

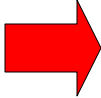
Disaster Management: Sensors Fabrication

Dr. Amporn Poyai

Thai Microelectronics Center (TMEC)

National Electronics and Computer Technology Center (NECTEC)

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 - 4. High Precision Water level Sensor**
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Why



Kabi, 14 April 2011

Why



THAILAND, November 2011

Why



MaeSai, ChiangRai, 19 March 2012

Why



www.krobkruakao.com

ChiangMai, 21 March 2012

Global warming: Causes and effects

Earth's temperature has risen about 1 degree Fahrenheit in the last century. The past 50 years of warming has been attributed to human activity.

Burning fuels such as coal, natural gas and oil produces greenhouse gases in excessive amounts.

Greenhouse gases are emissions that rise into the atmosphere and trap the sun's energy, keeping heat from escaping.

The United States was responsible for 20 percent of the global greenhouse gases emitted in 1997.

Most of the world's emissions are attributed to the United States' large-scale use of fuels in vehicles and factories.

During the past 100 years global sea levels have risen 4 to 8 inches.

Some predictions for local changes include increasingly hot summers and intense thunderstorms.



Damaging storms, droughts and related weather phenomena cause an increase in economic and health problems. Warmer weather provides breeding grounds for insects such as malaria-carrying mosquitoes.

Source: Environmental Protection Agency

NATE OWEN/STAFF

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 **2. High Precision Temperature Sensor**

3. Independence Soil Series Moisture Sensor

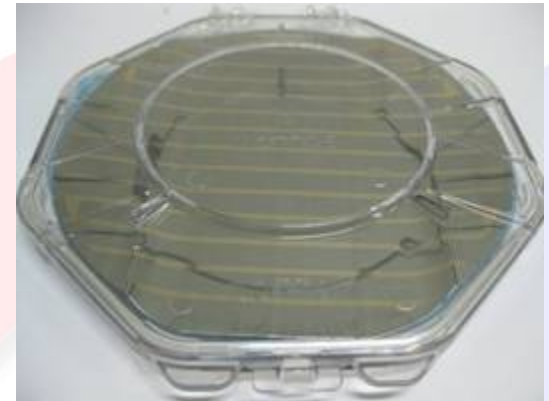
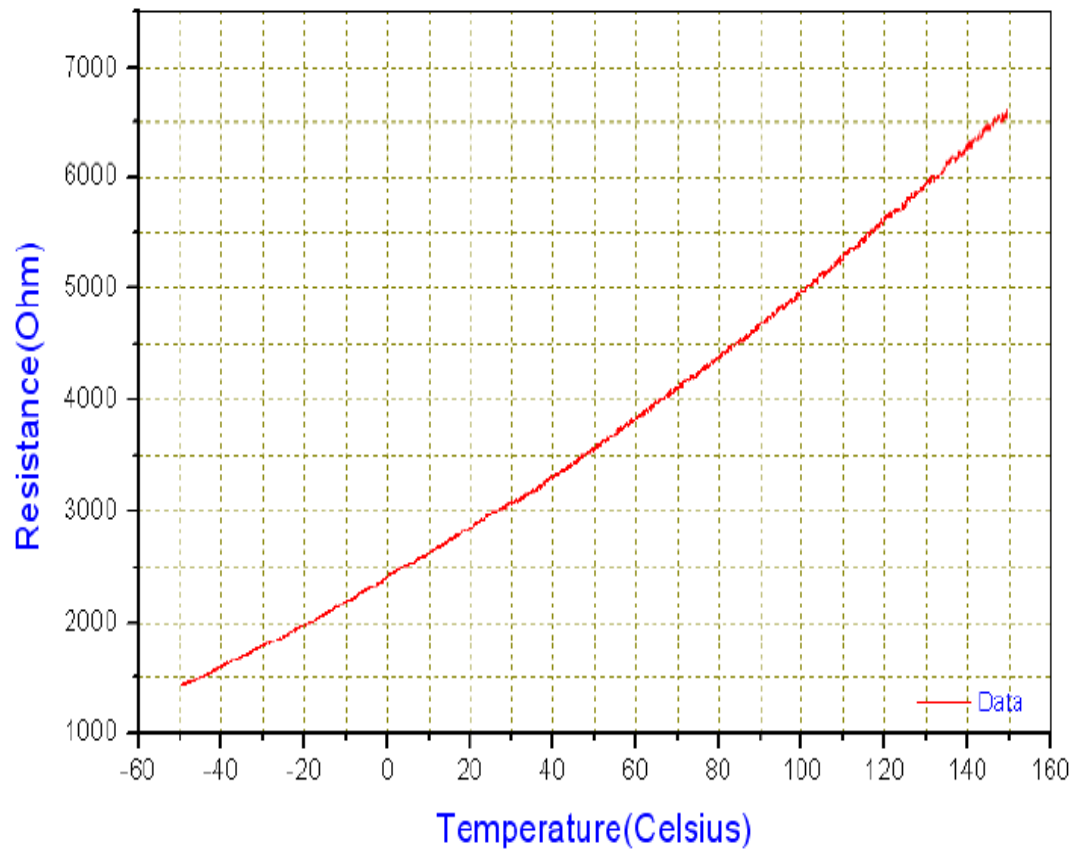
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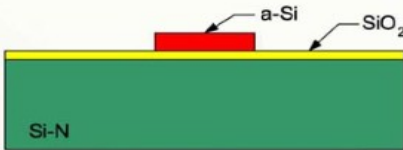
Temperature Sensor



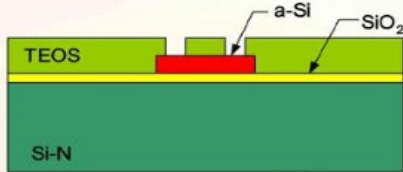
Temperature Sensor



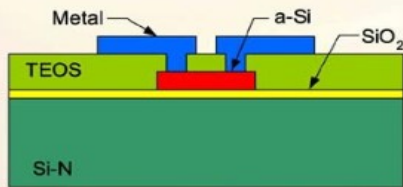
N-Type Silicon Substrate



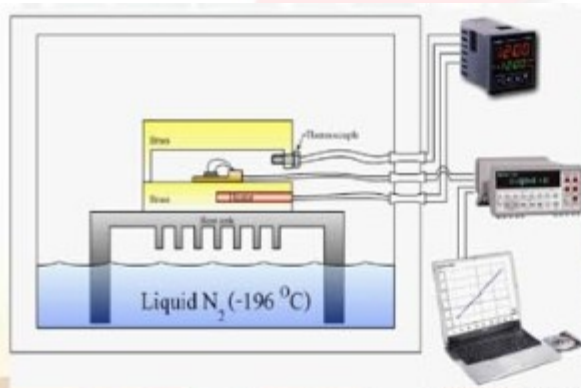
1. SiO² Oxidation
2. a-Si Deposition & Boron Dope
3. a-Si Resistor Patterning



1. TEOS Deposition
2. Contact Hold



1. Metal Deposition
2. Metal Patterning



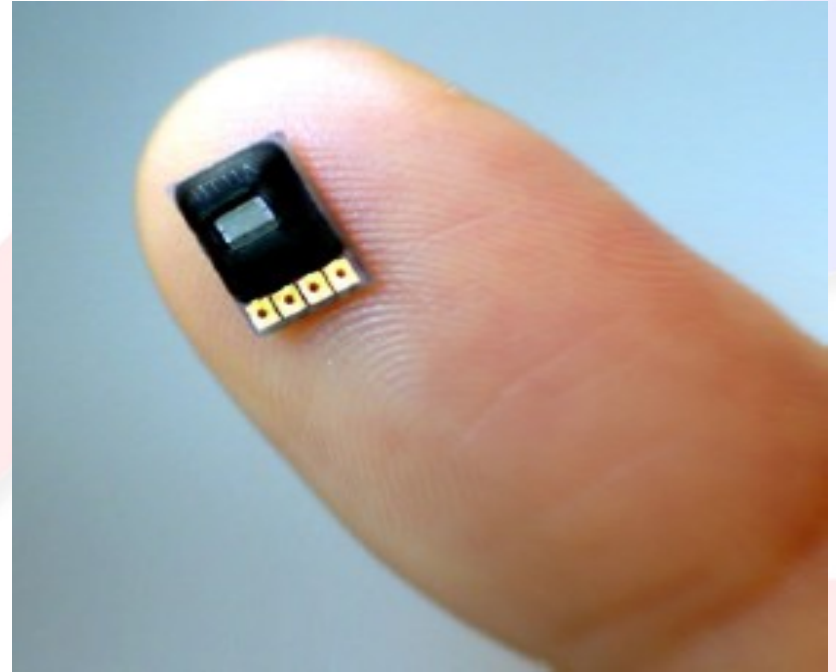
Temperature Sensor



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Robust humidity and temperature sensors



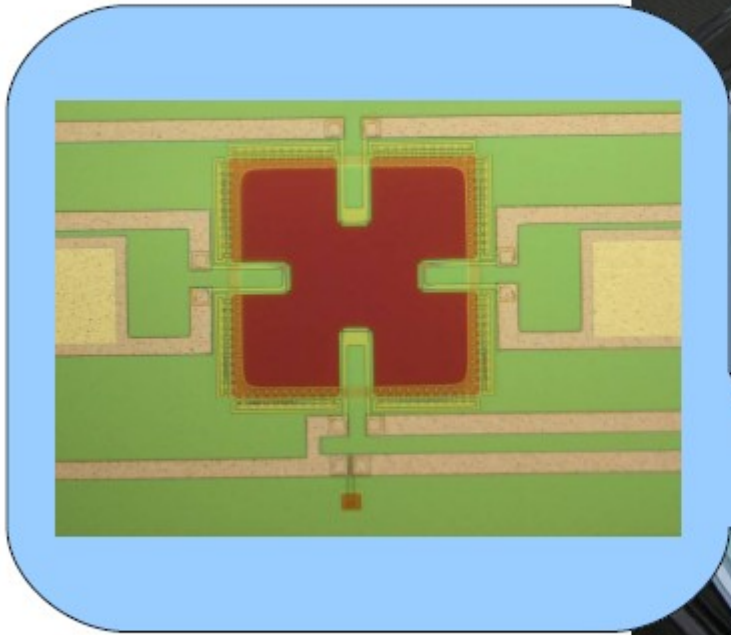
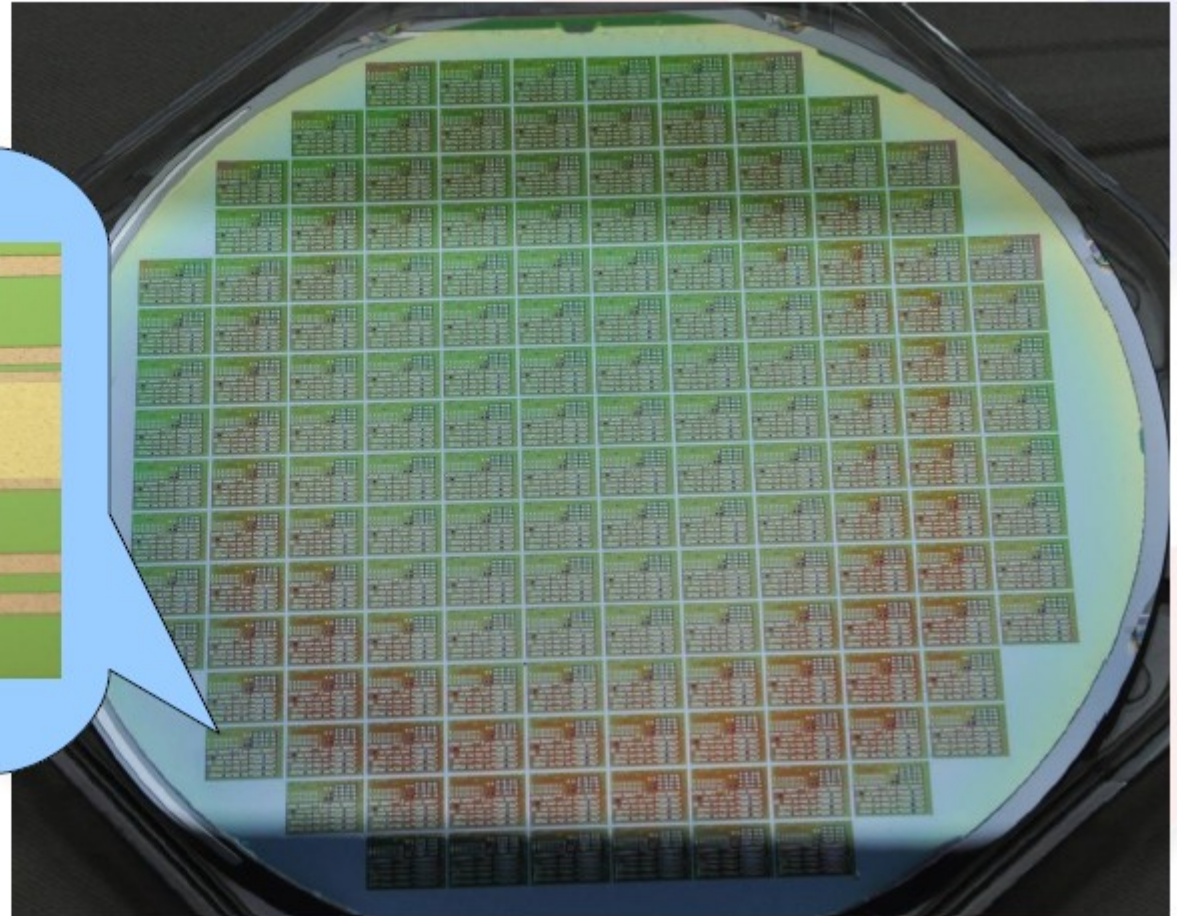
Independence soil series moisture sensors



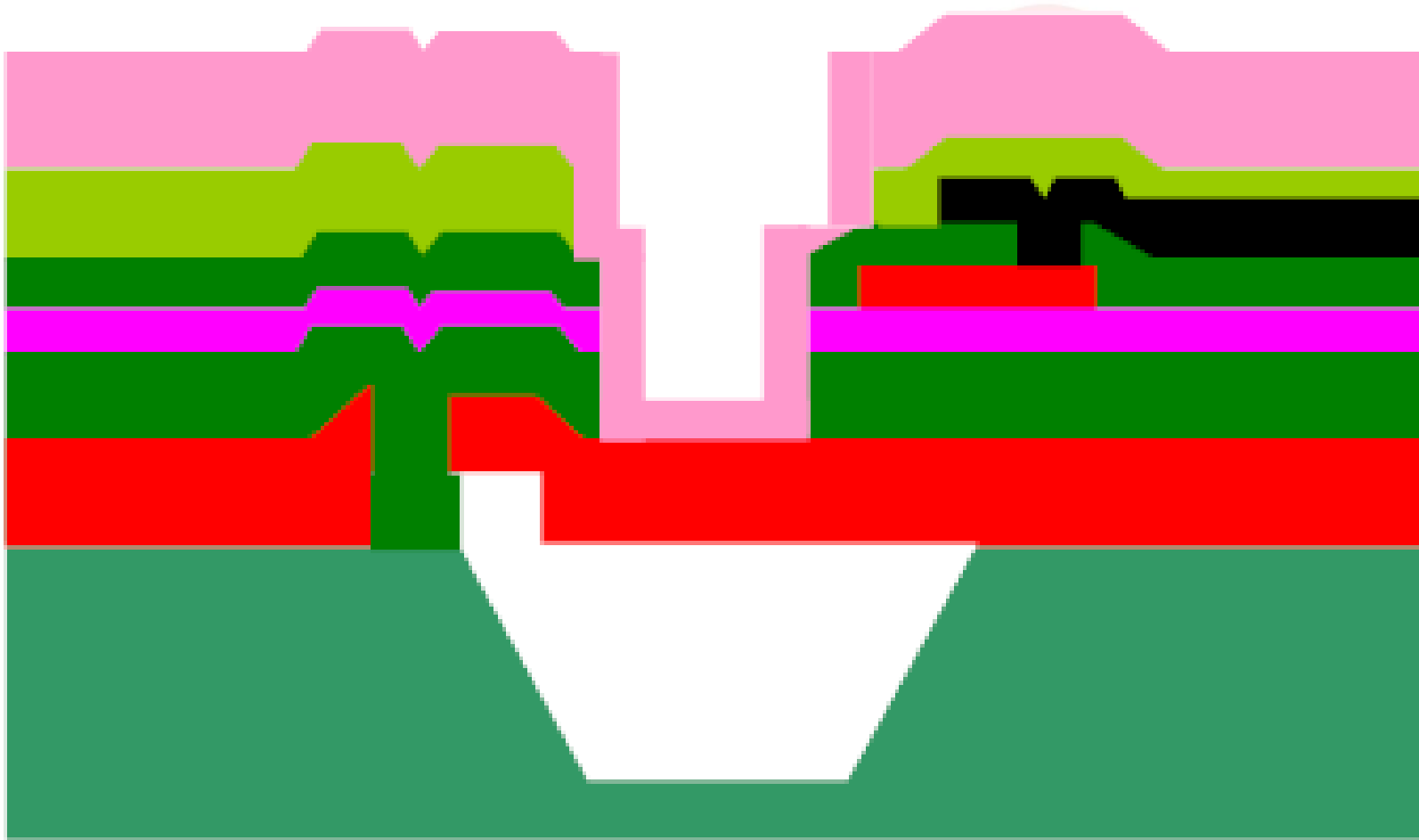
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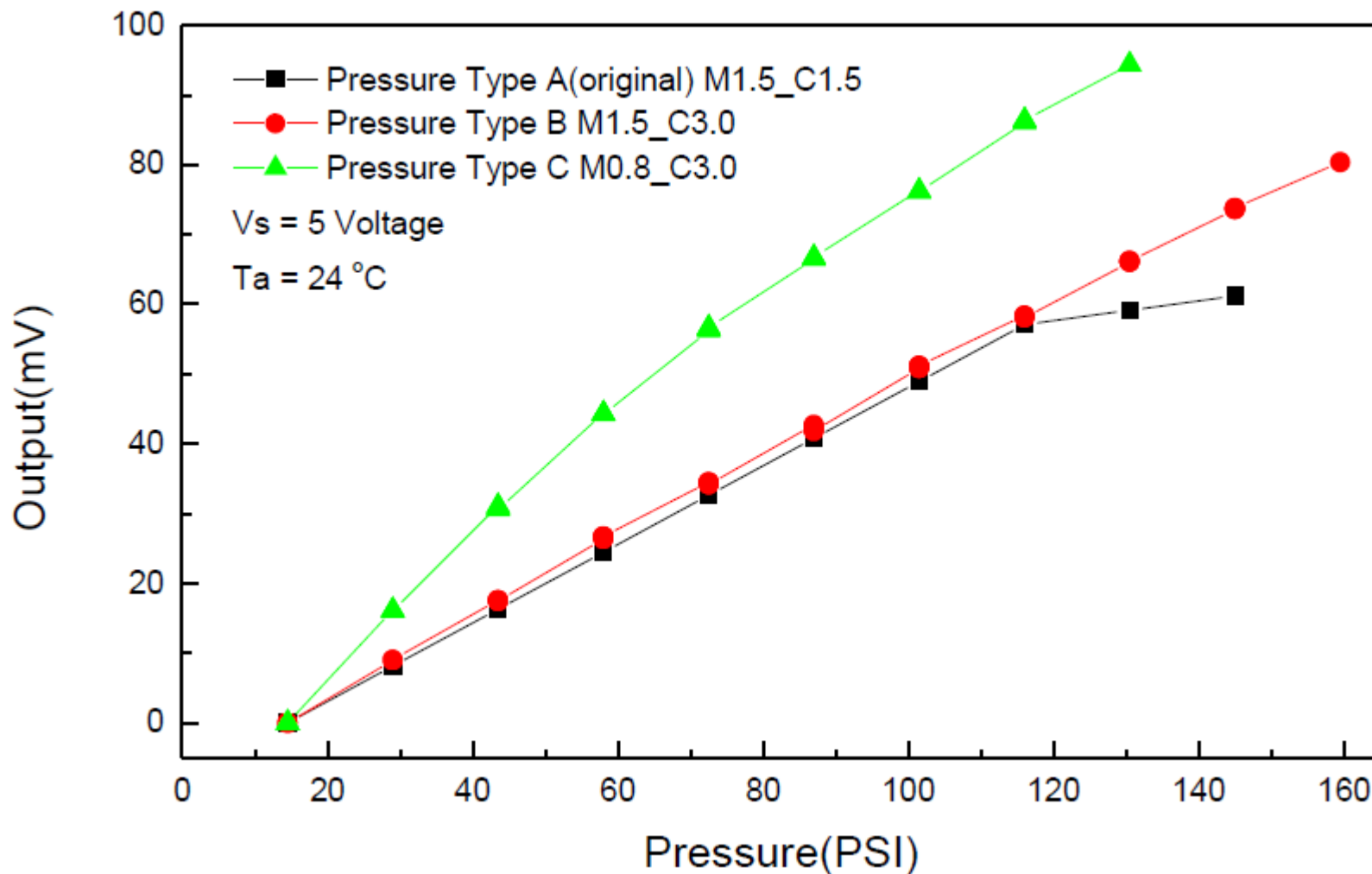
Pressure Sensor



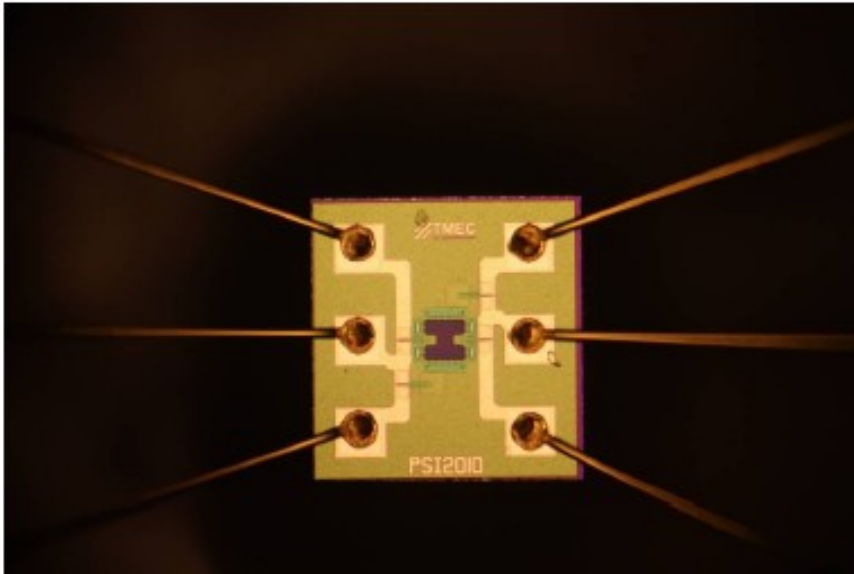
Pressure Sensor



Pressure Sensor



Pressure Sensor



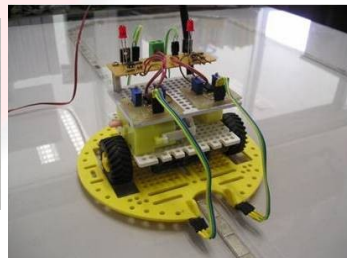
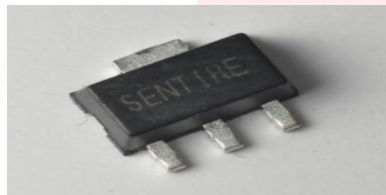
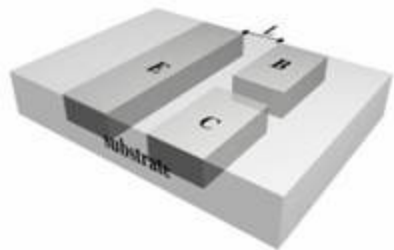
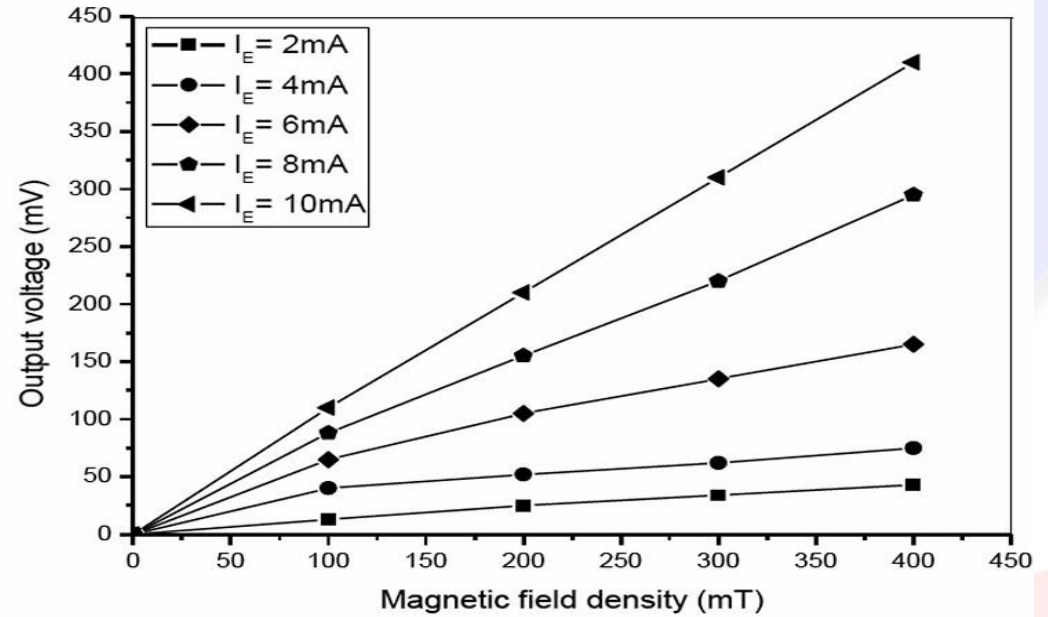
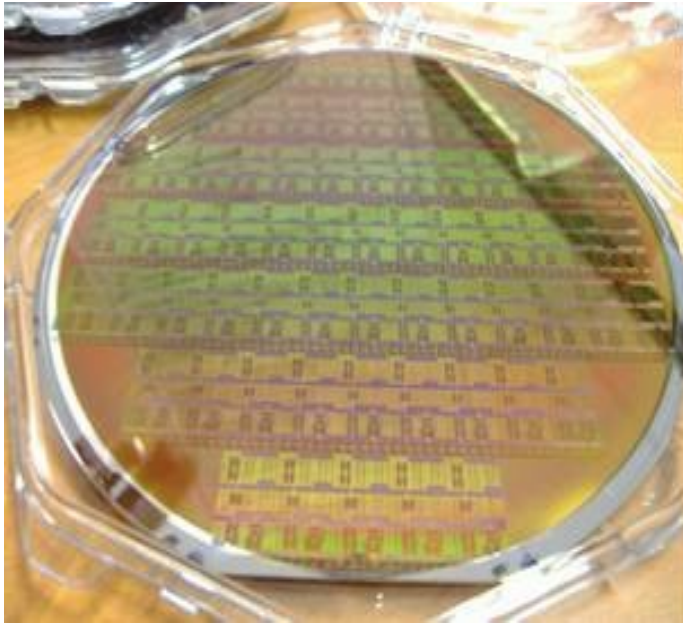
High precision water level sensor



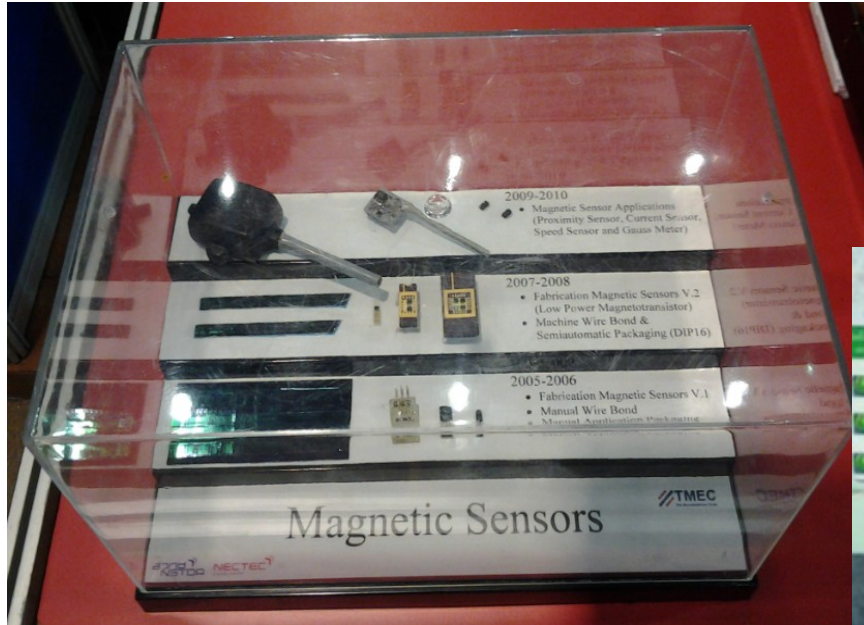
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Magnetotransistor



High precision water flow sensor



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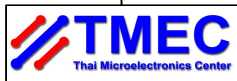
7. Summary



Ministry of Science and Technology



National Science and Technology Development Agency



NECTEC: National Electronics and Computer Technology Center
BIOTEC: National Center for Genetic Engineering and Biotechnology
MTEC: National Metal and Materials Technology Center
NANOTECH: National Nanotechnology Center
TMC: Technology Management Center

TMEC is ready

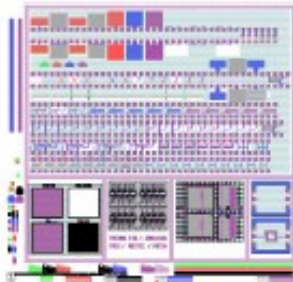
Our main office and facility is located in Chachoengsao province, approximately 70km east of Bangkok.

- 1,000 sq. m. (10,764 sq. ft.) of class 100 and 10,000 cleanroom space with additional support area.
- 6" Wafer production line
- 500 wafer starts per month capacity
- 80 employees and growing

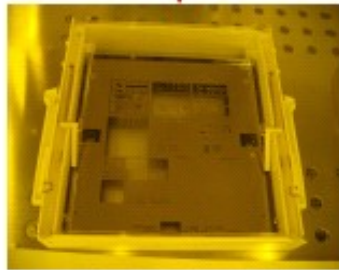
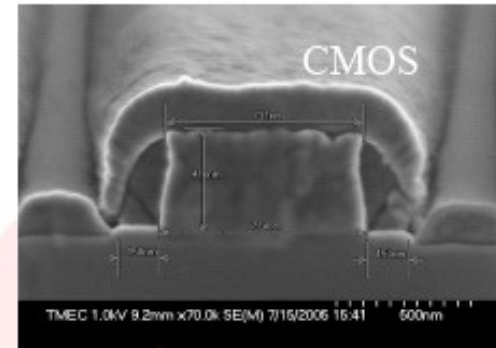
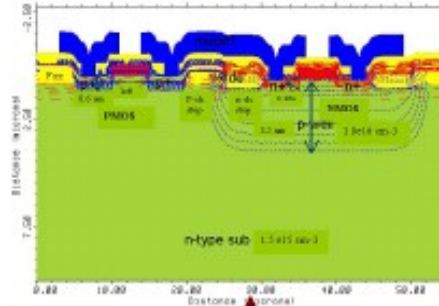


TMEC core technology

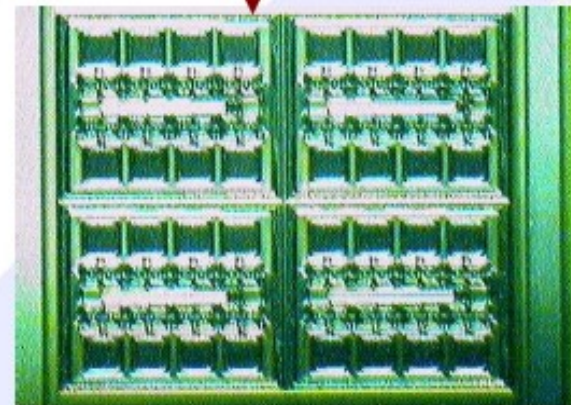
Layout design



Process simulation



Mask fabrication



Wafer fabrication

Integrating Ideas into Reality

TMECnology



2010

2011

2012

2013

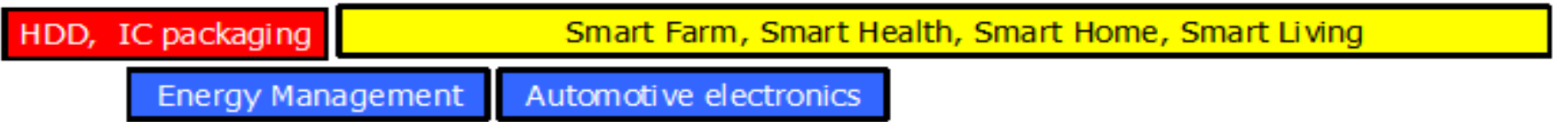
2014

2015

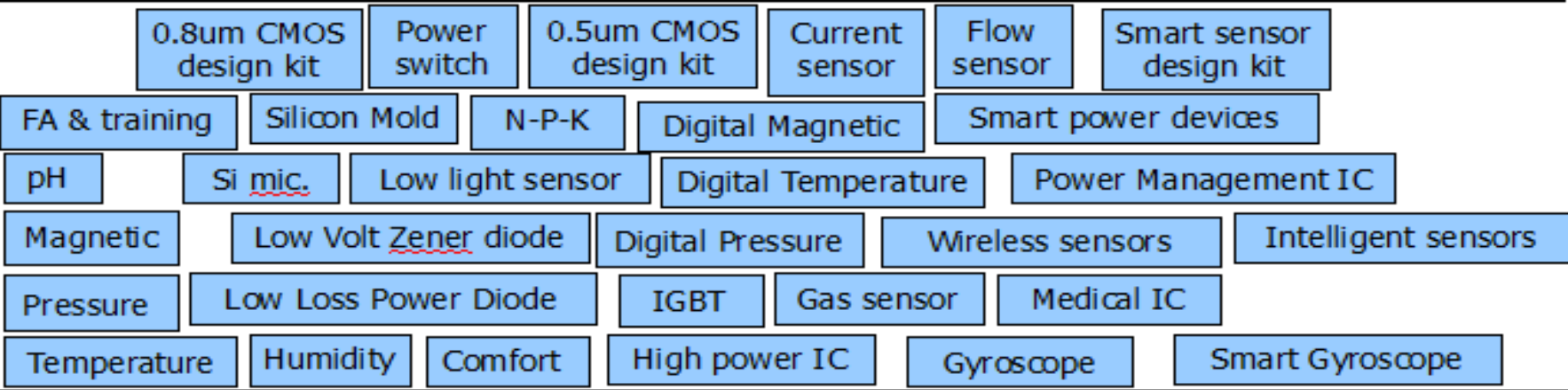
Market Driver



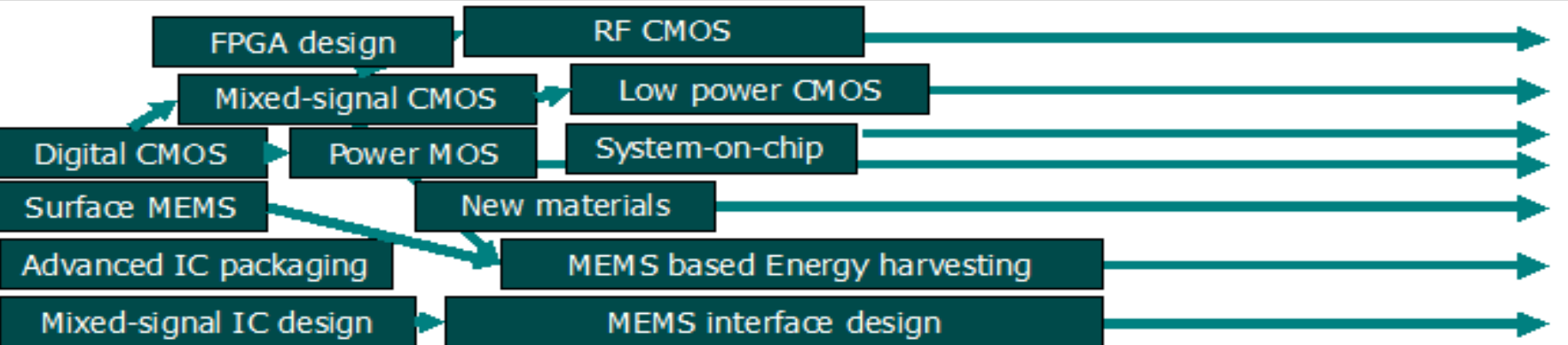
Market Driver



Products

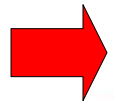


Technology



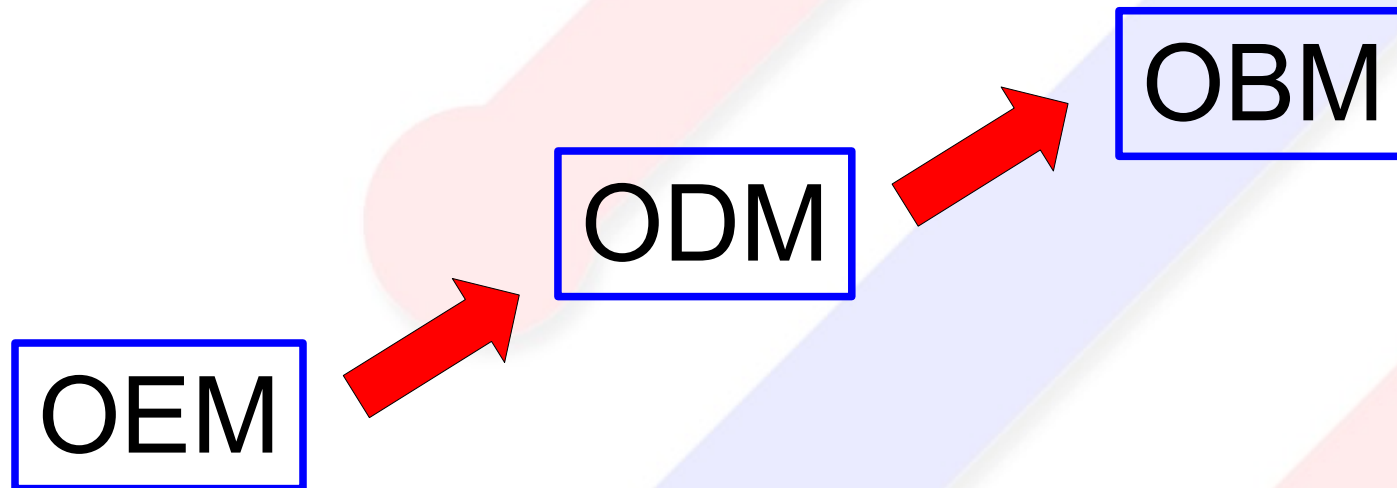
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7. Summary

TMEC is ideal partner for integrating ideas into reality





<http://tmec.nectec.or.th>