

AEC-Q006 Rev. B Compliant Tests

AEC-Q006 is a qualification test standard for devices using copper wire bonding. Due to rising gold prices and the demand for improved electrical performance, the transition from gold wire to copper wire accelerated. However, compared with gold wire, copper wire raised reliability concerns, such as increased susceptibility to oxidation and degradation under high-temperature/high-humidity conditions. In addition, the evaluation criteria in Rev. A were unclear, resulting in inconsistent judgments among manufacturers. Furthermore, with increasing temperature and power demands of automotive applications, the standard was extensively revised in Rev. B to ensure the reliability of copper wire bonding. ITC offers reliability testing and analysis services in compliance with AEC-Q006 Rev. B.

Test Flow

Sequence #	Qualification Step	Stress Test	TC	HAST / THB / H3TRB	HTSL	Option 1	Option 2
1	Initial sampling		Sample sizes as required			●	●
2	AM @ T0		Sample sizes as required			●	●
3	Preconditioning to MSLx		3 x 77	3 x 77	---	●	●
4	AM after PC		3 x 77	--	---	●	●
5	ATE Test		3 x 77	3 x 77	3 x 45	●	●
6	Stress 1X		3 x 77	3 x 77	3 x 45	●	●
7	ATE Test		3 x 77	3 x 77	3 x 45	●	●
If applying only the Q100/101 requirements, proceed to Item 12.							
8	AM post-1X stress		3 x 11	--	---	●	
9	SEM inspection (stitch)		3 x 1	---	---	●	
10a	Ball + Stitch/Wedge pull		3 x 3	3 x 3	---	●	
10b	Ball shear		3 x 3	3 x 3	3 x 3	●	
11	Cross-section		3 x 1	3 x 1	3 x 1	●	
Continue with Item 12 if Items 8-11 are not performed or if the criteria specified in Section 7.2.1 are not met.							
12	Stress 2X		3 x 77	3 x 77	3 x 45	○	●
13	ATE Test		3 x 77	3 x 77	3 x 45	○	●
Items 14-17 are optional but recommended. If Item 13 (ATE Test) is passed, it is recommended but optional to perform Items 14-17.							
14	AM post-2X stress						
15	SEM inspection (stitch)		The number of lots and samples is determined based on the purpose of the investigation.				
16a	Ball + Stitch/Wedge pull						
16b	Ball shear						
17	Cross-section						

Failure Criteria

Test Item/ Criteria	TCT	HAST	HTSL
AM	No delamination at the 1st bond, 2nd bond or active side die corners	X	X
SEM	No heel cracks	X	X
BW	Does not include bond lift (Type 1) or cratering (Type 3)	Does not include bond lift (Type 1) or cratering (Type 3)	Does not include bond lift (Type 1) or cratering (Type 3)
WBS Force Values	> 0h specification limit	X	1. > 0h specification limit 2. After 1X stress > 50% of 0h minimum value
WBP Pull Codes	1st and 2nd bonds fail by wire breakage at any location along the wire	1st and 2nd bonds fail by wire breakage at any location along the wire	X
WBP Force Values	> 0h specification limit	X	X
Cross-Section	No cracks in BEoL stack	Any sign of corrosion needs to be assessed	Corrosion signs: Pull test must surpass 0h spec limit

Connecting technology, information, and people
to give shape to "willingness"

Contact us:
<https://iontc.co.jp/contact>

