

**AEC-Q100-REV G Qualification IXD_614SI
VIS Foundry Process CU05UMS12010
Qualification No: 2014-001**



Reliability Report

**AEC-Q100-REV G Qualification for IXD_614SI
VIS Foundry Process CU05UMS12010**

Report Number: 2014-001

Date: 2/6/15

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Introduction

This report summarizes the AEC-Q100-REV G qualification of IXYS Integrated Circuits Division's IXD_614SI. The qualification data presented here were collected by IXYS ICD AV. The IXD_614SI silicon is founded at Vanguard International Semiconductor Corp. (VIS) and is assembled at Greatek Electronics Inc. in Taiwan. The VIS process is CU05UMS12010.

Qualification Tests

Table 1 below provides the qualification tests that were performed. The stress tests and sample size are per AEC-Q100-REV G.

Table 1: AEC-Q100-REV G Qualification Tests
Product IXD_614SI

Stress Test	Applicable Specs	Stress Conditions	Number of Lots	Sample Size (SS)	Total SS
HTOL	JESD22-A108	1000 hrs, 150°C	3	77	231
HAST	JESD22-A110-C	130°C, 85% RH, 18.8psi, 96 hrs	3	77	231
Solder-ability	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells, 15 cycles	2	15	30
Temp Cycle (T/C)	JESD22-A104-C	-65 to 150°C, 10/10 dwells, 500 cycles	3	77	231
High Temp Storage	JESD22-A103C	150°C, 1000 hrs	3	45	135
Autoclave	J-STD-020D.1, JESD22-A102	T=121°C, RH=100%, t=96 hrs unbiased	3	77	231
Latch Up	AEC-Q100-004	T=125°C, 35V, 100mA	1	8	8
Wirebond Pull	AEC-Q100-008-REV A	Examine 30 bonds From a min of 5 pcs	2	15	30
Wirebond Shear	AEC-Q100-008-REV A	Examine 30 bonds From a min of 5 pcs	2	15	30
Gate Leakage	RTN-0441-D REV	T=RT	1	8	8
ELFR	AEC-Q100-008-REV A	T=150°C, t=48 hrs With bias	3	800	2400
PTC	JESD22-A105-C	T=-40°C/+125°C, 1000 cycles, t=45 min	1	45	45

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Stress Test	Applicable Specs	Stress Conditions	Number of Lots	Sample Size (SS)	Total SS
ESD CDM	JESD22-A114-E	1.5kΩ, 100pF	1	9	9
ESD HBM	JESD22-A114-E	1.5kΩ, 100pF	1	12	12

Qualification Test Results

The stress tests and associated results for the IXD_614SI AEC-Q100-REV G qualification are summarized in Table 2. The devices chosen for the qualification were from standard material manufactured through normal production test flow and electrically tested to datasheet limits prior to stressing. Qualification stresses were conducted and parts then electrically tested to datasheet limits at each interval and the final readpoints.

Table 2: AEC-Q100-Rev G Qualification Test Results
Product IXD_614SI

Stress Test	Readpoint / (Reject/SS)
HTOL	1000 hrs
	0/231
HAST	96 hrs
	0/231
Solderability	15 Cycles
	0/30
Temp Cycle	500 Cycles
	0/231
High Temp Storage	1000 hrs
	0/135
Autoclave	96 hrs
	0/231
Latch-Up	Trigger Pulse
	0/8
Wirebond Pull	30 Bonds Tested
	0/30

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Stress Test	Readpoint / (Reject/SS)
Wirebond Shear	30 Bonds Tested
	0/30
Gate Leakage	Neg./Pos.Potential
	0/8
ELFR	48 hrs
	0/2400
PTC	1000 cycles
	0/45

ESD Testing Results

As part of this AEC-Q100-REV G qualification, the IXD_614SI product family was subjected to Human Body Model (HBM) ESD Sensitivity Classification testing using a KeyTek Zapmaster system. Charged Device Model testing was subcontracted to Integra Technologies LLC. The results are summarized in Table 3.

Table3: AEC-Q100-REV G ESD Testing Results
Product IXD_614SI

ESD Model	Package	ESD Test Spec	RC Network	Highest Passed	Class
CDM	SOIC – 8L EP	AEC- Q100-011	1Ω meas resistor	500V/all pins 750Vcorner pins	C4B
HBM	SOIC – 8L EP	JESD22, A114-E	1.5kΩ, 100pF	2000V	H2

FIT (Failure in Time)

Table 4 summarizes the number of devices used for the IXD_614SI AEC-Q100-REV G qualification testing and the associated failures. Using the HTOL data, FIT rates were calculated based on the Acceleration Factor (AF) and equivalent device hours at 0.7eV of activation energy for 150°C test temperature and 40°C use temperatures. Using the HAST data, FIT rates were calculated based on the Acceleration Factor (AF) and equivalent device hours at 0.7eV of activation energy for 130°C test temperature and 40°C use temperatures. The calculated FIT rates from the reliability stress is 15.59 for HTOL and 28.98 for HAST

**Table 4: FIT Rate Summary
 Product IXD_614SI**

Qual#	Stress	# of Devices	# of Fails	Hours Tested	Act. Energy	Acc. Factor	Equivalent Dev. Hours	FIT Rate @ 60% CL
1	HTOL	231	0	1000	0.7	255.41	58,998,778	15.59
1	HAST	231	0	96	0.7	1.4318E+03	31,751,277	28.98

Conclusion

The qualification of the IXD_614SI has been successfully completed according to AEC-Q100-REV G, and therefore the IXD_614SI is AEC Q100 qualified.

APPROVAL:

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