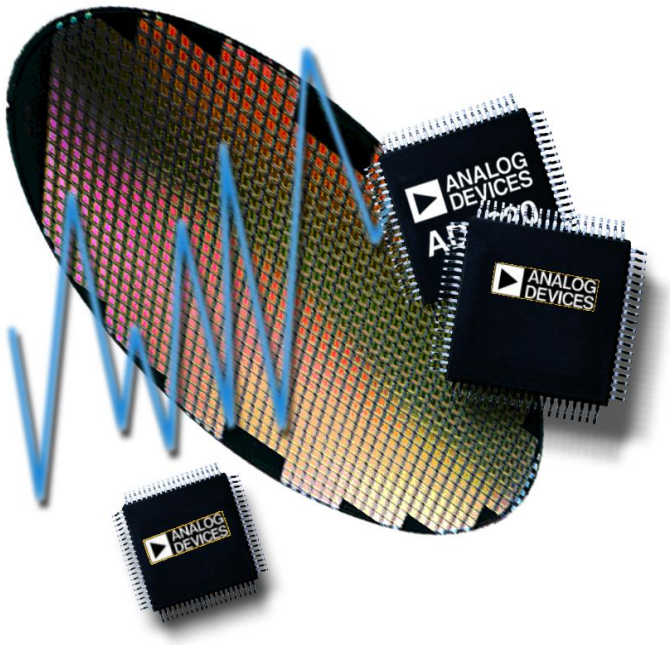

Reliability Report

Report Title: LTM4670 Material Set Change Qualification

Report Number: 21357

Revision: A

Date: 15 December 2023

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the LTM4670 product in a 162-CSP_BGA package assembled at ASE Korea. The only change made is the die thickness from 450m to 200m.

Die/Fab Product Characteristics

Table 1: LTM4670 Die/Fab Product Characteristics

Product Characteristics	Product(s) to be qualified	Product(s) used for Substitution Data
Generic/Root Part #	LTM4670	LTM4670
Die Id	LTC3311	LTC3311
Die Size (mm)	1.65 x 2.41	1.65 x 2.41
Wafer Fabrication Site	TSMC Taiwan	TSMC Taiwan
Wafer Fabrication Process	0.25um BCDMOS	0.25um BCDMOS
Die Substrate	Si	Si
Metallization / # Layers	AlCu/5	AlCu/5
Polyimide	Yes	Yes
Passivation	undoped-oxide/SiN	undoped-oxide/SiN

Package/Assembly Product Characteristics

Table 2: LTM4670 Product Characteristics - 162-CSP_BGA at ASE Korea

Product Characteristics	Product(s) to be qualified	Product(s) used for Substitution Data
Generic/Root Part #	LTM4670	LTM4670
Package	162-CSP_BGA	162-CSP_BGA
Body Size (mm)	15.00 x 7.50 x 4.65	15.00 x 7.50 x 4.65
Assembly Location	ASE Korea	ASE Korea
MSL/Peak Reflow Temperature(°C)	4 / 245°C	4 / 245°C
Mold Compound	Sumitomo G311E	Sumitomo G311E
Substrate Laminate Supplier	Daeduck	Daeduck
Substrate Material	BT Resin	BT Resin
Solder Ball Composition	SAC305	SAC305

Package/Assembly Test Results

Table 3: LTM4670 Test Results - CSP_BGA at ASE Korea

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Operating Life (HTOL)	JESD22-A108	125°C<Tj<135°C, Biased, 1,000 Hours	LTM4670	Q16156.2HTOL	0/77
				Q16156.3HTOL	0/77
				Q16156.4	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	LTM4670	Q16156.1HTS	0/45
Highly Accelerated Temperature and Humidity Stress Test (HAST) [1]	JESD22-A110	110C 85%RH 17.7 psia, Biased, 264 Hours	LTM4670	Q16156.1BHAST	0/25
				Q16156.2BHAST	0/25
				Q16156.3BHAST	0/25
Power Cycling	JESD22-A122	Tj = 60°C to 125°C, 50,000 cycles	LTM4670	1075049.1	0/8
				1112146.1	0/8
				1098799.1	0/8
Solder Heat Resistance (SHR)	J-STD-020	MSL-4	LTM4670	Q21357.1.SHR[3]	0/246
Temperature Cycling (TC)[1]	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4670	Q16156.1TC	0/77
				Q16156.2TC	0/77
				Q16156.3TC	0/77
Temperature Cycling (TC)[2]	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4670	Q21357.1.TC[3]	0/77
Thermal Shock (TS) [1]	JESD22-A106	-55°C/+125°C, 1,000 Cycles	LTM4670	Q16156.1TS	0/77
				Q16156.2TS	0/77
				Q16156.3TS	0/77
Unbiased HAST (UHST) [1]	JESD22-A118	110C 85%RH 17.7 psia, 264 Hours	LTM4670	Q16156.1UHAST	0/77
				Q16156.2UHAST	0/77
				Q16156.3UHAST	0/77

[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: Bake: 48 hrs @ 125°C, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 245°C.

[2] These samples were subjected to preconditioning (per J-STD-020 Level 4) prior to the start of the stress test. Level 4 preconditioning consists of the following: Bake: 48 hrs @ 125°C, Unbiased Soak: 96 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 245°C.

[3] Stress test with 200µm die.

ESD and Latch-Up Test Results

Table 4: ESD Test Result

ESD Model	Generic/Root Part #	Package	ESD Test Spec	RC Network	Highest Pass Level	Class
FICDM	LTM4670	162-BGA	JS-002	1Ω, Cpkg	±1250V	C3
HBM	LTM4670	162-BGA	ESDA/JEDEC JS-001	1.5kΩ, 100pF	±2000V	3A

Table 5: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T_A)	Class
JESD78	LTM4670[1]	+200mA, -200mA	+7V	25°C	I

[1] Stress test with 200µm die.

Approvals

Reliability Engineer: Lay Yong Ong