SITRI

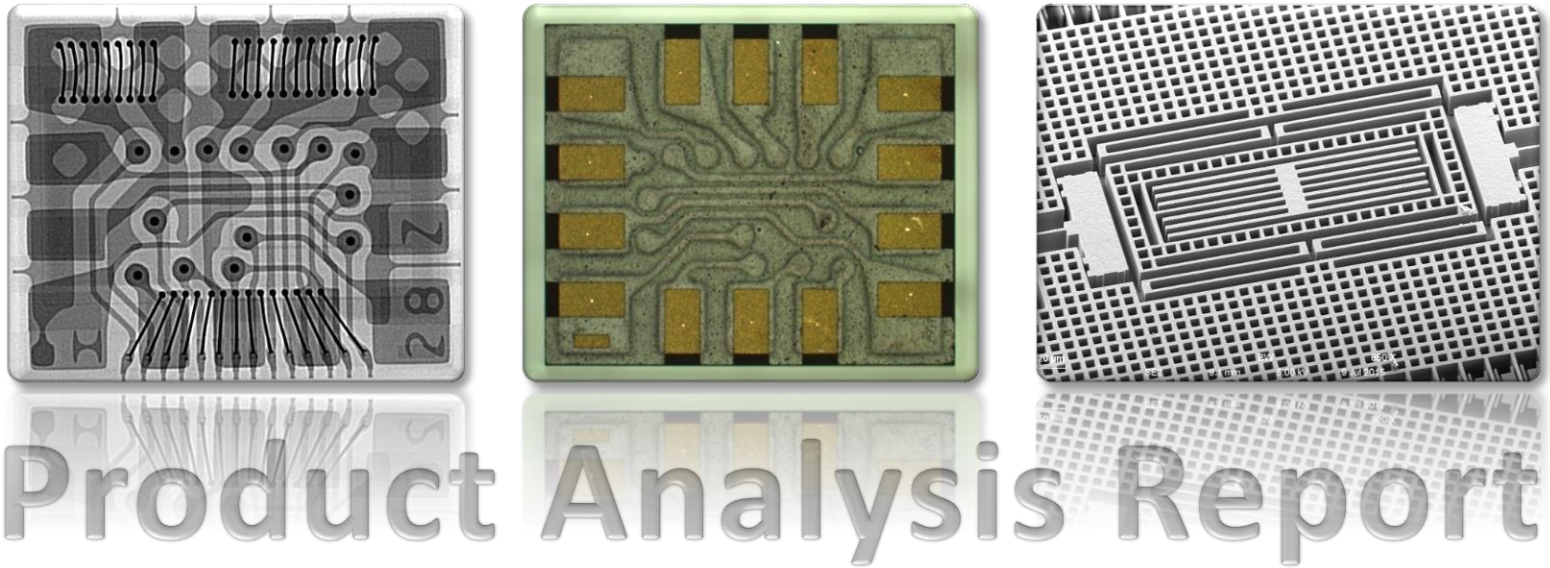
www.sitrigroup.com

Weibo

Wechat

BMI160

Small , Low Power Inertial Measurement Unit



Product Analysis Report

To Know

Table of Contents

Part Number	BMI160		
Manufacturer	BOSCH		
Description	Small , Low Power Inertial Measurement Unit		
Package Type	LGA-14		
Package Mark	DFP TS		
Package Size	3.0 mm X 2.5 mm X 0.83 mm		
MEMS	Inertia		
	Accelerometer & Gyroscope Analog Die	Accelerometer MEMS	Gyroscope MEMS
Die Mark	BAI160C (logo) BOSCH ©2014	CMA334M BOSCH(logo)	(logo)CMG 230M
Die Size	2.71 mm X 1.8 mm	0.86 mm X 1.39 mm	1.71 mm X 1.66 mm
Die Thickness	67 um	398.88 um	398.88 um
Process	M1P_AL_CMOS_0.18 um	Surface Silicon Process	Surface Silicon Process

Package Type	LGA -14
Package Mark	DFP TS
Package Size	3.00 mm X 2.50 mm X 0.8[illegible]
Pin Size	0.25 mm X 0.47 mm
Pin Pitch	0.50 mm

Figure1.1.1 Package Top View

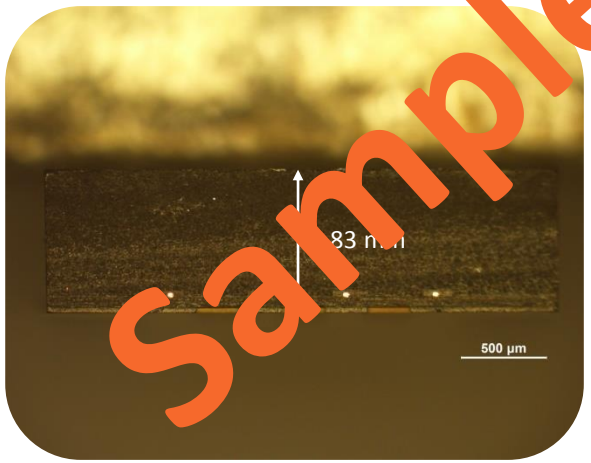


Figure 1.1.3 Package Side View

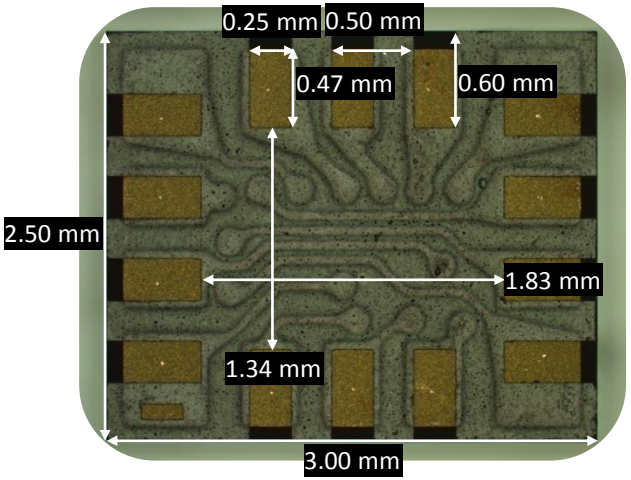


Figure1.1.2 Package Bottom View

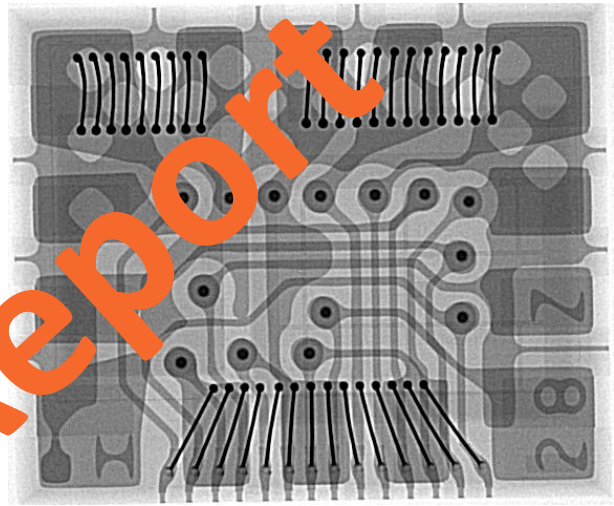


Figure1.2.1 Package X-ray Top View

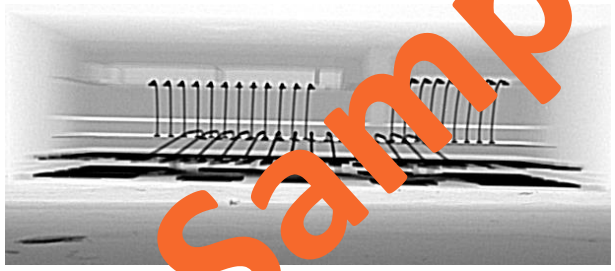


Figure1.2.3 Package X-ray End View

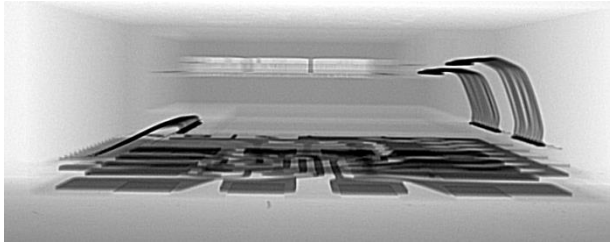
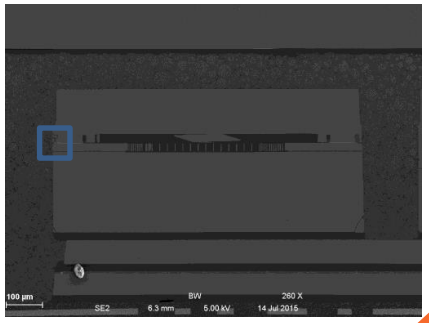


Figure1.2.2 Package X-ray Side View

Figure1.3.1 Cross Section of Package



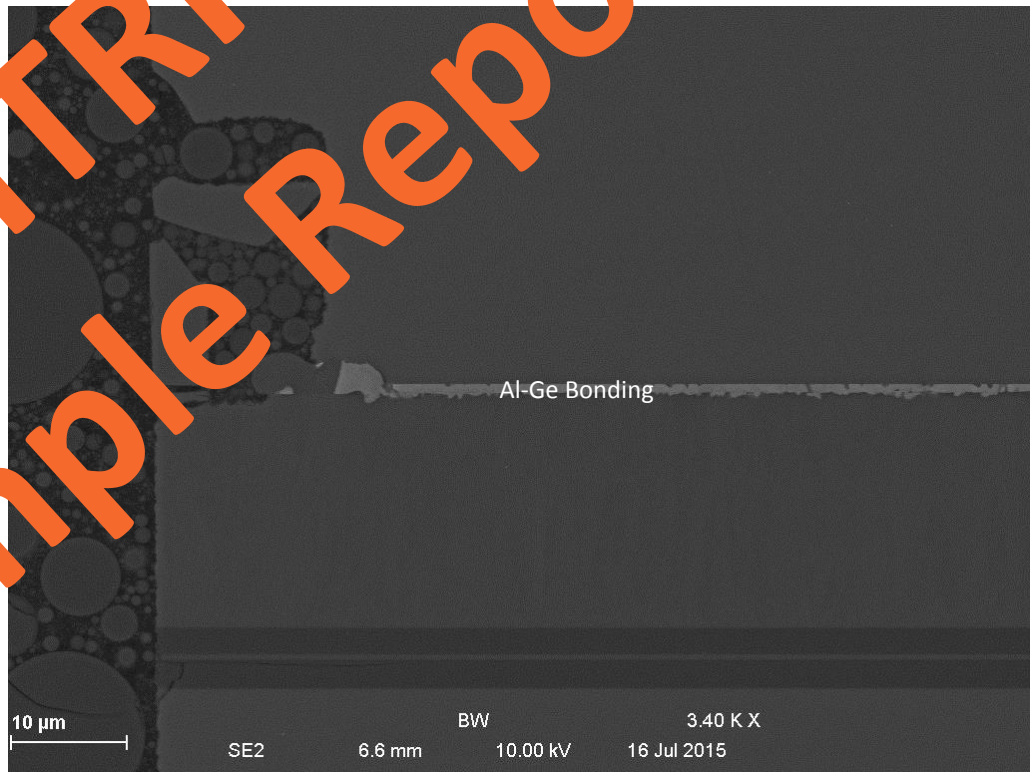
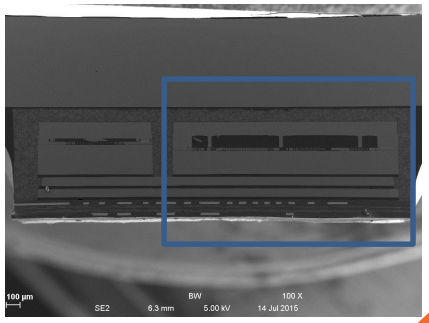


Figure1.3.8 Cross Section of Accelerometer MEMS Die Al-Ge Bonding



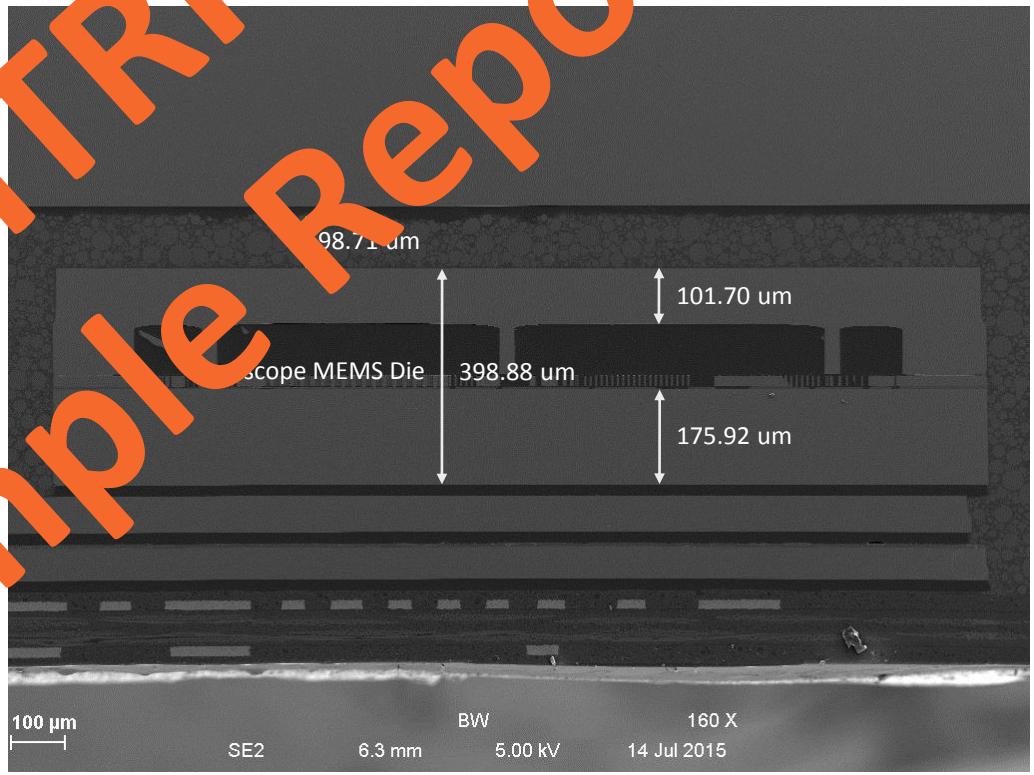


Figure1.3.9 Cross Section of Package with Dimension, Gyroscope

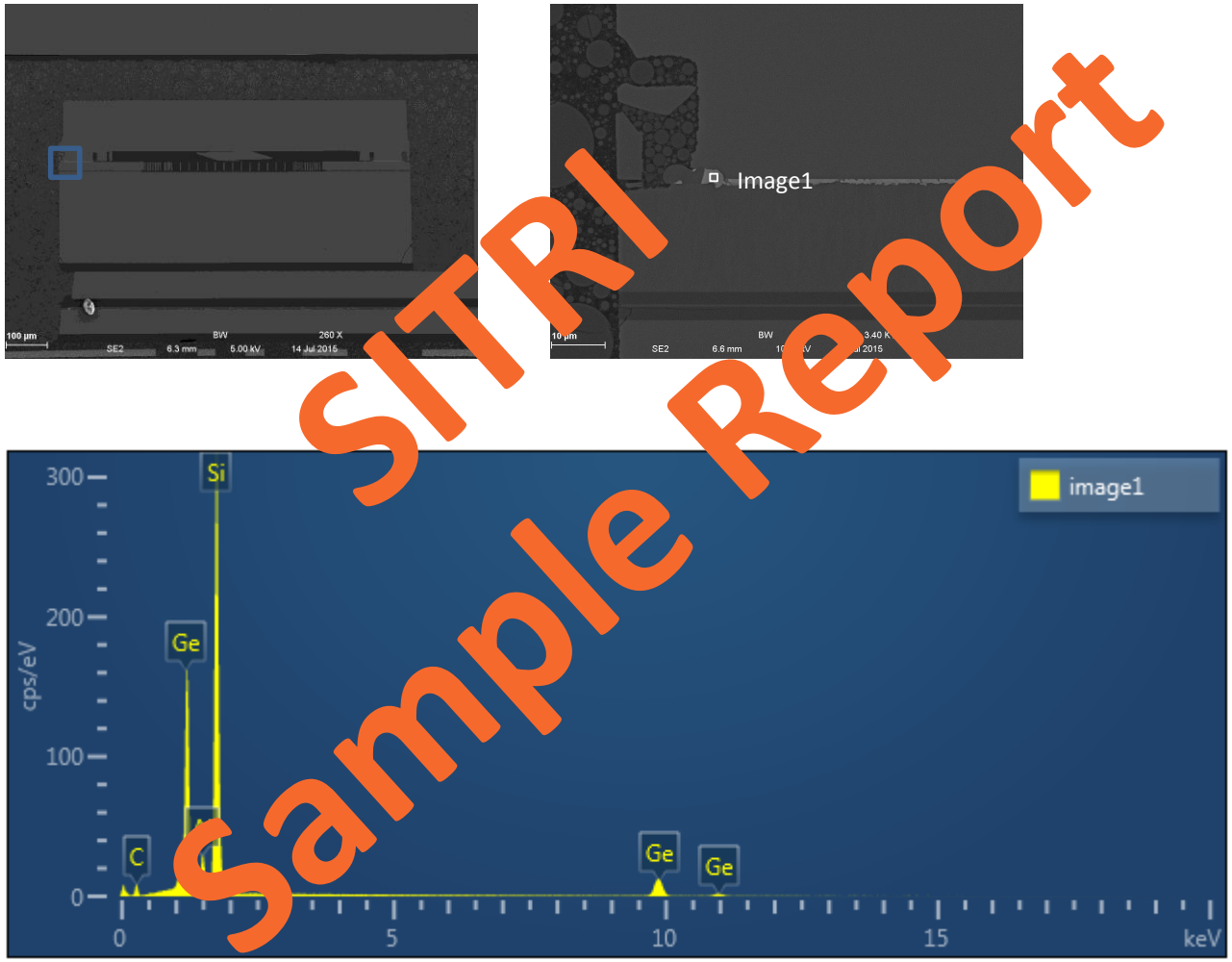


Figure1.4.1 EDS Analysis of Al-Ge Bonding in Accelerometer MEMS Die

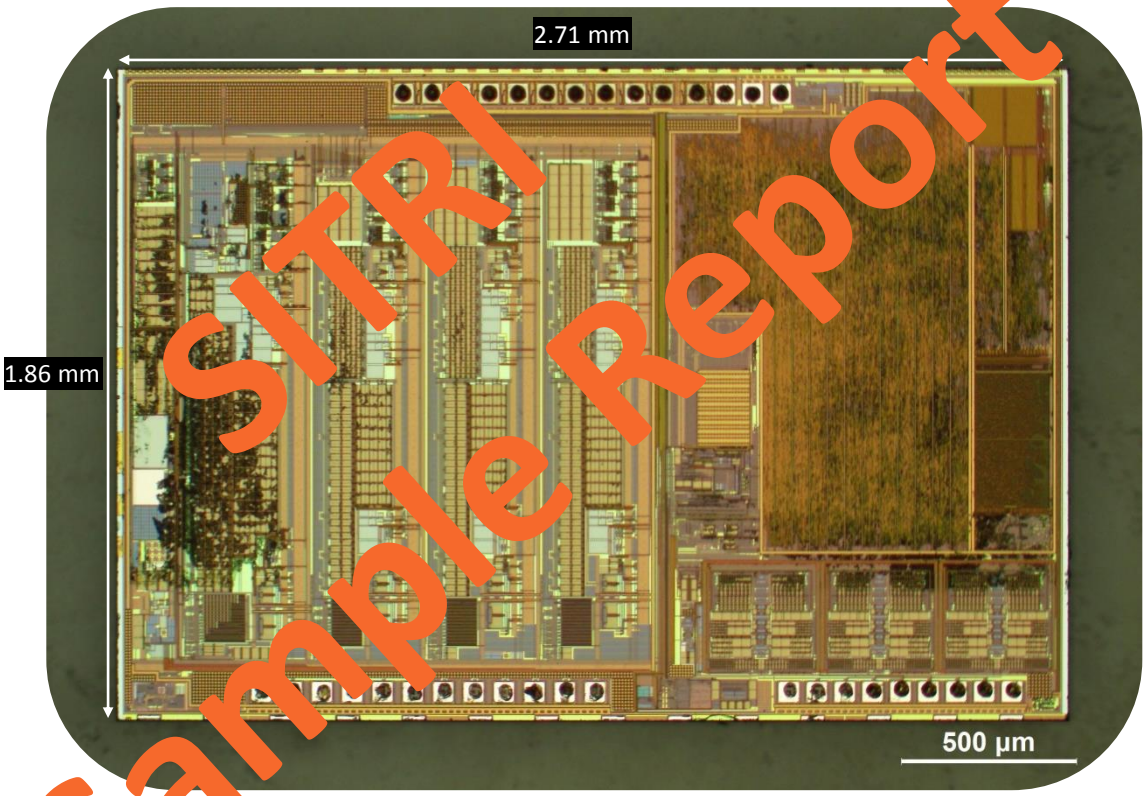


Figure2.1.1 ASIC Die Photo

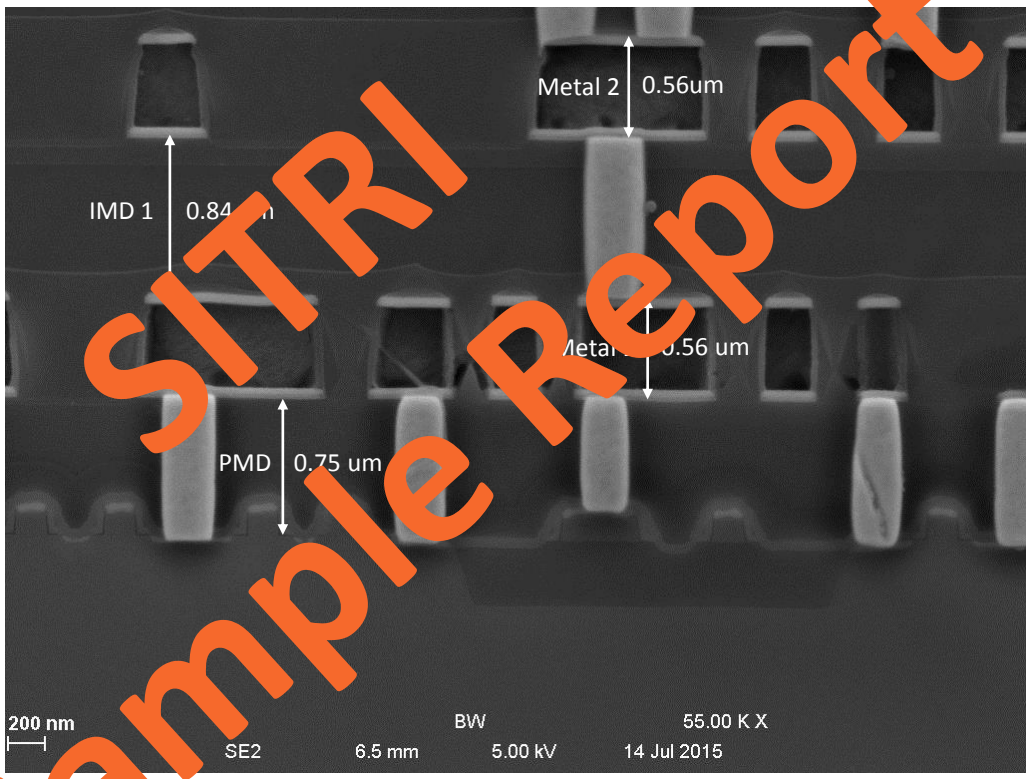


Figure2.1.8 ASIC Die Metal 2 to Metal 1

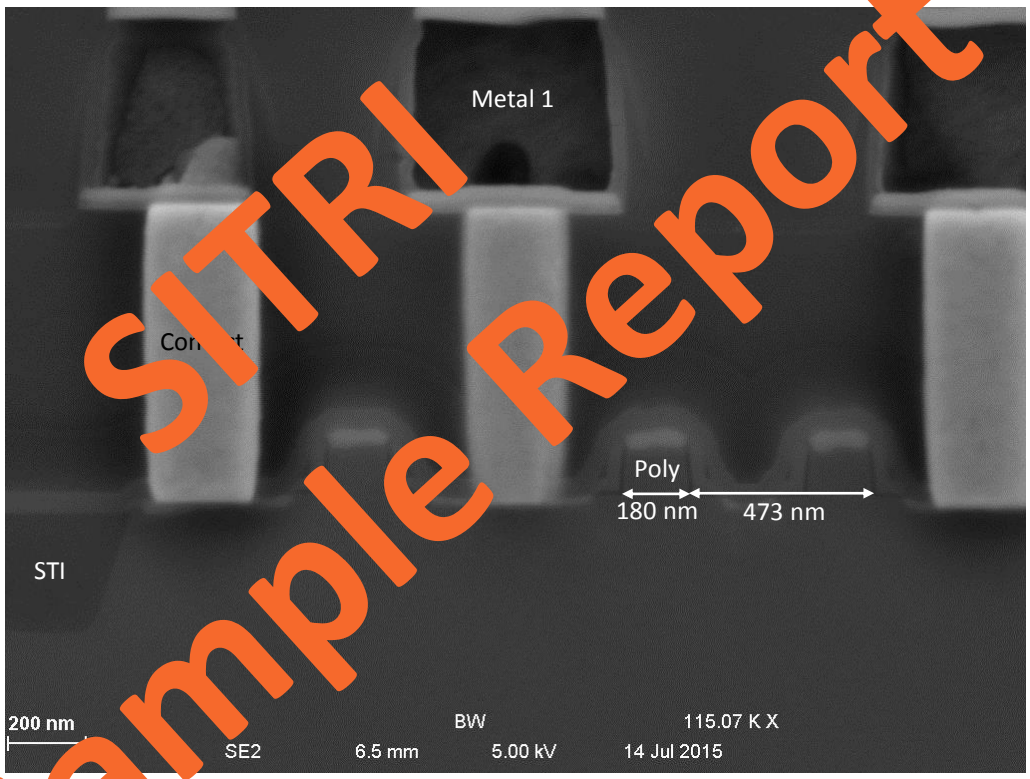


Figure2.1.9 ASIC Die Logic Gate Length

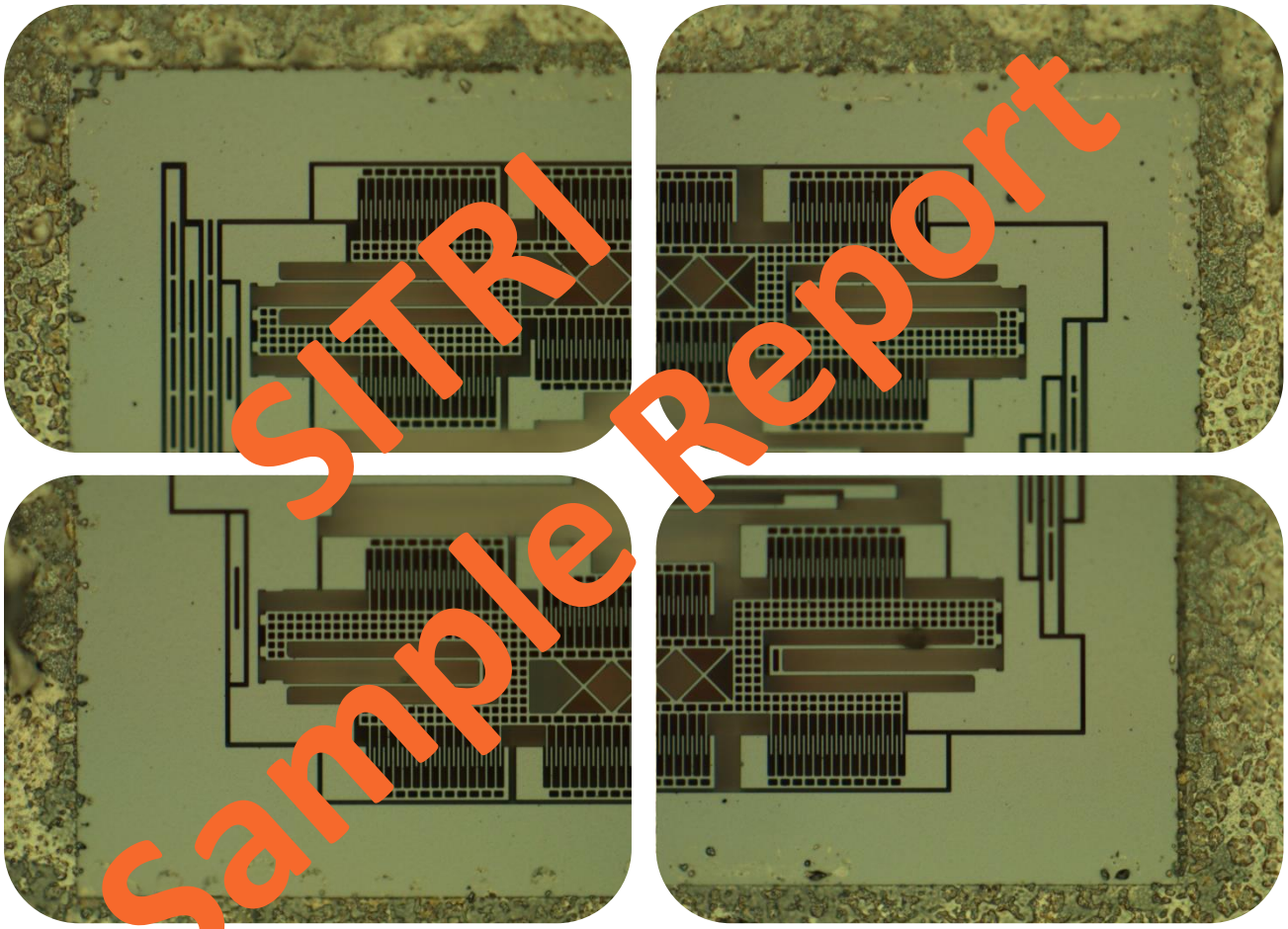


Figure2.3.3 Gyroscope MEMS Die Corner

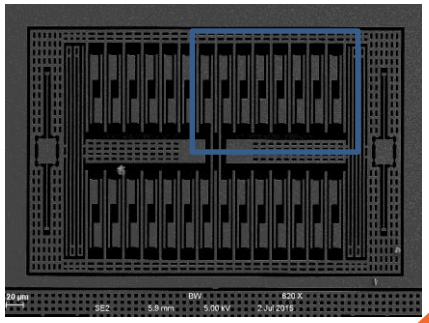
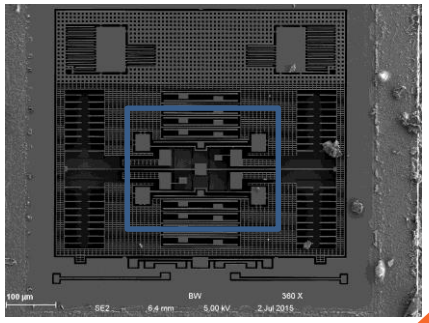


Figure3.2.3 Accelerometer MEMS Die SEM Plan View Image, Plates in X-axis



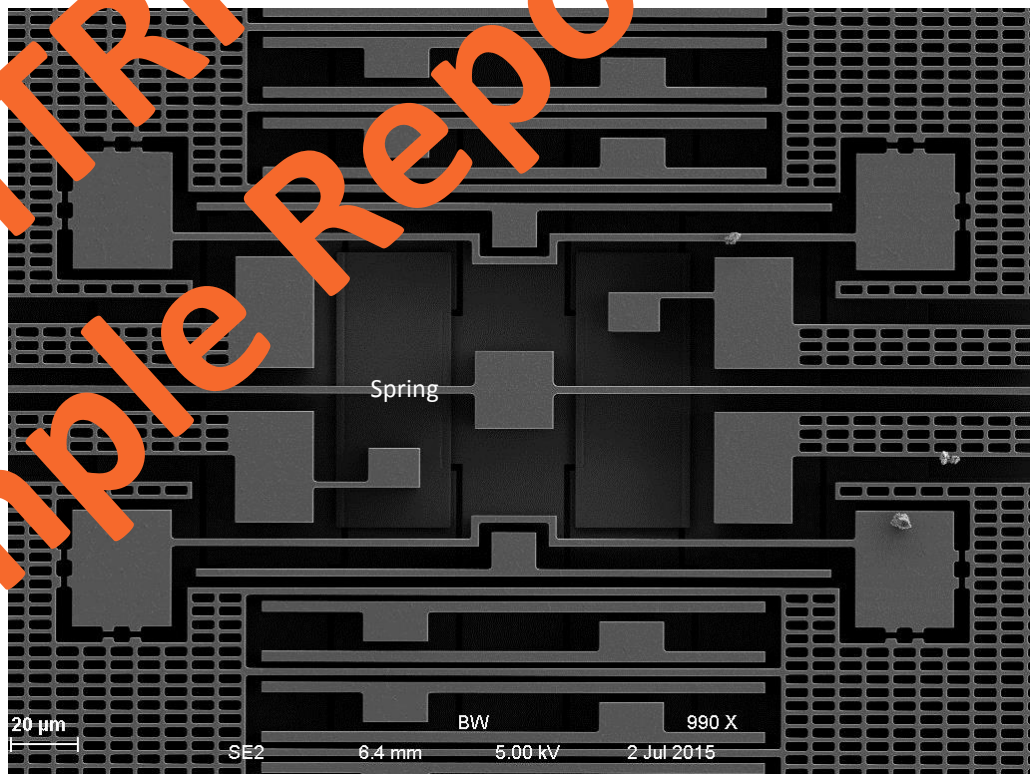
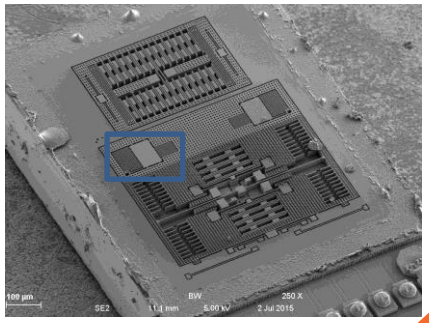


Figure3.2.8 Accelerometer MEMS Die SEM Plan View Image, Spring in Y-axis



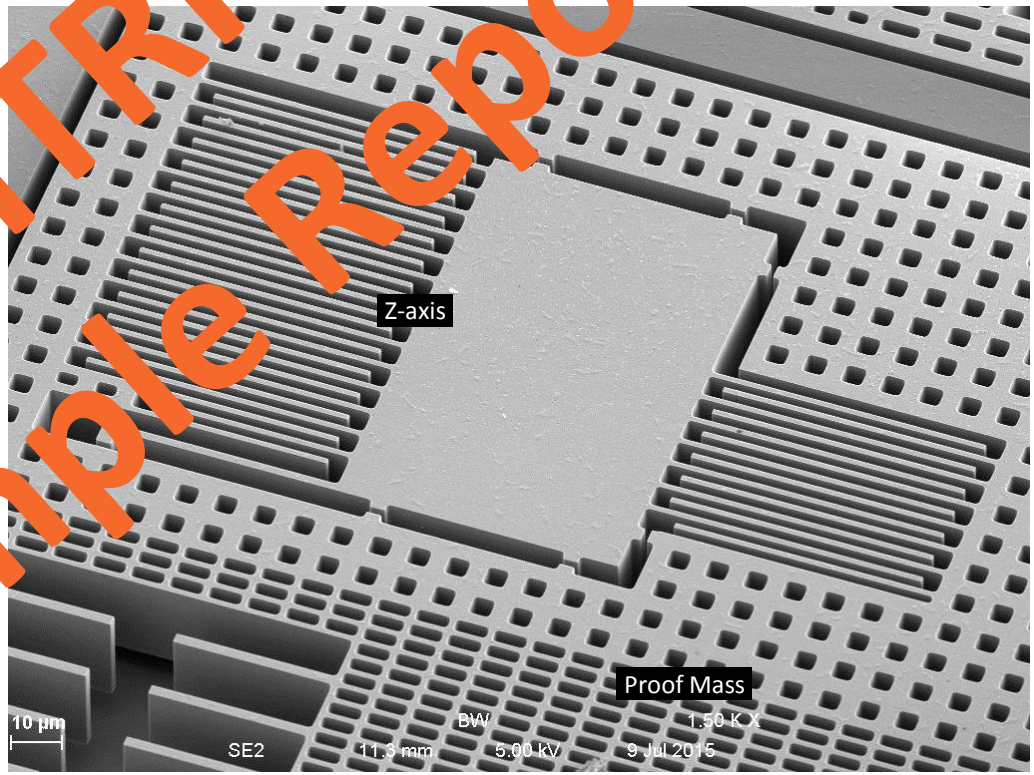
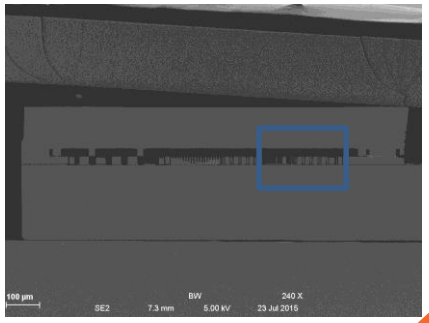
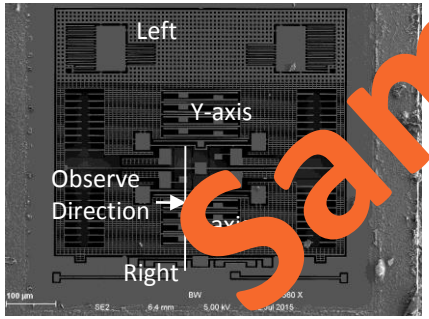


Figure3.2.12 Accelerometer MEMS Die SEM Angle View Image, Z-axis





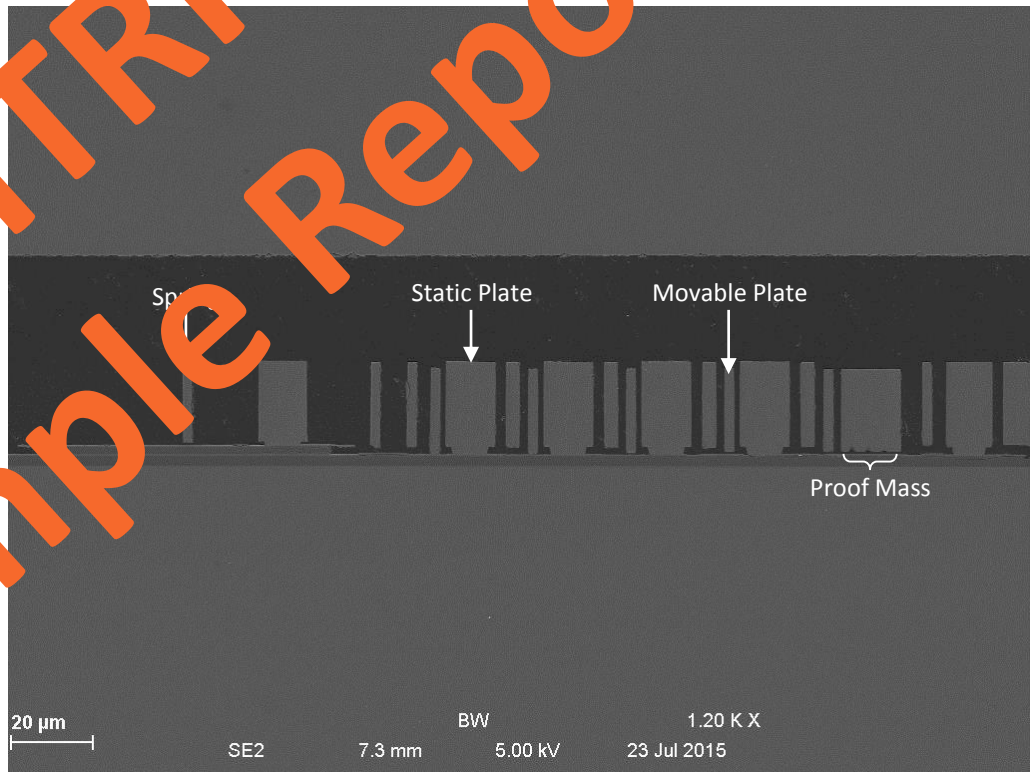
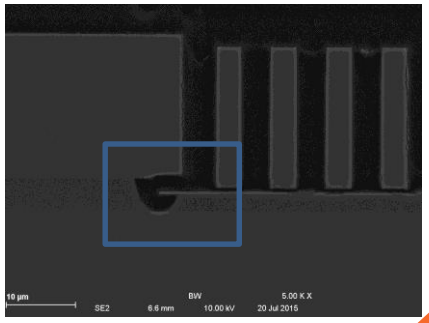
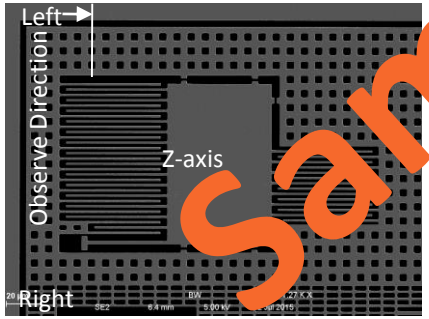


Figure4.2.2 Accelerometer MEMS Cross Section SEM Image with Description, Y-axis





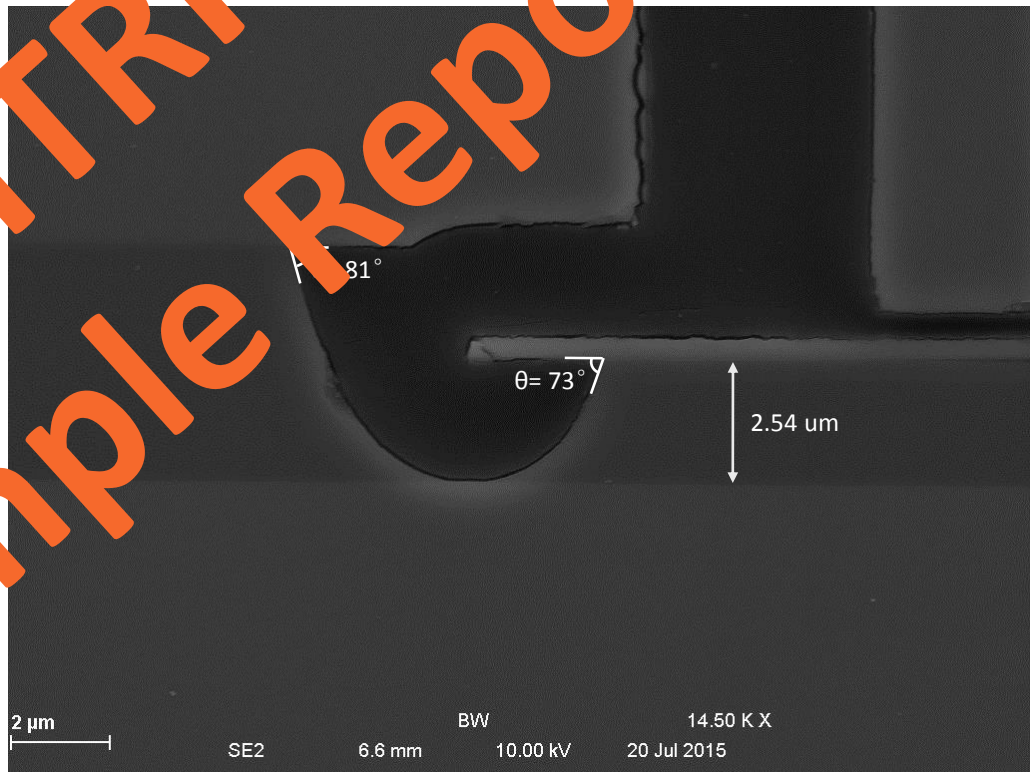
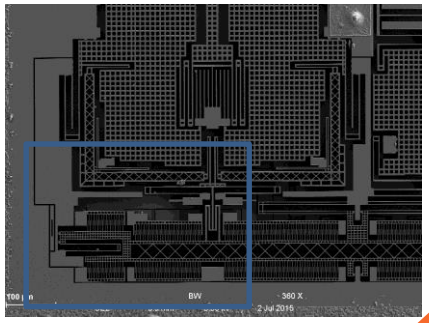


Figure4.3.5 Accelerometer MEMS Cross Section SEM Image with Dimensions, Z-axis



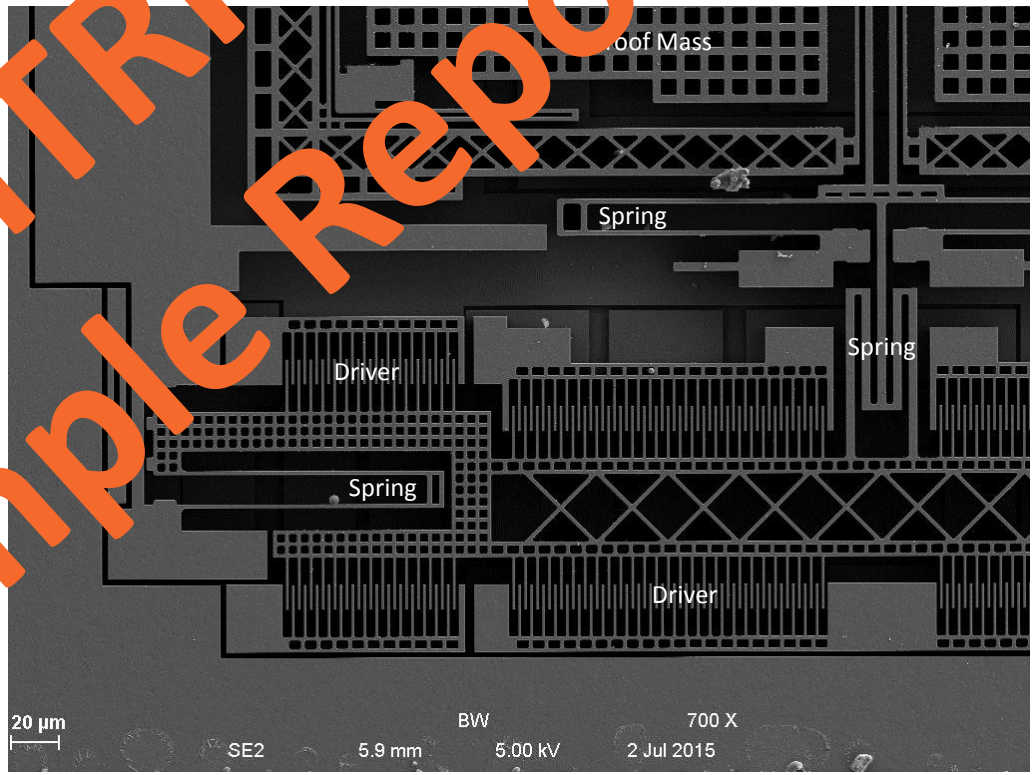
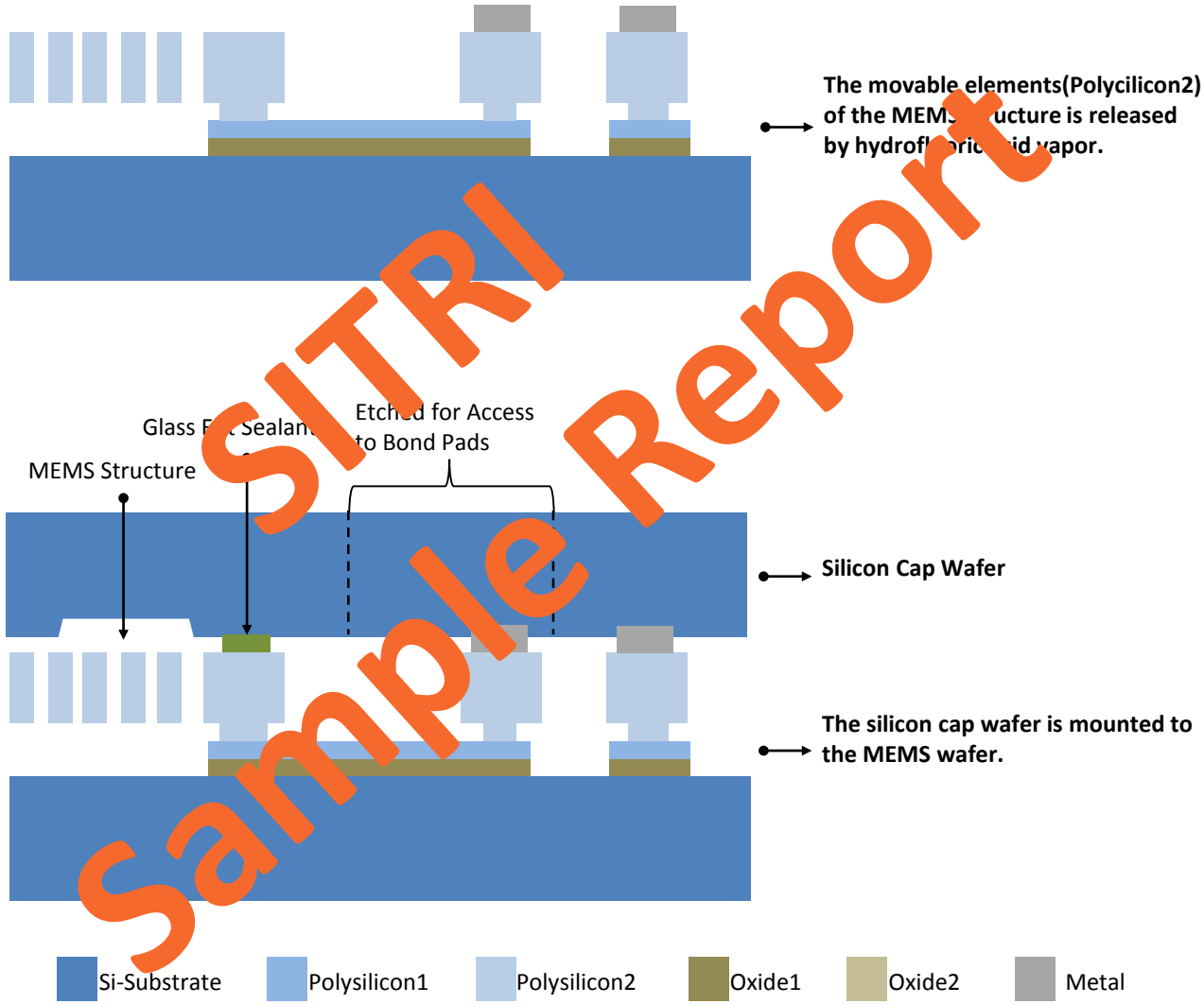


Figure5.2.4 Gyroscope SEM Plan View Image, Y-axis



- The BMI160 is an inertial measurement unit (IMU) consisting of a state-of-the-art 3-axis, low-g accelerometer and a low power 3-axis gyroscope. It has been designed for low power, high precision 6-axis and 9-axis applications in mobile phones, tablets, wearable devices, remote controls, game controllers, head-mounted devices and toys.
- The BMI160 is available in a compact 14 pin 2.0 mm x 2.50 x 0.83 mm^3 LGA package.
- The die size of accelerometer and gyroscope ASIC is 2.71 mm x 1.86 mm and the die thickness is 67.45 um.
- The die size of accelerometer MEMS is 0.86 mm x 1.39 mm and the thickness is 398.88 um.
- The die size of gyroscope MEMS is 1.71 mm x 1.66 mm and die thickness is 398.88 um.
- The isolation process of accelerometer and gyroscope ASIC die is regular STI(shallow trench isolation). The technology node is 0.18um. The accelerometer and gyroscope ASIC die is manufactured in aluminum planarization process with 4 metal layers.
- The accelerometer MEMS die and gyroscope MEMS die is manufactured in surface silicon process. The height of polysilicon2 in accelerometer MEMS die is 20.80 um. The height of polysilicon2 in gyroscope MEMS die is 20.65 um.
- The accelerometer MEMS die and the gyroscope MEMS die use Al-Ge bonding process.