MOTION SENSOR START-UP EXPERIENCE IN CHINA

JOSEPH XIE

QST Corporation

Intelligent MEMS Sensor & System Applications Company

OVERVIEW

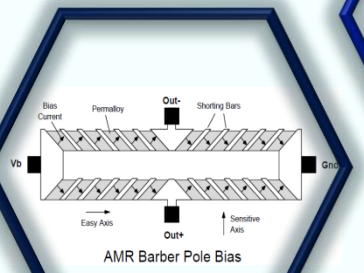
- ✓ Founded in 2012
- ✓ Team from Silicon Valley and local industry
- ✓ Support from Shanghai government
- ✓ Over 20 years of MEMS technology build up
- ✓ Complete supply chain in China

Company Profile

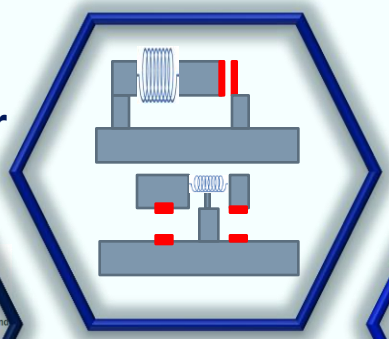
- Shanghai（Zhangjiang, Jinqiao, Jiading）：
  Development/Production/Technology Support/Market/Sales
- Shenzheng：Technology Support/Sales

Product and Service

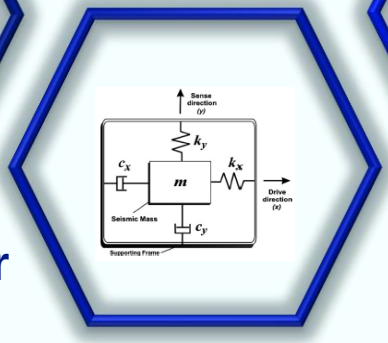
AMR Magnetometer

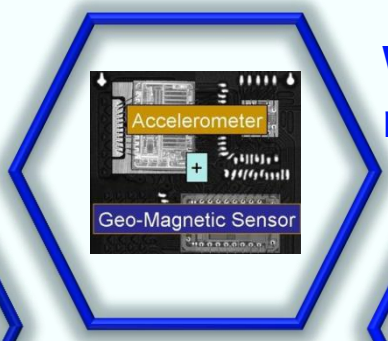


AMR Barber Pole Bias


Accelerometer

Gyroscopes





Fusion sensor combos & IMUs

Wearable reference scheme

Base on the advanced motion sensor and algorithm, for the Internet of Things and wearable devices, we develop intelligent application solution and service.

Honeywell AMR Technology

State Strategy Industry

A new generation of information technology industry

The development route of electronic core infrastructure industries

Industrialize: implements integrated circuits, new flat panel display innovation development projects; micro electro mechanical system (MEMS), to promote LED, smart sensors, the new power electronic devices and metal organic chemical vapor deposition (MOCVD) equipment industry.

Smartphone Platform

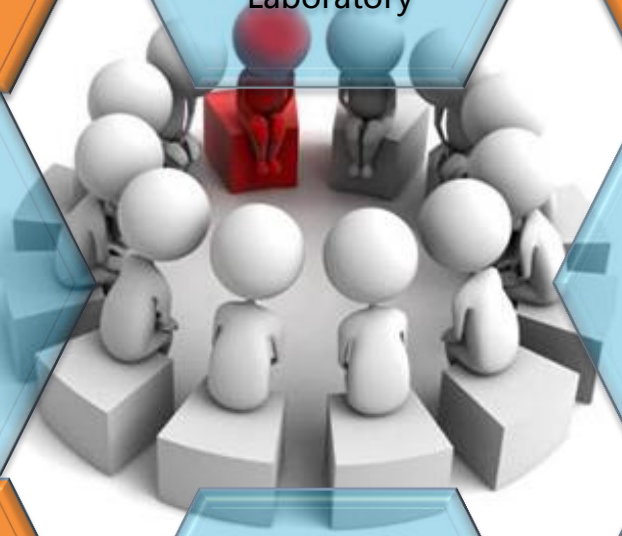
Qualcomm
（authentication）
MTK （ authentication ）
Leadcore （ authentication ）
SpreadTrum （ going on ）
Mediatek (going on)
Intel (going on)

Competitive Advantages

Experienced management team.

20 years of MEMS Technology accumulation by State Key Laboratory

More than 10 Ph.D. From US and China



Licensed Honeywell AMR technology and products

The world class design, production, and engineering support team

Rich IP portfolios

Government funded R&D Projects

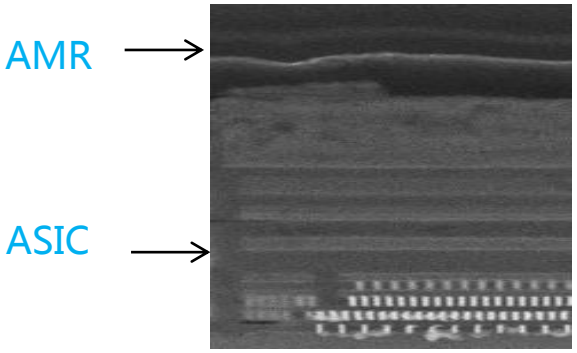
ISO 9001: 2008

Technology Platform

The strategic choice of a new generation of technology, get the advantage for a long time at performance, integration and cost.

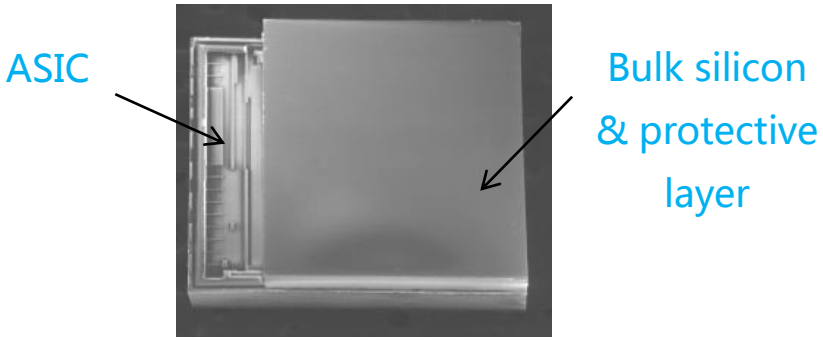
Magnetic sensor

Single chip integrate AMR & CMOS Process

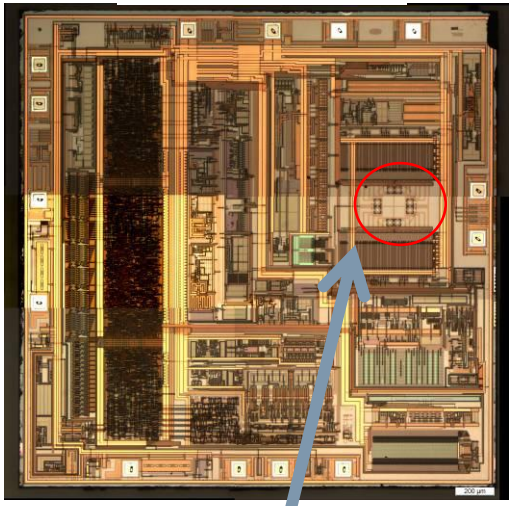


MEMS IMU

Single chip integrate Bulk silicon & CMOS Process



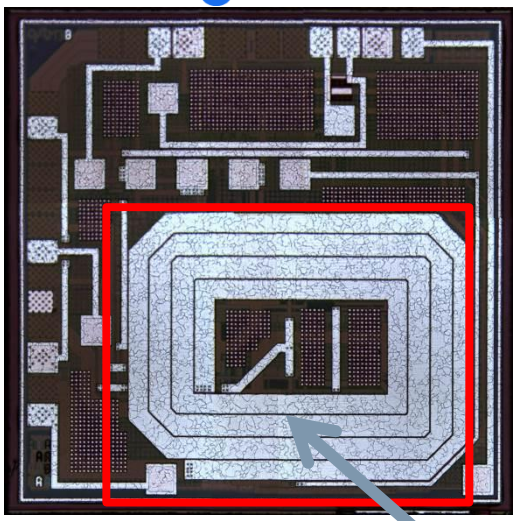
Architecture (QMC6983)



Hall

- Small sensor size generate weaker signal
- 4 group original signals convert to XYZ

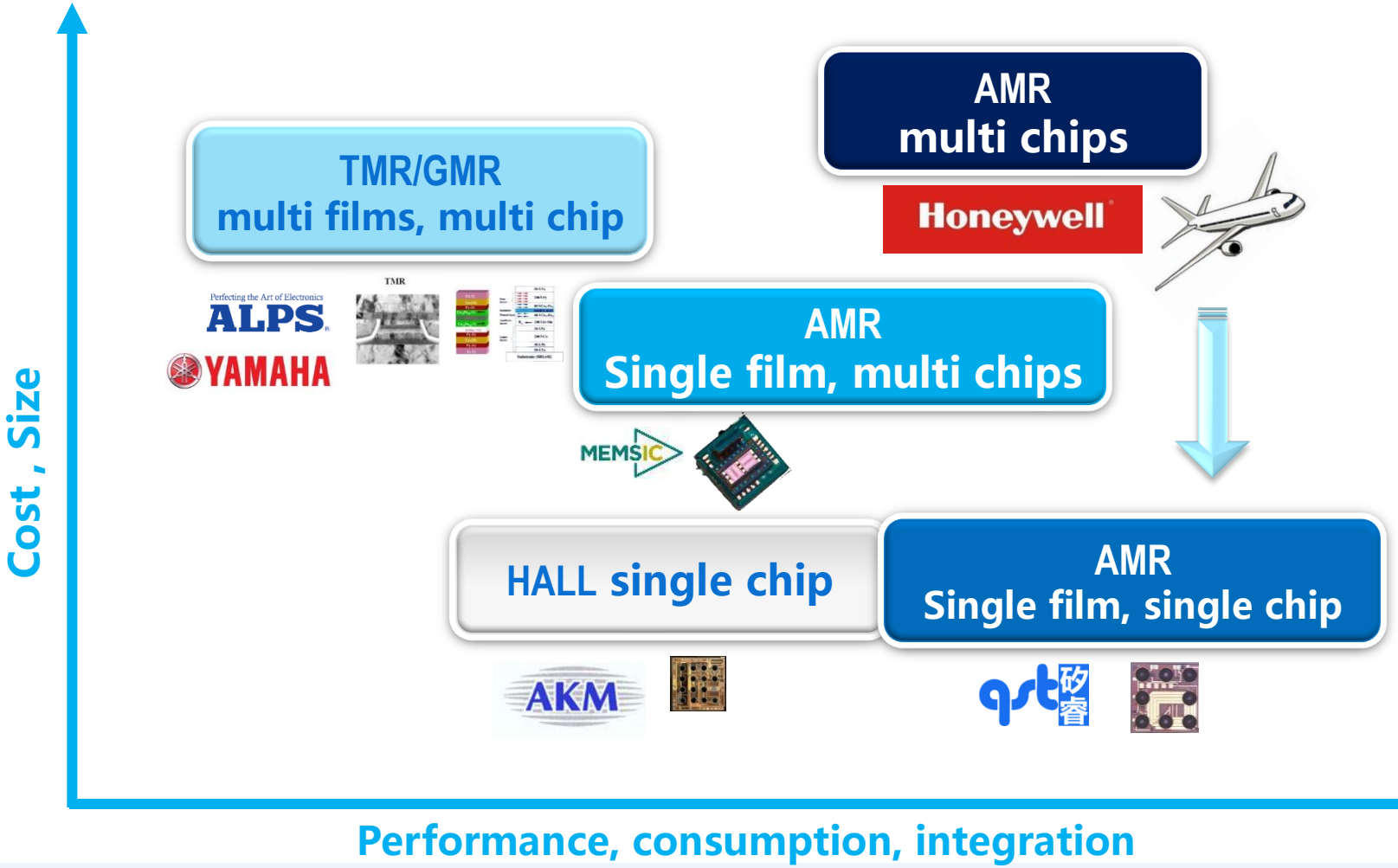
$$\begin{aligned} X1 &= aBx + cBz \\ X2 &= -aBx + cBz \\ Y1 &= aBy + cBz \\ Y2 &= -aBy + cBz \end{aligned} \Rightarrow \begin{aligned} X1 - X2 &= 2aBx \\ Y1 - Y2 &= 2aBy \\ X1 + X2 &= 2cBz \end{aligned}$$



AMR

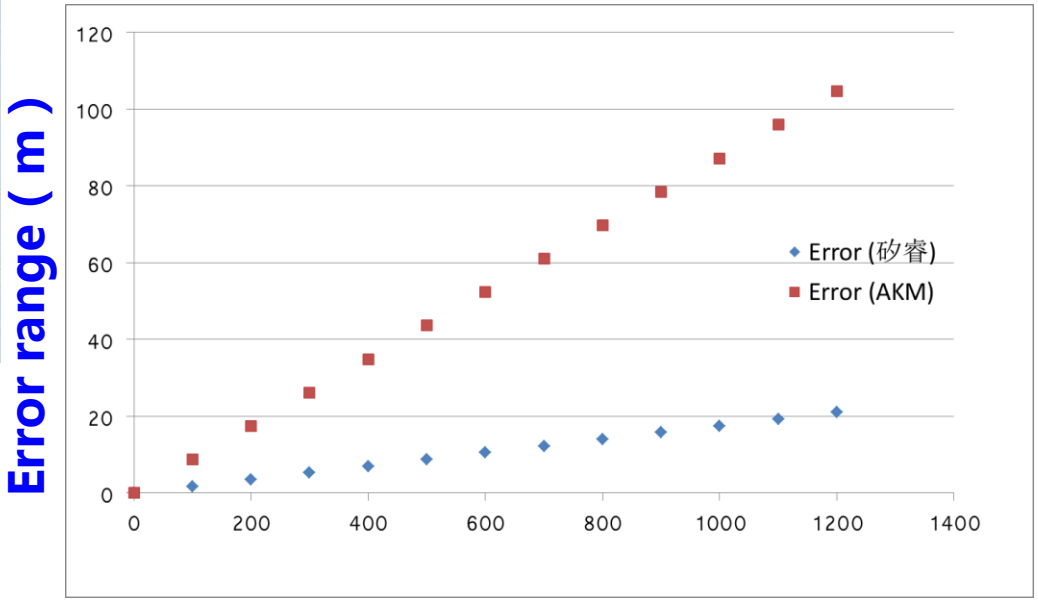
- Large sensor size(7* AKM) generate stronger signal
- Real XYZ components need less convert
- Have potential for upgrade at size and performance

Magnetic Sensor Technology



Future Applications Need more accurate sensors

Indoor Navigation： QST e-compass (1 degree) main steam （ 5 degree)



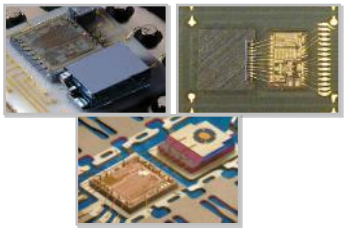
MEMS Sensor Technology

Cost , Size

Double chip capacity type

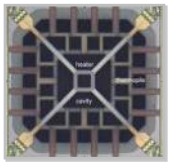
BOSCH

freescale semiconductor



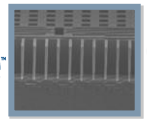
Single chip Thermistor type

MEMSIC



Single chip capacity type

mCube



InvenSense

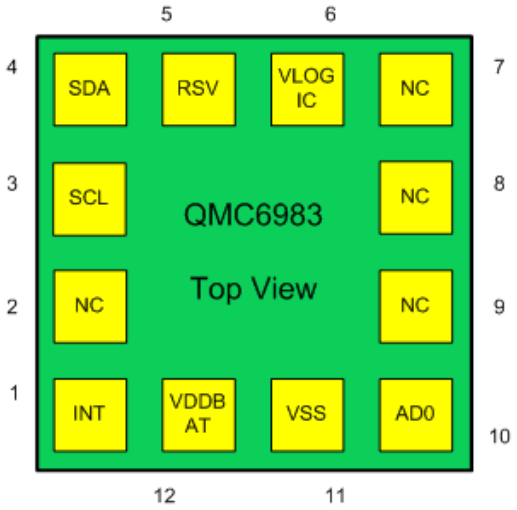
qst 矽睿

Performance, consumption, integration

QMC6983: 3-axis single chip AMR Magnetic Sensor

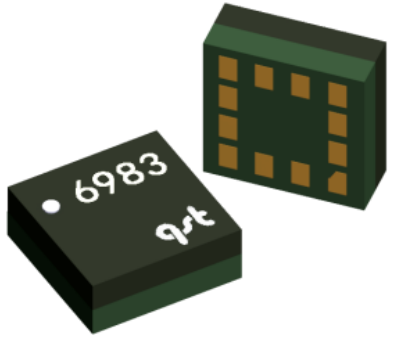
Feature

- LGA package compatible with AK8963C
- High resolution and Wide dynamic range
- Low current consumption
- Temperature Compensated Data Output
- Single Die AMR sensor



Specification

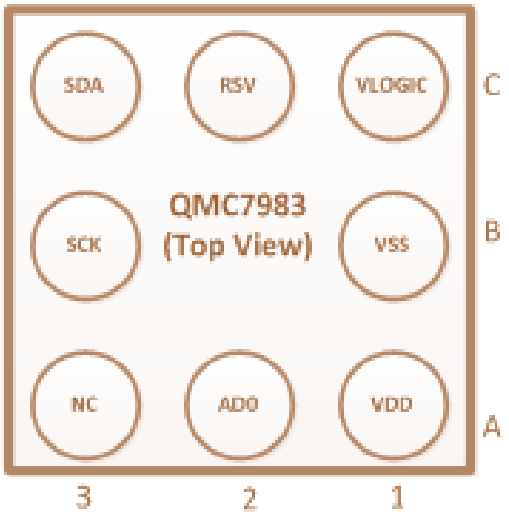
- Measurement range： +/- 2000uT
- Resolution ： 0.04uT/LSB @+/-8G
- Current consumption: 75uA@10Hz
- Max ODR : 200Hz
- Power supply : AVDD=2.16-3.6V DVDD=1.65-AVDD
- LGA 12PIN 1.6x1.6x0.75mm



QMC7983: 3-axis single chip AMR & ASIC Magnetic Sensor

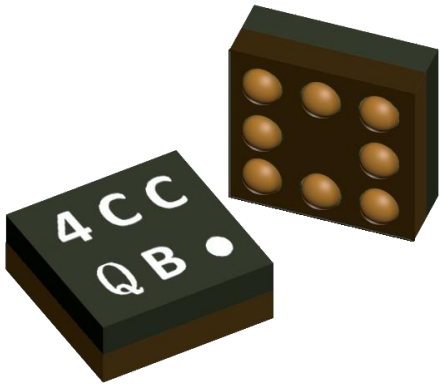
Feature

- CSP package compatible with AK09911C
- High resolution and Wide dynamic range
- Low current consumption
- Temperature Compensated Data Output
- Single Die AMR sensor



Specification

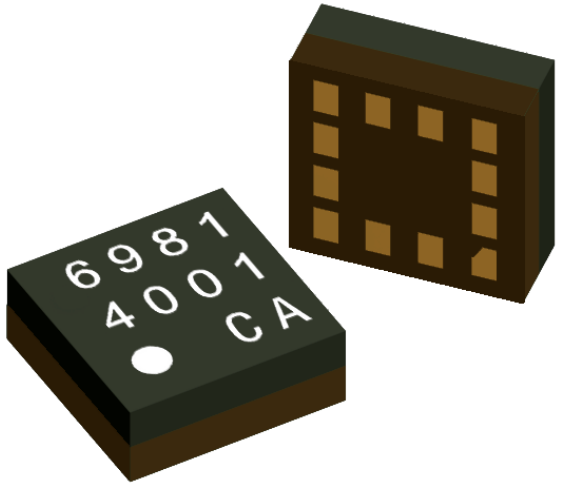
- Measurement range： +/- 1600uT
- Resolution ： 0.04uT/LSB @+/-8G
- Current consumption: 75uA@10Hz
- Max ODR : 200Hz
- Power supply : AVDD=2.4-3.6V DVDD=1.65-AVDD
- CSP 8PIN 1.2x1.2x0.55mm



QMA6981: 3-axis single chip Accelerometer

Feature

- MEMS-CMOS Monolithic Die
- Embedded 32-level FIFO
- Integrate motion detection
- Integrate step counter
- Low Power

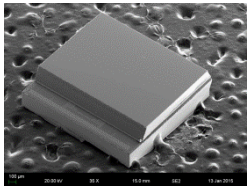


Specification

- Measurement range：+/- 8G@10 BIT
- Current consumption: 220uA@All blocks on run state
- Max ODR : 2000Hz
- Power supply : AVDD=2.4-3.6V DVDD=1.7-AVDD
- LGA 8PIN 2x2x0.95mm

QMG6982:3-AXIS SINGLE CHIP GYROSCOPE

- ✓ LGA12 3x3x0.95 mm^3
- ✓ Low power, <3mA. Standby current <2uA
- ✓ Full Scale up to +/- 2000dps
- ✓ 16bit ADC
- ✓ Support I2C and SPI
- ✓ Embedded 2 interrupts
- ✓ Embedded 32-level FIFO
- ✓ Support fast startup mode



Industry Collaboration

华虹宏力

- Advanced CMOS-MEMS 8 inch platform
- Production capacity: 12kk/month
- Skilled research and product team

中国科学院 SIMIT 上海微系统与信息技术研究所

- 20 years MEMS technology accumulation
- Complete research process and Test&Package platform
- Abundant human resource

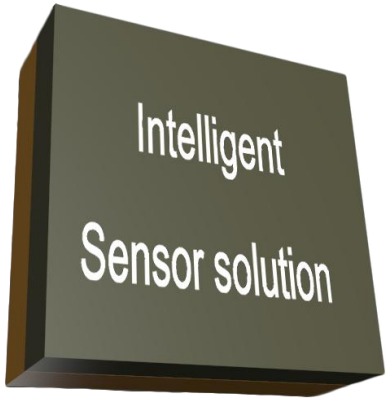
tsmc

上海华岭

LCSP MINIATURIZATION PROCESS

FUJITSU 南通富士通

WEARABLE DEVICES



Awards Received

Global Source
China ACE Awards
MEMS Design Team of the year 2014

Global Source EETIME
2014 China IC Design Awards
Best MEMS/Sensor of the year: QMC6983

SENSE THE WORLD TOGETHER

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