



# 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

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## 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

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