PCN # 1290A

DATE: July 29, 2014

Quality Assurance
160 Rio Robles
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☐ PROCESS CHANGE NOTICE
☒ PRODUCT CHANGE NOTICE

MAXIM INTEGRATED HEREBY ISSUES NOTIFICATION OF CHANGE THAT MAY AFFECT THE FOLLOWING CATEGORIES:

☐ DESIGN	☒ WAFER FAB	☐ ASSEMBLY	☐ TEST	☐ ELEC/MECH SPECS

AFFECTED PRODUCT:

Ordering P/N: (See PN listing XLS in PCN ZIP file)

CHANGE FROM:	CHANGE TO:
Fabrication process family MB3 (SiGe HBT, 0.35 um BiCMOS) qualified at Maxim's San Jose, CA fabrication site (X3).	Add Epson Japan Fabrication site as qualified for MB3(Y) process family.

JUSTIFICATION: Adding Epson to ensure wafer fabrication capacity. The Epson Fabrication facility has passed the qualification requirements (AECQ 100) for release of the MB3 processes to production. Qualification test results are reflected in attached AEC-Q100 Reports: MAX2136AETJ, MAX2172ETL, and MAX2659ETL.

TRACEABILITY: Maxim Integrated maintains full traceability by device marking, packaging labels and shipment documents.

Maxim Integrated's Change Notification System is designed to keep our customer base apprised of major product, manufacturing, or facility improvements.

Deborah Meeker / PCN Coordinator

For further information, please contact either of the people listed below.

Contact your local Maxim Integrated Company Representative or Deborah Meeker, PCN Coordinator
408-601-5618 / pcn.coordinator@maximintegrated.com

MAX2136AETJ/V+
ISDB-T/DVB-T Low-IF Tuner
Temperature Grade 3
32L TQFN 5x5
T3255+5

MAX2136AETJ/V+
ISDB-T/DVB-T Low-IF Tuner

Summary:

This report summarizes the results of the reliability tests performed by Maxim to qualify the MAX2136AETJ/V+ for automotive applications.

Conclusion:

The MAX2136AETJ/V+ was subjected to AEC-Q100 qualification testing. The qualification encountered ELFR failures that have been associated with a MC2 fab defect during the MFN fab step and EOS due to handling.

There is also one failure post 48hr IME which fails for PLL phase noise and root cause is unknown. See table 5 for results.

AEC-Q100 Qualification Requirements/Acceptance Criteria:

	Stress	ABV	AEC #	#of Lots	SS/Lot	ACC	ATE Temp	Method
Device Specific Tests	Electrostatic Discharge (Human Body/Machine Model)	ESD (HBM/MM)	E2	1	25	HBM:2000V MM:200V	RH	AEC-Q100-002 AEC-Q100-003
	Electrostatic Discharge (Device Model)	ESD (CDM)	E3	1	15	750V corner pins, 500V all other pins	RH	AEC-Q100-011
	Latch-Up	LU	E4	1	6	0	RH	AEC-Q100-004
	Electrical Distribution	ED	E5	3 *1	30	Cpk > 1.33	RHC	AEC-Q100-009
Package/ Process Related Tests	Preconditioning	PC	A1	3	77	0	R	J-STD-020 JESD22- A113
	Temperature Humidity Bias	HAST/THB	A2	3	77	0	RH	JESD22- A101 or A110
	Unbiased HAST	UHAST	A3	3	77	0	R	JESD22- A102, A118, or A101
	Temperature Cycle	TC	A4	3	77	0	RH	JESD22-A104 and Appendix 3
	Wire Bond Pull	WBP	C2	3	5	0	N/A	MIL-STD883 Method 2011
	High Temp Storage	HTSL	A6	1	45	0	RH	JESD22- A103
	Solderability	SD	C3	1	15	0	N/A	JESD22-B102
	High Temp Operating Life *2	HTOL	B1	3	77	0	RHC	JESD22-A108
	Early Life Failure Rate *3	ELFR	B2	3	800	0	RH	AEC Q100-008

Note *1 – One lot process skewed may be used
*2 – Grade 1 (1000hrs), Grade 2 (500hrs), Grade 3 (192hrs)
*3 – Grade 1 (48hrs), Grade 2 (24hrs), Grade 3 (12hrs)

Test Results/Lot information (Device Specific):

Table 1:

Lot Number:	EAKK3Q001A#
Part Number:	MAX2136AETJ/V+
Temperature Grade:	3
Fab Site:	EPSON
Fab Process Core:	MB3
Fab Process Tech:	MB3LWY - 8 " 0.35um
Metallization/# Layers:	Al/Ti/Cu / 4
Passivation:	BCB
Die Type:	WG58A-2D
Package Assembly Site:	ASE CHUNG LI
Die Size:	122.05 x 113.78
Package Type:	32L TQFN 5x5
Wire Bond Material/Dia.:	Au 1.0 mils
Mold Compound:	G770HJ
Die Attach:	EN4900G
Leadframe Material:	COPPER
Lead Finish:	100% MATTE TIN
Date Code:	1306
Rel Lot Number:	R26692A

AEC #	Test	Results SS	Temp
E2	**ESD (HBM)**	2500V	RH
E2	**ESD (MM)**	-	N/A
E3	**ESD (CDM)**	750V	RH
E4	**Latch-Up**	CI 0/6 / OV 0/6	RH
E5	**Electrical Distribution**	Cpk >1.33	RHC

Test Results/Lot information (Package Technology): ASE CHUNG-LI

Table 2:

Lot Number:		QAFZ9Q002GC		TML5AA6Y8D		TML5AA6Y8E		TML5AA6Y8B	
Part Number:		MAX9273GTL/V+		MAX1781ETM+		MAX1781ETM+		MAX1781ETM+	
Temperature Grade:		2		3		3		3	
Fab Site:		TSMC - SSMC		SAN ANTONIO		SAN ANTONIO		SAN ANTONIO	
Fab Process Core:		TS18		EB8		EB8		EB8	
Fab Process Tech:		TS181P6MTVOU 8" 0.18um		EB8S 8" 0.8um		EB8S 8" 0.8um		EB8S 8" 0.8um	
Metallization/# Layers:		AlCu / 6		AlCu / 2		AlCu / 2		AlCu / 2	
Passivation:		SiN/SiO		SiO/SiN		SiO/SiN		SiO/SiN	
Die Type:		HS51A-0A		UC03X-5Z		UC03X-5Z		UC03X-5Z	
Package Assembly Site:		ASE CHUNG-LI		ASE CHUNG-LI		ASE CHUNG-LI		ASE CHUNG-LI	
Die Size:		109.8425 X 109.8425		220 X 220		220 X 220		220 X 220	
Package Type:		40 TQFN 6X6		48 TQFN 7X7		48 TQFN 7X7		48 TQFN 7X7	
Wire Bond Material/Dia.:		Au 0.8 mils		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HJ		G770HJ		G770HJ		G770HJ	
Die Attach:		EN4900G		EN4900G		EN4900G		EN4900G	
Leadframe Material:		COPPER		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1302		946		946		946	
Rel Lot Number:		R26546A		R24745A, R24940B		R24745B, R24940C		R24745C, R254940D	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	RH	0/77	R	0/77	R
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 077	RH	500x – 077	RH	500x – 077	R	500x – 077	R
C2	**Wire Bond Pull**	0/200	N/A	0/200	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	500hrs – 0/45	RH	1000hrs – 0/45	RH	-	N/A	-	N/A
C3	**Solderability**	0/15	N/A	-	N/A	-	N/A	-	N/A
B1	**High Temp Op/Life**	-	N/A	-	RHC	-	N/A	-	N/A

Test Results/Lot information (Package Technology): UDG

Table 3:

Lot Number:		TML5AA0Z8C		TML5AA0Z8D		TML5AA0Z8E	
Part Number:		MAX1781ETM+		MAX1781ETM+		MAX1781ETM+	
Temperature Grade:		3		3		3	
Fab Site:		SAN ANTONIO		SAN ANTONIO		SAN ANTONIO	
Fab Process Core:		EB8		EB8		EB8	
Fab Process Tech:		EB8S 8" 0.8um		EB8S 8" 0.8um		EB8S 8" 0.8um	
Metallization/# Layers:		AlCu / 2		AlCu / 2		AlCu / 2	
Passivation:		SiN/SiO		SiN/SiO		SiN/SiO	
Die Type:		UC03X-5Z		UC03X-5Z		UC03X-5Z	
Package Assembly Site:		UDG		UDG		UDG	
Die Size:		220 X 220		220 X 220		220 X 220	
Package Type:		48 TQFN 7X7		48 TQFN 7X7		48 TQFN 7X7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HCD		G770HCD		G770HCD	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1036		904		904	
Rel Lot Number:		R25252A		R25252B		R25252C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/76	RH	0/76	R	0/76	R
A3	**Unbiased HAST**	0/77	R	0/69	R	0/69	R
A4	**Temperature Cycle**	500x – 0/77	RH	500x – 0/77	R	500x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	500hrs – 0/45	RH	500hrs – 0/45	R	500hrs – 0/45	R
C3	**Solderability**	-	N/A	-	N/A	-	N/A
B1	**High Temp Op/Life**	-	N/A	-	N/A	-	N/A

Test Results/Lot information (Wafer Process Technology):

Table 4:

Lot Number:		EAFL5Q045I/A045J		EAFL5A0048C/D/E		EAFL5A0048C/D/E	
Part Number:		TX27YETH+		TX27YETH+		TX27YETH+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/TiW/Cu / 4		Al/TiW/Cu / 4		Al/TiW/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		TX27Y-1Z		TX27Y-1Z		TX27Y-1Z	
Package Assembly Site:		UTL		UTL		UTL	
Die Size:		99.21 x 105.12		99.21 x 105.12		99.21 x 105.12	
Package Type:		44L TQFN 7x7		44L TQFN 7x7		44L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HCD		G770HCD		G770HCD	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1232		1234		1234	
Rel Lot Number:		R26182A		R26182C		R26182C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	-	R	-	R	-	R
A2	**HAST**	-	RH	-	RH	-	RH
A3	**Unbiased HAST**	-	R	-	R	-	R
A4	**Temperature Cycle**	-	RH	-	RH	-	RH
A6	**High Temp Storage**	-	RH	-	RH	-	RH
B1	**High Temp Operating Life**	1000hrs – 0/77	RHC	1000hrs – 0/77	RH	1000hrs – 0/77	RH
B2	**Early Life Failure Rate**	12hrs – 0/5402	RH	12hrs – 0/4804	RH	12hrs – 0/4804	RH

Test Results/Lot information (Wafer Process Technology)

Table 5:

Lot Number:		EAKP0A010AA		EAKP0A016BA		EAKP0A008AA	
Part Number:		MAX2553ETN+		MAX2553ETN+		MAX2553ETN+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/Ti/Cu / 4		Al/Ti/Cu / 4		Al/Ti/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		WC46A-2B		WC46A-2B		WC46A-2B	
Package Assembly Site:		ASE CHUNG - LI		ASE CHUNG - LI		ASE CHUNG - LI	
Die Size:		187.8 x 187.8		187.8 x 187.8		187.8 x 187.8	
Package Type:		56L TQFN 7x7		56L TQFN 7x7		56L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HJ		G770HJ		G770HJ	
Die Attach:		EN4900G		EN4900G		EN4900G	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1311		1314		1319	
Rel Lot Number:		R26494A		R26494B		R26494C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	RH	0/77	RH
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH
A6	**High Temp Storage**	500hrs – 0/45	RH	500hrs – 0/45	RH	500hrs – 0/45	RH
B1	**High Temp Operating Life**	-	N/A	500hrs – 0/77	RHC	1000hrs – 0/77	RHC
B2	**Early Life Failure Rate**	48hrs – 0/800	RH	48hrs – 1/800 48hrs – 2/800 (1)	RH	48hrs – 0/800	RH

Note:

(1) IFAR 40051611: Root cause unknown [1st ELFR run – 1/800 F].
IFAR 40054437: Root cause EOS (1 unit) and MC2 defect at MFN step (1 unit) [2nd EFLR run – 2/800F]. Single unit EOS suspected to be due to handling; externally sourced.

Failures in ELFR are included in the PPM rate: 279 PPM (18, 754 units burned in).

Electrical Distribution: One Lot Process Skewed

Temp	Test	Unit	EC / QA Min	EC / QA Max	CPK
85	RFAGC	uA	-24.95E+00	24.95E+00	20.18
25	RFAGC	uA	-24.95E+00	24.95E+00	20.21
-40	RFAGC	uA	-24.95E+00	24.95E+00	20.18
85	IFAGC	uA	-24.95E+00	24.95E+00	15.29
25	IFAGC	uA	-24.95E+00	24.95E+00	15.01
-40	IFAGC	uA	-24.95E+00	24.95E+00	14.77
85	RFAGC	uA	-24.95E+00	24.95E+00	17.79
25	RFAGC	uA	-24.95E+00	24.95E+00	17.82
-40	RFAGC	uA	-24.95E+00	24.95E+00	17.71
85	IFAGC	uA	-24.95E+00	24.95E+00	12.45
25	IFAGC	uA	-24.95E+00	24.95E+00	12.59
-40	IFAGC	uA	-24.95E+00	24.95E+00	12.86
85	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	1.35
25	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	1.75
-40	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	1.91
85	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	1.62
25	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	1.94
-40	BUF_OUT_XBD_00	Vpp	550.E-03	1.45E+00	2.04

Written By: 

Brian Vuong
Reliability Engineer

Approved By: 

First_Last Name
Manager, Reliability

Revision and Release Date	Description of Revision and Author	Approved By	Effective By (Date)
A 20 May 2014	Initial release for tkt 1868; Brian Vuong	J. Aquino	20 May 2014

MAX2172ETL/V+
Direct-Conversion to Low-IF Tuner for Digital Audio Broadcast
Temperature Grade 3
40L TQFN 6x6 EP
T4066+2

MAX2172ETL/V+
Direct-Conversion to Low-IF Tuner for Digital Audio Broadcast

Summary:

This report summarizes the results of the reliability tests performed by Maxim to qualify the MAX2172ETL/V+ for automotive applications.

Conclusion:

The MAX2172ETL/V+ was subjected to AEC-Q100 qualification testing. The qualification encountered ELFR failures that have been associated with a MC2 fab defect during the MFN fab step and EOS due to handling.

There is also one failure post 48hr IME which fails for PLL phase noise and root cause is unknown. See table 6 for results.

AEC-Q100 Qualification Requirements/Acceptance Criteria:

	Stress	ABV	AEC #	#of Lots	SS/Lot	ACC	ATE Temp	Method
Device Specific Tests	Electrostatic Discharge (Human Body/Machine Model)	ESD (HBM/MM)	E2	1	25	HBM:2000V MM:200V	RH	AEC-Q100-002 AEC-Q100-003
	Electrostatic Discharge (Device Model)	ESD (CDM)	E3	1	15	750V corner pins, 500V all other pins	RH	AEC-Q100-011
	Latch-Up	LU	E4	1	6	0	RH	AEC-Q100-004
	Electrical Distribution	ED	E5	3 *1	30	Cpk > 1.33	RHC	AEC-Q100-009
Package/ Process Related Tests	Preconditioning	PC	A1	3	77	0	R	J-STD-020 JESD22- A113
	Temperature Humidity Bias	HAST/THB	A2	3	77	0	RH	JESD22- A101 or A110
	Unbiased HAST	UHAST	A3	3	77	0	R	JESD22- A102, A118, or A101
	Temperature Cycle	TC	A4	3	77	0	RH	JESD22-A104 and Appendix 3
	Wire Bond Pull	WBP	C2	3	5	0	N/A	MIL-STD883 Method 2011
	High Temp Storage	HTSL	A6	1	45	0	RH	JESD22- A103
	Solderability	SD	C3	1	15	0	N/A	JESD22-B102
	High Temp Operating Life *2	HTOL	B1	3	77	0	RHC	JESD22-A108
	Early Life Failure Rate *3	ELFR	B2	3	800	0	RH	AEC Q100-008

Note *1 – One lot process skewed may be used
*2 – Grade 1 (1000hrs), Grade 2 (500hrs), Grade 3 (192hrs)
*3 – Grade 1 (48hrs), Grade 2 (24hrs), Grade 3 (12hrs)

Test Results/Lot information (Device Specific):

Table 1:

Lot Number:	EAKE6A004CA
Part Number:	MAX2172ETL/V+
Temperature Grade:	3
Fab Site:	EPSON
Fab Process Core:	MB3
Fab Process Tech:	MB3LWY - 8 " 0.35um
Metallization/# Layers:	Al/Ti/Cu / 4
Passivation:	BCB
Die Type:	WG56Z-2Z
Package Assembly Site:	ASE CHUNG LI
Die Size:	119.29 x 112.2
Package Type:	40L TQFN 6x6
Wire Bond Material/Dia.:	Au 1.0 mils
Mold Compound:	G770HJ
Die Attach:	EN4900G
Leadframe Material:	COPPER
Lead Finish:	100% MATTE TIN
Date Code:	1320
Rel Lot Number:	R26679A

AEC #	Test	Results SS	Temp
E2	**ESD (HBM)**	2000V	RH
E2	**ESD (MM)**	200V	RH
E3	**ESD (CDM)**	750V	RH
E4	**Latch-Up**	CI 0/6 / OV 0/6	RH
E5	**Electrical Distribution**	Cpk >1.33	RHC

Note:

(1) Die revisions PTXC and PTXB are equivalent dies.

Test Results/Lot information (Package Technology): UDG

Table 2:

Lot Number:		SPTZBA008BA		TKFYBQ003G		LTML6AA3R9A	
Part Number:		MAX2172ETL+		MAX17018BATL/V+		MAX1782ETM+	
Temperature Grade:		3		1		3	
Fab Site:		SAN JOSE		SAN ANTONIO		SAN ANTONIO	
Fab Process Core:		MB3		S4		EB8	
Fab Process Tech:		MB3HW 8" 0.35µm		S45US 8" 0.4µm		EB8S 8", 0.8µm	
Metallization/# Layers:		AlCu / 4		AlCu / 2		AlCu / 2	
Passivation:		SiO2 / BCB		SiN / SiO2		SiN / SiO2	
Die Type:		WG56Z		PE31Z-1Z		UC03X-6Z	
Package Assembly Site:		UDG		UDG		UDG	
Die Size:		119.29 X 112.2		92 X 111		220 X 220	
Package Type:		40L TQFN 6X6		40L TQFN 6X6		48L TQFN 7X7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mil		Au 1.0 mil	
Mold Compound:		G770C		G770C		G770C	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		0907		1029		0816	
Rel Lot Number:		R090106A		R25099A		R080248A	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	RH	0/45	R
A3	**Unbiased HAST**	0/77	R	0/77	R	-	N/A
A4	**Temperature Cycle**	500x – 0/77	RH	500x – 0/77	RH	1000x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	0/200	N/A	-	N/A
A6	**High Temp Storage**	500hrs – 0/45	RH	500hrs – 0/45	RH	-	N/A
C3	**Solderability**	0/15	N/A	-	N/A	0/15	N/A
B1	**High Temp Op/Life**	138hrs – 0/77	RHC	-	N/A	-	N/A

Test Results/Lot information (Package Technology): UDG

Table 3:

Lot Number:		TML6AA5R7A		TML6AA5R8A		N7N1EA0E1D	
Part Number:		MAX1782ETM+		MAX1782ETM+		MAX2820ETM+	
Temperature Grade:		3		3		3	
Fab Site:		SAN ANTONIO		SAN ANTONIO		MFN	
Fab Process Core:		EB8		EB8		GST40	
Fab Process Tech:		EB8S 8", 0.8µm		EB8S 8", 0.8µm		G4MDBGPRI 6", 0.5µm	
Metallization/# Layers:		AlCu / 2		AlCu / 2		AuTiW / 4	
Passivation:		SiN / SiO2		SiN / SiO2		SiN / SiO2	
Die Type:		UC03X-6Z		UC03X-6Z		WD15Y-1Z	
Package Assembly Site:		UDG		UDG		UDG	
Die Size:		220 X 220		220 X 220		142 X 166	
Package Type:		48L TQFN 7X7		48L TQFN 7X7		48L TQFN 7X7	
Wire Bond Material/Dia.:		Au 1.0 mil		Au 1.0 mil		Au 1.0 mil	
Mold Compound:		G770C		G770C		G770C	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		0816		0816		0811	
Rel Lot Number:		R080248B		R080248C		R080128B	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/227	R
A2	**HAST**	0/45	R	0/45	R	0/45	R
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	1000x – 0/77	R	1000x – 0/77	R	1000x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	-	N/A	-	N/A	-	N/A
C3	**Solderability**	0/15	N/A	0/15	N/A	0/15	N/A
B1	**High Temp Op/Life**	1000hr – 0/77	R	1000hr – 0/77	R	1000hr – 0/77	R

Test Results/Lot information (Package Technology): ASE CHUNG-LI

Table 4:

Lot Number:		TML5AA6Y8D		TML5AA6Y8E		TML5AA6Y8B	
Part Number:		MAX1781ETM+		MAX1781ETM+		MAX1781ETM+	
Temperature Grade:		3		3		3	
Fab Site:		SAN ANTONIO		SAN ANTONIO		SAN ANTONIO	
Fab Process Core:		EB8S		EB8S		EB8S	
Fab Process Tech:		EB8S 8", 0.8µm		EB8S 8", 0.8µm		EB8S 8", 0.8µm	
Metallization/# Layers:		AlCu / 2		AlCu / 2		AlCu / 2	
Passivation:		SiN / SiO2		SiN / SiO2		SiN / SiO2	
Die Type:		UC03X-5Z		UC03X-5Z		UC03X-5Z	
Package Assembly Site:		ASE		ASE		ASE	
Die Size:		220 X 220		220 X 220		220 X 220	
Package Type:		48L TQFN 7X7		48L TQFN 7X7		48L TQFN 7X7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HJ		G770HJ		G770HJ	
Die Attach:		EN4900G		EN4900G		EN4900G	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		0946		0946		0946	
Rel Lot Number:		R24745A, R24940B		R24745B, R24940C		R24745C, R24940D	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	R	0/77	R
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	RH	1000x – 0/77	R	1000x – 0/77	R
C2	**Wire Bond Pull**	0/200	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	500hrs – 0/77	RH	1000hrs – 0/77	R	1000hrs – 0/77	R
C3	**Solderability**	0/15	N/A	0/15	N/A	0/15	N/A
B1	**High Temp Op/Life**	-	N/A	-	N/A	-	N/A

Test Results/Lot information (Wafer Process Technology):

Table 5:

Lot Number:		EAFL5Q045I/A045J		EAFL5A0048C/D/E		EAFL5A0048C/D/E	
Part Number:		TX27YETH+		TX27YETH+		TX27YETH+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/TiW/Cu / 4		Al/TiW/Cu / 4		Al/TiW/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		TX27Y-1Z		TX27Y-1Z		TX27Y-1Z	
Package Assembly Site:		UTL		UTL		UTL	
Die Size:		99.21 x 105.12		99.21 x 105.12		99.21 x 105.12	
Package Type:		44L TQFN 7x7		44L TQFN 7x7		44L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HCD		G770HCD		G770HCD	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1232		1234		1234	
Rel Lot Number:		R26182A		R26182C		R26182C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	-	R	-	R	-	R
A2	**HAST**	-	RH	-	RH	-	RH
A3	**Unbiased HAST**	-	R	-	R	-	R
A4	**Temperature Cycle**	-	RH	-	RH	-	RH
A6	**High Temp Storage**	-	RH	-	RH	-	RH
B1	**High Temp Operating Life**	1000hrs – 0/77	RHC	1000hrs – 0/77	RH	1000hrs – 0/77	RH
B2	**Early Life Failure Rate**	12hrs – 0/5402	RH	12hrs – 0/4804	RH	12hrs – 0/4804	RH

Test Results/Lot information (Wafer Process Technology):

Table 6:

Lot Number:		EAKP0A010AA		EAKP0A016BA		EAKP0A008AA	
Part Number:		MAX2553ETN+		MAX2553ETN+		MAX2553ETN+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/Ti/Cu / 4		Al/Ti/Cu / 4		Al/Ti/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		WC46A-2B		WC46A-2B		WC46A-2B	
Package Assembly Site:		ASE CHUNG - LI		ASE CHUNG - LI		ASE CHUNG - LI	
Die Size:		187.8 x 187.8		187.8 x 187.8		187.8 x 187.8	
Package Type:		56L TQFN 7x7		56L TQFN 7x7		56L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HJ		G770HJ		G770HJ	
Die Attach:		EN4900G		EN4900G		EN4900G	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1311		1314		1319	
Rel Lot Number:		R26494A		R26494B		R26494C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	RH	0/77	RH
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH
A6	**High Temp Storage**	500hrs – 0/45	RH	500hrs – 0/45	RH	500hrs – 0/45	RH
B1	**High Temp Operating Life**	-	N/A	500hrs – 0/77	RHC	1000hrs – 0/77	RHC
B2	**Early Life Failure Rate**	48hrs – 0/800	RH	48hrs – 1/800 48hrs – 2/800 (1)	RH	48hrs – 0/800	RH

Note:

(1) IFAR 40051611: Root cause unknown [1st ELFR run – 1/800 F].
IFAR 40054437: Root cause EOS (1 unit) and MC2 defect at MFN step (1 unit) [2nd EFLR run – 2/800F]. Single unit EOS suspected to be due to handling; externally sourced.

Failures in ELFR are included in the PPM rate: 279 PPM (18, 754 units burned in).

Electrical Distribution:

Datasheet Parameter	Conditions	ATE Parameter Name	units	Spec High	Spec Typ	Spec Low	Room Cpk	Hot Cpk	Cold Cpk	Comments
Supply Current: Active Mode	VCC=3V	1.15.02: Icc_VHF_mode	mA	77	61		3.61	3.68	3.40	
		1.15.03: Icc_FM_mode	mA	77	61		4.07	4.19	3.89	
		1.15.04: Icc_LBAND_mode	mA	77	61		3.67	4.00	3.30	
RFAGC Input Bias Current	RFAGC=0.4V and 2.4V	1.20.01: IIH_VGC_RF	uA	15		-15	7.64	5.76	7.22	
		1.20.02: IIL_VGC_RF	uA	15		-15	5.22	4.99	4.89	
BBAGC Input Bias Current	BBAGC=0.4V and 2.4V	1.20.03: IIH_VGC_BB	uA	15		-15	7.43	7.18	7.33	
		1.20.04: IIL_VGC_BB	uA	15		-15	16.07	15.97	15.80	
SDA, SCL Input Current		1.21.06: IIH_SCL	uA	10		-10	69.16	46.09	89.59	All other IIH, IIL tests have higher CPKs.
Input Power per Channel: Max Gain Mode	FM band, output signal of at least 100mVpp at min input level	1.25.05: FM_MaxGain_Hi	dBm			-102	9.32	5.73	14.39	FM
	VHF-III band & L-band, output signal of at least 100mVpp at min input level	1.25.14: VHF_MaxGain_Hi	dBm			-96	9.84	6.29	13.52	VHF-III
		1.25.23: L_MaxGain_Hi	dBm			-96	9.96	6.67	13.73	L-band
	FM band, output signal not to exceed 1Vpp at max input level	1.25.06: FM_MinGain_Hi	dBm	-23			11.17	11.74	12.10	FM
	VHF-III band, output signal not to exceed 1Vpp at max input level	1.25.15: VHF_MinGain_Hi	dBm	-17			10.58	12.12	9.41	VHF-III
Overall Voltage Gain, Max Gain Mode	Unbalanced source impedance = 50 Ohms, balanced load impedance = 2kOhms, Cload=10pF	1.25.14: VHF_MaxGain_Hi	dB		92	80	9.84	6.29	13.52	VHF-III
		1.25.23: L_MaxGain_Hi	dB		92	80	9.96	6.67	13.73	L-band
	FM mode	1.25.05: FM_MaxGain_Hi	dB		100	86	9.32	5.73	14.39	FM
	VRFAGC=VBBAGC=0.4V	1.25.15: VHF_MinGain_Hi	dB	21			10.58	12.12	9.41	VHF-III
		1.25.24: L_MinGain_Hi	dB	21			8.67	9.43	7.98	L-band
	FM mode, VRFAGC=VBBAGC=0.4V	1.25.06: FM_MinGain_Hi	dB	30			11.17	11.74	12.10	FM
Input Power per Channel: Low-Gain Mode (LNA BYP=1)	All bands, output signal of at least 100mVpp at min input level	1.25.07: FM_MaxGain_Lo	dBm			-76	11.59	8.15	14.66	FM
		1.25.16: VHF_MaxGain_Lo	dBm			-76	10.52	6.53	16.10	VHF-III
		1.25.25: L_MaxGain_Lo	dBm			-76	11.65	7.97	19.75	L-band
	VHF-III and FM band, output signal not to exceed 1Vpp at max input level	1.25.08: FM_MinGain_Lo	dBm	3			12.50	16.61	12.20	FM
		1.25.17: VHF_MinGain_Lo	dBm	3			12.27	13.69	10.13	VHF-III
Overall Voltage Gain, Low-Gain Mode (LNA_BYP=1)	All bands, output signal of at least 100mVpp at min input level	1.25.07: FM_MaxGain_Lo	dB	60			11.59	8.15	14.66	FM
		1.25.16: VHF_MaxGain_Lo	dB	60			10.52	6.53	16.10	VHF-III
		1.25.25: L_MaxGain_Lo	dB	60			11.65	7.97	19.75	L-band
	VRFAGC=VBBAGC=0.4V	1.25.08: FM_MinGain_Lo	dB			1	12.50	16.61	12.20	FM
		1.25.17: VHF_MinGain_Lo	dB			1	12.27	13.69	10.13	VHF-III
		1.25.16: L_MinGain_Lo	dB			1	10.57	11.29	9.49	L-band
RF Gain Flatness	Over selected input frequency band, VRFAGC=2.4V	1.25.11: Gain_108M_Flat	dB	3		-3	18.40	18.47	19.20	FM Flatness
		1.25.19: Gain_205M_Flat	dB	3		-3	10.38	10.67	10.31	VHF-III Flatness
		1.25.29: Gain_1492M_Flat	dB	3		-3	57.47	53.73	55.37	L-band Flatness
Harmonic Rejection	FM, BAND_SEL=01 & VHF-III, BAND_SEL=00 (N=3 &5)	GBDC	dBc			60	4.13	5.93	6.31	
Sideband Suppression	FM mode, fCENTER=105kHz	1.28.03: FM_Image_Rej	dB		50	45	1.82	2.13	2.04	
Phase Noise (Single Sideband, Closed Loop) L-Band, BAND_SEL=01, 1472MHz,	At 1kHz	GBDC	dBc/Hz	-80	-90		3.16	3.98	3.81	
	At 10kHz	GBDC	dBc/Hz	-80	-88		2.02	2.13	2.36	
Charge-Pump Three-State Current		1.22.07: HiZ_Io_ICP=1	uA	10		-10	71.08	53.18	59.54	
Tune Range	Tank frequency	1.23.01: VCO1_SB1_Min	MHz	3840		2688	3.63	3.14	3.89	Min Tank Frequency CPK
		1.23.33: VCO2_SB8_Max	MHz	3840		2688	4.59	5.26	3.97	Max Tank Frequency CPK
1dB Output Compression Point	Differential voltage at fIF=2.048MHz	1.29.03: BB_1dB_Comp	Vpp		2.3	1.4	11.29	7.79	15.11	
Passband AGC Range	VBBAGC = 2.4V to 0.4V	1.25.02: BB_GainRange	dB		44	38	5.81	3.57	6.24	
Passband Cutoff Attenuation (DAB/T-DMB)	fIF=2.048+/-0.8MHz with nominal 3dB attenuation relative to 2.148MHz	1.37.04: DAB_BB_filter	dB	4	3	1.3	N/A	N/A	N/A	Trimmed parameter
Passband Cutoff Attenuation (FM)	fIF=2.198+/-0.1MHz with nominal 3dB attenuation relative to 2.298MHz	1.37.03: FM_BB_filter	dB	4	3	1.3	N/A	N/A	N/A	Trimmed parameter
Rejection Ratio (DAB/T - DMB)	At -0.52MHz (RF tone at fC-2.568MHz)	1.12.02: BB_000	dB		60	50	2.44	2.51	2.49	
	At 4.616MHz (RF tone at fC+2.568MHz)	1.12.03: BB_001	dB		60	50	2.87	2.92	3.15	
	At 2.453MHz (RF tone at fC+0.3MHz)	1.13.06: delta	dB		31	25	2.74	2.67	2.65	
AGC Gain Slope	VBBAGC = 2.4V to 0.4V	1.29.01: BB_Gn_Slp	dB/V	28	22	16	7.44	7.84	4.07	
LO Leakage	Pin=-100dBm, VHF band, fLO=204.64MHz, fRF=204.44MHz	1.30.01: FastCharge_leak	dBc		-20	0	2.09	2.02	2.56	
Detector Output	Sink current	1.10.01: I(0)	mA			0.4	3.05	2.89	2.94	
Reference Frequency Output Buffer: Output Level	REFOUT_VPP=0, Load impedance of 10kOhms in parallel with 10pF	1.35.02: Ref_out_0.8	mVpp	1000	700	500	6.48	6.24	6.64	
Digital Diode: Receive Mode Threshold	DD_TH=01, TA=25C	1.09.18: DD_TH_01	V	1.22	1	0.78	3.29	3.50	3.14	

Written By: 

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Approved By: 

Jeff Aquino
Manager, Reliability

Revision and Release Date	Description of Revision and Author	Approved By	Effective By (Date)
A 20 May 2014	Initial release for ticket 2031; Brian Vuong	J. Aquino	20 May 2014

MAX2659ELT/V+
GPS/GNSS Low-Noise Amplifier
Temperature Grade 3
6L uDFN
L611+2

MAX2659ELT/V+
GPS/GNSS Low-Noise Amplifier

Summary:

This report summarizes the results of the reliability tests performed by Maxim to qualify the MAX2659ELT/V+ for automotive applications.

Conclusion:

The MAX2659ELT/V+ was subjected to AEC-Q100 qualification testing. The qualification encountered ELFR failures that have been associated with a MC2 fab defect during the MFN fab step and EOS due to handling.

There is also one failure post 48hr IME which fails for PLL phase noise and root cause is unknown. See table 6 for results.

AEC-Q100 Qualification Requirements/Acceptance Criteria:

	Stress	ABV	AEC #	#of Lots	SS/Lot	ACC	ATE Temp	Method
Device Specific Tests	Electrostatic Discharge (Human Body/Machine Model)	ESD (HBM/MM)	E2	1	25	HBM:2000V MM:200V	RH	AEC-Q100-002 AEC-Q100-003
	Electrostatic Discharge (Device Model)	ESD (CDM)	E3	1	15	750V corner pins, 500V all other pins	RH	AEC-Q100-011
	Latch-Up	LU	E4	1	6	0	RH	AEC-Q100-004
	Electrical Distribution	ED	E5	3 *1	30	Cpk > 1.33	RHC	AEC-Q100-009
Package/ Process Related Tests	Preconditioning	PC	A1	3	77	0	R	J-STD-020 JESD22- A113
	Temperature Humidity Bias	HAST/THB	A2	3	77	0	RH	JESD22- A101 or A110
	Unbiased HAST	UHAST	A3	3	77	0	R	JESD22- A102, A118, or A101
	Temperature Cycle	TC	A4	3	77	0	RH	JESD22-A104 and Appendix 3
	Wire Bond Pull	WBP	C2	3	5	0	N/A	MIL-STD883 Method 2011
	High Temp Storage	HTSL	A6	1	45	0	RH	JESD22- A103
	Solderability	SD	C3	1	15	0	N/A	JESD22-B102
	High Temp Operating Life *2	HTOL	B1	3	77	0	RHC	JESD22-A108
	Early Life Failure Rate *3	ELFR	B2	3	800	0	RH	AEC Q100-008

Note *1 – One lot process skewed may be used
*2 – Grade 1 (1000hrs), Grade 2 (500hrs), Grade 3 (192hrs)
*3 – Grade 1 (48hrs), Grade 2 (24hrs), Grade 3 (12hrs)

Test Results/Lot information (Device Specific):

Table 1:

Lot Number:	EAJL2A005AE
Part Number:	MAX2659ELT+
Temperature Grade:	3
Fab Site:	EPSON
Fab Process Core:	MB3
Fab Process Tech:	MB3LBY 8" 0.35um
Metallization/# Layers:	AlCu / 3
Passivation:	BCB
Die Type:	WV15Z
Package Assembly Site:	UTL
Die Size:	30 X 30
Package Type:	6L uDFN 1.5 x 1
Wire Bond Material/Dia.:	Au 1.0 mil
Mold Compound:	CEL8240HF10G
Die Attach:	8006NS-1X
Leadframe Material:	BT SUBSTRATE
Lead Finish:	Au over Ni
Date Code:	1306
Rel Lot Number:	R26495A

AEC #	Test	Results SS		Temp
E2	**ESD (HBM)**	2500V		R
E2	**ESD (MM)**	-		N/A
E3	**ESD (CDM)**	750V		R
E4	**Latch-Up**	Cl 0/6	OV 0/6	R
E5	**Electrical Distribution**	Cpk >1.33		RHC

Test Results/Lot information (Package Technology): UTL

Table 2:

Lot Number:		EAIB8Q001B / C		NB6ACA080Q4		NB6ACA080Q5		NB6ACA080Q6	
Part Number:		MAX2659ELT+		MAX4166EKA+T		MAX4166EKA+T		MAX4166EKA+T	
Temperature Grade:		3		3		3		3	
Fab Site:		EPSON		MFN		MFN		MFN	
Fab Process Core:		MB3		CB20		CB20		CB20	
Fab Process Tech:		MB3LBY 8" 0.35um		CB20 6" 1.0 um		CB20 6" 1.0 um		CB20 6" 1.0 um	
Metallization/# Layers:		AlCu / 3		AlCu / 2		AlCu / 2		AlCu / 2	
Passivation:		BCB		SiN		SiN		SiN	
Die Type:		WV15Z		OP16Z		OP16Z		OP16Z	
Package Assembly Site:		UTL		UTL		UTL		UTL	
Die Size:		30 X 30		57 X 38		57 X 38		57 X 38	
Package Type:		6L uDFN 1.5 x 1		8L uDFN 2x2		8L uDFN 2x2		8L uDFN 2x2	
Wire Bond Material/Dia.:		Au 1.0 mil		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		CEL8240HF10G		CEL8240HF10G		CEL8240HF10G		CEL8240HF10G	
Die Attach:		8006NS-1X		8006NS-1X		8006NS-1X		8006NS-1X	
Leadframe Material:		BT SUBSTRATE		BT SUBSTRATE		BT SUBSTRATE		BT SUBSTRATE	
Lead Finish:		Au over Ni		Au over Ni		Au over Ni		Au over Ni	
Date Code:		1240		1005		1005		1005	
Rel Lot Number:		R26182F		R24473A		R24773B		R24773C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	R	0/46	R	0/46	R	0/46	R
A3	**Unbiased HAST**	-	R	-	R	-	R	-	R
A4	**Temperature Cycle**	500x – 0/77	R	500x – 0/77	R	500x – 0/77	R	500x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	-	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	1000hrs – 0/45	R	1000hrs – 0/45	R	1000hrs – 0/45	R	1000hrs – 0/45	R
C3	**Solderability**	-	N/A	0/15	N/A	0/15	N/A	0/15	N/A
B1	**High Temp Op/Life**	192hrs – 0/77	R	-	N/A	-	N/A	-	N/A

Test Results/Lot information (Package Technology): UTL

Table 3:

Lot Number:		L3K1DA138CC		L3K1DA138CD		L3K1DA138BC	
Part Number:		MAX4231AYT+C7G		MAX4231AYT+C7G		MAX4231AYT+C7G	
Temperature Grade:		3		3		3	
Fab Site:		VANGUARD		VANGUARD		VANGUARD	
Fab Process Core:		TS50		TS50		TS50	
Fab Process Tech:		VS502P2MP 8" 0.5um		VS502P2MP 8" 0.5um		VS502P2MP 8" 0.5um	
Metallization/# Layers:		AlCu / 2		AlCu / 2		AlCu / 2	
Passivation:		SiN / SiO2		SiN / SiO2		SiN / SiO2	
Die Type:		OS75Y-1Z		OS75Y-1Z		OS75Y-1Z	
Package Assembly Site:		UTL		UTL		UTL	
Die Size:		31 X 30		31 X 30		31 X 30	
Package Type:		6L LGA 1.5 X 1		6L LGA 1.5 X 1		6L LGA 1.5 X 1	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		CEL8240HF10G		CEL8240HF10G		CEL8240HF10G	
Die Attach:		8006NS-1X		8006NS-1X		8006NS-1X	
Leadframe Material:		BT SUBSTRATE		BT SUBSTRATE		BT SUBSTRATE	
Lead Finish:		Au over Ni		Au over Ni		Au over Ni	
Date Code:		1143		1143		1143	
Rel Lot Number:		R25866A		R25866B		R25866C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/48	R	0/48	R	0/48	R
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	R	500x – 0/77	R	500x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	500hrs – 0/77	RH	500hrs – 0/77	RH	500hrs – 0/77	RH
C3	**Solderability**	-	N/A	-	N/A	-	N/A
B1	**High Temp Op/Life**	-	N/A	-	N/A	-	N/A

Test Results/Lot information (Package Technology): ASE CHUNG-LI

Table 4:

Lot Number:		SBXZDA128Q1		SBXZDA128Q2		SBXZDA128Q2	
Part Number:		MAX2659ELT+G126		MAX2659ELT+G126		MAX2659ELT+G126	
Temperature Grade:		3		3		3	
Fab Site:		SAN JOSE		SAN JOSE		SAN JOSE	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LB 8" 0.35um		MB3LB 8" 0.35um		MB3LB 8" 0.35um	
Metallization/# Layers:		AlCu / 4		AlCu / 4		AlCu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		WV15Z		WV15Z		WV15Z	
Package Assembly Site:		ASE CHUNG - LI		ASE CHUNG - LI		ASE CHUNG - LI	
Die Size:		30 X 30		30 X 30		30 X 30	
Package Type:		6L uDFN 1.5 X 1		6L uDFN 1.5 X 1		6L uDFN 1.5 X 1	
Wire Bond Material/Dia.:		Au 1.0 mil		Au 1.0 mil		Au 1.0 mil	
Mold Compound:		G1250		G1250		G1250	
Die Attach:		AB2025D		AB2025D		AB2025D	
Leadframe Material:		BT SUBSTRATE		BT SUBSTRATE		BT SUBSTRATE	
Lead Finish:		Au over Ni		Au over Ni		Au over Ni	
Date Code:		1201		1201		1201	
Rel Lot Number:		R25923A		R25923B		R25923C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	R	0/77	R	0/77	R
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	R	500x – 0/77	R	500x – 0/77	R
C2	**Wire Bond Pull**	-	N/A	-	N/A	-	N/A
A6	**High Temp Storage**	1000hrs – 0/45	R	1000hrs – 0/45	R	1000hrs – 0/45	R
C3	**Solderability**	0/15	N/A	-	N/A	-	N/A
B1	**High Temp Op/Life**	192hrs – 0/48	R	192hrs – 0/48	R	192hrs – 0/48	R

Test Results/Lot information (Wafer Process Technology):

Table 5:

Lot Number:		EAFL5Q045I/A045J		EAFL5A0048C/D/E		EAFL5A0048C/D/E	
Part Number:		TX27YETH+		TX27YETH+		TX27YETH+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/TiW/Cu / 4		Al/TiW/Cu / 4		Al/TiW/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		TX27Y-1Z		TX27Y-1Z		TX27Y-1Z	
Package Assembly Site:		UTL		UTL		UTL	
Die Size:		99.21 x 105.12		99.21 x 105.12		99.21 x 105.12	
Package Type:		44L TQFN 7x7		44L TQFN 7x7		44L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HCD		G770HCD		G770HCD	
Die Attach:		AB8200T		AB8200T		AB8200T	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1232		1234		1234	
Rel Lot Number:		R26182A		R26182C		R26182C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	-	R	-	R	-	R
A2	**HAST**	-	RH	-	RH	-	RH
A3	**Unbiased HAST**	-	R	-	R	-	R
A4	**Temperature Cycle**	-	RH	-	RH	-	RH
A6	**High Temp Storage**	-	RH	-	RH	-	RH
B1	**High Temp Operating Life**	1000hrs – 0/77	RHC	1000hrs – 0/77	RH	1000hrs – 0/77	RH
B2	**Early Life Failure Rate**	12hrs – 0/5402	RH	12hrs – 0/4804	RH	12hrs – 0/4804	RH

Test Results/Lot information (Wafer Process Technology):

Table 6:

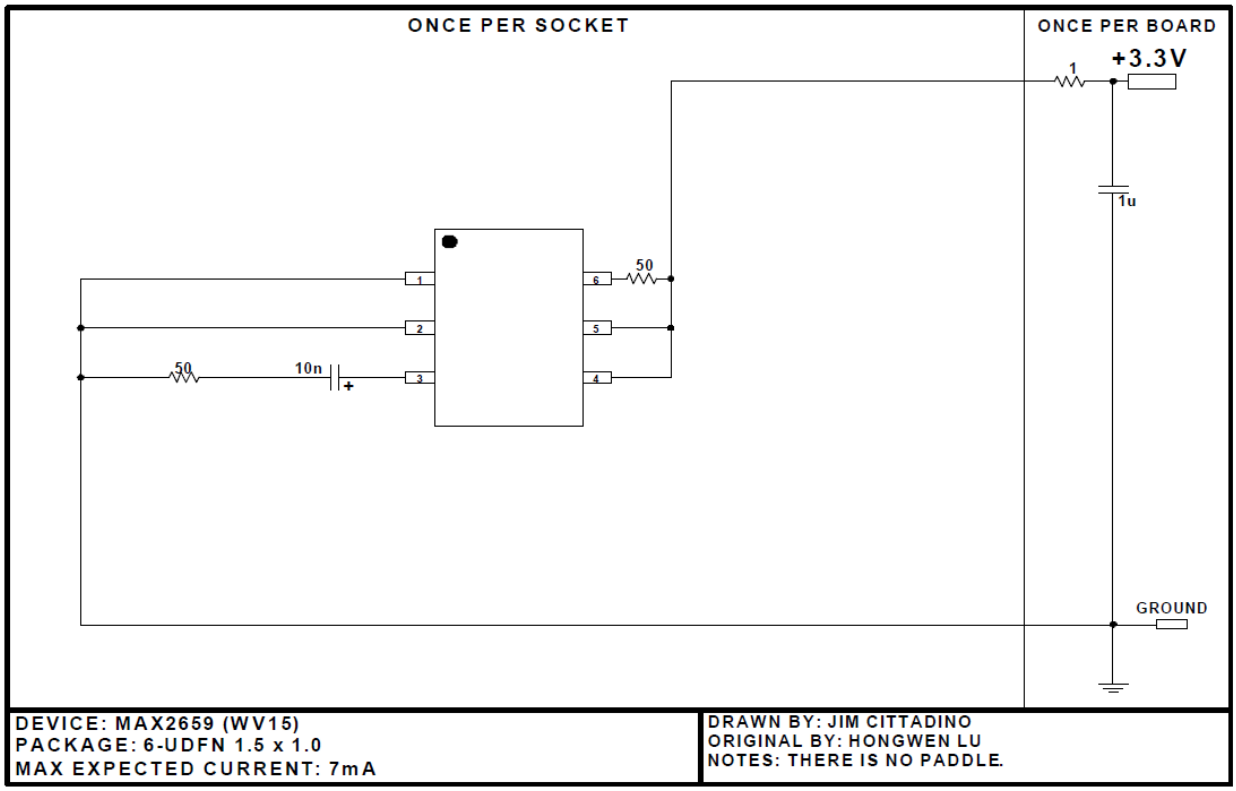
Lot Number:		EAKP0A010AA		EAKP0A016BA		EAKP0A008AA	
Part Number:		MAX2553ETN+		MAX2553ETN+		MAX2553ETN+	
Temperature Grade:		3		3		3	
Fab Site:		EPSON		EPSON		EPSON	
Fab Process Core:		MB3		MB3		MB3	
Fab Process Tech:		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um		MB3LWY - 8 " 0.35um	
Metallization/# Layers:		Al/Ti/Cu / 4		Al/Ti/Cu / 4		Al/Ti/Cu / 4	
Passivation:		BCB		BCB		BCB	
Die Type:		WC46A-2B		WC46A-2B		WC46A-2B	
Package Assembly Site:		ASE CHUNG - LI		ASE CHUNG - LI		ASE CHUNG - LI	
Die Size:		187.8 x 187.8		187.8 x 187.8		187.8 x 187.8	
Package Type:		56L TQFN 7x7		56L TQFN 7x7		56L TQFN 7x7	
Wire Bond Material/Dia.:		Au 1.0 mils		Au 1.0 mils		Au 1.0 mils	
Mold Compound:		G770HJ		G770HJ		G770HJ	
Die Attach:		EN4900G		EN4900G		EN4900G	
Leadframe Material:		COPPER		COPPER		COPPER	
Lead Finish:		100% MATTE TIN		100% MATTE TIN		100% MATTE TIN	
Date Code:		1311		1314		1319	
Rel Lot Number:		R26494A		R26494B		R26494C	
AEC #	**Test**	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*	**Results** *SS*	*Temp*
A1	**Preconditioning**	0/231	R	0/231	R	0/231	R
A2	**HAST**	0/77	RH	0/77	RH	0/77	RH
A3	**Unbiased HAST**	0/77	R	0/77	R	0/77	R
A4	**Temperature Cycle**	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH
A6	**High Temp Storage**	500hrs – 0/45	RH	500hrs – 0/45	RH	500hrs – 0/45	RH
B1	**High Temp Operating Life**	-	N/A	500hrs – 0/77	RHC	1000hrs – 0/77	RHC
B2	**Early Life Failure Rate**	48hrs – 0/800	RH	48hrs – 1/800 48hrs – 2/800 (1)	RH	48hrs – 0/800	RH

Note:

(1) IFAR 40051611: Root cause unknown [1st ELFR run – 1/800 F].
IFAR 40054437: Root cause EOS (1 unit) and MC2 defect at MFN step (1 unit) [2nd EFLR run – 2/800F]. Single unit EOS suspected to be due to handling; externally sourced.

Failures in ELFR are included in the PPM rate: 279 PPM (18, 754 units burned in).

Test Schematics: (Burn-in schematic)



Electrical Distribution: One Lot Process Skewed

Datasheet Parameter	Conditions	ATE Parameter Name	units	Spec High	Spec Typ	Spec Low	Room Cpk	Hot Cpk	Cold Cpk
Supply Current	SHDN\ = High	1.03.02: ICC	mA	5.6	4.1		2.23	2.08	3.96
	Shutdown mode, SHDN\ =Low	1.03.01: SHDN_ICC	uA	1			25.68	11.81	35.64
Digital Input Current	IIH	1.04.02: I_IH	uA	1			169.09	139.68	168.96
	IIL	1.04.01: I_IL	uA	1			4.53	5.13	4.67
Power Gain	VCC=2.85V	1.05.02: Gain_2.85V	dB		20.5	17	4.12	2.13	5.12
	VCC=1.6V	1.05.01: Gain_1.6V	dB		20.5	16.5	3.23	1.87	4.10
Input Return Loss	Guaranteed by Design and Characterization	GBDC	dB		15	10	3.31	2.65	2.29
Output Return Loss	Guaranteed by Design and Characterization	GBDC	dB		25	10	3.81	3.54	6.42

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Revision and Release Date	Description of Revision and Author	Approved By	Effective By (Date)
A 20 May 2014	Initial release for tkt 1868; Brian Vuong	J. Aquino	20 May 2014