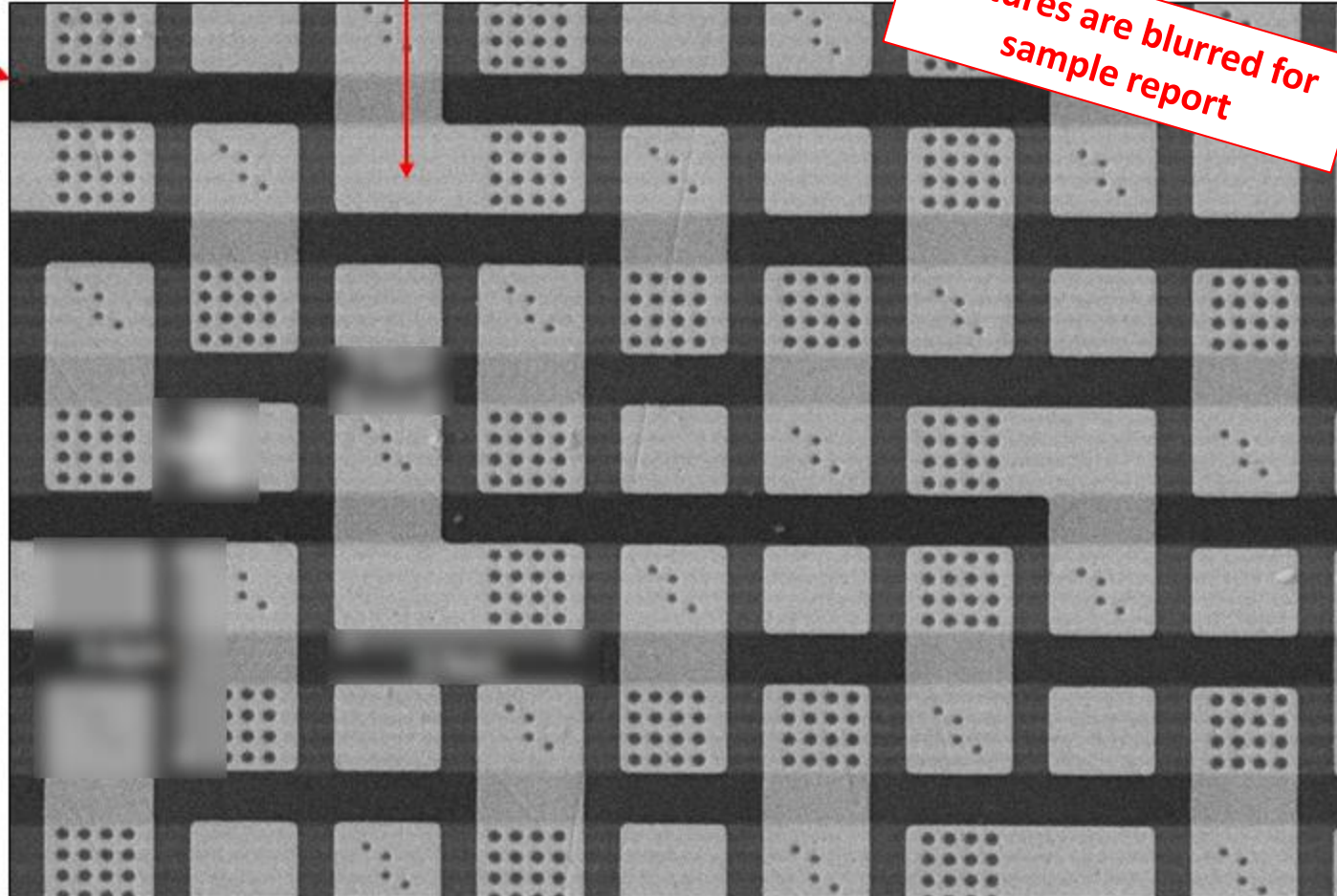


Sensor Overview

Top electrode



Pictures are blurred for sample report



EHT = 5.00 kV Signal A = SE2
WD = 6.7 mm Mag = 3.66 K X

X(Y)-Axis Top Electrode View – SEM View

	Low Yield		Medium Yield		High Yield	
	Cost	Breakdown	Cost	Breakdown	Cost	Breakdown
Front-End Cost						
BE 0 : Probe Test						
BE 0 : Backgrinding						
BE 0 : Backgrinding yield losses						
BE 0 : Dicing Cost						
ASIC Wafer Cost						
Nb of potential dies per wafer						
Nb of good dies per wafer						
Front-End Cost						
BE 0 : Probe Test Cost						
BE 0 : Backgrinding Cost						
BE 0 : Dicing Cost						
BE 0 : Yield losses Cost						
ASIC Die Cost						

- The ASIC die cost ranges from [redacted] according to yield variations.
- The main part of the ASIC die cost is due to the Front-end with [redacted]
- The back-end 0 yield ranges from [redacted]

Sensor Front-End	Low Yield		Medium Yield		High Yield	
	Cost	Breakdown	Cost	Breakdown	Cost	Breakdown
Raw wafer (Si)						
Clean Room						
Equipment						
Consumable						
Labor						
Yield losses						
Total Cost						
Everspin Overhead						
Sensor Front-End Cost						

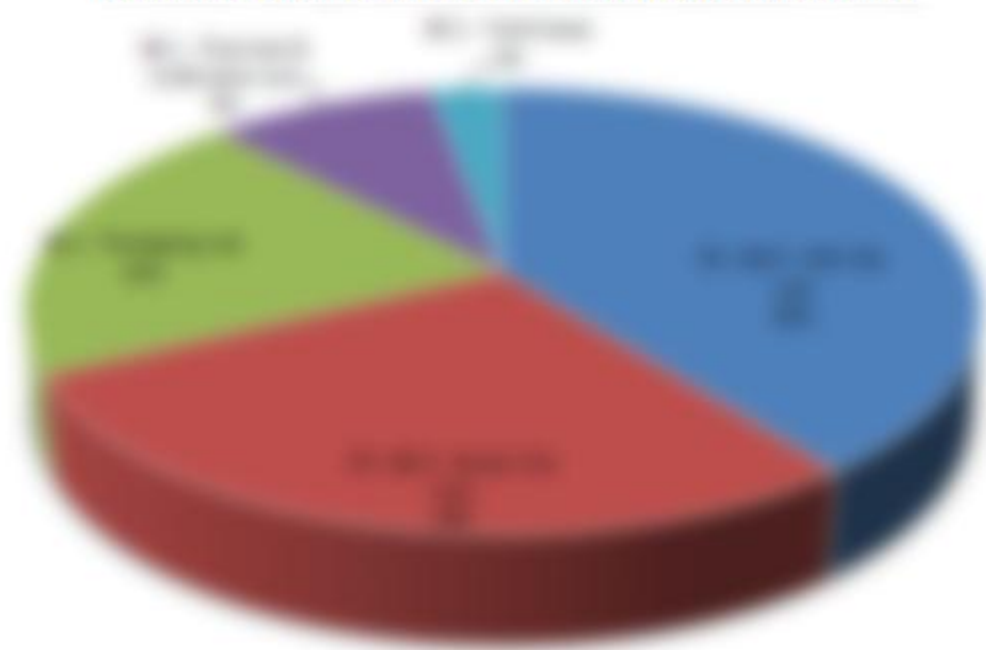
Sensor Front-End Cost Breakdown (Middle Yield)



- The **Sensor Front-end** manufacturing cost ranges from [redacted] according to yield variations.
- By adding the overhead of **Everspin** the cost ranges from [redacted].
- The main part of the manufacturing cost is due to the [redacted].

	Low Yield		Medium Yield		High Yield	
	Cost	Breakdown	Cost	Breakdown	Cost	Breakdown
FE + BE 0 : ASIC Die cost						
FE + BE 0 : Sensor Die Cost						
BE 1 : Packaging cost						
BE 1 : Final test & Calibration cost						
BE 1 : Yield losses						
MAG3110 Component Cost						

MAG3110 Component Cost Breakdown (Medium Yields)



- The component cost is between [] and [] according to yield variations.
- The dies (ASIC + Sensor) represents [] of the total manufacturing cost.
- The packaging cost represents [] of the total manufacturing cost.
- Final test cost and yield losses (due to packaging and final test) represent [] of the total manufacturing cost.