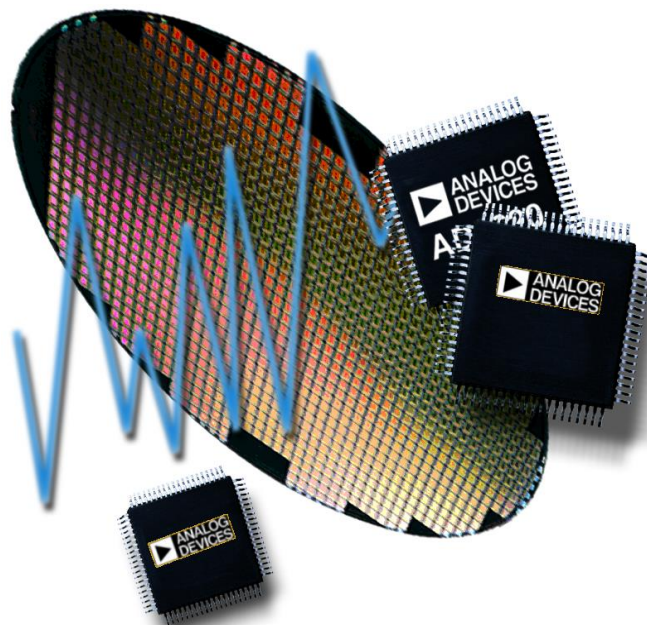




Reliability Report

Report Title:	LTM8078 Material Set Change Qualification
Report Number:	21414
Revision:	A
Date:	31 January 2024

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the material set change of the LTM8078 product in a 49-CSP_BGA package. The LTM8078 is 40 VIN, dual 1.4A/single 2.8A step-down Silent Switcher μ Module regulator. The only change made is the die thickness from 450 μ m to 200 μ m.

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics- 0.35 μ m DMOS

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	LTM8078
Die Id	8653
Die Size (mm)	1.75 x 2.19
Wafer Fabrication Site	Vanguard Fab
Wafer Fabrication Process	0.35 μ m DMOS
Die Substrate	Si
Metallization / # Layers	AlCu / 3
Polyimide	No
Passivation	undoped-oxide/SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results - 0.35µm DMOS at Vanguard

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Operating Life (HTOL)	JESD22-A108	Ta=125°C, Biased, 1,000 Hours	LTM8078	Q18032.1.1HTOL	0/77
				Q18032.1HTOL	0/77
				Q18032.3HTOL	0/77
				Q18032.4HTOL	0/77
				Q18032.5HTOL	0/77
				Q18032.7HTOL ²	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	LTM8078	Q18032.1HTS	0/45
				Q18032.3HTS	0/45
				Q18032.4HTS	0/45
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	JESD22-A110	110°C 85%RH 17.7 psia, Biased, 264 Hours	LTM8078	Q18032.2PC.BHAST	0/77
				Q18032.3BHAST	0/77
				Q18032.4BHAST	0/77
Power Cycle	JESD22-A122	Tj=50°C to 125°C, 10,000 Cycles	LTM8078	Q18032.1PWRCYC	0/16
				Q18032.3PWRCYC	0/16
				Q18032.4PWRCYC	0/16
Temperature Humidity Bias (THB) ¹	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	LTM8078	Q18032.2THB_A	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 260°C.

² Stress test with 200µm die.

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - 49-CSP_BGA at ASE

Product Characteristics	Product(s) to be qualified
Generic/Root Part #	LTM8078
Package	49-CSP_BGA
Body Size (mm)	6.25 x 6.25 x 2.22
Assembly Location	ASE
MSL/Peak Reflow Temperature(°C)	3 / 260°C
Mold Compound	Sumitomo G311E
Attach Material	Alpha WS609 95Sn_5Sb
Substrate Material	BT Resin
Terminal Finish	96.5Sn_3.0Ag_0.5Cu

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - CSP_BGA at ASE

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	LTM8078	Q18032.1HTS	0/45
				Q18032.3HTS	0/45
				Q18032.4HTS	0/45
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	JESD22-A110	110°C 85%RH 17.7 psia, Biased, 264 Hours	LTM8078	Q18032.2PC.BHAST	0/77
				Q18032.3BHAST	0/77
				Q18032.4BHAST	0/77
Temperature Cycling (TC) ¹	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM8078	Q18032.1TC	0/77
				Q18032.3TC	0/77
				Q18032.4TC	0/77
				Q18032.7TC ²	0/77
Temperature Humidity Bias (THB) ¹	JESD22-A101	85°C, 85%RH, Biased, 1,000 Hours	LTM8078	Q18032.2THB_A	0/77
Unbiased HAST (UHST) ¹	JESD22-A118	110°C 85%RH 17.7 psia, 264 Hours	LTM8078	Q18032.1UHAST	0/77
				Q18032.3UHAST	0/77
				Q18032.4UHAST	0/77
				Q18032.7UHAST ²	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 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	RC Network	Highest Pass Level	Class
FICDM	LTM8078 ¹	49-CSP_BGA	ESDA/JEDEC JS-002	1Ω, Cpkg	±1250V	C3
HBM	LTM8078 ¹	49-CSP_BGA	ESDA/JEDEC JS-001	1.5kΩ, 100pF	±4000V	3A

¹ Stress test with 200μm die.

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T _A)	Class
JESD78	LTM8078 ¹	+100mA, -100mA	+43V/+13V/+5.25V	25°C	I

¹ Stress test with 200μm die.

Approvals

Reliability Engineer: Li Li Tay