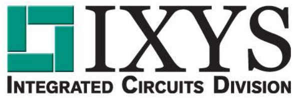

Reliability Report

Reliability Data for IX3180G

Report Title: IX3180G Qualification Report

Report Number: 2014-007

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Introduction:

This report summarizes the Reliability data of IXYS Integrated Circuits Division IX3180G. The Reliability data presented here were collected during IXYS IC Division product qualification. The purpose of this qualification was to verify IXYS IC Division Quality and Reliability requirements as outlined in IXYS IC Division internal specifications. The IX3180G is manufactured at XFAB in Texas and assembled at ATEC in the Philippines. The process is XFAB CX08 UL111 and IX3180G is available in an 8 Pin DIP package type.

Reliability Tests:

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

Table 1: IX3180G Reliability Tests Plan

Product/ Package	Stress Test	Applicable Specs	Conditions	# of Lots	Sample Size (SS)	Total SS
IX3180G/ 8 Pin DIP	HTRB	Mil-Std-883 M1005 JESD22-A-108	125°C, 80% WVDC, 1000 hrs	2	180	180
IX3180G/ 8 Pin DIP	MSL	J-STD-020D.1	IR Reflow, Level 1	1	50	50
IX3180G/ 8 Pin DIP	Thermal Shock (T/S)	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells, 15 cycles	3	50	150
IX3180G/ 8 Pin DIP	Temp Cycle (T/C)	Mil-Std-883, N1010, "B"	-55 to 125°C, 10/10 dwells 300 cycles	3	50	150
IX3180G/ 8 Pin DIP	Hot Storage	JESD22-A103-C	125C, 1000 hrs	1	50	50
IX3180G/ 8 Pin DIP	ESD	JESD22-A114-E	All Pins, 1.5kΩ, 100pF	1	9	9

Reliability Test Results:

The stress tests and associated results for IX3180G 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.

Table 2: IX3180G Reliability Tests Results

Product/ Package	Stress/ Kits	Readpoint Final / Reject/ SS
IX3180G/ 8 Pin DIP	HTRB/ TE3358 TE3433	1000 hrs. 0/180
IX3180G/ 8 Pin DIP	MSL/ TE3433	IR Reflow Level 1 0/50
IX3180G/ 8 Pin DIP	TS/ TE3437 TE3438 TE3439	15 Cycles 0/150
IX3180G/ 8 Pin DIP	TC/ TE3437 TE3438 TE3439	300 Cycles 0/150
IX3180G/ 8 Pin DIP	Hot Storage/ TE3358	1000 hrs 0/50

ESD Testing Results:

As part of this qualification, IX3180G was subjected to Human Body Model (HBM) ESD Sensitivity Classification testing using the KeyTek Zapmaster test 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 up to +/-2500V of HBM.

Table 3: IX3180 ESD Results

ESD Model	Product/ Kit	Package	ESD Test Spec	RC Network	Highest Passed	Class
HBM	IX3180G/ TE3433	8 Pin DIP	JESD22, A114-E	1.5kΩ, 100pF	2500V	2

FIT (Failure in Time) Rate of IX3180G:

Table 4 provides sample size with testing summary for HTRB stress from this qualification. For HTRB, FIT rates were calculated based on the Acceleration Factor (AF) and equivalent device hours at 0.7eV of activation energy at 125°C test temperature and 40°C ambient use temperatures. The FIT rates came out to be 20.01 FITs for HTRB.

Table 4: IX3180G FIT Rate Summary

Qual Lot #	Stress Test	Product/ Kits #	# of Devices	# of Fail	Hours Tested	Equivalent Dev. Hours	FIT Rate @ 60% CL
1	HTRB	IX3180G/ TE3358 TE3433	180	0	1000	45,973,074	20.01

Conclusion:

The qualification of IX3180G has completed and has met the FITs rate requirement for release.

Approval:

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