



Real-time Particle Detection in Semiconductor Vacuum Environment

IP Status: Issued US Patent; **Application #:** 11/773,197

Metal and Non-metal Particles can be Monitored

A particle-detecting integrated circuit that contains a device with a pair of conductive lines positioned in a vacuum environment can detect particles in real time in a semiconductor vacuum environment. The conductive lines are spaced at a critical pitch corresponding to diameters of particles of interest. An impedance measurement system linked to the circuit detects a change in an electrical property (e.g., a short in a current flow or a change in capacitance) of the conductive lines when a particle becomes lodged between the lines (particles smaller than the size of the pitch) or bridges the gap in-between (particles larger than the size of the pitch). A metallic particle larger than the pitch size generates a short in a current flow between the lines, while a non-metallic particle generates a change in capacitance between the lines.

Technology ID

z04142

Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls

Engineering & Physical Sciences/Semiconductor

Learn more



MN-IP Try and Buy

Try

- \$5,000 for a six month trial
- Trial fee is waived for MN companies or if sponsoring \$50,000+ research with the University
- No US patent costs during trial

Buy

- \$20,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first \$1M in sales

BENEFITS AND FEATURES:

- Detects particles in real time in a semiconductor vacuum environment
- Detects changes in an electrical property
- Monitors metallic or non-metallic particles

APPLICATIONS:

- Photolithography
- Depositing film on semiconductor wafers
- Dopant implanting on semiconductor wafers

Phase of Development - Proof of Concept

Researchers: David Pui, PhD Professor, Mechanical Engineering, College of Science and Engineering
Yi Liu Researcher, College of Science and Engineering,

Christof Asbach Oberhausen, Germany,

Heinz Fissan Kerken-Aledekerk, Germany