



Product/Process Change Notice - PCN 23_0207 Rev. -

Analog Devices, Inc. One Analog Way, Wilmington, MA 01887, USA

This notice is to inform you of a change that will be made to certain ADI products (see Appendix A) that you may have purchased in the last 2 years. **Any inquiries or requests with this PCN (additional data or samples) must be sent to ADI within 30 days of publication date.** ADI contact information is listed below.

PCN Title:	ADBMS6830 Die, Bond Wire and Data Sheet Revision
Publication Date:	15-Nov-2023
Effectivity Date:	17-Feb-2024 <i>(the earliest date that a customer could expect to receive changed material)</i>
Revision Description:	Initial Release.

Description Of Change:

- (1) Pin Configurations and Function Description: Pin 59 is changed from V-to S1N (see figure 5 pin configuration).
- (2) Updated the HVPDDD mask.
- (3) Bond wire material is changed from gold to copper.
- (4) Update to Product Data Sheet: Added a specification for pin 59 in the DIAGNOSTIC MEASUREMENTS section (Table 3. Auxiliary (AUX) ADC DC Specifications).

Reason For Change:

- (1) To improve the measurement accuracy of S1 ADC (Analog to Digital Converter).
- (2) To improve the quality of the part during operation at high end of the supply voltage.
- (3) Manufacturing standardization. The conversion of copper wire aligns with industry trends and ADI's current and future alignment with copper wire. Note: Supplier has been manufacturing copper wire products for ADI in mass production for several years.
- (4) Update to the Product Data Sheet to accurately reflect the capability of the device.

Impact of the change (positive or negative) on fit, form, function & reliability:

No change in reliability. Improvement to fit, form and function.

Product Identification *(this section will describe how to identify the changed material)*

Changed material will be identified by assembly Date Code.

Summary of Supporting Information:

Qualification has been performed per AEC-Q100, Stress Test Qualification for Integrated Circuits. See attached Qualification Results Report. Data sheet revision will be available on Rev SpC.

Supporting Documents

Attachment 1: Type: Qualification Results Summary

[ADI_PCN_23_0207_Rev_-_ADBMS6830_Cu_wire_Qualification.pdf...](#)

Attachment 2: Type: Qualification Results Summary

[ADI_PCN_23_0207_Rev_-_ADBMS6830_Die_Revision_Qualification.pdf...](#)

Attachment 3: Type: Delta Qualification Matrix

[ADI_PCN_23_0207_Rev_-_ADBMS6830M_Delta-Qualification-Matrix-ZVEI-5_0_1...](#)

Note: If applicable, the device material declaration will be updated due to material change.

ADI Contact Information:

For questions on this PCN, please send an email to the regional contacts below or contact your local ADI sales representatives.

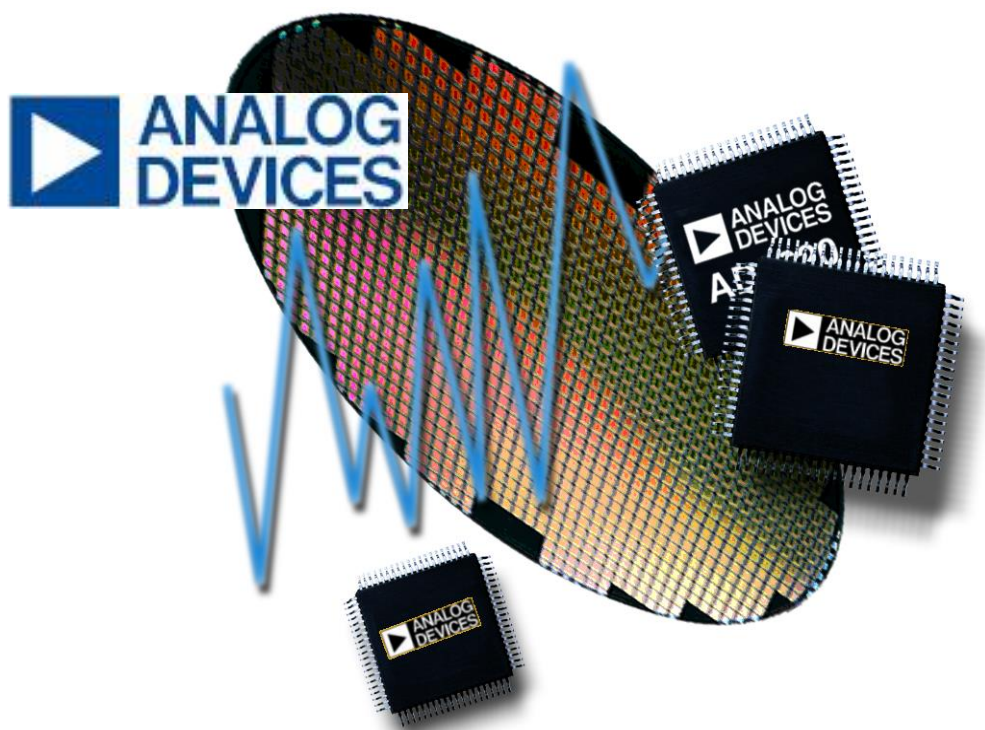
Americas:	Europe:	Japan:	Rest of Asia:
PCN_Americas@analog.com	PCN_Europe@analog.com	PCN_Japan@analog.com	PCN_ROA@analog.com

Appendix A - Affected ADI Models:

Added Parts On This Revision - Product Family / Model Number (6)

ADBMS6830M / ADBMS6830MWCCSZ	ADBMS6830M / ADBMS6830MWCCSZ- RL	ADBMS6830M / ADBMS6830MWFSCCSZ	ADBMS6830M / ADBMS6830MWFSCCSZ- RL	ADBMS6830M / ADBMS6830MXCSZ
ADBMS6830M / ADBMS6830MXCSZ- RL				

Appendix B - Revision History:			
Rev	Publish Date	Effectivity Date	Rev Description
Rev. -	15-Nov-2023	17-Feb-2024	Initial Release.



Reliability Report

Report Title:	ADBMS6830M (Lion-16) Automotive Grade 1 Die Rev G Qualification
Report Number:	20676
Revision:	A
Date:	15 September 2023

Summary

This report documents the successful completion of the reliability qualification requirements for the release of the ADBMS6830M with die revision G. The product is in a 72-LFCSP_SS package. The ADBMS6830M is a multicell battery stack monitor that measures up to 16 series-connected battery cells with a lifetime total measurement error (TME) of less than 2 mV over the full temperature range. The measurement input range of -2 V to $+5.5\text{ V}$ makes the ADBMS6830 suitable for most battery chemistries and allows the measurement of voltages across bus bars. Provisions are made for bypassing bus bars without dedicating any measurement channels.

AECQ100 Qualification Test Methods and Summary

AEC Test Group	AEC Stress Test Name	Abbreviation	AEC Test#	Reference
Group A ACCELERATED ENVIRONMENT STRESS TESTS	Preconditioning	PC	A1	Table 2, and Table 4
	Temperature Humidity Bias or Biased-HAST	THB or HAST	A2	
	Autoclave or Unbiased HAST or Temperature Humidity (without Bias)	AC, UHST, or TH	A3	
	Temperature Cycle	TC	A4	
	Power Temperature Cycling	PTC	A5	
	High Temperature Storage Life	HTSL	A6	
Group B ACCELERATED LIFETIME SIMULATION TESTS	High Temperature Operating Life	HTOL	B1	Table 2, and Table 4
	Early Life Failure Rate	ELFR	B2	
	NVM Endurance, Data Retention, and Operational Life	EDR	B3	
Group C PACKAGE ASSEMBLY INTEGRITY TESTS	Wire Bond Shear	WBS	C1	• Test C2 (and C1 for Cu Wire) are shown in Table 4. • Tests C3-6 are qualified and controlled with inline monitors and may be viewed on-site at Analog Devices.
	Wire Bond Pull Strength	WBP	C2	
	Solderability	SD	C3	
	Physical Dimensions	PD	C4	
	Solder Ball Shear	SBS	C5	
	Lead Integrity	LI	C6	
Group D DIE FABRICATION RELIABILITY TESTS	Electromigration	EM	D1	Die Fabrication Reliability data may be viewed on-site at Analog Devices.
	Time Dependent Dielectric Breakdown	TDDDB	D2	
	Hot Carrier Injection	HCI	D3	
	Negative Bias Temperature Instability	BTI	D4	
	Stress Migration	SM	D5	
Group E ELECTRICAL VERIFICATION TESTS	Pre- and Post-Stress Electrical Test	TEST	E1	Table 5 and Table 6
	Electrostatic Discharge Human Body Model	HBM	E2	
	Electrostatic Discharge Charged Device Model	CDM	E3	
	Latch-Up	LU	E4	
	Electrical Distributions	ED	E5	• For Tests E5, E6 and E7, ADI New Product Yield Analysis Testing Guidelines meet AEC Q100 requirements. • Results for Tests E7-E11 are available as applicable on a case by case basis. • Test E12 results may be viewed on-site at Analog Devices
	Fault Grading	FG	E6	
	Characterization	CHAR	E7	
	Electromagnetic Compatibility	EMC	E9	
	Short Circuit Characterization	SC	E10	
	Soft Error Rate	SER	E11	
	Lead (Pb) Free	LF	E12	
Group F DEFECT SCREENING TESTS	Process Average Test	PAT	F1	ADI New Product Yield Analysis Testing Guidelines meet AECQ100 Requirements.
	Statistical Bin/Yield Analysis	SBA	F2	
Group G CAVITY PACKAGE INTEGRITY TESTS	Mechanical Shock	MS	G1	< Applicable only for Cavity-Packages>
	Variable Frequency Vibration	VFV	G2	
	Constant Acceleration	CA	G3	
	Gross/Fine Leak	GFL	G4	
	Package Drop	DROP	G5	
	Lid Torque	LT	G6	
	Die Shear	DS	G7	
	Internal Water Vapor	IWV	G8	

Die/Fab Product Characteristics

Table 1: Die/Fab Product Characteristics - 0.13um DMOS

Product Characteristics	Product to be qualified	Product(s) used for Substitution Data		
Generic/Root Part #	ADBMS6830M	ADBMS2950	ADBMS6815M	ADBMS6815
Die ID	ADI_LION.07 G	TIGER 03	SENTRY.02 B	SCOUT_B D
Die Size (mm)	4.32 x 3.1	3.17 x 2.47	0.74 x 1.47	2.87 x 3.12
Wafer Fabrication Site	E_GLBL0712	E_GLBL0712	E_GLBL0712	E_GLBL0712
Wafer Fabrication Process	0.13um DMOS	0.13um DMOS	0.13um DMOS	0.13um DMOS
Die Substrate	Si	Si	Si	Si
Metallization / # Layers	AlCu(0.5%)/5	AlCu(0.5%)/5	AlSi(1.0%)Cu(0.5%)/5	AlCu(0.5%)/5
Polyimide	No	No	No	No
Passivation	doped-oxide/OxyNitride	doped-oxide/OxyNitride	doped-oxide/OxyNitride	undoped-oxide/SiN

Table 1.1: Die/Fab Product Characteristics – 7um BIPOLAR

Product Characteristics	Product(s) to be qualified	Product(s) used for Substitution Data		
Generic/Root Part #	ADBMS6830M	ADBMS6816	ADBMS6815	ADBMS6817
Die Id	6L815PV-F 10	W815	6L815PV-F 10	6L815PV-F 10
Die Size (mm)	1.47 x 0.74	1.47 x 0.74	1.47 x 0.74	1.47 x 0.74
Wafer Fabrication Site	ADI-Camas	ADI Camas	ADI-Camas	ADI-Camas
Wafer Fabrication Process	7um Bipolar	7um Bipolar	7um Bipolar	7um Bipolar
Die Substrate	Si	Si	Si	Si
Metallization / # Layers	AlSi(1.0%)Cu(0.5%)/1	AlCu/1	AlSi(1.0%)Cu(0.5%)/1	AlSi(1.0%)Cu(0.5%)/1
Polyimide	No	No	No	No
Passivation	doped-oxide/SiN	doped-oxide/SiN	doped-oxide/SiN	doped-oxide/SiN

Die/Fab Test Results

Table 2: Die/Fab Test Results - 0.13um DMOS at GlobalFoundries Fab-7

Test Name	AEC #	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS	eTest Temp
Early Life Failure Rate (ELFR)	B2	AECQ100-008	Ta=125°C, 48 Hours	ADBMS6822	Q18113.1.EL1DIA-AU	0/800	RH
					Q18113.2.EL2DIA-AU	0/800	RH
					Q18113.3.EL2DIA-AU	0/800	RH
				ADBMS6830	Q17238.EL1A_LION80LQ	0/300	RH
					Q17238.EL1B_LION80LQ	0/300	RH
					Q17238.EL1C_LION80LQ	0/200	RH
					Q17238.EL2A_LION80LQ	0/300	RH
					Q17238.EL2B_LION80LQ	0/300	RH
					Q17238.EL2C_LION80LQ	0/200	RH
					Q17238.EL3A_LION80L	0/300	RH
					Q17238.EL3B_LION80L	0/300	RH
					Q17238.EL3C_LION80L	0/200	RH
				ADBMS6816	Q17013.EL1APION_NP-Au	0/300	RH
					Q17013.EL1BPION_NP-Au	0/300	RH
					Q17013.EL1CPION_NP-Au	0/200	RH
					Q17013.EL2APION_NP-Au	0/300	RH
					Q17013.EL2BPION_NP-Au	0/300	RH
					Q17013.EL2CPION_NP-Au	0/200	RH
					Q17013.EL3APION_NP-Au	0/300	RH
					Q17013.EL3BPION_NP-Au	0/300	RH
					Q17013.EL3CPION_NP-Au	0/200	RH
High Temperature Operating Life (HTOL)	B1	JEESD22-A108	Ta=125°C, Biased, 1,000 Hours	ADBMS6822	Q18113.1.HO1DIA-AU	0/77	RCH
					Q18113.1.HO1DIA-AU	0/77	RCH
					Q18113.1.HO1DIA-AU	0/77	RCH
				ADBMS6832	Q19822.1.HO	0/77	RCH
				ADBMS6830M	Q18108.3.HO3L16CU	0/77	RCH

				ADBMS6815	Q17170.1HTOL	0/77	RCH
					Q18354.1HTOL	0/77	RCH
					Q18472.1HTOL	0/77	RCH
				ADBMS6832	Q18939.1.HOLION18	0/77	RCH
					Q18939.2.HOLION18	0/77	RCH
					Q18939.3.HOLION18	0/77	RCH
			Ta=125°C, Biased, 2,000 Hours	ADBMS6830	Q17238.HO1_LION80L	0/77	RCH
					Q17238.HO2_LION80L	0/77	RCH
					Q17238.HO3_LION80L	0/77	RCH
High Temperature Storage Life (HTSL)	A6	JESD22- A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.2.HS2-L16CU	0/45	RH
					Q18108.3.HS3-L16CU	0/45	RH
			150°C, 1,000 Hours	ADBMS6816	Q17013.HS1PIONEER_NP-Au	0/45	RH
				ADBMS6830	Q17238.HS_LION80L	0/45	RH
				ADBMS6822	Q18113.1.HS1DIA-AU	0/45	RH
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	A2	JESD22- A110	130C 85%RH 33.3 psia, Biased, 96 Hours	ADBMS6822	Q18113.1.HA1DIA-AU	0/77	RH
					Q18113.2.HA1DIA-AU	0/77	RH
					Q18113.3.HA1DIA-AU	0/77	RH
				ADBMS6815	Q18424.2.HA2	0/77	RH
				ADBMS6815M	Q17978.1.HASenG	0/77	RH
				ADBMS6816	Q17013.HA1PIONEER_NP-Au	0/77	RH
					Q17013.HA2PIONEER_NP-Au	0/77	RH
					Q17013.HA3PIONEER_NP-Au	0/77	RH
				ADBMS6830	Q17238.HA1_LION80L	0/77	RH
					Q17238.HA2_LION80L	0/77	RH
					Q17238.HA3_LION80L	0/77	RH
				ADBMS6830M	Q19643.1.HA1	0/77	RH
					Q19643.3.HA3	0/77	RH

Temperature Humidity Bias (THB) ¹	A2	JESD22-A101	85°C, 85%RH, Biased, 2,000 Hours	ADBMS6815M	Q17951.3.TH3SenCu	0/77	RH
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Table 2.1: Die/Fab Test Results - 7um Bipolar at ADI-Camas, WA

Test Name	AEC #	Spec	Conditions	Generic/Root Part #	Lot #	Fail/S	eTest Temp
High Temperature Operating Life (HTOL)	B1	JESD22-A108	Ta=125°C, 1,000 Hours	ADBMS6830	Q19131.1.HO_L16D	0/77	RCH
				ADBMS6830M	Q18108.3.HO3L16CU	0/77	RCH
			Ta=125°C, Biased, 1,000 Hours	ADBMS6816	Q17013.HO1PIONEER_NP-Au	0/77	RCH
					Q17013.HO2PIONEER_NP-Au	0/77	RCH
					Q17013.HO3PIONEER_NP-Au	0/77	RCH
			Ta=125°C, Biased, 2,000 Hours	ADBMS6830	Q17238.HO1_LION80L	0/77	RCH
					Q17238.HO2_LION80L	0/77	RCH
					Q17238.HO3_LION80L	0/77	RCH
High Temperature Storage Life (HTSL)	A6	JESD22-A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.2.HS2-L16CU	0/45	RH
					Q18108.3.HS3-L16CU	0/45	RH
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	A2	JESD22-A110	130C 85%RH 33.3 psia, Biased, 96 Hours	ADBMS6815	Q18424.1.HA1	0/77	RH
					Q18424.2.HA2	0/77	RH
					Q18424.3.HA3	0/77	RH
				ADBMS6816	Q17013.HA1PIONEER_NP-Au	0/77	RH
					Q17013.HA2PIONEER_NP-Au	0/77	RH
					Q17013.HA3PIONEER_NP-Au	0/77	RH
				ADBMS6830	Q17238.HA1_LION80L	0/77	RH
					Q17238.HA2_LION80L	0/77	RH
					Q17238.HA3_LION80L	0/77	RH
Temperature Humidity Bias (THB) ¹	A2	JESD22-A101	85°C, 85%RH, Biased, 2,000 Hours	ADBMS6815M	Q17951.3.TH3SenCu	0/77	RH

¹These samples were subjected to preconditioning at MSL 3 with 3x reflow peak temp of 260°C prior to the start of the stress test.

Package/Assembly Product Characteristics

Table 3: Package/Assembly Product Characteristics - 72-LFCSP_SS at UTAC (UT2)

Product Characteristics	Product(s) to be qualified	Product(s) used for Substitution Data		
Generic/Root Part #	ADBMS6830M	ADBMS6832	ADBMS2960	ADBMS2950
Package	72-LFCSP_SS	64-LFCSP_SS	48-LFCSP_SS	48-LFCSP_SS
Body Size (mm)	10.00 x 10.00 x 0.75	9.00 x 9.00 x 0.75	7.00 x 7.00 x 0.75	7.00 x 7.00 x 0.75
Assembly Location	UTAC (UT2)	UTAC (UT2)	UTAC (UT2)	UTAC (UT2)
MSL/Peak Reflow Temperature(°C)	3 / 260°C	3 / 260°C	3 / 260°C	3 / 260°C
Mold Compound	Sumitomo G700LTD	Sumitomo G700LTD	Sumitomo G700LTD	Sumitomo G700LTD
Die Attach/Underfill/TIM	Ablestik 8600 conductive	Ablestik 8600 conductive	Ablestik 8600 conductive	Ablestik 8600 conductive
Leadframe Material	Copper	Copper	Copper	Copper
Lead Finish	100Sn	Matte Sn	Matte Sn	Matte Sn
Wire Bond Material/Diameter (mils)	PdCuAu 4N / 1.00	PdCuAu 4N / 1.00	PdCuAu 4N / 1.00	PdCuAu 4N / 1.00

Package/Assembly Test Results

Table 4: Package/Assembly Test Results - LFCSP_SS at UTAC (UT2)

Test Name	AEC #	Spec	Conditions	Generic/Root Part #	Lot #	Fail/SS	eTest Temp
High Temperature Storage Life (HTSL)	A6	JESD22-A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.1.HS1-L16CU	0/45	RH
					Q18108.2.HS2-L16CU	0/45	RH
					Q18108.3.HS3-L16CU	0/45	RH
				ADBMS6815M	Q17951.1.HS1SenCu	0/45	RH
					Q17951.2.HS2SenCu	0/45	RH
					Q17951.3.HS3SenCu	0/45	RH
Highly Accelerated Temperature and Humidity Stress Test (HAST) ¹	A2	JESD22-A110	110C 85%RH 17.7 psia, Biased, P264	ADBMS2960	Q20478.1.HAPANTHER	0/77	RH
			130C 85%RH 33.3 psia, Biased, 504 Hours	ADBMS2950	Q18620.1.HA1_TiCuRC	0/77	RH
					Q18620.2.HA2_TiCuRC	0/77	RH
					Q18620.3.HA3_TiCuRC	0/77	RH
Temperature Cycling (TC) ¹	A4	JESD22-A104	-65°C/+150°C, 500 Cycles	ADBMS6830	Q19836.1.TC-Li16revE	0/77	H
			-55C/+150C, 2,000 Cycles	ADBMS6815M	Q17951.1.TC1SenCu	0/77	H
					Q17951.2.TC2SenCu	0/77	H
					Q17951.3.TC3SenCu	0/77	H
				ADBMS6830M	Q18108.1.TC1_L16CU	0/77	H
					Q18108.2.TC2_L16CU	0/77	H
					Q18108.3.TC3_L16CU	0/77	H
Unbiased HAST (UHST) ¹	A3	JESD22-A118	130C 85%RH 33.3 psia, 96 Hours	ADBMS2950	Q18620.1.UH1_TiCuRC	0/77	R
					Q18620.2.UH2_TiCuRC	0/77	R
					Q18620.3.UH3_TiCuRC	0/77	R
				ADBMS6832	Q18939.1.UHLION18	0/77	R
					Q18939.2.UHLION18	0/77	R

¹ These samples were subjected to preconditioning at MSL 3 with 3x reflow peak temp of 260°C prior to the start of the stress test.

Samples of the many devices manufactured with these package and process technologies are continuously undergoing reliability evaluation as part of the ADI Reliability Monitor Program. Additional qualification data is available on [Analog Devices' web site](#).

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	eTest Temp
FICDM	ADBMS6830M	72-LFCSP_SS	AEC Q100-011	1Ω, Cpkg	±500V	C2A	RH
HBM	ADBMS6830M	72-LFCSP_SS	AEC-Q100-002	1.5kΩ, 100pF	±2000V	2	RH

Table 6: Latch Up Test Result

LU Test Spec	Generic/Root Part #	Passing Current	Passing Over-Voltage	Temperature (T _A)	Class	eTest Temp
JESD78	ADBMS6830M	+200mA, -200mA	+86V	125°C	II	RH

Approvals

Reliability Engineer: Ryan Quintin

Additional Information

Data sheets and other additional information are available on [Analog Devices' web sites](#).

Appendix

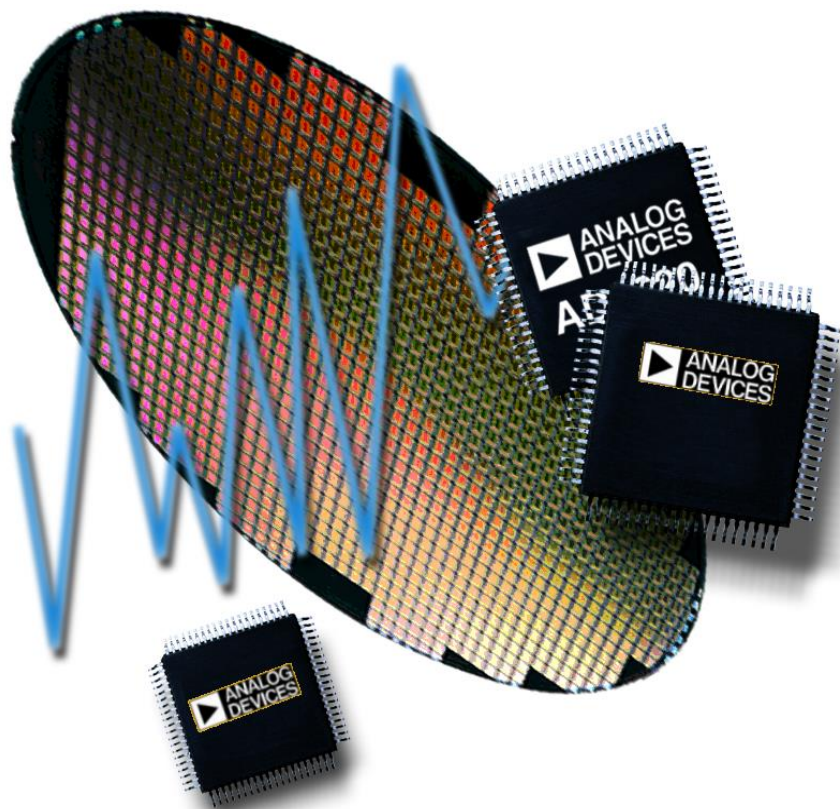
AEC -Q006 – Qualification Requirements for Products using Cu Wire Interconnections

Step	Tests Qualification Step	Stress	TC (-65°C to 150°C) JESD22-A104	THB (85°C/85%RH) JESD22-A101	HTSL (150°C) JESD22-A103
1	Initial Sampling (T0) ¹	Sample size as required			
2	CSAM @ T0	Sample size as required			
3	Preconditioning to MSLx	3x77	3x77	--	
4	CSAM after PC	3x16	3x16	--	
5	ATE Test ¹	3x77	3x77	1x45	
6	Stress 1x	3x77	3x77	1x45	
7	ATE Test ¹	3x77	3x77	1x45	
8	CSAM post-1x stress	3x16	3x16	--	
9a	Ball + Stitch/Wedge Pull	3x3	3x3	--	
9b	Ball Shear	3x3	3x3	--	
10	Cross-section	3x1	3x1	1x1	
11	Stress 2x	3x70	3x70	3x44	
12	ATE Test ¹	3x70	3x70	3x44	
13	CSAM post-2x Stress	3x16	3x16	--	
14a	Ball + Stitch/Wedge Pull	3x3	3x3	--	
14b	Ball Shear	3x3	3x3	--	
15	Cross-section	3x1	3x1	3x1	

¹ These samples were tested at the ATE in Ambient and Hot temperature.

REL Lot number		Q17951.1. TC1SenCu	Q17951.1. TH1BSen	Q17951.1. HS1SenCu	Q17951.2. TC2SenCu	Q17951.2. TH2B-	Q17951.2. HS2SenCu	Q17951.3. TC3SenCu	Q17951.3. TH3BSen	Q17951.3. HS3SenCu
AEC#	Test	TC	THB	HTS	TC	THB	HTS	TC	THB	HTS
1	Initial Sampling (T0) ¹	0/77	0/77	0/77	0/77	0/77	0/77	0/77	0/77	0/77
2	CSAM @ T0	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
3	Preconditioning to MSLx	0/77	0/77	--	0x77	0x77	--	0x77	0x77	--
4	CSAM after PC	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
5	ATE Test ¹	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
6	Stress 1x	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
7	ATE Test ¹	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
8	CSAM post-1x stress	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
9a	Ball + Stitch/Wedge Pull	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
9b	Ball Shear	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
10	Cross-section	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
11	Stress 2x	0/70	0/70	0/44	0/70	0/70	0/44	0/70	0/70	0/44
12	ATE Test ¹	0/70	0/70	0/44	0/70	0/70	0/44	0/70	0/70	0/44
13	CSAM post-2x Stress	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
14a	Ball + Stitch/Wedge Pull	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
14b	Ball Shear	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
15	Cross-section	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

REL Lot number		Q18108.1. TC1 L16C	Q18108.1. TH1 L16C	Q18108.1. HS1-	Q18108.2. TC2 L16C	Q18108.2. TH2 L16C	Q18108.2. HS2-	Q18108.3. TC3 L16C	Q18108.3. TH3 L16C	Q18108.3. HS3-
AEC#	Test	TC	THB	HTS	TC	THB	HTS	TC	THB	HTS
1	Initial Sampling (T0) ¹	0/77	0/77	0/77	0/77	0/77	0/77	0/77	0/77	0/77
2	CSAM @ T0	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
3	Preconditioning to MSLx	0/77	0/77	--	0x77	0x77	--	0x77	0x77	--
4	CSAM after PC	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
5	ATE Test ¹	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
6	Stress 1x	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
7	ATE Test ¹	0x77	0x77	0/45	0x77	0x77	0/45	0x77	0x77	0/45
8	CSAM post-1x stress	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
9a	Ball + Stitch/Wedge Pull	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
9b	Ball Shear	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
10	Cross-section	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
11	Stress 2x	0/70	0/70	0/44	0/70	0/70	0/44	0/70	0/70	0/44
12	ATE Test ¹	0/70	0/70	0/44	0/70	0/70	0/44	0/70	0/70	0/44
13	CSAM post-2x Stress	0/16	0/16	--	0/16	0/16	--	0/16	0/16	--
14a	Ball + Stitch/Wedge Pull	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
14b	Ball Shear	0/3	0/3	--	0/3	0/3	--	0/3	0/3	--
15	Cross-section	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1



Reliability Report

Report Title:	ADBMS6830M (Lion-16) Cu-wire Automotive Grade 1 Qualification
Report Number:	18108
Revision:	A
Date:	16 May 2022

Summary

This report documents the successful completion of the reliability qualification requirements for the release to Automotive Grade 1 application of the ADBMS6830M product in a 72-LFCSP_SS package. The ADBMS6830M is a multicell battery stack monitor that measures up to 16 series-connected battery cells with a lifetime total measurement error (TME) of less than 2 mV over the full temperature range. The measurement input range of -2 V to $+5.5\text{ V}$ makes the ADBMS6830 suitable for most battery chemistries and allows the measurement of voltages across bus bars. Provisions are made for bypassing bus bars without dedicating any measurement channels.

Table 1: ADBMS6830M Product Characteristics

Die/Fab

Die Id	LION_TRY C	6L815PV-F 08
Die Size (mm)	4.32 x 3.1	1.47 x 0.74
Wafer Fabrication Site	E_GLBL0712	I_CAMA0106
Wafer Fabrication Process	0.13um DMOS	BIPOLAR
Passivation Layer	doped-oxide/OxyNitride	doped-oxide/SiN
Bond Pad Metal Composition	AlCu(0.5%)	AlSi(1.0%)Cu(0.5%)

Package/Assembly

Package	72-LFCSP_SS
Body Size (mm)	10.00 x 10.00 x 0.75
Assembly Location	UTAC (UT2)
Operating Temperature Range	$-40^{\circ}\text{C} \leq \text{TA} \leq +125^{\circ}\text{C}$
Molding Compound	Sumitomo G700LTD
Die Attach Material	Ablestik 8600 conductive
Wire Type	PdCuAu 4N
Wire Diameter (mils)	1.0
Lead Frame Material	Copper
Lead Finish	100Sn
Moisture Sensitivity Level	3
Maximum Peak Reflow Temperature ($^{\circ}\text{C}$)	260

Description / Results of Tests Performed

Tables 2 through 4 provide a description of the qualification tests conducted and the associated test results for products manufactured on the same technologies as described in Table 1. All devices were electrically tested before and after each stress. Any device that did not meet all electrical data sheet limits following stressing would be considered a valid (stress-attributable) failure unless there was conclusive evidence to indicate otherwise.

Table 2: LFCSP_SS at UTAC (UT2) Package Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Storage Life (HTSL) ^{3,6}	JESD22-A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.1.HS1-L16CU	45	0
				Q18108.2.HS2-L16CU	45	0
				Q18108.3.HS3-L16CU	45	0
			ADBMS6815M	Q17951.1.HS1SenCu	45	0
				Q17951.2.HS2SenCu	45	0
				Q17951.3.HS3SenCu	45	0
Temperature Cycling (TC) ^{1,4,5,6}	JESD22-A104	-55°C to +150°C, 2,000 Cycles	ADBMS6830M	Q18108.1.TC1_L16CU	77	0
				Q18108.2.TC2_L16CU	77	0
				Q18108.3.TC32_L16CU	77	0
			ADBMS6815M	Q17951.1.TC1SenCu	77	0
				Q17951.2.TC2SenCu	77	0
				Q17951.3.TC3SenCu	77	0
Unbiased HAST (UHST) ^{1,2}	JESD22-A118	130°C 85%RH 33.3 psia, 96 Hours	ADBMS6830M	Q18108.1.UH1-L16CU	77	0
				Q18108.2.UH2-L16CU	77	0
				Q18108.3.UH3-L16CU	77	0
			ADBMS6815M	Q17951.1.UH1SenCu	77	0
				Q17951.2.UH2SenCu	77	0
				Q17951.3.UH3SenCu	77	0
Temperature, Humidity, Bias (THB) ^{1,3,5,6}	JESD22-A101	85°C, 85%RH, Biased, 2,000 Hours	ADBMS6830M	Q18108.1.TH1_L16CU	77	0
				Q18108.2.TH2L16CU	77	0
				Q18108.3.TH3L16CU	77	0
			ADBMS6815M	Q17951.1.TH1SenCu	77	0
				Q17951.2.TH2SenCu	77	0
				Q17951.3.TH3SenCu	77	0

¹These 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: 24 hrs @ 125°C, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

²Pre- and post-stress electrical tests were performed at room temperature.

³Pre- and post-stress electrical tests were performed at room and hot temperatures.

⁴Pre- and post-stress electrical tests were performed at hot temperatures.

⁵Samples taken from these lots at post-2000 hours (THB) or cycles (TCT) were subjected to wirebond pull test and wirebond shear test. The samples passed as per the AEC-Q006 requirement.

⁶Samples taken from these lots at post-2000 hours (THB and HTS) or cycles (TCT) were subjected cross-section and SEM inspection. The samples passed as per the AEC-Q006 requirement.

Table 3: >2.5um Bipolar at ADI-Camas, WA Fab Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Storage Life (HTSL) ³	JESD22-A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.1.HS1-L16CU	45	0
				Q18108.2.HS2-L16CU	45	0
				Q18108.3.HS3-L16CU	45	0
			ADBMS6815M	Q17951.1.HS1SenCu	45	0
				Q17951.2.HS2SenCu	45	0
				Q17951.3.HS3SenCu	45	0
High Temperature Operating Life (HTOL) ²	JESD22-A108	Ta=125°C, Biased, 1,000 Hours	ADBMS6830M	Q18108.1.HO1L16CU	77	0
				Q18108.2.HO2L16CU	77	0
				Q18108.3.HO3L16CU	77	0
			ADBMS6815M	Q17951.1.HO3SenCu	77	0
			ADBMS6816	Q17013.HO1PIONEER_NP-Au	77	0
				Q17013.HO2PIONEER_NP-Au	77	0
Temperature, Humidity, Bias (THB) ^{1,3}	JESD22-A101	85°C, 85%RH, Biased, 2,000 Hours	ADBMS6830M	Q18108.1.TH1_L16CU	77	0
				Q18108.2.TH2L16CU	77	0
				Q18108.3.TH3L16CU	77	0
			ADBMS6815M	Q17951.1.TH1SenCu	77	0
				Q17951.2.TH2SenCu	77	0
				Q17951.3.TH3SenCu	77	0
Early Life Failure Rate (ELFR) ³	AEC-Q100-008	Ta=125°C, 48 Hours	ADBMS6816	Q17013.EL1APION_NP-Au	300	0
				Q17013.EL1BPION_NP-Au	300	0
				Q17013.EL1CPION_NP-Au	200	0
				Q17013.EL2APION_NP-Au	300	0
				Q17013.EL2BPION_NP-Au	300	0
				Q17013.EL2CPION_NP-Au	200	0
				Q17013.EL3APION_NP-Au	300	0
				Q17013.EL3BPION_NP-Au	300	0
			ADBMS6830	Q17013.EL3CPION_NP-Au	200	0
				Q17238.EL1A_LION80LQ	300	0
				Q17238.EL1B_LION80LQ	300	0
				Q17238.EL1C_LION80LQ	200	0
				Q17238.EL2A_LION80LQ	300	0
				Q17238.EL2B_LION80LQ	300	0
				Q17238.EL2C_LION80LQ	200	0
				Q17238.EL3A_LION80L	300	0
				Q17238.EL3B_LION80L	300	0
				Q17238.EL3C_LION80L	200	0

¹These 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: 24 hrs @ 125°C, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

²Pre- and post-stress electrical test were performed at room, cold and hot temperatures.

³Pre- and post-stress electrical test were performed at room and hot temperatures.

Table 4: 0.13 BCD at GlobalFoundries Fab-7 Fab Qualification Test Results

Test Name	Specification	Conditions	Device	Lot #	Sample Size	Qty. Failures
High Temperature Storage Life (HTSL) ³	JESD22-A103	150°C, 2,000 Hours	ADBMS6830M	Q18108.1.HS1-L16CU	45	0
				Q18108.2.HS2-L16CU	45	0
				Q18108.3.HS3-L16CU	45	0
			ADBMS6815M	Q17951.1.HS1SenCu	45	0
				Q17951.2.HS2SenCu	45	0
				Q17951.3.HS3SenCu	45	0
High Temperature Operating Life (HTOL) ²	JESD22-A108	Ta=125°C, Biased, 1,000 Hours	ADBMS6830M	Q18108.1.HO1L16CU	77	0
				Q18108.2.HO2L16CU	77	0
				Q18108.3.HO3L16CU	77	0
			ADBMS6815M	Q17951.1.HO3SenCu	77	0
			ADBMS6816	Q17013.HO1PIONEER_NP-Au	77	0
				Q17013.HO2PIONEER_NP-Au	77	0
Temperature, Humidity, Bias (THB) ^{1,3}	JESD22-A101	85°C, 85%RH, Biased, 2,000 Hours	ADBMS6830M	Q18108.1.TH1_L16CU	77	0
				Q18108.2.TH2L16CU	77	0
				Q18108.3.TH3L16CU	77	0
			ADBMS6815M	Q17951.1.TH1SenCu	77	0
				Q17951.2.TH2SenCu	77	0
				Q17951.3.TH3SenCu	77	0
Early Life Failure Rate (ELFR) ³	AEC-Q100-008	Ta=125°C, 48 Hours	ADBMS6816	Q17013.EL1APION_NP-Au	300	0
				Q17013.EL1BPION_NP-Au	300	0
				Q17013.EL1CPION_NP-Au	200	0
				Q17013.EL2APION_NP-Au	300	0
				Q17013.EL2BPION_NP-Au	300	0
				Q17013.EL2CPION_NP-Au	200	0
				Q17013.EL3APION_NP-Au	300	0
				Q17013.EL3BPION_NP-Au	300	0
			ADBMS6830	Q17013.EL3CPION_NP-Au	200	0
				Q17238.EL1A_LION80LQ	300	0
				Q17238.EL1B_LION80LQ	300	0
				Q17238.EL1C_LION80LQ	200	0
				Q17238.EL2A_LION80LQ	300	0
				Q17238.EL2B_LION80LQ	300	0
				Q17238.EL2C_LION80LQ	200	0
				Q17238.EL3A_LION80L	300	0
				Q17238.EL3B_LION80L	300	0
				Q17238.EL3C_LION80L	200	0

¹These 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: 24 hrs @ 125°C, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

²Pre- and post-stress electrical test were performed at room, cold and hot temperatures.

³Pre- and post-stress electrical test were performed at room and hot temperatures.

Samples of the many devices manufactured with these package and process technologies are continuously undergoing reliability evaluation as part of the ADI Reliability Monitor Program. Additional qualification data is available on [Analog Devices' web site](#).

ESD Test Results

The results of Field-Induced Charged Device Model (FICDM) ESD testing is summarized in Table 5. ADI measures ESD results using stringent test procedures based on the specifications listed. Any comparison with another supplier's results should ensure that the same ESD test procedures have been used. For further details, please see the EOS/ESD chapter of the ADI Reliability Handbook (available via the 'Quality and Reliability' link on [Analog Devices' web site](#)).

Table 5: ADBMS6830M ESD Test Results

ESD Model	Package	ESD Test Spec	RC Network	Highest Pass Level	First Fail Level	Class
FICDM ¹	72-LFCSP_SS	AEC Q100-011	1Ω, Cpkg	±500V	±750V	C2a
HBM ¹	72-LFCSP_SS	AEC Q100-002	1.5kΩ, 100pF	±2000V	±2500V	2

¹ Pre- and post-stress electrical test were performed at room, and hot temperatures.

Latch-Up Test Results

Six samples of ADBMS6830M were latch-up tested at $T_A = 125^{\circ}\text{C}$ per JEDEC Standard JESD78. Class II. Pre- and post-stress electrical test was performed at room and hot temperatures. All pins passed.

Passing Positive Current	Passing Negative Current	Passing Over-Voltage
100 mA	100 mA	+86V

Approvals

Reliability Engineer: Ryan Quintin

Additional Information

Data sheets and other additional information are available on [Analog Devices' web site](#).