criteria labs

Engineering and service capabilities

Defense/ Military /Space Services

Criteria Labs provides services for all major defense subcontractors like Raytheon, Lockheed, Boeing, BAE, AMIS, DOD and others. We are fully DSCC certified to MIL-PRF-38535/883 for all processes. Whether you need just one of our world-class services or full turnkey capability, Criteria Labs wants to be a partner in your success.

Engineering:

Criteria Labs has assembled world-class design and engineering teams to solve your complex problems.

TURNKEY

- Product engineering
- Program management
- Advanced interconnect development
- Packaging and development of interconnection technologies
- Process development for advanced technology
- Qualification plan development
- Construction analysis
- Semiconductor failure analysis

SOFTWARE

- Characterization and validation of new silicon (digital, mixed signal, discrete components, i.e. transistors, diodes and RF)
- Test plan and design for testability, probe and final test (digital, mixed signal, discrete components, i.e. transistors, diodes and RF)
- Conversion between different ATE platforms (digital and mixed signal)

HARDWARE

- Probe card design including spider
- Load board design (low frequency to high frequency)
- Burn-in/HAST board design
- DUT/probe interface boards
- Tape pocket design (for tape and reel services)
- Handler kit / Interface

PROCESS ENGINEERING FOR MICROELECTRONIC PACKAGING

- Hybrids
- Chip on board designs (COB)
- Advanced packaging
- Flex boards
- Smart cards

Services:

Criteria Labs provides a broad array of in-house services to reduce your time to market, verify quality and make sure what's being shipped meets your exact specifications.

DEFENSE/MILITARY/SPACE SERVICES

WAFER TEST, FINAL TEST & TEST ENGINEERING SERVICES

- Wafer probe from -55° C to +175° C
- Off-line inking
- Final semiconductor package electric test -55° C to +175° C
- Wafer mapping
- Data logging and yield monitoring with feedback to customer
- Laser marking
- Package inspection

DIE PROCESSING

- Wafer saw (2” to 8”)
- Wafer sort
- Visual inspection *(MIL-STD 883 Method 2010 A or B)*
- Die mapping
- Wafer wash/ink removal
- Die sort duals, trios and quads
- Die to waffle pack/GEL pack
- Die to tape
- Bar code labels
- Special packing

PACKAGING

COMMERCIAL, MEDICAL CUSTOM, CERAMIC & PROTOTYPE (CLASS B AND CLASS S)

- Ceramic dips, flat packs, LCC, CERQUAD, CERPAC, ceramic SOIC
- BGA, CQFP, CPGA, TO-CAN, METAL CAN
- Sidebraze, JLCC
- Multi-chip module (MCM), hybrids, chip on board (COB)
- Flex assembly, smart cards, FR4 chip bonding
- MIMS assembly
- Opto assembly
- Die attach material
  - Silver glass: QMI 2569 conductive
  - Silver-filled cyanate ester: JM-7000 and QMI-84-1 or 3 (conductive or nonconductive)
  - Silver-filled epoxy
  - Electrically insulating epoxy
  - Low-temp cure epoxies
  - Eutectic: ~2% silicon 98% gold preform
~80% gold 20% tin preform
- Sealing and encapsulation
  - Solder sealing (gold-tin eutectic) and glass sealing
  - Resistance welding for metal cans
  - Glob topping with hysol material on custom packages
  - Seam seal
  - Taped lids
  - B-stage epoxy attachment
- Assembly testing (quality conforms or exceeds military requirements)
  - Die shear strength
  - Bond pull
  - Non-destructive bond pull (Class S)
  - Fine and gross leak testing
  - Constant acceleration (centrifuge)
  - Particle impact noise detection (PIND)
  - Solderability
  - Temperature cycle
  - Resistance to solvents
  - External visual
- Lab suitability qualification services
  - Solder dip
  - Lead trim and form/manual
  - Lead inspection and repair
  - Temperature cycle
  - Constant acceleration (centrifuge)
  - Particle Impact Noise Detection (PIND)
  - Fine and gross leak
  - Resistance to solvents testing
  - Marking
  - Demark and remark
  - Ball shear
  - Bond pull
  - Die shear

PRODUCT ASSEMBLY QUALIFICATION AND STRESS SCREENING FOR CERAMIC DEVICES

(DSCC LAB SUITABILITY, MIL-38535, MIL-STD-883, QUAL GROUPS A, B, C AND D (SUB-GROUPS 1 TO 7) TESTING SERVICES, COMPLIANT PER MIL-STD-750, MIL-STD-202)

- Environmental
  - Steady state life test *(Method 1005)*
  - Thermal shock *(Method 1011)*
  - Temp cycling *(Method 1010)*

- Burn-in *(Method 1015)*
- Moisture resistance *(Method 1004)*
- Fine/gross leak testing *(Method 1014)*
- Internal water vapor content (RGA) *(Method 1018)*
- Salt atmosphere corrosion *(Method 1009)*

> Mechanical Tests

- Physical dimensioning *(Method 2016)*
- Marking: stamp or laser
- Marking: resistance to solvents testing *(Method 2015)*
- Solderability *(Method 2003)*
- Bond strength (destructive bond pull) *(Method 2011)*
- Mechanical Shock *(Method 2002)*
- Vibration variable frequency (*Method 2007)*
- Vibration random *(Method 2026)*
- Constant acceleration (centrifuge) *(Method 2001)*
- Adhesion of lead finish *(Method 2025)*
- Lead integrity *(Method 2004)*
- Lead torque
- Particle noise impact detection (PIND) *(Method 2020)*
- Bond shear
- Die shear strength *(Method 2019)*
- Lid torque for glass fit sealed packages *(Method 2024)*
- Visual per MIL-STD-883

> Process Testing

- Latch up/electrical overload stress (EOS)
- Electro static discharge (ESD) HMB, MMB and CDM

DESTRUCTIVE PHYSICAL ANALYSIS (DPA)

IN ACCORDANCE WITH MIL-STD-1580

> External visual *(Method 2009)*
> Radiographic inspection *(Method 2012)*
> Hermetic seal testing *(Method 1014)*
> Internal visual inspection *(Method 2010, condition B)*
> Bond pull testing *(Method 2011)*
> Scanning electron microscopy (SEM) *(Method 2018)*
> Die shear testing *(Method 2019)*
> Photograph of the internal construction and pad locations
> Summary report

RELIABILITY ANALYSIS OR FAILURE ANALYSIS

> Acoustic microscopy (CSAM)
> Focus ion beam (FIB)
> Scanning electron microscope (SEM)
> X-ray
> Real-time X-ray
> Cross sectioning
> Micro-probe
> Light emission microscopy
> De-cap (wet) manual/acid jet etcher
> Construction analysis
> Parallel polishing
> Back lapping
> Latch up/electrical overload stress (EOS)
> Electro static discharge (ESD)
> Level 1, 2 and 3 failure analysis
> EDX
> Digital image capture
> Solderability testing

PRODUCT QUALIFICATION TESTING FOR PLASTIC ENCAPSULATED DEVICES

(JEDEC & AEC STANDARD USED IN AUTOMOTIVE APPLICATIONS)

> Environmental Tests

- Pre-conditioning of plastic surface mount devices prior to reliability testing *(Method A113)*
- Moisture sensitivity test for plastic surface mount devices *(Method A112)*
- Lead-free re-flow charting and validation to JEDEC-22 or Japanese automotive requirements (green mold compound)
- Temperature cycling *(Method A104)*
- Steady state life test/1000 hour burn-in *(Method 108A)*
- Temperature humidity bias testing *(Method A101)*
- Autoclave – accelerated moisture resistance – unbiased *(Method A102)*
- Moisture resistance
- Thermal shock *(Method A106)*
- Highly accelerated temperature and humidity stress test (HAST) *(Method A110)*
- High-temp storage (HTS)
- Salt atmosphere *(Method A1107)*
- High-temp operating life (HTOL) (biased/unbiased)
- THB 85° C/85% RH

- Mechanical Tests
  - Physical dimensions *(Method B100)*
  - Vibration, variable frequency *(Method B103)*
  - Mechanical shock *(Method B104)*
  - Lead integrity *(Method B105)*
  - Solderability *(Method B102)*
  - Resistance to soldering heat *(Method B106)*
  - Resistance to solvents *(Method B107)*
- Process Testing
  - Latch up/electrical overload stress (EOS)
  - Electro static discharge (ESD) HMB, MMB & CDM

ELECTRONIC DEVICE PHYSICAL EVALUATION AND ANALYSIS

(JEDEC OR MIL-STD-883)

- Counterfeit parts evaluation
- Lead free re-flow charting and validation to JEDEC-22 or Japanese Automotive requirements (green mold compound)
- BGA and uBGA automatic ball inspection
- Bond pull
- Die shear
- Solder dip
- Lead trim
- Lead inspection and repair
- Solderability restoration
- Bake and dry pack

TAPE & REEL SERVICES

- Tray to tape, QFP, TSOP, BGA, uBGA, FBBGA, QFN
- Tube to tape, SOIC, PLCC, SOJ, SOMC, SSOP, TSSOP, MSOP, VSOP, QSOP, QVSOP, DDPAK, DPAK, TO263, PLCC SOCKETS, MLF, MLP
- Bulk to Tape SOT, CHIP RESISTORS/CAPACITORS
- Tray to tray
- Tube to tube
- Lead scan trays
- Lead scan tape
- 3-D laser scanning: QFP, TSOP, BGA & uBGA
- 3-D vision system: SOIC, TSSOP, SSOP, MSOP, VSOP, QSOP, QVSOP, SOMC
- 2-D: QFP, TSOP, PLCC, BGA and uBGA
- Lead conditioning
- In-line mark inspection
- Parts marking
- Tape custom packages (Criteria Labs will custom design tape pocket)
- Bar coding and custom bar coding
- Labeling & custom packaging
- Laser mark capability
- De-tape
- Bake and dry pack

QUALITY SYSTEMS

- Total Quality Management Program
- Incoming inspection of consigned and turnkey products
- 100% ESD controlled environment
- Packaging process to customer specifications
- QA sample inspection or 100% based on customer requirements
- SPC controlled in critical processes
- 8D corrective action
- Employee training and certification
- Equipment calibration schedule
- Document control
- Final gate inspection (AQL or LTPD)
- CFC and summary data reports

CERTIFICATIONS and COMPLIANCE PROCESSES

ISO-9001/2000
QML-PRF-38535 Certified
MIL-STD-883 Certified
IPC 610 Class I, II, III Certified
MIL-PRF-19500 Compliant
MIL-STD-750 Compliant
Classified Facility Controls
EIA 485 Compliant
EIA 481 Compliant

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