

IC Products

		Qualification Level						Customer Specific
		Automotive		Industrial		Consumer		
Industry standards		AEC-Q100		JESD-47		IR internal guidelines		Customer guidelines
Environmental Test	Sample Size (#Lot X #Parts)	Condition ^{1,2,3,4}	Duration	Condition ²	Duration	Condition ²	Duration	Reliability qualification per agreed customer contract
High Temperature Operating Life (HTOL)	3 X 77	Tj=125°C or Tj=150°C Biased up to 100% Vmax (static or dynamic) Test cold, room and hot	1000 hours or 500 hours	Tj=125°C or Tj=150°C Biased up to 100% Vmax (static or dynamic)	1000 hours or 500 hours	Tj=125°C or Tj=150°C Biased up to 100% Vmax (static or dynamic)	500 hours or 336 hours	
High Temperature Storage Life (HTSL)	1 X 45	Ta=150°C, no bias or Ta=175°C, no bias Test room and hot	1000 hours or 500 hours	Ta=150°C, no bias or Ta=175°C, no bias	1000 hours or 500 hours	Ta=150°C, no bias or Ta=175°C, no bias	500 hours or 240 hours	
Unbiased Autoclave (AC)	3 X 77	121°C, 29.7psia, 100%RH	96 hours	121°C, 29.7psia, 100%RH	96 hours	N/A	Not required	
Unbiased Temperature / Humidity (Unbiased HAST)	3 x 77	130°C/85%RH/33Psia or 110°C/85%RH/17.7Psia Test room and hot	96 hours or 264 hours	130°C/85%RH/33Psia or 110°C/85%RH/17.7Psia	96 hours or 264 hours	N/A	Not required	

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Temperature and Humidity Bias (THB)	3 X 77	85°C/85%RH Biased up to 100% Vmax (Not to exceed 100V) Test room and hot	1000 hours	85°C/85%RH Biased up to 100% Vmax (Not to exceed 100V)	1000 hours	85°C/85%RH Biased up to 100% Vmax (Not to exceed 100V)	500 hours	
or								
High Accelerated Temperature and Humidity Stress Test (HAST)	3 x 77	130°C/85%RH/33Psia or 110°C/85%RH/17.7Psia Biased up to 100% Vmax (Not to exceed 42V) Test room and hot	96 hours or 264 hours	130°C/85%RH/33Psia or 110°C/85%RH/17.7Psia Biased up to 100% Vmax (Not to exceed 42V)	96 hours or 264 hours	130°C/85%RH/33Psia or 110°C/85%RH/17.7Psia Biased up to 100% Vmax (Not to exceed 42V)	96 hours or 264 hours	
Temperature Cycle (TC)	3 X 77	-55°C/150°C or -65°C/150°C 30 minute cycles Test hot	1000 cycles or 500 cycles	-55°C/150°C or -65°C/150°C 30 minute cycles	1000 cycles or 500 cycles	-55°C/150°C or -65°C/150°C 30 minute cycles	500 cycles or 250 cycles	
Power Temperature Cycle (PTC)	1 x 45	-40°C to 125°C Biased up to 100% Vmax Test room and hot	1000 cycles	N/A	N/A	N/A	N/A	

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Early Life Failure Rate (ELFR) ⁴	3 x 800	Ta=125°C Biased up to 100% Vmax Test room and hot	48 hours	N/A	N/A	N/A	N/A	
MSL Criteria using JESD-022		No TODD (Top Of Die Delamination) during MSL testing		No TODD during MSL testing		TODD allowed if samples pass reliability testing per JESD-022		TODD requirement per agreed customer contract
Process Change Notice		JESD-46C with 6 month minimum notification & customer approval prior to change		JESD-46C: Customer notified 90 days before implementation		Customer notified 30 days before implementation.		Process notification per agreed customer contract

Conditions and additional requirements

- 1 – Tri-temp testing required at -40°C, Rm Temp, and 125°C before and after reliability testing as required per AEC-Q100.
- 2 – Family data may be used to qualify one or more products.
- 3 – Exceptions to AEC-Q100 requirements are noted in the qualification report.
- 4 – Performed only as required per AEC-A100.

PRECONDITIONING REQUIREMENTS

Minimum MSL3 preconditioning per JESD22-A113 is required for surface mount capable devices that are put on TC, THB/HAST, uHAST, AC, or PTC.

FAILURE CRITERIA

All devices parameters must pass the data sheet specification requirements.

Links:

AEC: <http://www.aecouncil.com/AECDocuments.html>

Jedec: <http://www.jedec.org/standards-documents>