



Supply Chain Shortcuts

Can COTS be Mission Critical?

Reed Coffey
Technical Sales Manager
09/23/2025

WE PROVIDE COMPONENT CONFIDENCE

At AAA Engineering & Test Lab we provide component test engineering expertise that decodes industry requirements and empowers you to trust your supply

Component Engineering Experts

Our team of specialized component engineers brings deep industry knowledge and practical experience.

They are trained to identify anomalies and inform our customers, putting decades of experience into your hands. Our engineers work in tandem with yours, pushing us towards mutual success.

Decode Complex Requirements

AAA stays at the forefront of industry standards and testing requirements, including ISO Standards, MIL-STDs, and AS6171.

We decode these complex requirements, translating them into actionable insights for our customers. Our testing protocols are designed to meet rigorous standards, ensuring components are verified and compliant.

Trust Your Supply

With our thorough testing and verification process, customers gain the confidence they need in their components and suppliers.

By partnering with AAA Test Lab, you receive transparent, data-driven reports that enable you to make informed decisions and trust in the integrity of your supply chain.

Test, Binning, Qualification & Screening

1. Design and fabrication under standard commercial or industrial process, with known yields, process control, etc.
2. Initial testing / wafer sort: functional checks, parametric tests, etc. Identify defects and marginal dies.
3. Binning: classifying dies into performance bins (speed, power, etc.), and discarding unusable ones.
4. Package and environmental stress screening: temperature cycling, stress tests, vibration, humidity, etc., to weed out early life failures and ensure reliability across environment.
5. Qualification testing: For military/high-reliability specs, tests per MIL-STD or MIL-PRF documents, including long-term reliability, life testing, possibly radiation hardness (for space), lot traceability, failure analysis, etc.
6. Certification or qualification / listing: If spec requires, submitting test data, applying for inclusion in Qualified Manufacturer List or Qualified Product List (QML/QPL)
7. Ongoing quality / process control: Change control, periodic audits, DSCC or DLA oversight, maintaining traceability, etc.

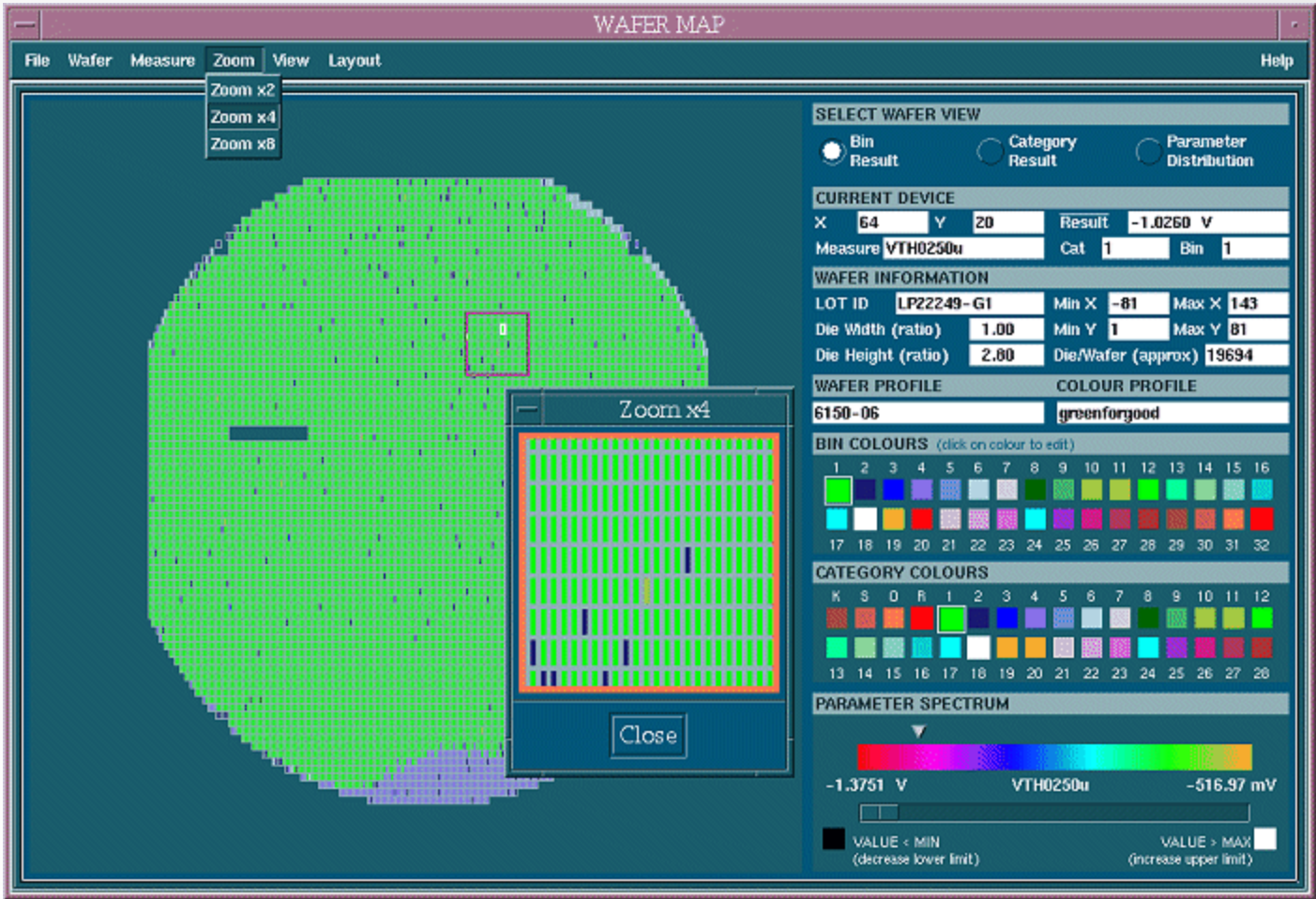


Figure 1: Wafer Probe & Test Software Example

Qualification	Description
5962-XXXX	QPL for MIL-PRF-38535
JANTX/JANTXV	Discrete devices screened for reliability to MIL-PRF-19500, used in severe environments
JANS	Joint Army-Navy devices including space grade
XXXX/883	SMD registered & and screened to MIL-STD-883
5962-XXXX	SMD registered & screened to MIL-PRF-38535

Table 1: Common Qualification Grades

Motivations for Binning

- Original Chipmakers have separated die into different bins for decades based on performance data for maximum clock frequency (Speed Binning)
- Pioneered in the 1990s by IBM for commercial transition and by Texas Instruments for Sun Sparc product line in the 1990s
- Binning on speed and power, chipmakers were able to direct product towards different end applications
- Ultimately, selling the same product for different speed and power grades allows for flexibility to respond to consumer demand and increased profits

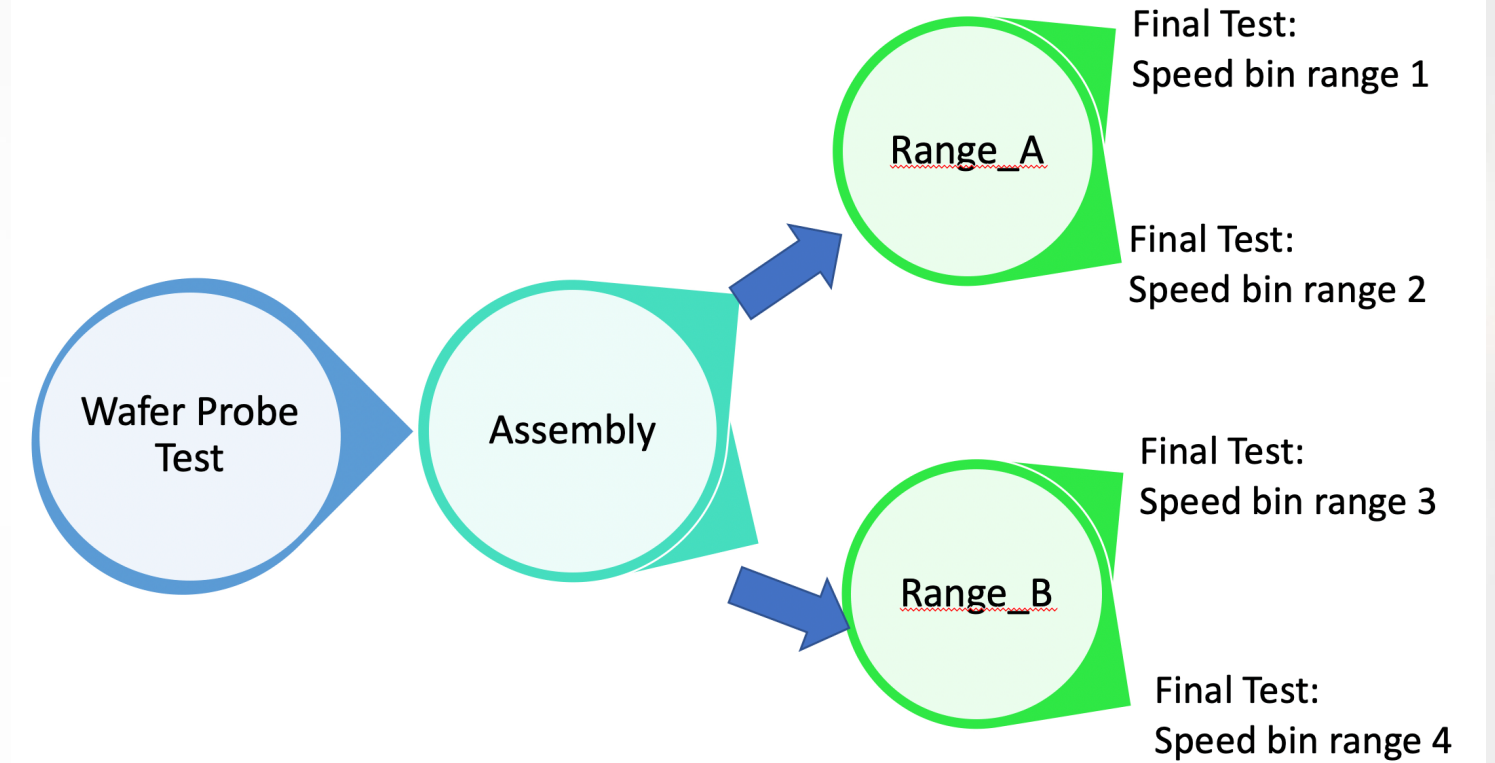


Figure 2: TI's Sparc Microprocessor test flow

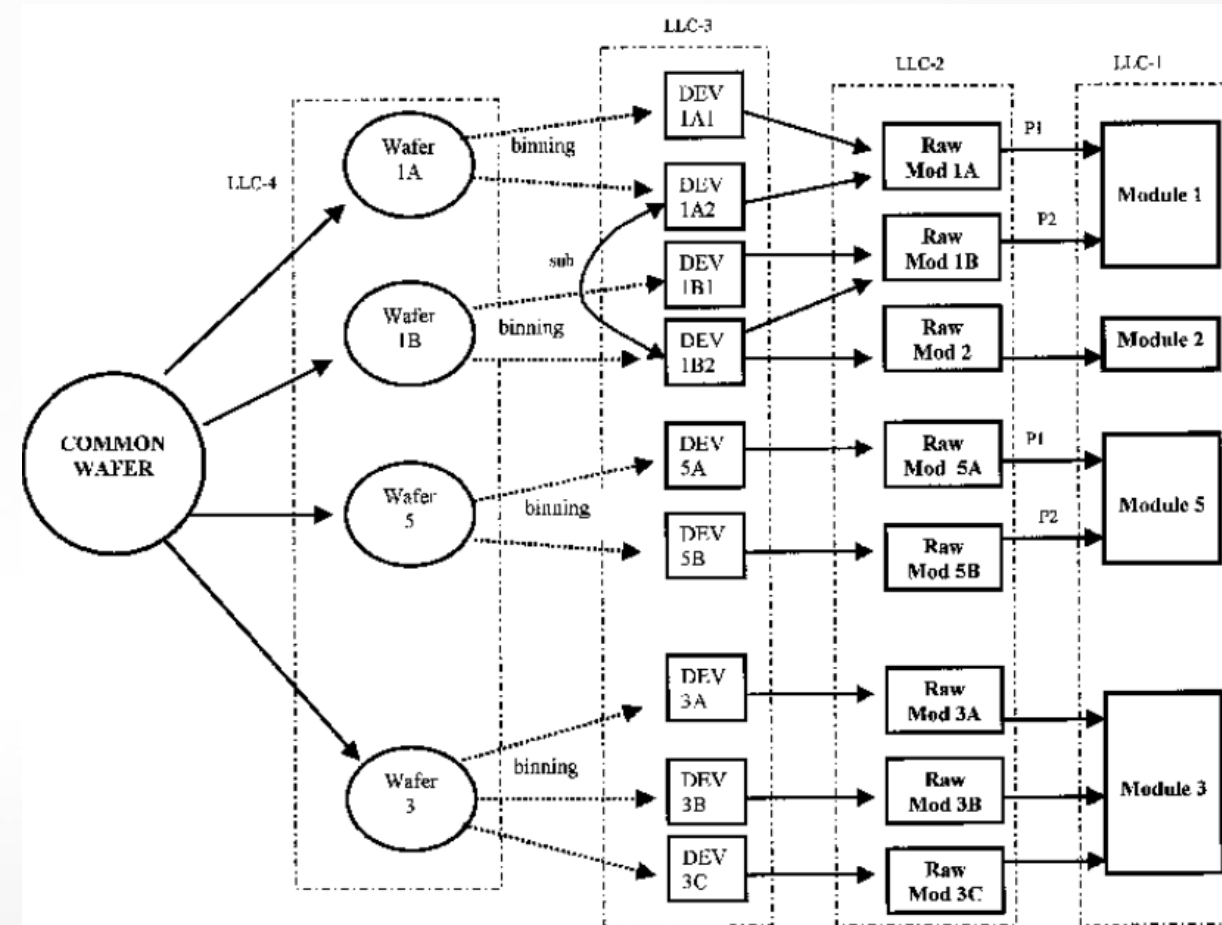
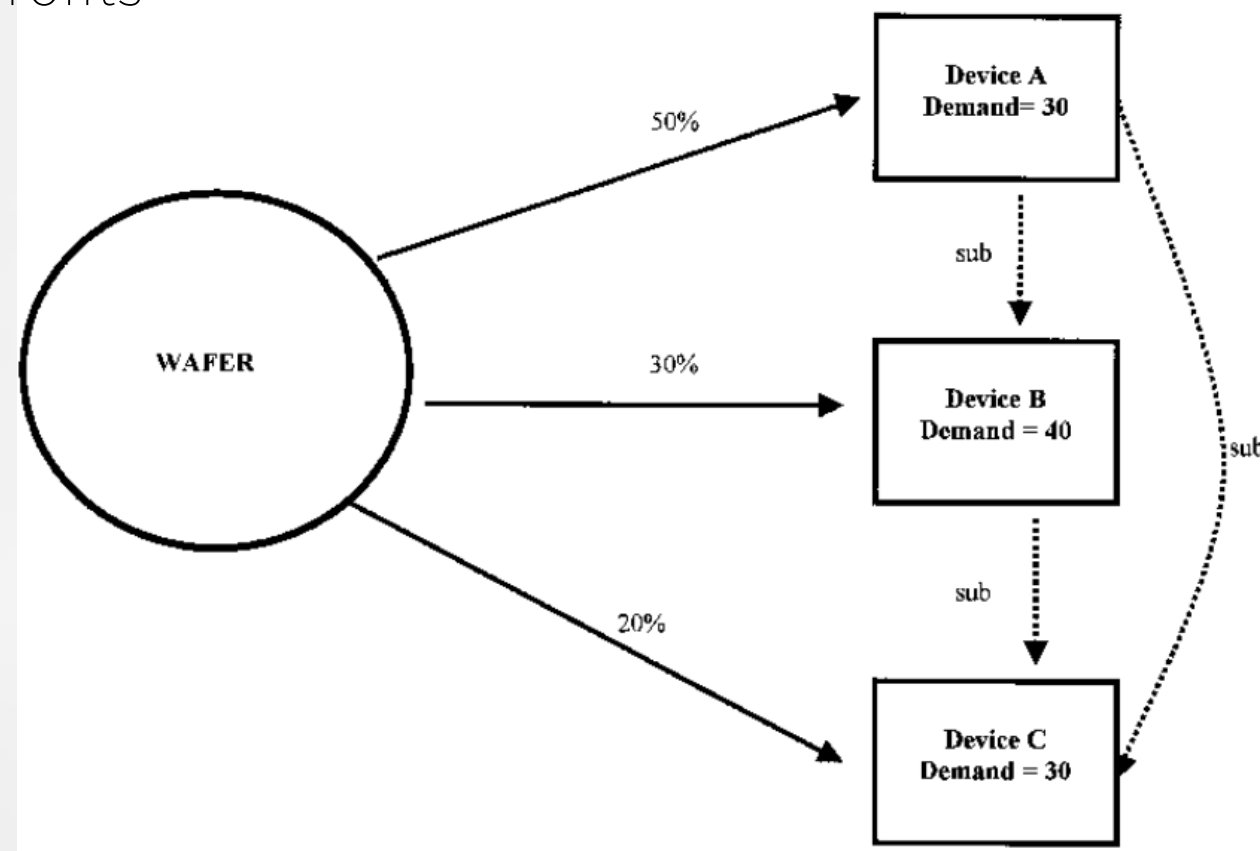


Figure 3: Simple vs. Complex Wafer Binning Algorithms

Upscreening in Practice

- Engineering teams at AAA regularly leverage upscreening
 - Meet customer component requirements
 - Resolve supply chain shortages
 - Provide cost savings to end customers
- Successfully implemented in multiple Aerospace, Defense, Automotive, Medical, and Industrial end use cases
- Commercial devices are tested for key parameters at extended temperature ranges - Industrial and Military commonly.
- Commercial devices are tested IAW MIL-PRF-19500 to become usable in place of JAN/JANTX/JANTXV devices
- Commercial devices are tested IAW MIL-STD-883 to become usable in place of XXX/883 devices
- Full Datalogs and Screening/Qualification workflows are delivered to customer alongside parts
- Solution to problems caused by obsolescence, rapid production

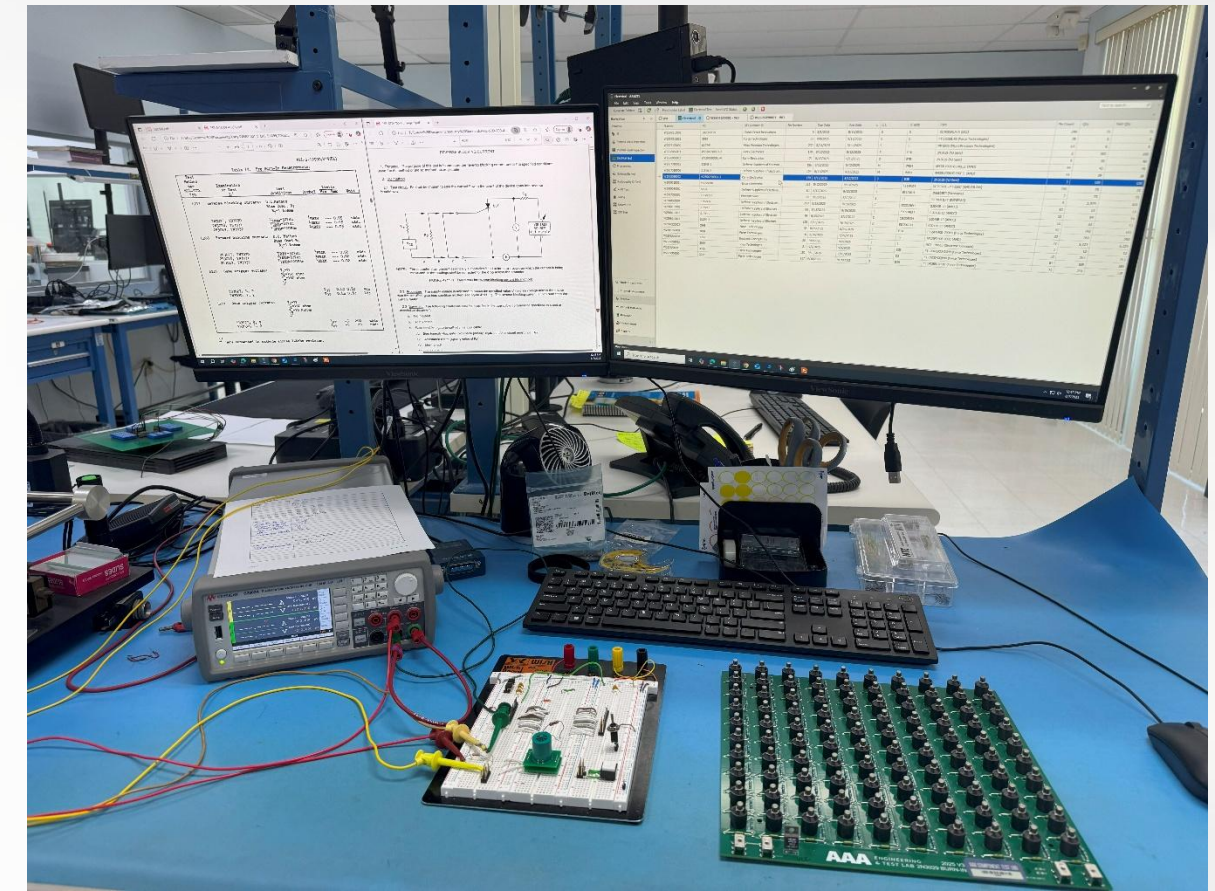


Figure 4: AAA JANTX Electrical Testing Setup

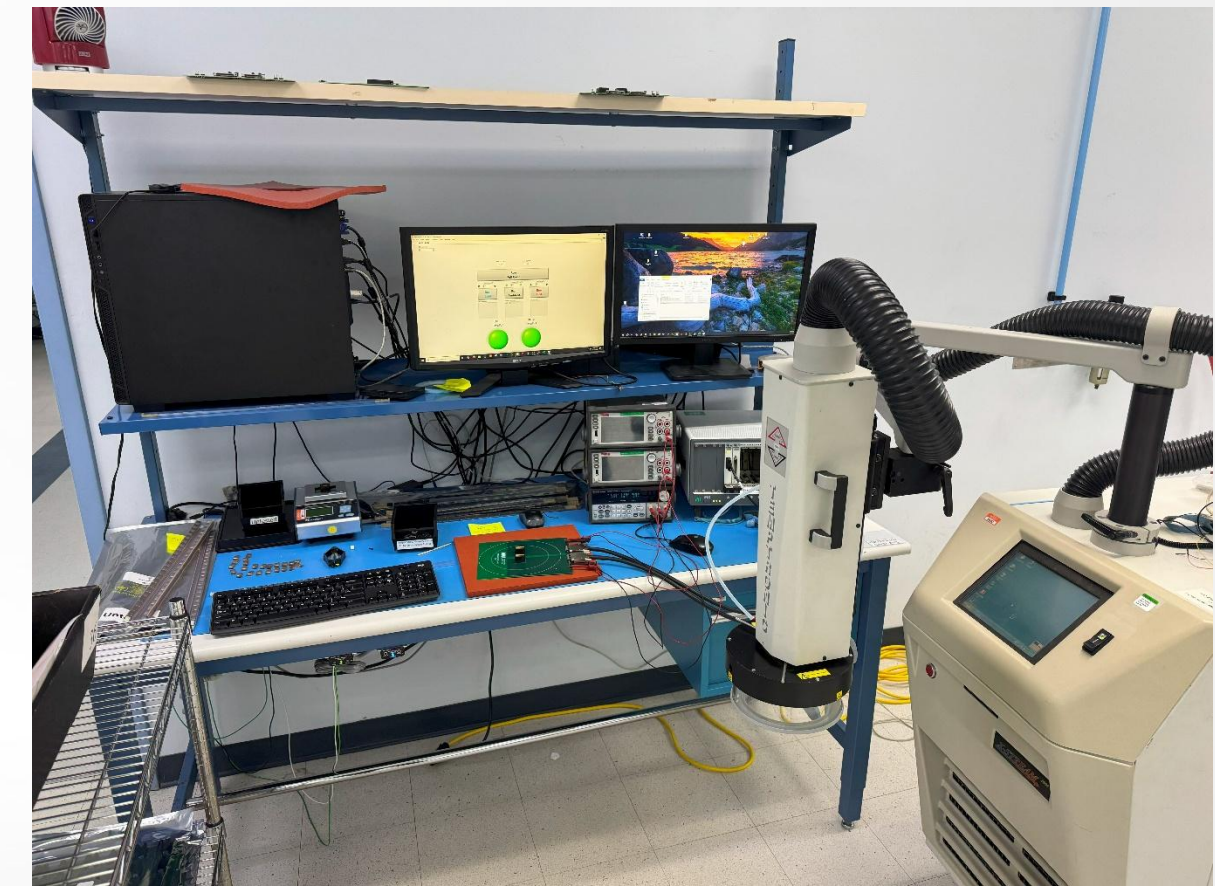


Figure 5: AAA Commercial to Industrial Upsampling Setup

Upscreening in Practice

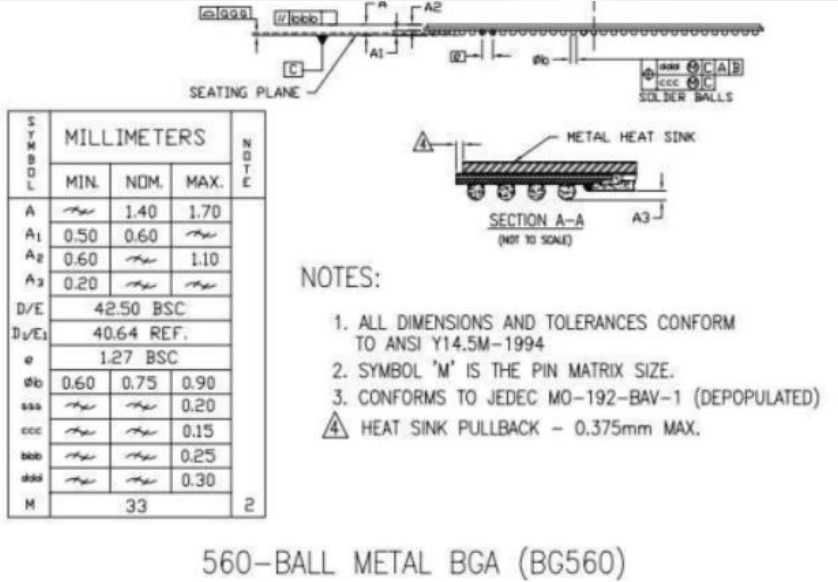
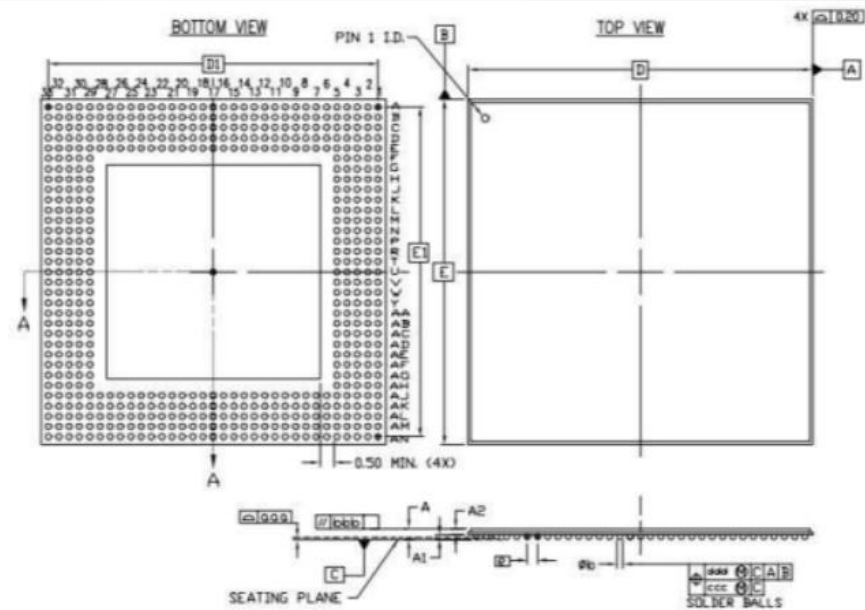
XC40150XV-09BG560C to XC40150XV-09BG560I



Electrical Testing

Electrical Testing per AS6171/7

Test Type	Quantity Tested	Pass	Fail	Requirements
Electrical Test Level 5	48 pcs.	48 pcs.	0 pcs. (0.00%)	Electrical Test Level 5
Test Procedure	SCOPE: Verify Industrial Temperature Specifications Devices were tested for the following at -40°C, 25°C & 100°C: - Configuration: JTAG Bitstream test. - ID Check: Device ID is the code read from the chip to identify the manufacturer and the device type. - Delay Test: Verify tPD timing ≤ 6.968 ns - I/O Test: Verify internal buffers for every I/O Testing performed in accordance with A-622-110 Electrical Inspection.			
Parameters Verified	Configuration, IDCODE tPD ≤ 6.968 ns I/O Function test			
Observation	48 devices passed all tested parameters at -40°C, 25°C & 100°C. Full data log to be sent to customer separate from test report.			
Equipment	[E0032] RIGOL DP1308A - Cal Due Date: (01/30/26) [E0040] Keysight Infiniivision MSOX2024A - Cal Due Date: (08/17/26) [E0051] Siglent SDG6022X - Cal Due Date (06/13/26) [E0081] Temptronic TP04310A-8C44-4 - Cal Due Date (2/20/26) [E0142] HP 34401A - Cal Due Date: (2/7/2027) SOID: 1120			
Test Operator	J Burns			
Test Date	4/11/2025			



Sample Device Passing JTAG Configuration and IDCODE



Sample Device Passing Programming

Figure 6: AAA Commercial to Industrial Upscreening Test Report

Finances of Upscreening

Manufacturer	Base Part Number	Commercial Number/Cost	Industrial Number/Cost
AMD/Xilinx	XC7A200T	2FBG676C \$339.30	2FBG676I \$390.00
AMD/Xilinx	XC7Z020	2CLG484C \$145.00	2CLG484I \$191.25
Altera/Intel	10AX115H2F34	E2LG \$10,455.85	I1SG \$12,201.15

Typical Cost of Upscreening

\$5 to \$8 per device + NRE

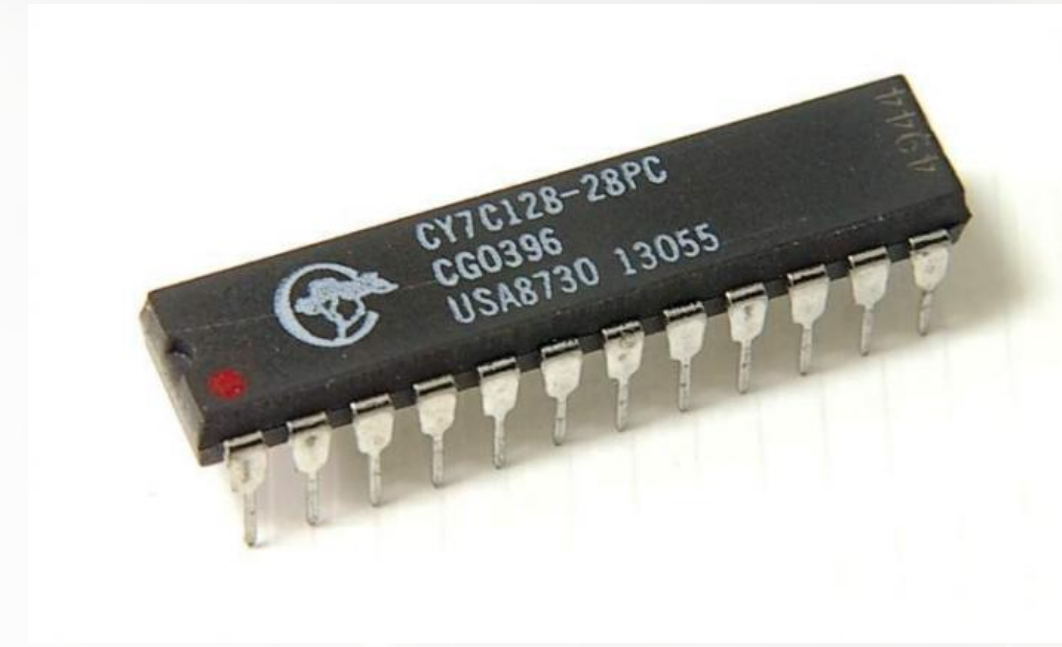
Case Study – Medical Device OEM

- Large Medical Device OEM uses a now-obsolete Altera component in 75% of their products.
- Altera MAX7000 Series CPLD
- Time needed for product redesign was underestimated, and more Altera stock was needed to sustain production
- Altera manufactured -10 and -15 ns speed grades of this device, and the -10 ns speed was needed for OEM's assembly
- Market pricing for the -10 ns was \$625/pc
- Market pricing for the -15 ns was \$100/pc
- AAA Engineering & Test Lab provided speed measurement and screening services on the -15 ns devices over temperature to prove that the devices can perform in place of the -10 ns speed grade
- This saved the end customer hundreds of thousands of dollars and allowed production to continue on schedule



Case Study – Industrial Heavy Equipment OEM

- Large Industrial Equipment OEM needed a Cypress component that had been obsolete for 10+ years
- The design called for a faster speed grade that was no longer available even in the secondary market
- Plenty of stock was available on the secondary market of a lower speed grade device – enough to sustain the service requirements and manufacturing qty of the end product
- AAA Engineering & Test Lab provided speed measurement and screening services on the lower speed grade devices over temperature to prove that the devices can perform in place of the higher speed grade
- This allowed the end customer to fulfill their contract requirements
- Upscreening cost <\$10k but had end product impact of over \$10MM



AAA Engineering & Test Lab

A Partner You Can Trust

At AAA, we know your missions can't fail.

That's why we commit ourselves to precision, transparency, and on-time delivery so you can move forward with total confidence in your components and your supply chain

1

Devotion to Our Customers: Same day quoting, meticulous project management, and punctual delivery define our customer relationships.

2

Quality is our Cornerstone: Integrity, transparency, and honesty form the bedrock of our reputation.

3

Complexity is our Playground: We embrace challenges and provide realistic engineering solutions to illuminate clear path ways for our customers to make mission critical decisions.

THANK YOU

CONTACT US



941-875-6933



customerservice@aaactl.com



877-369-6547



www.aaactl.com

sources

1. <https://www.ipctest.com/wafer-die-testing>
2. <https://semiengineering.com/testing-more-to-boost-profits/>
3. https://www.researchgate.net/publication/247823809_Matching_Assets_with_Demand_in_Supply-Chain_Management_at_IBM_Microelectronics