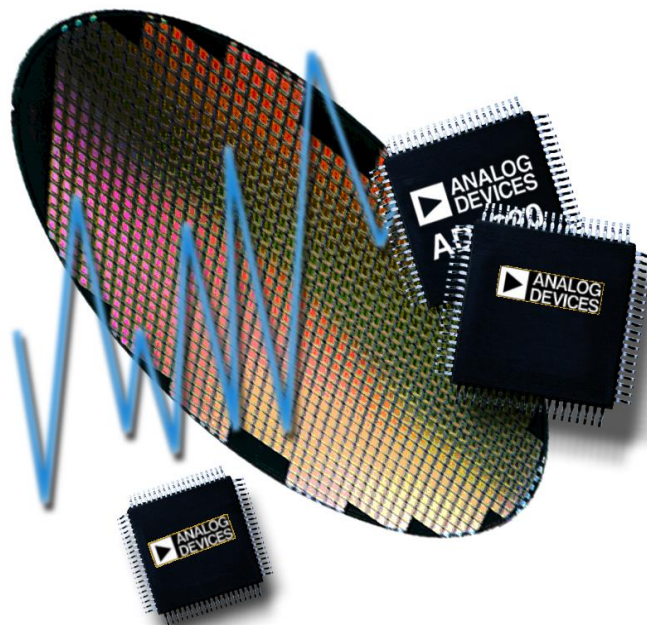




Reliability Report

Report Title:	LTM4693 Material Set Change Qualification
Report Number:	21969
Revision:	A
Date:	6 June 2024

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the material set change of the LTM4693 product in a 25-LGA package. The LTM4693 is Ultrathin Low V_{IN} , 2A Buck-Boost μ Module regulator. The only change made is the die thickness from 450um to 200um.

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	LTM4693
Die Id	LTC3154
Die Size (mm)	2.44 x 1.96
Wafer Fabrication Site	TSMC
Wafer Fabrication Process	0.25um CMOS
Die Substrate	Si
Metallization / # Layers	AlCu/5
Polyimide	No
Passivation	oxide/OxyNitride

Die/Fab Test Results

Table 2: Die/Fab Test Results - 0.25um CMOS at TSMC

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
Highly Accelerated Stress Test (HAST) ¹	JESD22-A110	110C 85%RH 17.7 psia, Biased, 264 hours	LTM4693	Q17386.1RCMHASt	0/25
				Q17386.2	0/25
				Q17386.3BHASt	0/25
High Temperature Storage Life (HTSL)	JESD22-A103	+150°C, 1,000 hours	LTM4693	Q17386.1HTS	0/45
				Q17386.2HTS	0/45
				Q17386.3HTS	0/45
High Temperature Operating Life (HTOL)	JESD22-A108	Ta = 125C, Biased, 1000 hours	LTM4693	Q17386.1HTOL	0/77
				Q17386.2HTOLB	0/77
				Q17386.3HTOL	0/77
Power Cycling	JESD22-A122	Tj=25°C to 80°C, Biased, 50,000 Cycles.	LTM4693	1023679.1	0/8
				1042445.1	0/8
				1084500.1	0/8

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 260°C.

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - 25-LGA at ASE Korea

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	LTM4693
Package	25-LGA
Body Size (mm)	4.00 x 3.50 x 1.25
Assembly Location	ASE Korea
MSL/Peak Reflow Temperature(°C)	3 / 260°C
Mold Compound	Sumitomo G311E
Substrate Material	BT Resin
Terminal Finish Composition	Au

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - LGA at ASE Korea

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
Solder Heat Resistance (SHR)	J-STD-020	MSL-3	LTM4693	Q21969.1.MSL3 ²	0/231
Temperature Cycling (TC) ¹	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4693	Q21969.1.TC ²	0/77
				Q17386.1TC	0/77
				Q17386.2TC	0/77
				Q17386.3TC	0/77
Highly Accelerated Stress Test (HAST) ¹	JESD22-A110	110C 85%RH 17.7 psia, Biased, 264 hours	LTM4693	Q17386.1RCMHAST	0/25
				Q17386.2	0/25
				Q17386.3BHAST	0/25
Unbiased HAST (UHAST) ¹	JESD22-A118	110C 85%RH 17.7 psia, 264 hours	LTM4693	Q17386.1UHAST	0/77
				Q17386.2UHAST	0/77
				Q17386.3UHAST	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	+150°C, 1,000 hours	LTM4693	Q17386.1HTS	0/45
				Q17386.2HTS	0/45
				Q17386.3HTS	0/45

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 260°C.

² Stress test with 200µm die.

ESD and Latch-Up Test Results

Table 5: ESD Test Result

ESD Model	Generic/Root Part #	Package	ESD Test Spec	ESD Test Spec	Highest Pass Level	First Fail Level	Class
FICDM	LTM4693	25-LGA	JS-002	1Ω, Cpkg	±2000V	NA	C3
HBM	LTM4693	25-LGA	ESDA/JEDEC JS-001	1.5kΩ, 100pF	±3000V	±3500V	2

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T _A)	Class
JESD78	LTM4693 ¹	+100mA, -100mA	+8.25V	25°C	I

¹ Stress test with 200μm die.

Approvals

Reliability Engineer: Nor Nazreen bin Norhisham