

AEC-Q100 QUALIFICATION

Failure Mechanism Based Stress Test Qualification for Integrated Circuits AEC-Q100

Test Group A – Accelerated environment stress tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
A1	Preconditioning	PC	JEDEC J-STD-020 JESD22-A113	√		
A2	Temperature-Humidity-Bias or Biased HAST	THB or HAST	JESD22-A101 JESD22-A110	√	√	
A3	Autoclave or Unbiased HAST or Temperature/Humidity (without Bias)	AC or UHAST or TH	JESD22-A102 JESD22-A118 JESD22-A101	√	√	
A4	Temperature Cycling	TC	JESD22-A104	√	√	
A5	Power Temperature Cycling	PTC	JESD22-A105	√	√	
A6	High Temperature Storage	HTSL	JESD22-A103	√	√	

Test Group B – Accelerated lifetime simulation tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
B1	High Temperature Operating Life	HTOL	JESD22-A108	√	√	
B2	Early Life Failure Rate	ELFR	JESD22-A108	√	√	
B3	NVM Endurance, Data Retention and Operational Life	EDR	AEC Q100-005	√		

Test Group C – Package assembly integrity tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
C1	Wire Bond Shear	WBS	AEC Q100-001	√	√	
C2	Wire Bond Pull	THB or HAST	MIL-STD883 M2011	√	√	
C3	Solderability	SD	J-STD-002D	√		- Dip and Look - SMD reflow
C4	Physical Dimensions	PD	JESD22-B100 and B108 AEC Q003	√		
C5	Solder Ball Shear	SBS	AEC Q100-010	√	√	
C6	Lead Integrity	LI	JESD22-B105	√		

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Test Group D – Die fabrication reliability tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
D1	Electromigration	EM	-	√**		
D2	Time Dependent Dielectric Breakdown	TDDB	-	√**		
D3	Hot Carrier Injection	HCI	-	√**		
D4	Negative Bias Temperature Instability	NBTI	-	√**		
D5	Stress Migration	SM	-	√**		

Test Group E – Electrical verification tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
E1	Pre- and Post-Stress Function/Parameter	TEST	test programm			ATE test centre
E2	Electrostatic Discharge Human Body Model	HBM	AEC Q100-002	√		
E3	Electrostatic Discharge Charged Device Model	CDM	AEC Q100-011	√		
E4	Latch-Up	LU	AEC Q100-004	√		
E5	Electrical Distributions	ED	AEC Q100-009 AEC Q003			ATE test centre
E6	Fault Grading	FG	AEC Q100-007			ATE test centre
E7	Characterization	CHAR	AEC Q003			
E9	Electromagnetic Compatibility	EMC	SAE J1752/3 – Radiated Emissions	√*		
E10	Short Circuit Characterization	SC	AEC Q100-012			ATE test centre
E11	Soft Error Rate	SER	Unaccelerated: JESD89-1 or Accelerated: JESD89-2 & JESD89-3			ATE test centre
E12	Lead (Pb) Free	LF	AEC Q005	√		

Test Group F – Defect screening tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
F1	Process Average Testing	PAT	AEC Q001			ATE test centre
F2	Statistical Bin/Yield Analysis	SBA	AEC Q002			ATE test centre

Test Group G – Cavity package integrity tests

	stress	abbreviation	specification	MASER	ISO-17025 accreditation	comment
G1	Mechanical Shock	MS	JESD22-B104	√		
G2	Vibration Variable Frequency	VVF	JESD22-B103	√		
G3	Constant Acceleration	CA	MIL-STD-883 M2001	√		
G4	Gross /Fine Leak	GFL	MIL-STD-883 M1014	√		
G5	Package Drop	DROP	-	√		
G6	Lid Torque	LT	MIL-STD-883 M2024	√		
G7	Die Shear	DS	MIL-STD-883 M2019	√	√	
G8	Internal Water Vapor	IWV	MIL-STD-883 M1018	√*		

* executed at an external laboratory under supervision of Eurofins | MASER

** in principle tests can be executed but need a thorough hreview of the requirements