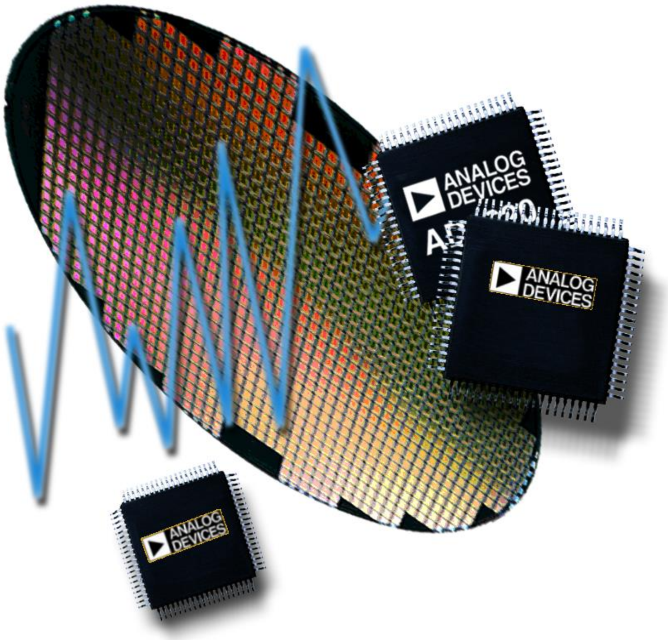

Reliability Report

Report Title: LTM4637 and LTM4639 Material Set Change Qualification

Report Number: 19167

Revision: A

Date: 10 March 2023

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the LTM4637, LTM4639 product in 133-CSP_BGA package. The LTM4637 and LTM4639 are 20A DC/DC uModule step-down regulators. This report is to qualify them with PMU9163 Alpha&Omega AONX36322 MOSFET.

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics

Product Characteristics	Product(s) to be qualified	Product(s) to be qualified	Product(s) to be qualified	Product(s) to be qualified
Generic/Root Part #	LTM4639	LTM4639	LTM4637	LTM4637
Die Id	3855	6700-3	3855	6700-3
Die Size (mm)	1.78 x 1.78	1.47 x 0.81	1.78 x 1.78	1.47 x 0.81
Wafer Fabrication Site	ADI Milpitas	ADI Camas	ADI Milpitas	ADI Camas
Wafer Fabrication Process	0.6µm BiCMOS	4um Bipolar	0.6µm BiCMOS	4um Bipolar
Die Substrate	Si	Si	Si	Si
Metallization / # Layers	AlCu / 2	AlSiCu / 1	AlCu / 2	AlSiCu/ 1
Polyimide	No	No	No	No
Passivation	doped-oxide/SiN	undoped-oxide/SiN	doped-oxide/SiN	undoped-oxide/SiN

Package/Assembly Product Characteristics

Table 2: Package/Assembly Product Characteristics - 133-CSP_BGA at ADI Penang

Product Characteristics	Product(s) to be qualified	
Generic/Root Part #	LTM4637	LTM4639
Package	133-CSP_BGA	133-CSP_BGA
Body Size (mm)	15.00 x 15.00 x 4.92	15.00 x 15.00 x 4.92
Assembly Location	ADPG	ADPG
MSL/Peak Reflow Temperature(°C)	4 / 245	4 / 245
Mold Compound	Sumitomo G311E	Sumitomo G311E
Die Attach	Multicore 95Sn/5Sb	Multicore 95Sn/5Sb
Substrate Material	BT Resin	BT Resin
Lead Finish	96.5Sn_3.0Ag_0.5Cu	96.5Sn_3.0Ag_0.5Cu
Wire Bond Material/Diameter (mils)	Gold / 1.00	Gold / 1.00

QMCL

PID P/N	Description	Vendor, Vendor P/N
PMU9163	MOSFET	Alpha&Omega, AONX36322

Reliability Test Results

Table 3: Reliability Test Results – LTM4637 and LTM4639

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	LTM4639	Q19167.6HTOL	0/77
			LTM4637	Q19167.5HTOL	0/77
Temperature Cycling (TC)[1]	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4637	Q19167.1TC	0/77
			LTM4639	Q19167.2TC	0/77
Thermal Shock (TS)[1]	JESD22-A106	-55°C/+125°C, 1,000 Cycles	LTM4637	Q19167.1TS	0/77
			LTM4639	Q19167.2TS	0/77
Unbiased HAST (UHST)[1]	JESD22-A118	110C 85%RH 17.7 psia, 264 Hours	LTM4637	Q19167.1UHAST	0/77
			LTM4639	Q19167.2UHAST	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.

Approvals

Reliability Engineer: Yi Ning