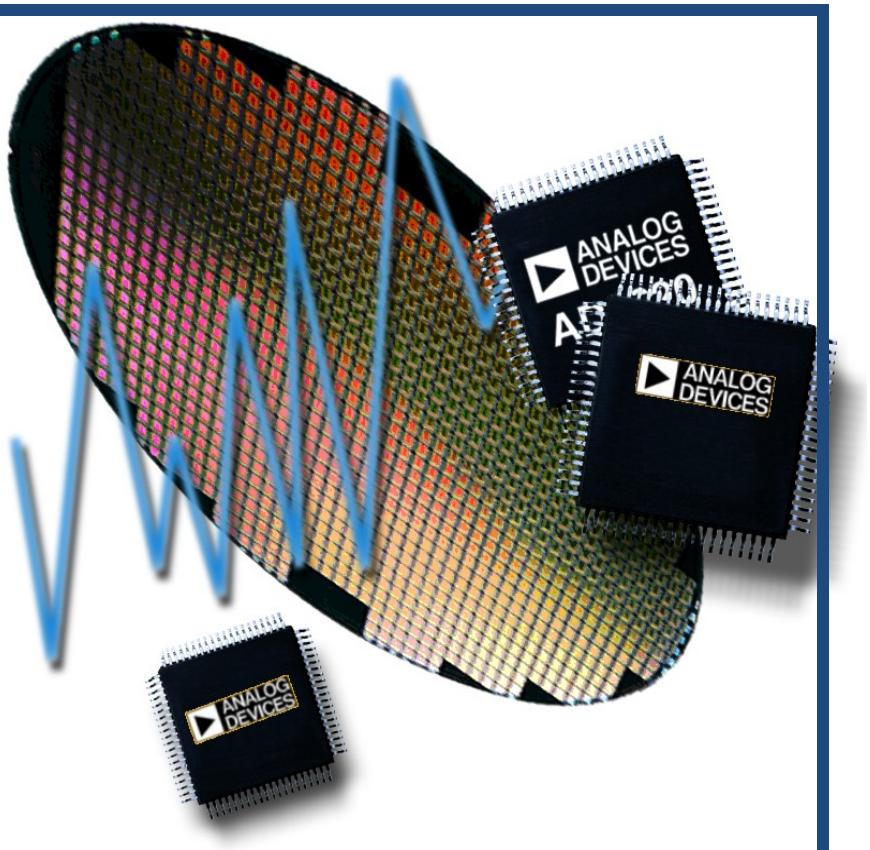

Reliability Report

Report Title: ADXL351 Carsem Package Transfer Qualification (Interim Report)

Report Number: 18985

Revision: A

Date: 06 July 2022

Summary

This report documents the successful completion of the reliability qualification requirements for commercial release of the ADXL351 product in a 14-LCC package. The ADXL351 is a low noise, low drift, low power 3-axis accelerometer in 14-LCC package at Carsem. The ADXL351 is targeted for use in ADIS16550W, an automotive-qualified, high performance iSensor IMU module. It is targeted at Level 3+ Autonomous Vehicles and is a critical input for determining precise positioning for navigation and emergency redundancy of the self-driving system.

Table 1: ADXL351 Product Characteristics

Die/Fab

Die Id	TMLB22 A / XA351 A	XM357 A
Die Size (mm)	1.73 x 2.43	2.85 x 2.56
Wafer Fabrication Site	E_TSMC1108	I_WILM1B08
Wafer Fabrication Process	0.18um CMOS	MEMS
Approximate Transistor Count	NA	NA
Passivation Layer	undoped-oxide/SiN	None
Bond Pad Metal Composition	AlCu(0.5%)	AlCu(0.5%)

Package/Assembly

Package	14-LCC
Body Size (mm)	6.00 x 6.00 x 2.20
Assembly Location	CARSEM (CRM)
Adhesive Material	Die 1 (D1): Henkel JM7000 conductive Die 2 (D2): Henkel ABP8151D7 non-conductive
Wire Type	HTS 2N Gold
Wire Diameter (mils)	1.0
Lid Shield Material	Alloy 42
Lid Shield Attach Material	90Pb_5.0Sn_3.0Ag2.0In
Mark Process	Laser
Terminal Finish Composition	Au
Glass Type	NA
Moisture Sensitivity Level	3
Maximum Peak Reflow Temperature (°C)	260

Description / Results of Tests Performed

Tables 2 provides a description of the qualification tests conducted and the associated test results for products manufactured on the same technologies as described in Table 1. All devices were electrically tested before and after each stress. Any device that did not meet all electrical data sheet limits following stressing would be considered a valid (stress-attributable) failure unless there was conclusive evidence to indicate otherwise.

Table 2: ADXL351 Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
Group D	MIL-STD-883, M5005	Sub 4, Shock/Vib/Cent.	ADXL351	Q18985.1.1	15	0
				Q18985.2.1	15	0
				Q18985.3.1	15	0
Guided Drop	IEC 60068-2-32	1X6 axes- 1.2m concrete, Single Duration	ADXL351	Q18985.1.2	25	0
				Q18985.2.2	25	0
				Q18985.3.2	25	0
High Temperature Storage Life (HTSL)	JESD22-A103	200C, 72hr	ADXL351	Q18985.1.3	77	0
Mechanical Shock - Un-Powered	IEC 60068-2-27	10,000g, 5 Shock Pulses, 0.1ms, Single Duration	ADXL351	Q18985.1.7	32	0
				Q18985.2.6	32	0
				Q18985.3.6	32	0
Mechanical Shock - Powered	IEC 60068-2-27	10,000g, 5 Shock Pulses, 0.1ms, Single Duration	ADXL351	Q18985.1.7	32	0
				Q18985.2.6	32	0
				Q18985.3.6	32	0
Temperature Cycling (TC)[1]	JESD22-A104	-55°C/+125°C, 1,000 Cycles	ADXL351	Q18985.1.4	77	0
				Q18985.2.3	77	0
				Q18985.3.3	77	0

[1] These samples were subjected to preconditioning (per J-STD-020 Level 3) prior to the start of the stress test. Level 3 preconditioning consists of the following: 1. Bake – 24 hours at 125°C; 2. Soak – unbiased soak for 192 hours at 30°C, 60%RH; 3. Reflow – three passes through a reflow oven with a peak temperature of 260°C. TC samples were subjected to wire-pull test after 500 cycles with results within specification limits.

Samples of the many devices manufactured with these package and process technologies are continuously undergoing reliability evaluation as part of the ADI Reliability Monitor Program. Additional qualification data is available on Analog Devices' web site.

Approvals

Reliability Engineer: Michael Walornyj

Additional Information

Data sheets and other additional information are available on Analog Devices' web site