ELECTROSTATIC DISCHARGE (ESD) TESTING REPORT

Applicant/Department: Nations Technologies Inc.	
Product: N32G030K6Q7/ N32G030K6Q7-1	**LOT:**
Case NO: S210319134	**Quantity:** 18 ea
Test Item: Human Body Model (HBM)	**Package/Pin Count:** QFN32
Application Date: 2021/3/19	**Date Finished:** 2021/3/30
Reference: MIL-STD-883K / Method 3015.9	**Temperature:** 25 ± 5 °C **Humidity:** 55 ± 5%
Test Instrument: MK2(SN0204336)	**Calibration Due Date:** 2020/09/02~2021/09/01
Test Voltage: ±4000V	
Failure Criteria: compliance within 10% V+I envelope around REFERENCE I-V curve (pre-zap) and Customer FunctionTest.	
ESD Testing Result:	**Minimum Pass Level = ±4000V**

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 this test(s) were delivered by qualified personnel.

Tested by	Reviewed by	Approved by
Joe_Xu	Fly_Fei	Steven 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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2.坚持独立检测、独立判断，保持和发展认可的分析检测能力；
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TABLE OF CONTENTS

1. TEST SUMMARY

2. PIN ASSIGNMENT

3. ESD TESTING CONDITIONS

4. RAW DATA

5. APPENDIX-1 (PASS/FAIL CRITERIA)

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

1. TEST SUMMARY

Sensitivity Pass: ±4000V

Class-3A

MIL-STD-883K / Method 3015.9

Class-0 : 0 V - < 250 V
Class-1A : 250 V - < 500 V
Class-1B : 500 V - < 1000 V
Class-1C : 1000 V - < 2000 V
Class-2 : 2000 V - < 4000 V
Class-3A : 4000 V - < 8000 V
Class-3B : >= 8000 V

Pin Combination	Sample	Pass Level
All other pins to VSS(+)	3	+4000V
All other pins to VSS(-)	3	-4000V
All other pins to VDD(+)	3	+4000V
All other pins to VDD(-)	3	-4000V
IO pins to IO pins(+)	3	+4000V
IO pins to IO pins(-)	3	-4000V

* DUT failed at the first level of test condition, defined by client.

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

ESD Zap Interval: **≧ 1 S** **Zap:** **3 pulse.**

Testing Combinations

All other pins to VSS(+)
All other pins to VSS(-)
All other pins to VDD(+)
All other pins to VDD(-)
IO pins to IO pins(+)
IO pins to IO pins(-)

4. Raw Data - 2

HBM All other pins to VSS_+4000 (Unit: V)								
Test Pin Fail Voltage		#1	#2	#3	Test Pin Fail Voltage	#1	#2	#3
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

HBM All other pins to VSS_-4000 (Unit: V)								
Test Pin Fail Voltage		#4	#5	#6	Test Pin Fail Voltage	#4	#5	#6
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

HBM All other pins to VDD_+4000 (Unit: V)								
Test Pin Fail Voltage		#7	#8	#9	Test Pin Fail Voltage	#7	#8	#9
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

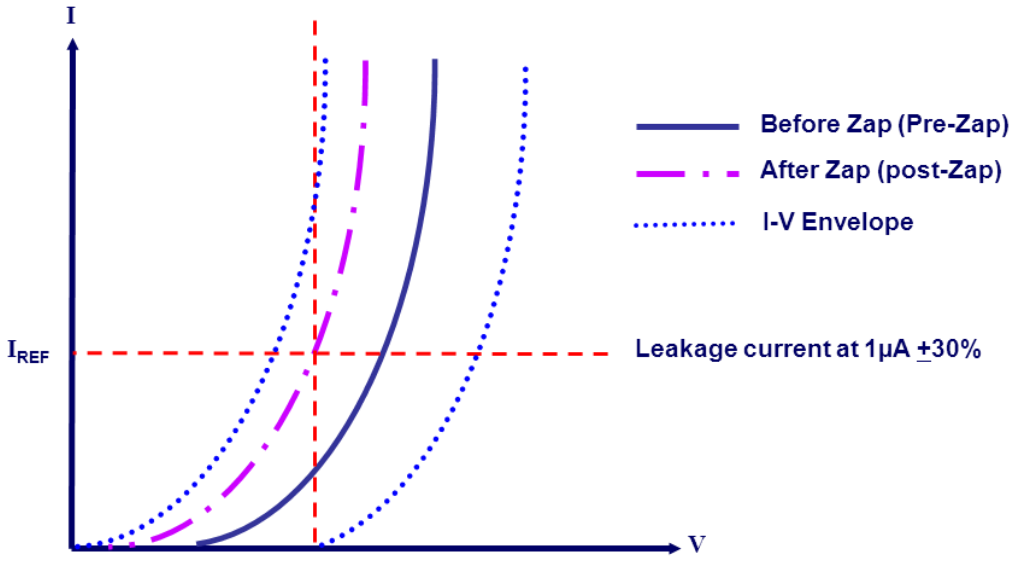
HBM All other pins to VDD_-4000 (Unit: V)								
Test Pin Fail Voltage		#10	#11	#12	Test Pin Fail Voltage	#10	#11	#12
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

HBM IO pins to IO_+4000 (Unit: V)								
Test Pin Fail Voltage		#13	#14	#15	Test Pin Fail Voltage	#13	#14	#15
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

HBM IO pins to IO_-4000 (Unit: V)								
Test Pin Fail Voltage		#16	#17	#18	Test Pin Fail Voltage	#16	#17	#18
	VDD	Pass	Pass	Pass	IO	Pass	Pass	Pass
	VSS	Pass	Pass	Pass				

5. APPENDIX-1 (PASS/FAIL CRITERIA)

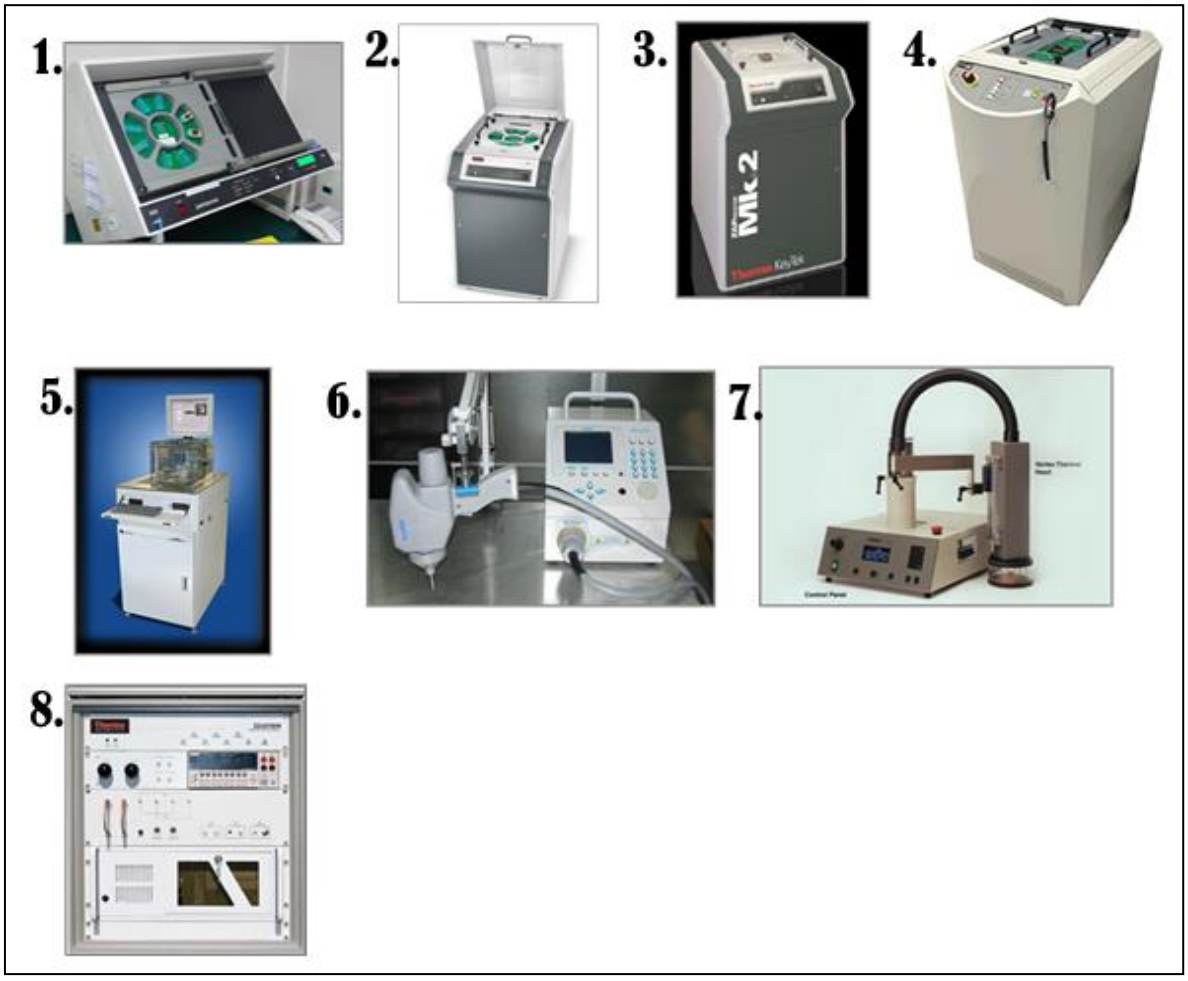
FAILURE CRITERIA	**compliance within 10% V+I envelope around REFERENCE I-V curve (pre-zap) and Customer FunctionTest.**
Note	**For custom designed ESD testing customers may select variation in Idd, and leakage current as criteria to determine pass/fail results of ESD testing.**



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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