



# ***Reliability Report***

**Report Title:** LTM4620, LTM4620A, LTM4677,  
LTM4648 and LTM4649 Material Set  
Change Qualification

**Report Number:** 19271

**Revision:** A

**Date:** 5 May 2024

## Summary

This report documents the successful completion of the reliability qualification requirements for the release of the PMU9168 MOSFET component from OnSemi in the LTM4620, LTM4620A and LTM4677 product in 144-CSP\_BGA, LTM4648 and LTM4649 product in a 68-CSP\_BGA package. The LTM4620, LTM4649, LTM4677 are the selected qualification vehicles.

## Qualified Components

<b>ADI P/N</b>
PMU9168
SE006847-01

## Die/Fab Product Characteristics

**Table 1: Die/Fab Product Characteristics**

<b>Product Characteristics</b>	<b>Product(s) to be qualified</b>	
Generic/Root Part #	LTM4620	LTM4649
Die Id	3855	3855-9
Die Size (mm)	1.78 x 1.78	1.78 x 1.78
Wafer Fabrication Site	ADI Camas	ADI Camas
Wafer Fabrication Process	0.6um BiCMOS	0.6um BiCMOS
Die Substrate	Si	Si
Metallization / # Layers	AlCu/ 2	AlCu/ 2
Polyimide	No	No
Passivation	doped-oxide/SiN	doped-oxide/SiN

**Die/Fab Test Results**
**Table 2: Die/Fab Test Results - BiCMOS**

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	LTM4620	Q19271.1HTOL	0/77
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	LTM4620	Q19271.1HTS	0/50
			LTM4649	Q19271.3HTS	0/50
Highly Accelerated Temperature and Humidity Stress Test (HAST) <sup>1</sup>	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	LTM4620	Q19271.1HAST	0/25
		110C 85%RH 17.7 psia, Biased, 264 Hours	LTM4649	Q19271.3HAST	0/25

<sup>1</sup> 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.

## Package/Assembly Product Characteristics

**Table 3: Package/Assembly Product Characteristics - CSP\_BGA at ADI Penang**

Product Characteristics	Product(s) to be qualified		
Generic/Root Part #	LTM4620	LTM4649	LTM4677
Package	144-CSP_BGA	68-CSP_BGA	144-CSP_BGA
Body Size (mm)	15.00 x 15.00 x 5.01	9.00 x 15.00 x 4.92	16.00 x 16.00 x 5.01
Assembly Location	ADI Penang	ADI Penang	ADI Penang
MSL/Peak Reflow Temperature(°C)	3 / 245	3 / 245	4 / 245
Mold Compound	Hitachi GE100LFCWA	Hitachi GE100LFCWA	Sumitomo G311E
Die Attach/Underfill/TIM	Multicore 95Sn/5Sb / NA / NA	Multicore 95Sn/5Sb / NA / NA	Multicore 95Sn/5Sb / NA / NA
Substrate Material	BT Resin	BT Resin	BT Resin
Terminal Finish	96.5Sn_3.0Ag_0.5Cu	96.5Sn_3.0Ag_0.5Cu	96.5Sn_3.0Ag_0.5Cu
Wire Bond Material/Diameter (mils)	Tanaka Gold GLD/ 1.00	Tanaka Gold GLD/ 1.00	N/A

**Package/Assembly Test Results**
**Table 4: Package/Assembly Test Results - CSP\_BGA at ADPG**

Test Name	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS
High Temperature Storage Life (HTSL)	JESD22-A103	150°C, 1,000 Hours	LTM4620	Q19271.1HTS	0/50
			LTM4649	Q19271.3HTS	0/50
			LTM4677	Q19271.2HTS	0/50
Highly Accelerated Temperature and Humidity Stress Test (HAST) <sup>1</sup>	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	LTM4620	Q19271.1HAST	0/25
		110C 85%RH 17.7 psia, Biased, 264 Hours	LTM4649	Q19271.3HAST	0/25
Temperature Cycling (TC) <sup>1</sup>	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4620	Q19271.1TMCL	0/77
			LTM4649	Q19271.3TMCL	0/77
Temperature Cycling (TC) <sup>2</sup>	JESD22-A104	-55°C/+125°C, 1,000 Cycles	LTM4677	Q19271.2TMCL	0/77
Unbiased HAST (UHST) <sup>1</sup>	JESD22-A118	110C 85%RH 17.7 psia, 264 Hours	LTM4649	Q19271.3uHAST	0/77
		130C 85%RH 33.3 psia, 96 Hours	LTM4620	Q19271.1uHAST	0/77
Unbiased HAST (UHST) <sup>2</sup>	JESD22-A118	110C 85%RH 17.7 psia, 264 Hours	LTM4677	Q19271.2uHAST	0/77

<sup>1</sup> 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.

<sup>2</sup> 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.

**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	LTM4649	68-CSP_BGA	JS-002	1Ω, Cpkg	±2000V	C3
HBM	LTM4649	68-CSP_BGA	JS-001	1.5kΩ, 100pF	±4000V	3A
FICDM	LTM4677	144-CSP_BGA	JS-002	1Ω, Cpkg	±750V	C3
HBM	LTM4677	144-CSP_BGA	JS-001	1.5kΩ, 100pF	±2500V	2

**Approvals**

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