Making EEE Parts Selection Less Risky

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criteria labs
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EEE Parts Selection can be Risky Business

System Designer must understand and consider the following:

1. Criticality of Application – Is it a “must work”? 
2. Environment/Lifetime – Harsh environment? Length of mission? 
3. Affordability
The Availability of Devices that meet Criticality, Environment/Longevity, and Affordability is what the NASA System Designer needs to have confidence in to make the correct decision.

Availability of Devices that fall into these four categories:

1. COTS
2. Commercial Upscreening
3. NASA Level 1 and 2 Screening
4. Space Qualified QML Class V

This is what Criteria Labs does
Space Qualified QML Class V devices

1. Full Turn Key 38535 / 883 QML Assembly and Qualification
2. Package Assembly – Class 100 clean Room
   1. Package die in hermetic packaging
   2. High Reliability multi-chip modules – Hermetic
   3. Custom package design / RF / multichip modules / photonics
      1. Organic
      2. Ceramic
3. Three temp Electrical / Stress Screening
   1. Test Program Development
   2. Electrical test
4. Device Qualification
   1. Group A Electrical
   2. Group B Testing
   3. Group C
      1. Test board design, layout
      2. Burn In Ovens (Dynamic / Static)
      4. Group D (All tests performed in house except RGA)
5. Data pack creation and Flight Units shipped
RF Eval Assemblies
Packaging Services

- **Process Engineering Development**
  - Process development, tooling design
  - Package design and Fabrication

- **Prepackaging and Wafer Handling**
  - Wafer Saw, sort and MIL inspection
  - Class 1000 clean room, Class 100 critical areas

- **Packaging Assembly**
  - 38535 /883 MIL Ceramic Assembly
  - MCM, RF Assembly, Open cavity, TO Can
  - Smart Card Assembly and Flex Board Assembly
  - Chip on Board (Includes SMT Attachment)
  - Stack die
  - Flip chip

- **Void Free Process Development and Assembly**
  - Process development
  - Tooling development
Packaging Capabilities

- Wafer Saw 2” to 8”
- Die sort, manual & Automatic, including wafer mapping
- Die inspection, MIL-STD 883, method 2010 A or B Level
- Die attach- JM7000, 84-1/3, Silver Glass, Eutectic, Die Mat, Indium, other
- Plasma Clean- Ar, H, O gas
- Wire Bond- Wedge (Al & Au) Ball (Au)
- Pre cap inspection A or B Level
- Vacuum bake
- Solder Seal, Seam Seal, Resistance seal
- Vacuum solder seal
- PIND test
- X-Ray
- CSAM
- Full environmental screening
Packaging Equipment

- DATACON EVO-2200
- JUKI KE-2070
- SST VACUUM SEALER
- DEK SCREEN PRINTER
- SIKAMA REFLOW OVEN
Packaging Equipment (continued)

F&K 6400
ESEC 3100
ELECTROX LASER MARKING
NASA Level 1, 2, and 3 Screening Capabilities

EEE-INST-002

- Full Turnkey Screening and Qual
  - Monolithic Microcircuits
  - Hybrid Microcircuits
  - Resistors and Capacitors
  - Crystals
  - Filters
  - PEMS (plastic encapsulated)

- For Destructive Physical Analysis we partner with Microtech Labs

MICROTECH LABORATORIES LLC
www.Micro-Labs.com

- John Olson is speaking here at 2:10pm today
Device Qualification Services
Reliability Equipment

- (2) ESPEC TSE-11-A Temp Cycle Chamber -65 to +150°C, paperless recording
- (5) ONE Box Dynamic Burn In (+250 °C)
- (1) Dispatch Temp Humidity Oven
- (3) ESPEC Temp Humidity Chamber (TEMP -20°C to + 85°C) (Humidity 40% to 95% RH)
- (2) Express Test HAST Oven, Model 1000
- Low temp storage chamber
- Test Equity Temp cycle chamber +175°C to -65°C
- Cincinnati Sub Zero Temp cycle chamber +250°C to -70°C
- Scientific American Bake Oven (Up to 250°C)
- Blue M Bake Ovens (Up to 300°C)
- NAPCO 8300 Autoclave Oven
- Advanced Techniques Pro-1600 Reflow Profile Oven
- Dage 4000 Wire Bond Pull / Die Shear
- Resistance to Solvents Station
- Steam Age Station
- Lead Integrity Station
- Associate Environmental-Salt Chamber
- Labworks Shock and Vibration station
- Spectral Dynamics PIND tester
PEMs Upscreening

Options

- Auto Clave
- Solderability
- Bond Pull
- Die Shear
- Ball Shear
- Dimensions
- Lead Integrity
- Leak Test

Temp Cycle (77)
Condition B/C
Standard JESD22-104-A

Pre-Con (77 x 3)
CSAM (22)
THB (Per MSL)
3X Conv Reflow
220°C to 260°C
CSAM (22)

Test

HTS – 77 units
JESD22-A108-A

HTOL – 77 units
JESD22-A-1030-A

LTS – 77 units

HAST (77)
Per MSL
JESD22-A110-B

Dimensions

Lead Integrity

Leak Test

Test
Test Services

**Wafer-level Capability:**

**Wafer Probe:**
- RF
- Analog
- Digital
- Photonics

**WLAT – MIL-PRF-38534 Class K & H**
- Die Element Eval
- Bond pull and Die shear
- SEM

Automated Wafer Map creation

Saw

Die Pick

Die Inspection (Cond A & B)

**Device Test:**

**Technologies:**
- RF Test – 50 GHz
- Analog
- Digital – 200MHz
- Photonics – lasers and PD’s

**Reliability Levels:**
- Class V & Q
- NASA Level 1/2/3

**Package Types:**
- Hermetics, Hybrids, COTS

**Multi-Temp Test (-70C to 250C):**
- Post Clabs Assembly
- COTS Screening
- Qualification
More about Criteria Labs

HQ in Austin Texas – 20,000 sq. ft.
2nd Site Penrose Colorado – 15,000 sq. ft

Markets served:
- Space
- Aerospace and Defense
- Commercial Semiconductor
- Downhole Electronics
- Medical

Certifications:
- MIL-PRF-38535 / MIL-STD-883
- DLA Class Q Assembly and Test
- DLA Lab Suitability (Reliability)
- ISO 9001:2008
- Certification Roadmap: AS9100, Class V assembly and test, and AEC-Q100
Penrose Colorado
Largest TnR house in the U.S.A.
Tape Design and Fabrication
Custom tooling
High volume production capability for all surface mount devices (SMT)
Meet or exceed all JEDEC or EIA standards