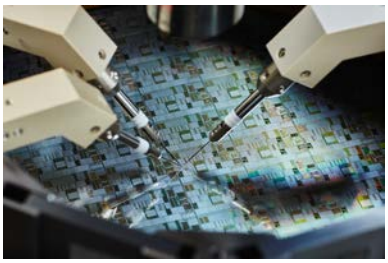
Introduction

Power Semiconductor wafer level testing continues to be a growing market with new product demands from energy, automotive, aeronautical, consumer electronic and military sectors. Testing small and large semiconductor chips at wafer level at voltages up to 10 KV and currents up to 500 A (pulsed) provides some interesting challenges to the device manufacturer, probe system and test instrumentation suppliers. Because of the lethal voltage and current level at test it is important to provide integrated probing and testing solutions with user safety as the highest priority. A summary of some of the SemiProbe solutions:

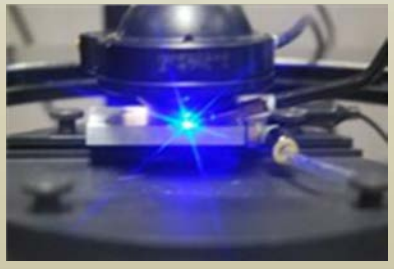
- **High Power Probing Solutions**
  - 3 KV and 10 KV Solutions
  - Currents up to 500 A (pulsed)
  - Chucks - Standard and Thermal (Hot & Cold)
  - Integrated Safety Enclosures
    - Dark Box
    - Laser Light Safety Curtain
  - Manipulators – manual & programmable
    - Variety of probe arms and tips
  - Interface Panels – chuck, dark box and light curtain
  - Cables, Connectors – several options
  - Test Instrumentation – Keysight, Keithley, Tesec and others
- **R&D to Production**
  - Manual, Semiautomatic and Fully Automatic
- **Devices**
  - Die, Partial Wafers and whole Wafers
  - 75 mm to 300 mm
  - Testing methods in open air, immersed in fluid and in vacuum

Types of High Power Devices Tested

- Transistors
  - 3 & 4 terminal
  - Lateral
  - Vertical
- Diodes



Let us help you with your High Power testing requirements



Application Specific High Power Probing Solutions

300 mm HV Sensor Test

On wafer 300 mm 10 KV semiautomatic probe system with a thermal chuck operating from -60 C to 300 C. Manual manipulators are being used and the electrical connections are made through a plexiglass interconnect panel in the laser light curtain to a Keysight B1505 Parametric Analyzer.

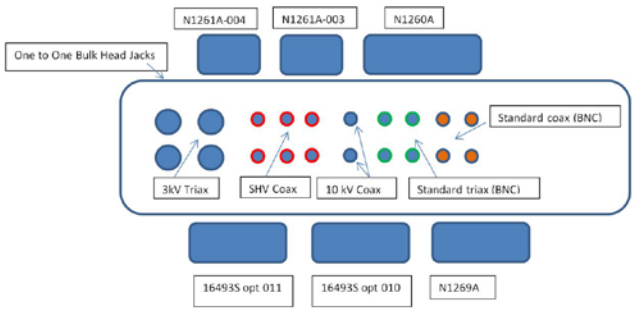
Manual 150 mm Probe System with Laser Light Safety Curtain

Configured with a 3 KV triaxial thermal chuck that operates from ambient to 200 C, a compound microscope, manual manipulators with triaxial probe arms and a laser light safety curtain.

Manual Probe System with a Dark Box

Integrated solution involving a manual 150 mm probe system inserted into a dark box for both light prevention and safety. Application uses manipulators with 3 KV high voltage probe arms and probe cards. Interconnect panel allows the easy insertion of Keysight boxes and cable changeover from the outside. Built in safety redundancy prevents the user from biasing the device under test with the dark box cover open.

Interconnect panels – chuck and dark box – are specifically built to the customer's application. The majority of the panels interface with Keysight or Keithley test instrumentation – low and high voltages and currents.

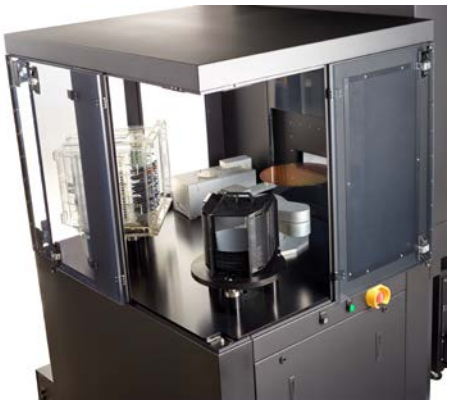


Research

Research is being performed to determine if high voltage arching on closely placed probes on small chips can be prevented when tested at controlled vacuum levels using a vacuum chamber. Work is being done using manipulators and probe cards. SemiProbe manufactures semiautomatic and fully automatic vacuum probing systems.

Automation – Fully Automatic Probe Systems

Two ways to achieve automation with SemiProbe probe systems. The customer has the option of field upgrading their existing PS4L semiautomatic system or purchasing a fully automatic probe system.



Accessories

SemiProbe manufactures a complete line of accessories for High Power applications – chucks, manipulators, high voltage and high current probe arms, probe tips, probe card holders, dark boxes and more.