

AN1421: AEC Qualification vs Automotive Grade



Silicon Labs offers AEC-Q100/Q006 qualification on a limited number of part numbers and package combinations. This additional qualification level is targeted to customers who require a more extensive qualification for their end products than the standard JESD-47 qualification but do not require full Automotive Grade support.

AEC-Q100 is the qualification standard issued by the Automotive Electronics Council (AEC). It defines the qualification requirements accepted by most Automotive customers around the world. Some customers have additional qualification requirements, but meeting AEC-Q100 guidelines meets the needs of almost all Automotive customers. AEC-Q100 is the Automotive equivalent of JESD47, which is the JEDEC qualification standard used for Silicon Labs' standard products.

AEC-Q100 is similar in many ways to JESD47, and many of the methods used for performing qualifications refer directly to the JEDEC documents. AEC-Q100 requires a larger sample of units for some stresses. For example, JESD47 requires 1500 devices for Early Life Failure Rate (ELFR); AEC-Q100 requires 2400 devices. Environmental stresses such as Temperature Cycling and Biased HAST require 25 units per qualification lot to meet JESD47 requirements whereas the AEC-Q100 requirement is 77 units per qualification lot.

AEC-Q006 is an addendum to AEC-Q100 that defines the minimum requirements for qualification of copper (Cu) wire interconnects. The environmental stress durations are longer than AEC-Q100. JESD47 does not have different requirements based on bond wire composition.

While AEC-Q100 and AEC-Q006 were developed by the Automotive industry, they are not synonymous with Automotive or A-grade products at Silicon Labs. Silicon Labs designates Automotive grade with an -A in the orderable part number. All A-grade products will be qualified to AEC-Q100, but not all AEC-Q100 qualified products are A-grade.

Automotive grade parts have several other features that are typically required by automotive customers. These include Production Part Approval Process (PPAP), Design Failure Mode and Effect Analysis (DFMEA), expediated failure analysis cycle times for customer failures, enhanced test procedures for defect screening, and enhanced process controls in the manufacturing processes that are in support of a zero defect strategy.

AEC-Q100 qualified, non-Automotive products follow Silicon Labs' standard support:

- PPAPs are not provided
- DFMEAs are not required
- Failure analysis and 8D cycle time goals meet JESD671 guidelines
- Product/Process Change Notifications and Product Discontinuance Notifications follow JESD46 and JESD48

For more information on standard Silicon Labs Quality processes, visit <https://www.silabs.com/about-us/quality>

KEY POINTS

- AEC-Q100 Qualification is not synonymous with Automotive or A-grade products
- Automotive grade products have several features that are not included with standard products that are only AEC-Q100 qualified

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