



Reliability Report

Reliability Data for CPC1593G 6 Pin DIP Product

Report Title: Reliability Data for CPC1593G
6 Pin DIP Product

Report Number: 2011-013

Date: 5/31/12

Introduction:

This report summarizes the Reliability data of IXYS Integrated Circuits Division CPC1593G. The Reliability data presented here were collected during IXYS IC Division's product qualification. The purpose of this qualification was to verify IXYS IC Division Quality and Reliability requirements as outlined in the internal specifications. The CPC1593G Gate Driver is manufactured at IXYS IC Division and assembled at ATEC in the Philippines. The process is IXYS IC Division P10 and CPC1593G is available in a 6 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 the IXYS IC Division internal specifications and with the approval of the product development team and quality assurance.

Table 1: CPC1593G Reliability Tests

Product Package	Stress Test	Applicable Specs and Readpoints	Stress Conditions	# Lots	Sample Size	Total
CPC1540 6 Pin DIP CPC1563G 6 Pin DIP CPC1593G 6 Pin Dip	HTRB	JESD22-A108	125C, 80% WVDC, 1000 hrs	3 1 1	90 90 90	270 90 90
CPC1540 6 Pin DIP	THB	JESD22, A101	85°C, 85% 1000 hrs	1	77	77
CPC1540 6 Pin DIP	Thermal Shock	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells, 15 cycles	1	55	55
CPC1540 6 Pin DIP	Temp Cycle	Mil-Std-883, N1011 "B"	-55 to 125°C, 10/10 dwells, 300 cycles	3	55	165
CPC1540 6 Pin DIP	MSL	J-STD-020D.1	IR Reflow, Level 1, Level 3	2	50	100
CPC1540 6 Pin DIP CPC1563G 6 Pin DIP CPC1593G 6 Pin Dip	High Temp Storage	JESD22-A103C	125°C, 1000hrs	1 1 1	50 50 50	50 50 50

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Product Package	Stress Test	Applicable Specs and Readpoints	Stress Conditions	# Lots	Sample Size	Total
CPC1540 6 Pin DIP	ESD HBM	JESD22, A114-E	1.5kΩ, 100pF	3	6	18
CPC1563G 6 Pin DIP				1	6	6
CPC1593G 6 Pin DIP				1	6	6

Reliability Test Results:

The stress tests and associated results for CPC1593G 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: CPC1593G Reliability Test Results

Product/ Package	Stress/ Kits	Readpoint 1 / Reject/ SS	Readpoint 2 / Reject/ SS	Readpoint 3 / Reject/ SS	Comments
CPC1540 6 Pin DIP	HTRB TE3089	168 hrs. 0/90	500 hrs. 0/90	1000 hrs. 0/90	
CPC1540 6 Pin DIP	HTRB TE3113	168 hrs. 0/90	500 hrs. 0/90	1000 hrs. 0/90	
CPC1540 6 Pin DIP	HTRB TE3114	168 hrs. 0/90	500 hrs. 0/90	1000 hrs. 0/90	
CPC1563G 6 Pin DIP	HTRB TE3185	168 hrs. 0/90	500 hrs. 0/90	1000 hrs. 1/90	Failure for DMOS SKS053 Ref Report FA12-060
CPC1593G 6 Pin DIP	HTRB TE3190	168 hrs. 0/90	500 hrs. 0/90	1000 hrs. 0/90	
CPC1540 6 Pin DIP	THB TE3089	168 hrs. 0/77			
CPC1540 6 Pin DIP	Thermal Shock TE3089	15 Cycles 0/55			
CPC1540 6 Pin DIP	Temp Cycle TE3089	300 Cycles 0/55			

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Product/ Package	Stress/ Kits	Readpoint 1 / Reject/ SS	Readpoint 2 / Reject/ SS	Readpoint 3 / Reject/ SS	Comments
CPC1540 6 Pin DIP	Temp Cycle TE3113	300 Cycles 0/55			
CPC1540 6 Pin DIP	Temp Cycle TE3114	300 Cycles 3/55			(3) Failures: Ball Bond break at neck Ref Report FA11-114
CPC1540 6 Pin DIP	MSL 1 TE3089	IR Reflow Level 1 0/50			
CPC1540 6 Pin DIP	MSL 3 TE3089	IR Reflow Level 2 0/50			
CPC1540 6 Pin DIP	High Temp Storage TE3089	168 hrs. 0/50	500 hrs. 0/50	1000 hrs. 0/50	
CPC1563G 6 Pin DIP	High Temp Storage TE3185	168 hrs. 0/50	500 hrs. 0/50	1000 hrs. 0/50	
CPC1593G 6 Pin DIP	High Temp Storage TE3190	168 hrs. 0/50	500 hrs. 0/50	1000 hrs. 0/50	

ESD Testing Results:

As part of this qualification, the product CPC1593G 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 +/- 8000V zapping.

Table3: Product CPC1593G ESD Characterization Results

ESD Model	Kit Number	Package	ESD Test Spec	RC Network	Highest Passed	Class
HBM	CPC1540 TE3034 TE3113 TE3114 CPC1563G TE3146 CPC1593G TE3190	6 Pin DIP	JESD22, A114-E	1.5k Ω , 100pF	8000V 3000V 3000V	3B 2 2

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FIT (Failure in Time) Rate of CPC1593G

Table 4 below summarizes the FIT rate from the HTRB data. Using the Reliability HTRB data, FIT rate was calculated based on the equivalent device hours at use condition of 40°C and stressed condition of 125°C at 0.7eV of activation energy. The FIT rate came out to be 17.66 FITs.

Table 4: CPC1563G FIT Rate Summary

Product/ Stress	Lot Number	# of Devices	# of Failed	Hours Tested	Test Temp (°C)	Eq. Device Hours	FITs @ 60% CL
CPC1540/ HTRB CPC1563G/ HTRB CPC1593G/ HTRB	TE3089 TE3113 TE3114 TE3185 TE3190	450	1	1000	125	114,932,685	17.66

Conclusion:

The qualification of the product CPC1593G has been successfully completed for the production release.

APPROVAL:

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