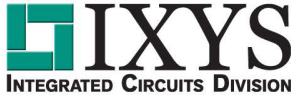


Reliability Report-IX4426N.IX4427N.IX4428N
Qualification No: 2012-023



Reliability Report

Reliability Data for IX4426N.IX4427N.IX4428N

Report Title: Reliability Data for IX4426N.IX4427N.IX4428N

Report Number: 2012-023

Date: 3/11/13

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Introduction:

This report summarizes the Reliability data of IXYS Integrated Circuits Division IX4426N.IX4427N.IX4428N. The Reliability data presented here were collected during IXYS product qualification. The purpose of this qualification was to verify the IXYS Quality and Reliability requirements as outlined in IXYS internal specifications. The IX4426N.IX4427N.IX4428N silicon is manufactured at MagnaChip in South Korea and assembled at Greatek in Taiwan.

Reliability Tests:

Table 1 below provides the qualification tests that were performed. The stress tests and sample size are chosen based on the IXYS internal specification and with the approval of the product development team and quality assurance.

Table 1: Product IX4426N.IX4427N.IX4428N Reliability Tests

Stress Test	Applicable Specs	Stress Conditions	Product/Package	Number of Lots	Sample Size (SS)	Total SS
HTRB	Mil-Std-883	125°C, 80% 1000hrs	IX4427N 8L SOIC	3	105, 108, 108	321
HAST	JESD22- A110-C	130°C, 85% 18.8PSI, 96hrs	IX4427N 8LSOIC	3	77	231
ESD HBM	JESD22, A114-E	1.5kΩ, 100pF	IX4427N 8L SOIC	1	15	15

Reliability Test Results:

The stress tests and associated results for the product IX4426N.IX4427N.IX4428N 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. Then reliability stresses were conducted and electrically tested to datasheet limit at each interval and final readpoints.

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Table 2: Product IX4426N.IX4427.IX4428N Reliability Test Results

Stress Test	Product/Kit Number	Readpoint / (Reject/ SS)	Comments
HTRB	IX4427N GGE008	1000 hrs.	Qual Lot#1 Data
		0/105	
HTRB	IX4427N GGE011	1000 hrs.	Qual Lot#2 Data
		0/108	
HTRB	IX4427N GGE015	1000 hrs.	Qual Lot#3 Data
		0/108	
HAST	IX4427N GGE008	96 hrs.	Qual Lot#1 Data
		0/77	
HAST	IX4427N GGE011	96 hrs	Qual Lot#2 Data
		0/77	
HAST	IX4427N GGE015	96 hrs	Qual Lot#3 Data
		0/77	

ESD Testing Results:

As part of this qualification, the product IX4426N.IX4427N.IX4428N was subjected to Human Body Model (HBM) ESD Sensitivity Classification testing using a KeyTek Zapmaster system. The results are summarized in Table 3. All samples were electrically tested to data sheet limits before and after ESD stressing and they passed after +/-1000V testing.

Table3: Product IX4427N ESD Characterization Results

ESD Model	Product/Kit Number	Package	ESD Test Spec	RC Network	Highest Passed	Class
HBM	IX4427N GGE011	8L SOIC	JESD22, A114-E	1.5kΩ, 100pF	1000V	1C

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FIT (Failure in Time) Rate on the Product IX4426N.IX4427N.IX4428N:

Table 4 summarizes the number of devices used for the product IX4426N.IX4427N.IX4428N reliability stress with associated failures. Using the HTRB data, FITs were calculated based on the Acceleration Factor (AF) and equivalent device hours at 0.7eV of activation energy for 125°C test temperature and 40°C use temperature. For HAST stress, FITs were calculated based on the Acceleration Factor (AF) and equivalent device hours at 0.7eV activation energy for 130°C test temperature and 40°C use temperature. The calculated FITs from the reliability stress came out to be 11.22 and 35.05 for HTRB and HAST, respectively.

Table 4: Product IX4426N.IX4427N.IX4428N FIT Rate Summary

Qual#	Stress	Product/Kit Number	# of Devices	# of Fails	Hours Tested	Act. Energy	Acc. Factor	Equivalent Dev. Hours	FIT Rate @ 60% CL
1	HTRB	IX4427N GGE008 GGE011 GGE015	321	0	1000	0.7	255.41	81,985,315	11.22
1	HAST	IX4427N GGE008 GGE011 GGE015	231	0	96	0.7	1.4318E+03	26,247,604	35.05

Conclusion:

The qualification of the product IX4426N.IX4427N.IX4428N has been successfully completed for the production release. Please reference Qual Report 2014-010 Reliability Data for IX4426M, IX4427M, IX4428M for package qualification data.

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