PCN Number:	20221220000.2	PCN Date:	December 21, 2022
Title:	Qualification of RFAB as an additional Fab site option and new Assembly & Test site (TIPI)/BOM options for select LBC8 devices		
Customer Contact:	PCN Manager	Dept:	Quality Services
Proposed 1st Ship Date:	Jun 19, 2023	Sample requests accepted until:	Jan 21, 2023*

***Sample requests received after January 21, 2023 will not be supported.**

Change Type:					
☒	Assembly Site	☒	Assembly Process	☒	Assembly Materials
☐	Design	☐	Electrical Specification	☐	Mechanical Specification
☒	Test Site	☐	Packing/Shipping/Labeling	☐	Test Process
☐	Wafer Bump Site	☐	Wafer Bump Material	☐	Wafer Bump Process
☒	Wafer Fab Site	☐	Wafer Fab Materials	☐	Wafer Fab Process
		☐	Part number change		

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of its RFAB fabrication facility as an additional Wafer Fab option in addition to new AT (TIPI) & BOM options for the devices listed in the "Product Affected" section.

Current Fab Site			New Fab Site		
Fab Site	**Process**	**Wafer Diameter**	**Fab Site**	**Process**	**Wafer Diameter**
DP1DM5	LBC8	200 mm	RFAB	LBC8	300 mm

Construction differences and AT site options are as follows:

	HANA	TIPI
Bond wire composition, diameter diameter(Cu)	Au, 0.96 mil	Cu, 0.96 mil
Mold Compound	SID#450207	4222198
Mount Compound	SID#6498861	4226215
MSL	LEVEL2-260C	LEVEL1-260C

Currently, there is no probe test step in the process for DP1DM5 die , but for the RFAB die, CD-PR will be activated as a probe site.

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ

Reason for Change:

Supply continuity

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

None

Impact on Environmental Ratings

Checked boxes indicate the status of environmental ratings following implementation of this change. If below boxes are checked, there are no changes to the associated environmental ratings.

RoHS	REACH	Green Status	IEC 62474
☒ No Change	☒ No Change	☒ No Change	☒ No Change

Changes to product identification resulting from this PCN:

Fab Site Information:

Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
DP1DM5	DM5	USA	Dallas
RFAB	**RFB**	**USA**	**Richardson**

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
HNA	HNT	THA	Ayutthaya
TIPI	**PHI**	**PHL**	**Baguio City**

Sample product shipping label (not actual product label):

Product Affected:

SN6505AQDBVRQ1	SN6505BQDBVRQ1	SN6505DQDBVRQ1	SN6505DQDBVTQ1
SN6505AQDBVTQ1	SN6505BQDBVTQ1		

TI Information
Selective Disclosure

Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)

SN6505Q DBV Redbull
Approve Date 16-December-2022

Product Attributes

Attributes	Qual Device: SN6505AQDBVRQ1	Qual Device: SN6505DQDBVRQ1	Qual Device: SN6505BQDBVRQ1	QBS Reference: TLV2401QDBVRQ1	QBS Reference: LP87332ARHDRQ1	QBS Reference: UCC27517AQDBVRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Operating Temp Range (C)	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125	-40 to 125
Product Function	Interface	Interface	Interface	Signal Chain	Power Management	Power Management
Wafer Fab Supplier	RFAB	RFAB	RFAB	DL-LIN	RFAB	RFAB
Assembly Site	PHI	PHI	PHI	PHI	UTL1	PHI
Package Group	SOT	SOT	SOT	SOT	QFN	SOT
Package Designator	DBV	DBV	DBV	DBV	RHD	DBV
Pin Count	6	6	6	5	28	5

- QBS: Qual By Similarity
- Qual Device SN6505AQDBVRQ1 is qualified at MSL1 260C
- Qual Device SN6505DQDBVRQ1 is qualified at MSL1 260C
- Qual Device SN6505BQDBVRQ1 is qualified at MSL1 260C

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: SN6505AQDBVRQ1	Qual Device: SN6505DQDBVRQ1	Qual Device: SN6505BQDBVRQ1	QBS Reference: TLV2401QDBVRQ1	QBS Reference: LP87332ARHDRQ1	QBS Reference: UCC27517AQDBVRQ1
Test Group A - Accelerated Environment Stress Tests													
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	1 Step	No Fails	-	-	No Fails	-	No Fails

HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	-	3/231/0	-	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Autoclave	121C/15psig	96 Hours	1/77/0	-	-	-	-	-
AC/UHAST	A3	JEDEC JESD22-A102/JEDEC JESD22-A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	-	3/231/0	-	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-	-	3/15/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	150C	1000 Hours	1/45/0	-	-	-	-	3/135/0
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	3/135/0	-	-
Test Group B - Accelerated Lifetime Simulation Tests													
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	408 Hours	-	-	-	3/231/0	-	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	500 Hours	-	-	-	-	3/231/0	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	150C	24 Hours	-	-	-	-	3/2400/0	-
Test Group C - Package Assembly Integrity Tests													
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0	3/15/0	-	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0	3/15/0	-	3/90/0
SD	C3	JEDEC J-STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	-	1/15/0	-	-
SD	C3	JEDEC J-STD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	-	-	-	1/15/0	-	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	1/10/0	1/10/0	3/30/0	-	3/30/0
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
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
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	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
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
Test Group E - Electrical Verification Tests													
ESD	E2	AEC Q100-002	1	3	ESD HBM	-	2000 Volts	1/3/0	1/3/0	1/3/0	1/3/0	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	500 Volts	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	-	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	1/30/0	1/30/0	1/30/0	3/90/0	-	-
Additional Tests													
Type	**#**	**Test Spec**	**Min Lot Qty**	**SS / Lot**	**Test Name**	**Condition**	**Duration**	**Qual Device**	**Qual Device**	**Qual Device**	**QBS Reference**	**QBS Reference**	**QBS Reference**

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable
- The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours
- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Ambient Operating Temperature by Automotive Grade Level:

- Grade 0 (or E): -40C to +150C
- Grade 1 (or Q): -40C to +125C
- Grade 2 (or T): -40C to +105C
- Grade 3 (or I) : -40C to +85C

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

Quality and Environmental data is available at TI's external Web site: http://www.ti.com/

TI Qualification ID: R-CHG-2203-051

Automotive Q006 Qualification Summary

AEC-Q006 Table 3a: Integrated Circuit Qualification Test Requirements: Qualification Results

Qualification Device(s) **BiCMOS analog**

Technology attributes covered by this Q006 qualification

- **Silicon attributes**: 300mm LBCx processes finished with BOAC in TI CLARK.
- **Bond pad metal technology**: 'Copper top'
- **Package family** : SOT23 packages in TIPI
- **Wire type** : 1.3 Mil Copper wire / 0.96 Mil copper / 0.8 Mil copper wire.

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

	SOT23 Package	**DBV (5 pin)**	**DBV (5 pin)**	**DDF (8 pin)**
	Wire	**1.3 mil Cu**	**0.96 mil Cu**	**0.8 Mil Cu**

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TPS22810DBV	Qual Device: UCC2751xDBV	Qual Device: LM74700QDDFQ1
Test Group A - Accelerated Environment Stress Test									
					SAM Analysis, Pre Stress	-	Passed	Passed	Passed
PC	A1	JESD22-113	-	-	**Preconditioning**	**Level 3-260C**	**Passed**	**Passed**	**Passed**
			-	-	SAM Analysis, Post-Precon on 11 marked (or 22 random) units per lot before THB, TC, PTC and HTSL		Passed : No delamination	Passed : No delamination	Passed : No delamination
HAST	A2	JESD22-A101	3	77	**BHAST, Vmax/130C/85% RH**	**96 Hours**	**3/231/0**		**3/231/0**
			3	1	Cross Section, Post bHAST 96 Hours	-	3/3/0		3/3/0
			3	11 / 22	SAM Analysis, Post bHAST, 96 Hours	-	3/33/0		Skipped to 2x
			3	3	Wire Bond Shear, Post bHAST, 96 Hours	units	3/9/0		3/9/0
			3	3	Bond Pull over Stitch, post bHAST, 96 Hours	units	3/9/0		3/9/0
			3	3	Bond Pull over Ball, Post bHAST, 96 Hours	units	3/90/0		3/90/0
HAST	A2	JESD22-A101	3	70	**BHAST, Vmax/130C/85% RH**	**192 Hours**	**3/210/0**		**3/210/0**
			3	1	Cross Section, Post bHAST 192 Hours	-	3/3/0		3/3/0
			3	11 / 22	SAM Analysis, Post bHAST, 192 Hours	-	3/33/0		3/66/0
			3	2	Wire Bond Shear, Post bHAST, 192 Hours	units	3/9/0		3/9/0
			3	2	Bond Pull over Stitch, post bHAST, 192 Hours	units	3/9/0		3/9/0
			3	2	Bond Pull over Ball, Post bHAST, 192 Hours	units	3/9/0		3/9/0
TC	A4	JESD22-A104	3	77	**Temperature Cycle, -65/150C**	**500 Cycles**	**3/231/0**	**1/77/0**	**3/231/0**
			3	1	Cross Section, Post T/C 500 Cycles	-	3/3/0	1/1/0	3/3/0
			3	11 / 22	SAM Analysis, Post T/C, 500 Cycles	-	3/33/0	1/11/0	3/66/0
			3	3	Wire Bond Shear, Post T/C 500 Cycles	units	3/9/0	1/3/0	3/9/0
			3	3	Bond Pull over Stitch Post T/C 500 Cycles	units	3/9/0	1/3/0	3/9/0
			3	3	Bond Pull over Ball Post T/C 500 Cycles	units	3/9/0	1/3/0	3/9/0
TC	A4	JESD22-A104	3	70	**Temperature Cycle, -65/150C**	**1000 Cycles**	**3/210/0**	**1/70/0**	**3/210/0**
			3	1	Cross Section, Post T/C 1000 Cycles	-	3/3/0	1/1/0	3/3/0
			3	11 / 22	SAM Analysis, Post T/C, 1000 Cycles	-	3/33/0	1/11/0	3/66/0
			3	2	Wire Bond Shear, Post T/C 1000 Cycles	units	3/6/0	1/2/0	3/6/0
			3	2	Bond Pull over Stitch, Post T/C, 1000 Cycles	units	3/6/0	1/2/0	3/6/0
			3	2	Bond Pull over Ball, Post T/C, 1000 Cycles	units	3/6/0	1/2/0	3/6/0
PTC	A5	JESD22-A105	1	45	**Power Temperature Cycle**	**1000 Cycles**	**NA**	**NA**	**NA**
PTC	A5	JESD22-A105	1	45	**Power Temperature Cycle**	**2000 Cycles**	**NA**	**NA**	**NA**
HTSL	A6	JESD22-A103	3	45	**High Temp Storage Bake 150C***	**1000 Hours**	**3/135/0**		**3/135/0**
			3	1	Cross Section, Post HTSL 1000 Hours	-	3/3/0		3/3/0
			3	44	**High Temp Storage Bake 150C**	**2000 Hours**	-		**3/132/0**
			3	1	Cross Section, Post HTSL 2000 Hours	-	-		3/3/0
			3	45	**High Temp Storage Bake 175C**	500 hours		**1/45/0**	
			3	1	Cross Section, Post HTSL 500 Hours			1/1/0	
			3	44	**High Temp Storage Bake 175C**	1000 hours		1/44/0	
			3	1	Cross Section, Post HTSL 1000 Hours			1/1/0	

*Device was released as Q100 grade 2 where 1000 hours x 150C is 2x duration.

Summary post-reliability construction analysis.
1. CSAM shows no delamination after BHAST and Temperature cycling
2. Cross sections showed no evidence of cracking or oxidation within the bonds.
3. Bond pulls, shears and stitch pulls show no degradation – distribution showing similar performance to unaged devices

TI Qualification ID: 20170418-121595 , 20191011-131872 and 20200416-133706

For alternate parts with similar or improved performance, please visit the product page on TI.com

For questions regarding this notice, e-mails can be sent to the contact shown below or your local Field Sales Representative.

Location	E-Mail
WW Change Management Team	PCN_ww_admin_team@list.ti.com