

PCN Number:	20191104001.2	PCN Date:	Nov 13, 2019
Title:	Conversion to TSMC 0.6/0.5um Hybrid Process		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	May 13, 2020	Estimated Sample Availability:	Date provided at sample request.
Change Type:			
<input type="checkbox"/> Assembly Site	<input type="checkbox"/> Assembly Process	<input type="checkbox"/> Assembly Materials	
<input type="checkbox"/> Design	<input type="checkbox"/> Electrical Specification	<input type="checkbox"/> Mechanical Specification	
<input type="checkbox"/> Test Site	<input type="checkbox"/> Packing/Shipping/Labeling	<input type="checkbox"/> Test Process	
<input type="checkbox"/> Wafer Bump Site	<input type="checkbox"/> Wafer Bump Material	<input type="checkbox"/> Wafer Bump Process	
<input type="checkbox"/> Wafer Fab Site	<input type="checkbox"/> Wafer Fab Materials	<input checked="" type="checkbox"/> Wafer Fab Process	
	<input type="checkbox"/> Part number change		

Notification Details

Description of Change:

This change notification is to announce the conversion from the current TSMC 0.6um back end metallization/SOG Etch Back process to the TSMC 0.5um Tungsten plug back end process for the selected devices listed in the "Product Affected" section.

Change From	Change To
0.6um TSMC Backend Process IMD layer: PEOX + SOG DEP+ PEOX Metal: Ti / AlSiCu / TiN	0.5um TSMC Backend Process IMD layer: PEOX+SACVD-OX+PEOX+SOG dep. & Etch back+PEOX Metal: Via Plug TiN/WCVD/AlCu /TiN

Reason for Change:

Quality Improvement.

Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):

None.

Changes to product identification resulting from this notification:

None.

Product Affected:

REF3212AMDBVREP	REF3230AMDBVREP	V62/07602-01XE	V62/07602-04XE
REF3220AMDBVREP	REF3233AMDBVREP	V62/07602-02XE	V62/07602-05XE
REF3225AMDBVREP	REF3240AMDBVREP	V62/07602-03XE	V62/07602-06XE

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Q100H Grade-1 qual for REF31XXAQBZRQ1 (TSMC-WF2 / 0.5/0.6-DPDM) in HNT using 3-pin SOT pkg

Approved 28-Mar-2017

Product Attributes

Attributes	Qual Device: REF3133AQBZRQ1	Qual Device: REF3112AQBZRQ1	Qual Device: REF3120AQBZRQ1	Qual Device: REF3125AQBZRQ1	Qual Device: REF3130AQBZRQ1	Qual Device: REF3140AQBZRQ1	QBS Process Reference: OPA356AQBVRQ1
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Product Function	Power Management	Power Management	Power Management	Power Management	Power Management	Power Management	Signal Chain
Wafer Fab Supplier	TSMC-WF2	TSMC-WF2	TSMC-WF2	TSMC-WF2	TSMC-WF2	TSMC-WF2	TSMC-WF2
Die Revision	E	E	E	E	E	E	-
Assembly Site	HNT	HNT	HNT	HNT	HNT	HNT	NFME
Package Type	SOT	SOT	SOT	SOT	SOT	SOT	SOT
Package Designator	DBZ	DBZ	DBZ	DBZ	DBZ	DBZ	DBV
Ball/Lead Count	3	3	3	3	3	3	5

- QBS: Qual By Similarity

- Qual Device REF3112AQBZRQ1 is qualified at LEVEL2-260C

- Qual Devices qualified at LEVEL3-260C: REF3120AQBZRQ1, REF3130AQBZRQ1, REF3140AQBZRQ1, REF3125AQBZRQ1, REF3133AQBZRQ1

Qualification Results
Data Displayed as: Number of lots / Total sample size / Total failed

Type	#	Test Spec	Min Lot Qty	SS/ Lot	Test Name / Condition	Duration	Qual Device: REF3133AQDBZRQ1	Qual Device: REF3112AQDBZRQ1	Qual Device: REF3120AQDBZRQ1	Qual Device: REF3125AQDBZRQ1	Qual Device: REF3130AQDBZRQ1	Qual Device: REF3140AQDBZRQ1	QBS Process Reference: OPA356AQDBVRQ1
Test Group A – Accelerated Environment Stress Tests													
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning	Level 2-260C peak	3/all/0	-	-	-	-	-	3/all/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/0	-	-	-	-	-	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	3/231/0	-	-	-	-	-	3/230/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0	-	-	-	-	-	3/230/0
TC-BP	A4	MIL-STD883 Method 2011	1	30	Post Temp. Cycle Bond Pull	500 Cycles	1/30/0	-	-	-	-	-	1/30/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	N/A	N/A	N/A	N/A	N/A	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	500 Hours	1/45/0	-	-	-	-	-	1/45/0
Test Group B – Accelerated Lifetime Simulation Tests													
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C	1000 Hours	3/231/0	-	-	-	-	-	3/231/0
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	-	-	-	-	-	3/2400/0
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	--	N/A	N/A	N/A	N/A	N/A	N/A	-
Test Group C – Package Assembly Integrity Tests													
WBS	C1	AEC Q100-001	1	30	Bond Shear (Cpk>1.67)	Wires	1/30/0	-	-	-	-	-	-
WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	1/30/0	-	-	-	-	-	-
SD	C3	JEDEC JESD22-B102	1	15	Solderability (>95% Coverage)	Steam aging 8 hrs	-	-	-	-	-	-	1/150*
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	-	3/30/0	-	-	-	-	-	-
SBS	C5	AEC Q100-010	3	50	Solder Ball Shear (Cpk>1.67)	Post HTSL/Bump	NA	-	-	-	-	-	-
LI	C6	JEDEC JESD22-B105	1	50	Lead Integrity	Leads	NA	-	-	-	-	-	-
Test Group D – Die Fabrication Reliability Tests													
EM	D1	JESD61	-	-	Electromigration	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDDB	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
NBTI	D4	-	-	-	Negative Bias Temperature Instability	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-	-	-	Stress Migration	--	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group E – Electrical Verification Tests													
HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000 V	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM	500 V (all pins) 750V (corner pins)	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
LU	E4	AEC Q100-004	1	6	Latch-up	(Per AEC Q100-004)	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold test	1/30/0	1/30/0	1/30/0	1/30/0	1/30/0	1/30/0	3/90/0

Note: Solderability is performed on a separate device, SN74LVC2G66QDCURQ1, which has same lead frame plating material on same package type by same assembly site.

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST & TC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C

Grade 1 (or Q): -40°C to +125°C

Grade 2 (or T): -40°C to +105°C

Grade 3 (or I): -40°C to +85°C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

Room/Hot/Cold: HTOL, ED

Room/Hot: THB/HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room: AC/uHAST

Green/Pb-free Status:

Qualified Pb-Free (SMT) and Green

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