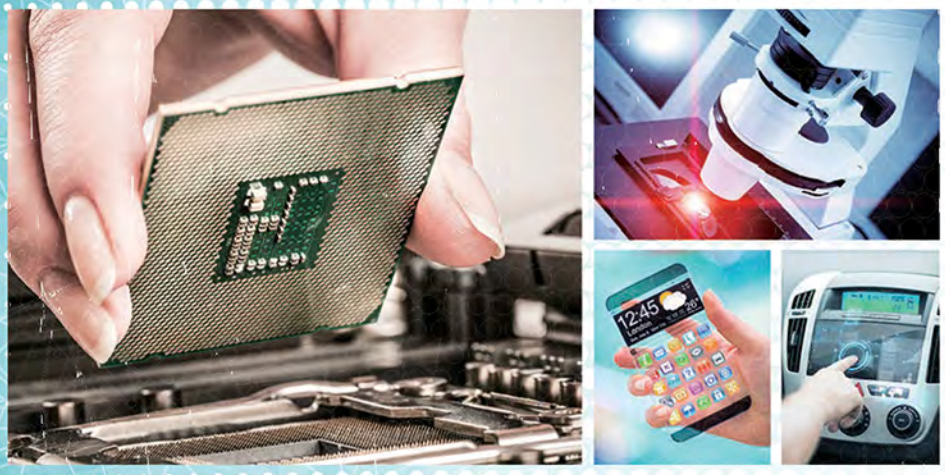
Outermost Technology

Advanced Technology Services at Affordable Price



Materials Analysis

Reliability Testing

Failure Analysis

Reverse Engineering

www.outermost-tech.com

Outermost Technology

MA Materials Analysis

RT Reliability Testing

CEO and Founder
Sang Lee, PhD

Message from our CEO:

I have built my career primarily in Silicon Valley, working for major tech companies including Applied Materials and Intermolecular. Engineers like myself have high expectations for high quality data and in-depth reports at affordable price. However, there are multiple obstacles preventing the combination of these three requirements in one service: high cost of quality data, lack of in-depth analysis, and misalignment of the output with the analysis goals.

Outermost Technology delivers services that meet the requirements through an innovative business model. We have contributed to hundreds of projects for 20+ Silicon Valley technology companies since our inception in 2017. Please feel free to contact us for your technical needs and challenges. Our team of experts is fully ready to assist. Thank you.

MISSION STATEMENT

Helping companies gain easy access to various advanced technologies at affordable price with fast turnaround time and high quality.

CORE VALUES

Committing to help customers solve technological challenges

Committing to make the access to technological resources easy and affordable

Committing to provide in-depth interpretation of data

Committing to introduce new technologies to industrial applications

Advanced Technology Services at Affordable Price

FA Failure Analysis

RE Reverse Engineering

Why work with us?

Affordable Price
Up to 40% lower than industry pricing

Free Consultation
Before and after service

In-Depth Data Interpretation
As a second opinion to yours

Quality Assurance Program
Free remeasurement* if not satisfied

How to work with us?

STEP 1 — Consult with Our Technologists

STEP 2 — Provide Your Samples

STEP 3 — Receive In-Depth Report

STEP 4 — Debrief with Our Technologists

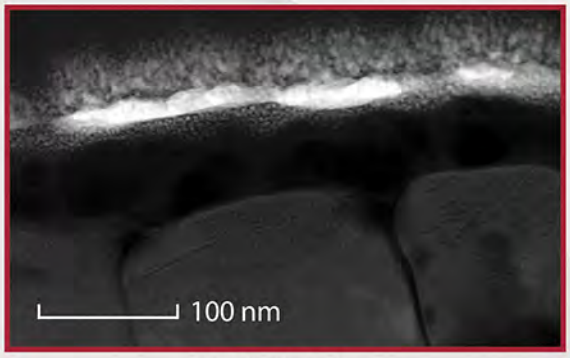
*Applies to selected services

One Stop Shop for All Services

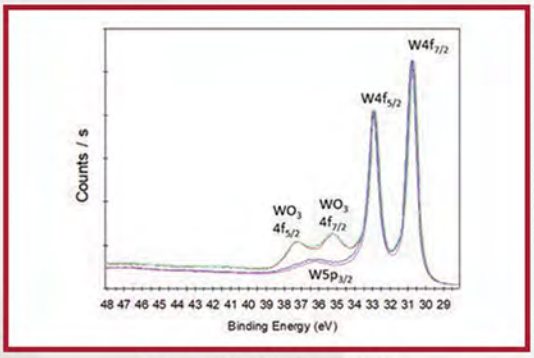
Materials Analysis from Outermost Technology is a turnkey solution offering a wide range of services. These are performed in parallel across multiple measurement types from a centralized point of contact. Reports will include in-depth interpretation across the various measurements.

Materials Analysis

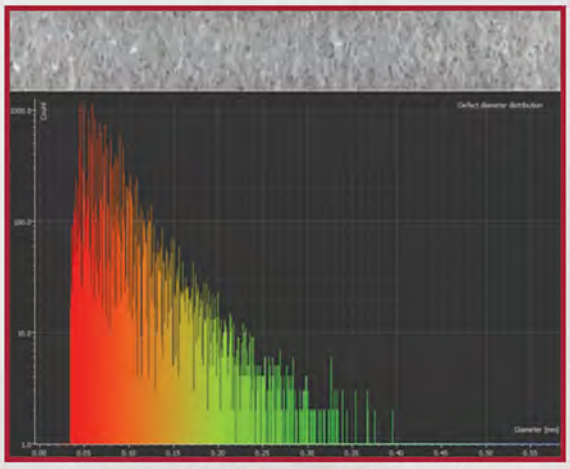
Microscopy	Visualization from macroscopic to atomic level 3D-CT, AFM, C-SAM, Dual Beam FIB/SEM, SQUID, SEM, TEM
Scattering	Analysis of material structure and composition DBS, PALS, RBS, HFS, NRA, ToF SIMS, XRR, XRD, XRF
Chemical Analysis	Identification of elements and chemical bonding states d-AES, d-XPS, ICP, NMR, MALDI ToF, EDS, EELS
Spectroscopy	Characterization of materials based on their interaction with light Fluorescence, FTIR, Raman, UV-VIS
Chromatography	Analysis of Composition including trace impurities in liquids and gases GC-MS, TGA GC-MS, IC-MS, HPLC-MS
Thermal & Mechanical	Qualification of physical properties of materials Porosimetry, TMA, DSC, TGA, Nanoindentor



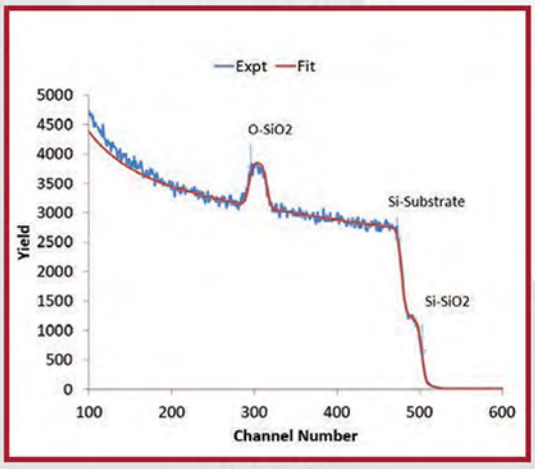
TEM-HAADF



W and WO_3 by XPS



Pore Size Distribution by 3D X-ray

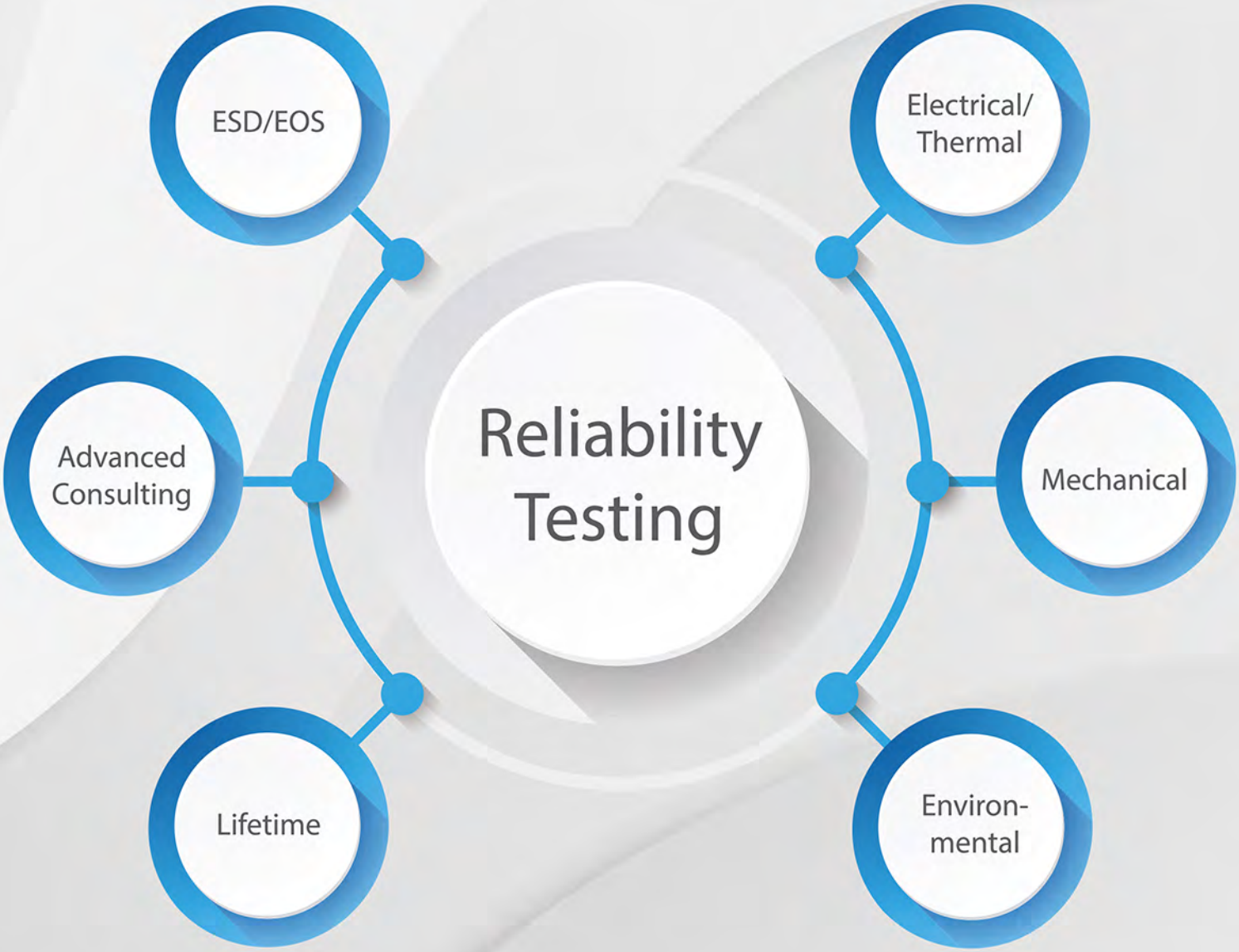


RBS Profile

SEMICONDUCTOR AUTOMOTIVE IC CHIP LED OTHER

All Reliability Tests from NPI to Obsolescence

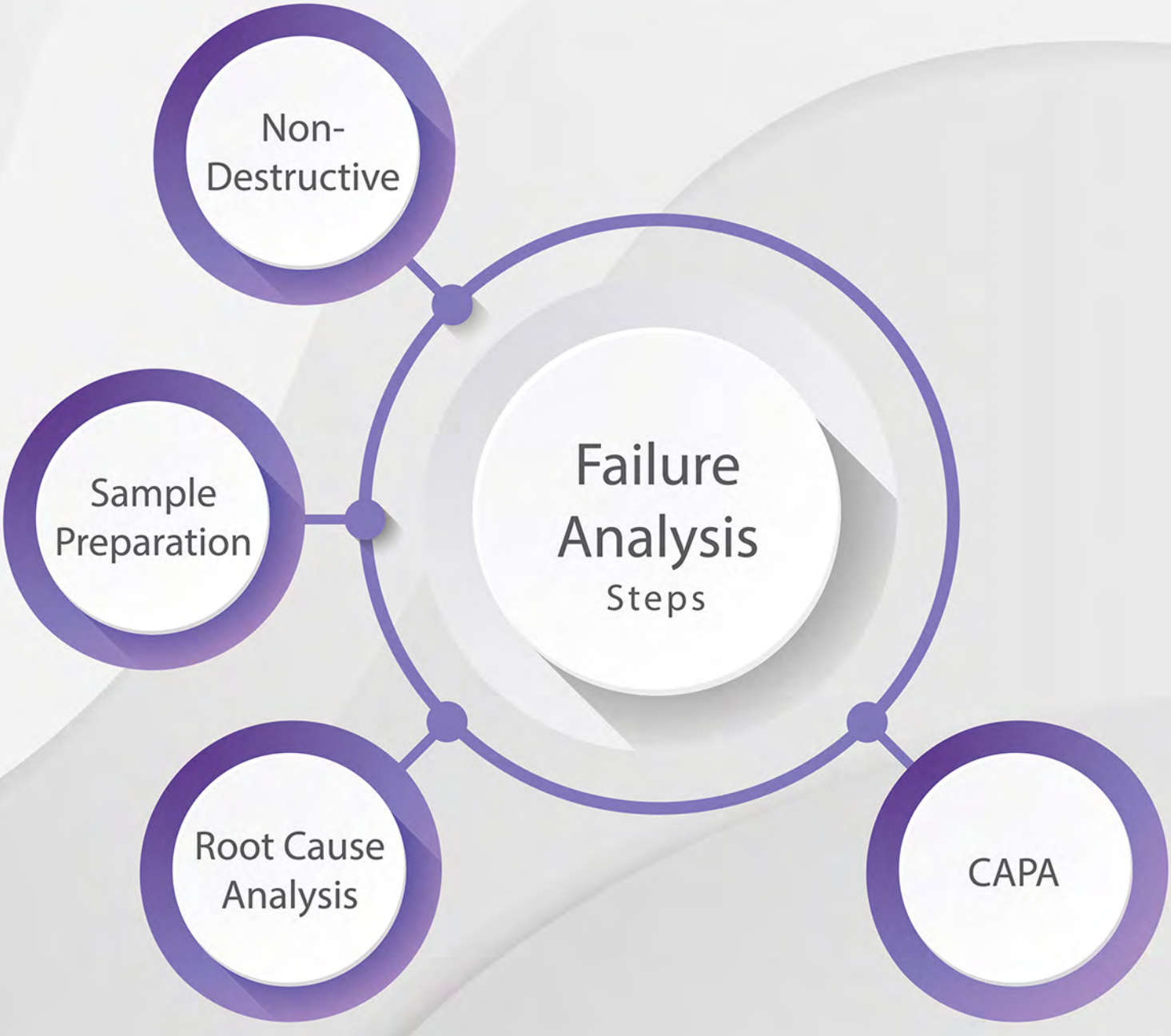
Outermost Technology's goal is to help customers solve all hardware issues in order to achieve robust product design with world class quality. Reliability tests provided by Outermost Technology are governed by JEDEC and are ISO 9001:2018, ISO 17025: 2015, ISO 26262, AEC, IPC certified.



ESD/EOS Test	HBM, MM, CDM, TLP, Latch up, System Level ESD Test, EMC, EMI
Electrical/Thermal Test	Burn-In, Damp Heat, HTGB, HTFB, HTRB, TC
Mechanical Test	Shock, Vibration, Drop, Solderability, Memory Twist
Environmental Test	Altitude, MSC, MSL, THB, THS, HAST
Lifetime Test	ELFR, HTOL, LTOL, HALT, HASS
Advanced Consulting	DFX, FMEA, MTBF, Weibull Analysis, QMS/Pursue ISO Certificates

All Your FA Needs Covered

Outermost Technology provides full service in failure analysis from non-destructive analysis to root cause identification. The combination of highly trained experts and leading-edge equipment provides cost efficiency and fast turnaround time with the best quality. Our FA8D report includes CAPA, ECO, FCO, and SCAR in addition to standard content.

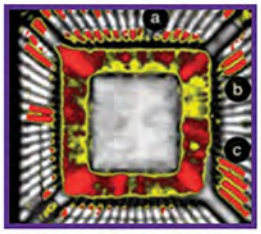


Non-Destructive	Curve Tracer, C-SAM, SIMM, TDR, SQUID, Optical Microscope, X-Ray Imaging
Sample Preparation	Decapsulation, Ion Milling, Parallel Lapping, RIE, Cross-Section, Dye and Pry Analysis
Root Cause Analysis	3D-CT, AFM, APT, EBSD, EMMI, FIB/EDX, FTIR, LSM, OBIRCH, PICA, SEM/EDX, SCM, SSRM, TEM/EDX/EELS
CAPA	Generate CAR, PAR, SCAR, ECO, FCO, Training

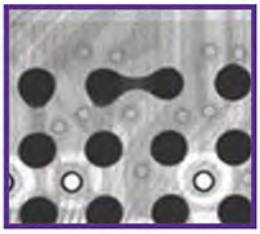
STEP 1

Non-Destructive

FA usually starts with non-destructive analysis, visual and electrical, to locate the failures. The samples are handled with extreme care to prevent any additional damage during analysis and storage.



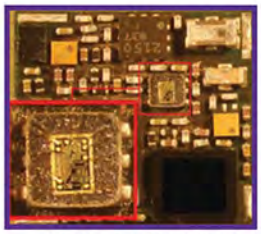
Scanning Acoustic Microscope

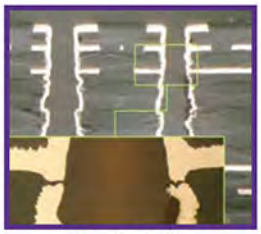

X-Ray

STEP 2

Sample Preparation

Depending on the packaging material types and the findings from non-destructive analysis, various methods are available for sample preparation. These methods include mechanical, chemical and laser decapsulation as well as parallel lapping and cross-section.


Package Removed

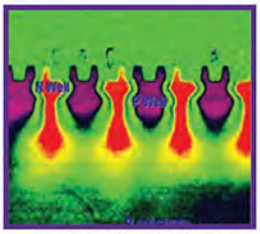

Crack on Via

STEP 3

Root Cause Analysis

Leveraging our expertise in analytical technologies, we perform FA on micron to nanometer scale devices for AI, ASIC, automotive, LED, semiconductor industries. Our services will locate the issues, isolate the fault, and identify the root cause, quickly and economically.


Optical Beam Induced Resistance Change


Scanning Capacitance Microscope

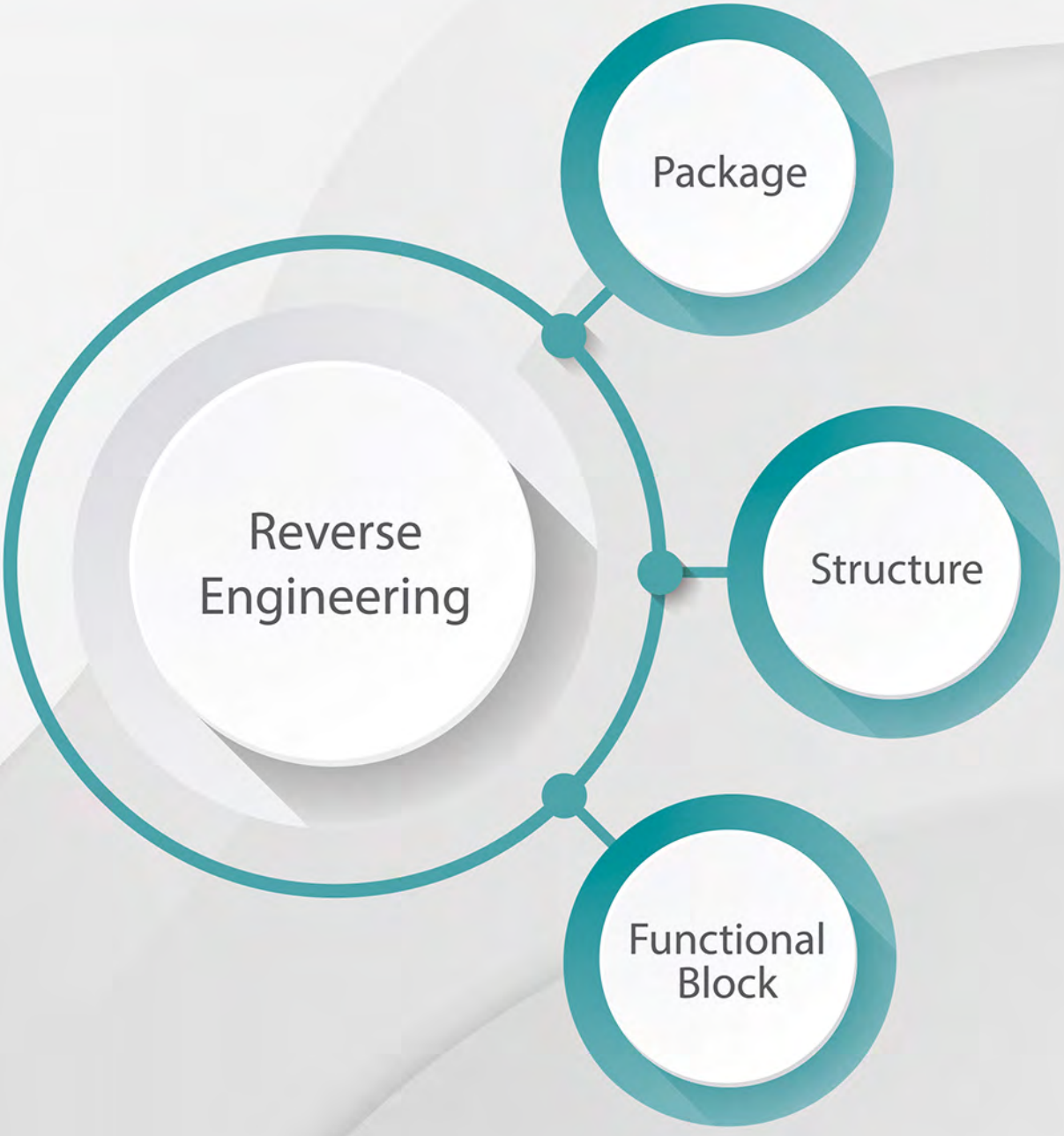
AUTOMOTIVE

IC CHIP

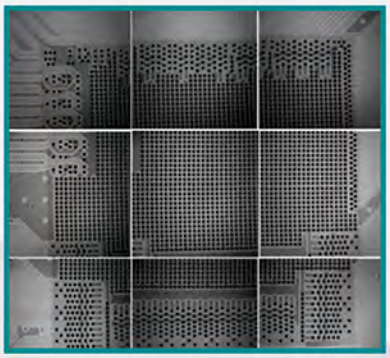
LED

You Pick a Device, We Provide All from A to Z

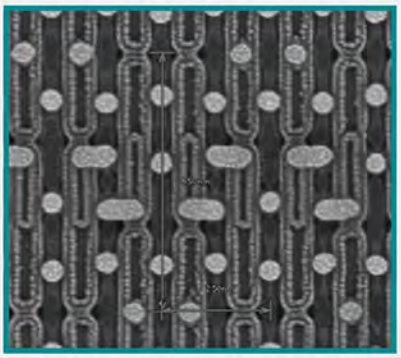
Outermost Technology provides services to IC design & manufacturing, display, sensor, and IP licensing companies. As our services include traditional approaches and the advanced ones such as TEM/EELS and SCM/SSRM, we can cover all your needs in reverse engineering and litigation.



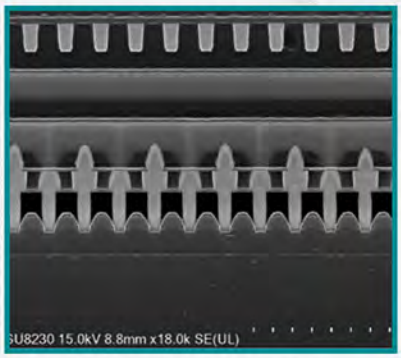
Package	Parallel Lapping, Dual Beam FIB/SEM, High Resolution Optical Microscope, Polishing/Ion Milling, SEM/EDS, TEM/EDS/EELS, APT, SCM, Wet/Dry Etching, X-ray Imaging, FIB, SEM
Structure	Bump Pitch/Pad, Metal Layer/Via, Package Layer, Pin Connection Configuration, Pin Mapping, Polyimide, Solder Ball/Pad, UBM Size
Functional Block	Block Identification, Chip/Pad Dimensions, IO Pads, Technology Node, Memory Block/Size, Memory Type, Metal Structure, Material Identification



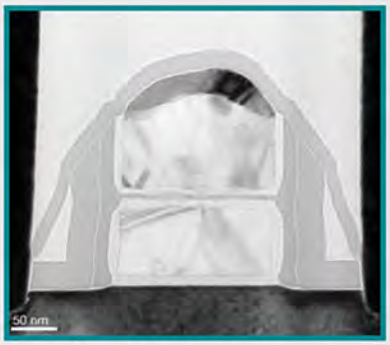
X-ray Image of a SoC Chip



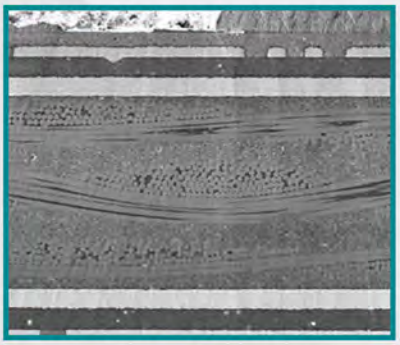
Unit Cell from SRAM Block



SEM Cross-Section

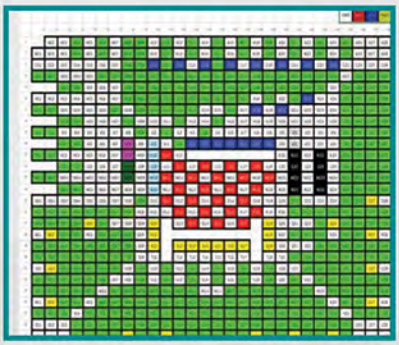


TEM Cross-Section

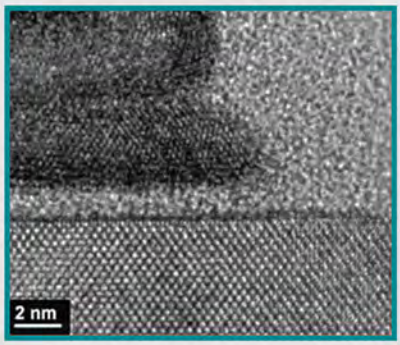


Cross-Section by Ion Milling

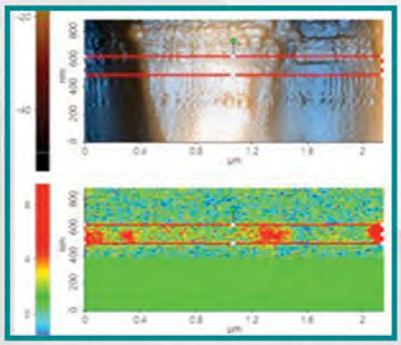
Metal Layers by FIB/SEM



Pin Connections



Atomic Resolution TEM



SCM of Poly CG - 20nm

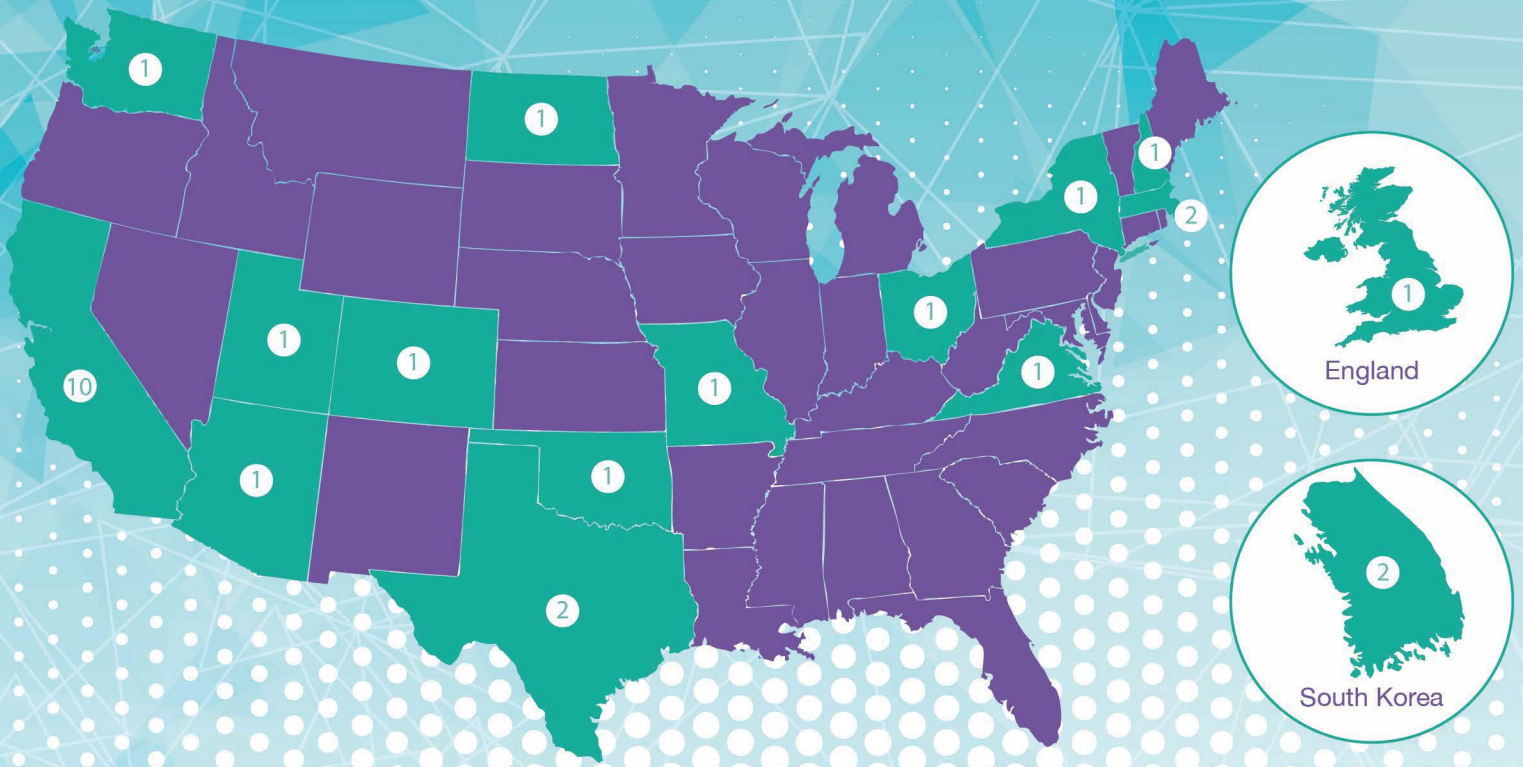
AUTOMOTIVE

IC CHIP

LED

OTHER

Global Network



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