



Latch-up TESTING REPORT

Applicant/Department: Nations Technologies Inc.			
Product: N32G030K6Q7/ N32G030K6Q7-1		LOT:	
Case NO: S210319134		Quantity: 9 ea	
Test Item: Latch-up (LU)		Package/Pin Count: QFN32	
Application Date: 2021/3/19		Date Finished: 2021/3/30	
Reference: JESD78E		Temperature: 85 ± 5 °C Humidity: 55 ± 5%	
Test Instrument: MK2(SN0204336)		Calibration Due Date: 2020/09/02~2021/09/01	
Failure Criteria:			
If absolute Inom is ≤ 25 mA, then absolute Inom + 10 mA is used Or If absolute Inom is >25mA, then > 1.4X absolute Inom is used			
Trigger Current:	±100mA	Minimum Pass Level = ±	±100mA
Trigger Voltage:	/	Minimum Pass Level = ±	/
Vsupply Over Voltage:	+8.25V	Minimum Pass Level = ±	+8.25V

NOTE 1: ESD/latch-up test is employed as one of qualification tests for electronic products. However, the pass / fail results of this test can NOT be taken as go/no-go criteria for IC tape-out and mass production. Before and after ESD/latch-up test(s), complete parametric and functional testing (F/T) are essential for determining pass/fail of the tested products. (References: Page 9, AEC-Q100-003-Rev-E-2003; and Page 15, ESDA-JEDEC JS-001-2017).

NOTE 2: MA-tek sample storage policy is 14 days after the test data delivery. Prolonged storage can be arranged per client's request.

WE HEREBY CERTIFY THAT:

The test(s) was/were conducted according to test conditions provided by customer. Testing was performed on calibrated and JEDEC-ESDA qualified ESD instruments. The quality and comprehensiveness of the test(s) were delivered by qualified personnel.

Tested by	Reviewed by	Approved by
Joe_Xu	Fly_Fei	Zhen-Zhu

CERTIFICATE of APPROVAL INDEPENDENT TESTING LABORATORY:

ISO9001:2015 Certificate Registration No. 20001845 QM08, issued by UL DQS Inc.
IEC/IECQ17025 Certificate No. IECQ-L ULTW 09.0009, approved by Certification Body (CB): UL Registered Firm





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**1. TEST SUMMARY**

IT CLASS: II NOTE: Class I - Latch-up testing performed at room temperature. Class II - Latch-up testing performed at maximum ambient rated temperature for the device. Level: A Level A - The failure criteria as defined in JEDEC. Level B - Special failure criteria. Supplier shall provide definition of failure criteria used.	Trigger Model	Test Pin	Sample	Passing Current or Voltage
	+IT	+IT_IO	3	Pass(+100mA)
	-IT	-IT_IO	3	Pass(-100mA)
	Vsupply Over voltage test	OV_VDD	3	Pass(+8.25V)

NOTE: Red color in raw data indicates failed pins, if any.

**2. Pin ASSIGNMENT**

Pin Group	PAD Pins
VDD	1,17
VSS	33
IO	2-16,18-32



3. ESD TEST CONDITIONS

Positive Current Trigger
Negative Current Trigger
Over Voltage Supply Test

VDD= 5V
GND= 0V

Clamp= 200mA

Vclamp= +7.5V/-2.5V (IO5V pins)

**4. Raw Data - 2**

Positive Current Trigger_+100 (Unit:mA)								
Test Pin Fail Current	#22	#23	#24	Test Pin Fail Current				
IO	Pass	Pass	Pass					

Negative Current Trigger_-100 (Unit:mA)								
Test Pin Fail Current	#25	#26	#27	Test Pin Fail Current				
IO	Pass	Pass	Pass					

Vsupply Over voltage test_+8.25 (Unit:V)								
Test Pin Fail Voltage	#28	#29	#30	Test Pin Fail Voltage				
VDD	Pass	Pass	Pass					

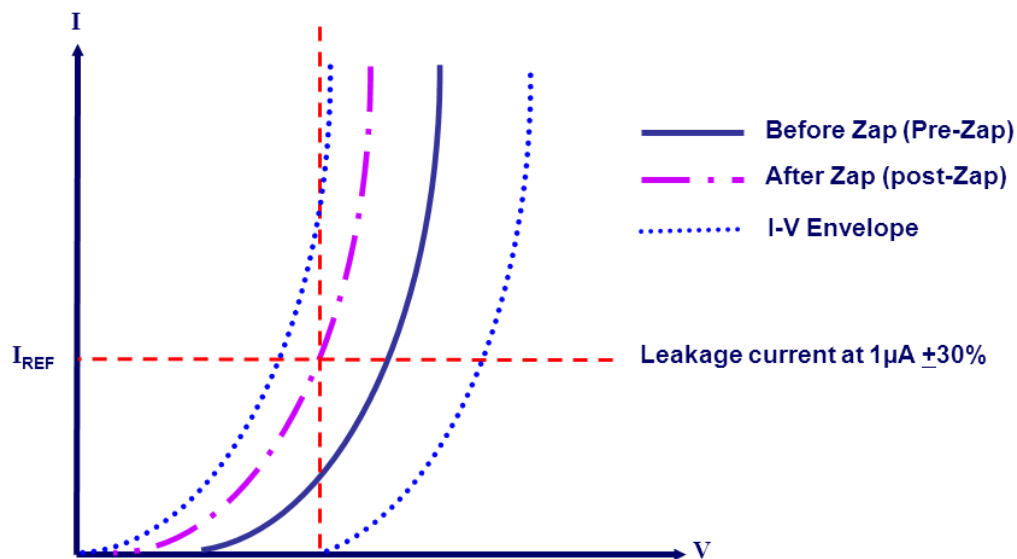
5. APPENDIX-1 (PASS/FAIL CRITERIA)

FAILURE CRITERIA

If absolute I_{nom} is ≤ 25 mA, then absolute $I_{nom} + 10$ mA is used
Or If absolute I_{nom} is > 25 mA, then $> 1.4X$ absolute I_{nom} is used.

Note

For custom designed ESD testing customers may select variation in I_{dd} , and leakage current as criteria to determine pass/fail results of ESD testing.

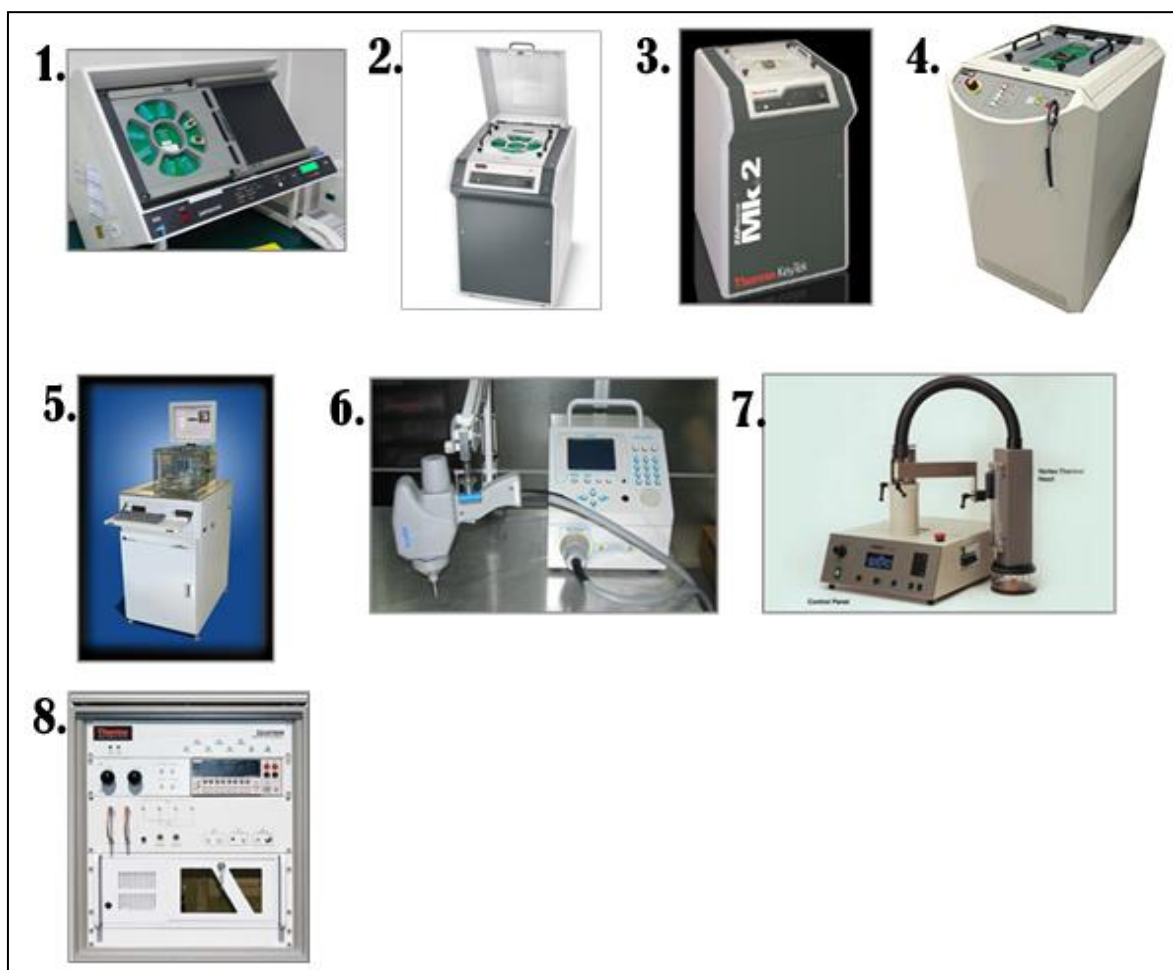


Pass/Fail Criteria:

Variation of Leakage Current and I-V Shift in Pre-Zap and Post-Zap curves

6. APPENDIX-2 (ESD INSTRUMENTATION AT MA-TEK)

No.	Test Tools	Vendors	System Specification
1	Zapmaster	Thermo Keytek	256 Pin Count, ESD Pulse 50 V to 8 KV
2	MK1	Thermo Scientific	256 Pin Count, ESD Pulse 10 V to 8 KV
3	MK2	Thermo Keytek	768 Pin Count, ESD Pulse 10 V to 8 KV
4	MK4	Thermo Scientific	2304 Pin Count, ESD Pulse 10 V to 8 KV
5	CDM Tester	Oryx Orion	100 V to 2 KV
6	ESD Gun	Noiseken	Voltage = 1 KV to 30 KV
7	High Temp. Test Module	Thermonics	Maximum temperature = 150°C.
8	TLP Tester	Thermo Scientific	Voltage = 1 V to 2 KV, Current = 10 nA to 40 A





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