

Reliability Report-CPC5002G
Qualification No: 2011-011



Reliability Report

Reliability Data for CPC5002G

Report Title: Reliability Data for CPC5002G

Report Number: 2011-011

Date: 11/16/11

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Introduction:

This report summarizes the Reliability data of IXYS IC Division CPC5002G. 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 CPC5002G silicon is founded at ON-SEMI and assembled at Atec in the Philippines. The ON-SEMI process is D3N (reference qual by comparison CPC5750, CPC5902G, CPC5903G).

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 specifications and with the approval of the product development team and quality assurance.

Table 1: Product CPC5002G Reliability Tests

Stress Test	Applicable Specs	Stress Conditions	Product/ Package	Number of Lots	Sample Size (SS)	Total SS
HTOL	Mil-Std-883	125°C, 80%	CPC5002G 8 Pin Dip	3	55	165
Thermal Shock (T/S)	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells, 15 cycles	CPC5002G 8 Pin Dip	3	50	150
Temp Cycle (T/C)	Mil-Std-883, N1010, "B"	-55 to 125°C, 10/10 dwells, 300 cycles	CPC5002G 8 Pin Dip	3	50	150
High Temp Storage	JESD22-A103C	125°C, 1000hrs	CPC5002G 8 Pin Dip	3	50	150
MSL	J-STD-020D.1	IR Reflow, Level 1	CPC5002G 8 Pin Dip	1	50	50
ESD HBM	JESD22, A114-E	1.5kΩ, 100pF	CPC5002G 8 Pin Dip	2	9	18

Reliability Test Results:

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The stress tests and associated results for the product CPC5002G 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: Product CPC5002G Reliability Test Results

Stress Test	Product/Kit Number	Readpoint / (Reject/ SS)	Comments
HTOL	CPC5002 TE3099 1126	1000 hrs.	Qual Lot#1 Data
		0/55	
HTOL	CPC5002 TE3100 1127	1000 hrs.	Qual Lot#2 Data
		0/55*	
HTOL	CPC5002 TE3101 1128	1000 hrs.	Qual Lot#3 Data
		0/55	
Thermal Shock	CPC5002 TE3099 1126	15 Cycles	Qual Lot#1 Data
		0/50	
Thermal Shock	CPC5002 TE3100 1127	15 Cycles	Qual Lot#2 Data
		0/50	
Thermal Shock	CPC5002 TE3101 1128	15 Cycles	Qual Lot#3 Data
		0/50	
Temp Cycle	CPC5002 TE3099 1126	300 Cycles	Qual Lot#1 Data
		0/50	
Temp Cycle	CPC5002 TE3100 1127	300 Cycles	Qual Lot#2 Data
		0/50	
*NOTE: Failures not considered in FIT calculation due to results of the FA Report FA11-153 (BSOB lift 500hrs and 1000hrs).			

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Stress Test	Product/Kit Number	Readpoint / (Reject/ SS)	Comments
Temp Cycle	CPC5002 TE3101 1128	300 Cycles	Qual Lot#3 Data
		0/50	
High Temp Storage	CPC5002 TE3099 1126	192 hrs.	Qual Lot#1 Data
		0/50	
High Temp Storage	CPC5002 TE3100 1127	192 hrs.	Qual Lot#2 Data
		0/50*	
High Temp Storage	CPC5002 TE3101 1128	192hrs.	Qual Lot# 3 Data
		0/50	
MSL	CPC5002 TE3099 1126	IR Reflow Level 1 0/50	Qual Lot#1 Data
*Note: BSOB wire issue failure evaluated in FA Report FA11-146			

ESD Testing Results:

As part of this qualification, the product CPC5002G 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 +/-4000V testing.

Table3: Product CPC5002G ESD Characterization Results

ESD Model	Product/Kit Number	Package	ESD Test Spec	RC Network	Highest Passed	Class
HBM	CPC5002G TE3099 TE3101	8 Pin Dip	JESD22, A114-E	1.5kΩ, 100pF	4000V	3A

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FIT (Failure in Time) Rate on the Product CPC5002G:

Table 4 summarizes the number of devices used for the product CPC5002G reliability stress with associated failures. Using the HTOL 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 temperatures. The calculated FITs from the reliability stress came out to be 21.83 for HTOL.

Table 4: Product CPC5002G 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	HTOL	CPC5002G TE3099 TE3100 TE3101	165	0	1000	0.7	255.41	42,141,984	21.83

Conclusion:

The qualification of the product CPC5002G has been successfully completed for the production release. The reliability and process data for D3N can be found at S:/REED/Projects/New Process Information/On-Semi.

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APPROVAL:

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