PCN Number:	20240502002.2	PCN Date:	May 02, 2024
Title:	Qualification of RFAB as an additional Fab site option, Die revision and TIPI as an additional Assembly & Test Site options for select devices		
Customer Contact:	Change Management Team	Dept:	Quality Services
Proposed 1st Ship Date:	October 29, 2024	Sample requests accepted until:	June 01, 2024*

*Sample requests received after June 01, 2024 will not be supported.

Change Type:

☒	Assembly Site	☒	Design	☐	Wafer Bump Material
☒	Assembly Process	☐	Data Sheet	☐	Wafer Bump Process
☒	Assembly Materials	☐	Part number change	☒	Wafer Fab Site
☐	Mechanical Specification	☒	Test Site	☒	Wafer Fab Material
☒	Packing/Shipping/Labeling	☐	Test Process	☒	Wafer Fab Process

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 TIPI as an additional Assembly & Test Site options for the devices listed below.

Current Fab Site			Additional Fab site		
Current Fab Site	**Process**	**Wafer Diameter**	**Additional Fab site**	**Process**	**Wafer Diameter**
FR-BIP-1	BCB8	200mm	RFAB	LBC9	300mm

The die was also changed as a result of the process change to accommodate the change in Assembly technology

Construction differences are as follows:

	UTL	TIPI
Bond wire composition, diam.	Au, 1.0 mil	Cu, 0.8 mil
Mount Compound	PZ0001	4222198
Mold Compound	CZ0096	8095733
Wafer thickness	8.0 mil	6.0 mil
Marking appearance	 **** = BINARY DATECODE Pin 1 Stripe	 **** **** = SECONDARY CODE **** = BINARY DATECODE Pin 1 dot

Reason for Change:

Supply Continuity
1) To align with world technology trends and use wiring with enhanced mechanical and electrical properties
2) Maximize flexibility within our Assembly/Test production sites.
3) Cu is easier to obtain and stock

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
FR-BIP-1	TID	DEU	Freising
RFAB	**RFB**	**USA**	**Richardson**

Die Rev:

Current	New
Die Rev [2P]	**Die Rev [2P]**
-	**A**

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
UTL	NSE	THA	Bangkok
TIPI	**PHI**	**PHL**	**Baguio City**

Sample product shipping label (not actual product label):

Product Affected:

LMV331QDBVRQ1	LMV331QDBVRSV

Qualification Report

Automotive New Product Qualification Summary
(As per AEC-Q100 Rev. H and JEDEC Guidelines)
Approve Date 23-OCTOBER -2023

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: LMV331QDBVRQ1	QBS Reference: TLV9021QDBVRQ1	QBS Reference: TLV9030QDBVRQ1	QBS Reference: TLV9031QDBVRQ1	QBS Reference: TLV1805QDBVRQ1	QBS Reference: TLV9032QPWRQ1	QBS Reference: TLV9022QPWRQ1	QBS Reference: TLIN2029DQ1
Test Group A - Accelerated Environment Stress Tests															
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	MSL1 260C	-	-	-	-	1/308/0	3/830/0	-	-	-
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	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	1/77/0	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	-	-	-
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	-	-	-	1/5/0	1/5/0	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-	-	1/77/0	3/135/0	-	-	-
Test Group B - Accelerated Lifetime Simulation Tests															
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	125C	1000 Hours	-	-	-	-	3/231/0	1/77/0	-	-
HTOL	B1	JEDEC JESD22-A108	1	77	Life Test	150C	300 Hours	-	-	-	1/77/0	-	-	1/77/0	-
ELFR	B2	AEC Q100-008	1	77	Early Life Failure Rate	125C	48 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	1/30/0	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	1/30/0	3/90/0	-	-	-
SD	C3	JEDEC J-STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	1/15/0	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	1/10/0	3/30/0	-	-	-
Test Group D - Die Fabrication Reliability Tests															
EM	D1	JESD61	-	-	Electromigration	-	-	Completed Per Process Technology Requirements	-	-	-	-	-	-	-
TDDB	D2	JESD35	-	-	Time Dependent Dielectric Breakdown	-	-	Completed Per Process Technology Requirements	-	-	-	-	-	-	-
HCI	D3	JESD60 & 28	-	-	Hot Carrier Injection	-	-	Completed Per Process Technology Requirements	-	-	-	-	-	-	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	Completed Per Process Technology Requirements	-	-	-	-	-	-	-
SM	D5	-	-	-	Stress Migration	-	-	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	-	-	-	-
ESD	E3	AEC Q100-011	1	3	ESD CDM	-	1000 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	-	-	-	-
ED	E5	AEC Q100-009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	1/30/0	-	1/30/0	-	-	3/90/0	-

QBS: Qual By Similarity
Qual Device LMV331QDBVRQ1 is qualified at MSL1 260C
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

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/ he following are equivalent
Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Qualification Report

Automotive New Product Qualification Summary
(As per AEC-Q100 / Q006 and JEDEC Guidelines)
Approved 01-Oct-2021

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: TLV1805QDBVRQ1
Test Group A – Accelerated Environment Stress Tests								
			AEC-Q006	3	11	SAM Analysis, Pre Stress	-	3/33/0
	PC	**A1**	**JEDEC J-STD-020 JESD22-A113**	**3**	**77**	**Automotive Preconditioning**	**Level 1-260C**	**No Fails**
			AEC-Q006	3	11	SAM Analysis, Post Stress	-	3/33/0
	HAST	**A2**	**JEDEC JESD22-A110**	**3**	**77**	**Biased HAST, 130C/85%RH**	**96 Hours**	**3/231/0**
		A2	AEC-Q006	3	1	Cross Section, Post bHAST 96 Hours	-	3/3/0
		A2	AEC-Q006	3	3	Wire Bond Shear, Post bHast, 96 Hours	-	3/9/0
		A2	AEC-Q006	3	3	Bond Pull over Stitch, post bHAST, 96 Hours	-	3/9/0
		A2	AEC-Q006	3	3	Bond Pull over Ball, Post bHAST, 96 Hours	-	3/9/0
		A2	**JEDEC JESD22-A110**	**3**	**70**	**Biased HAST, 130C/85%RH**	**192 Hours**	**3/210/0**
		A2	AEC-Q006	3	1	Cross Section, Post bHAST 192 Hours	-	3/3/0
		A2	AEC-Q006	3	22	SAM Analysis, Post bHAST, 192 Hours	Completed	3/66/0
		A2	AEC-Q006	3	3	Wire Bond Shear, Post bHast, 192 Hours	-	3/9/0
		A2	AEC-Q006	3	3	Bond Pull over Stitch, post bHAST, 192 Hours	-	3/9/0
		A2	- AEC-Q006	3	3	Bond Pull over Ball, Post bHAST, 192 Hours	-	3/9/0
	TC	**A4**	**JEDEC JESD22-A104 and Appendix 3**	**3**	**77**	**Temperature Cycle, -65/150C**	**500 Cycles**	**3/231/0**
	TC	A4	-	3	1	Cross Section, Post T/C 500 Cycles	-	3/3/0
	TC	A4	-	3	22	SAM Analysis, Post T/C, 500 Cycles	-	3/66/0

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TLV1805QDBVRQ1
	TC	A4	-	3	3	Wire Bond Shear, Post T/C 500 Cycles	-	3/9/0
	TC	A4	-	3	3	Bond Pull over Stitch Post T/C 500 Cycles	-	3/9/0
	TC	A4	-	3	3	Bond Pull over Ball Post T/C 500 Cycles	-	3/9/0
	TC	**A4**	**JEDEC JESD22-A104 and Appendix 3**	**3**	**70**	**Temperature Cycle, -65/150C**	**1000 Cycles**	**3/210/0**
	TC	A4	-	3	1	Cross Section, Post T/C 1000 Cycles	-	3/3/0
	TC	A4	-	3	22	SAM Analysis, Post T/C, 1000 Cycles	-	3/66/0
	TC	A4	-	3	30	Wire Bond Shear, Post T/C 1000 Cycles	-	3/9/0
	TC	A4	-	3	30	Bond Pull over Stitch, Post T/C, 1000 Cycles	-	3/9/0
	TC	A4	-	3	30	Bond Pull over Ball, Post T/C, 1000 Cycles	-	3/9/0
	PTC	**A5**	**JEDEC JESD22-A105**	**1**	**45**	**Power Temperature Cycle -40/125C**	**1000 Cycles**	**N/A**
	PTC	**A5**	**JEDEC JESD22-A105**	**1**	**45**	**Power Temperature Cycle -40/125C**	**2000 Cycles**	**N/A**
	HTSL	**A6**	**JEDEC JESD22-A103**	**3**	**77**	**High Temp Storage Bake 175C**	**500 Hours**	**3/231/0**
	HTSL	A6	-	3	1	Cross Section, Post HTSL 500 Hours	-	3/3/0
	HTSL	**A6**	**JEDEC JESD22-A103**	**3**	**77**	**High Temp Storage Bake 150C**	**1000 Hours**	**3/231/0**
	HTSL	A6	-	3	1	Cross Section, Post HTSL 1000 Hours	-	3/3/0
Test Group C – Package Assembly Integrity Tests								
	WBS	C1	AEC Q100-001	3	30	Wire Bond Shear, Cpk>1.67	Wires	3/90/0
	WBP	C2	MIL-STD883 Method 2011	3	30	Bond Pull over Ball, Cpk >1.67	Wires	3/90/0

- QBS: Qual By Similarity
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): -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
Green/Pb-free Status:
Qualified Pb-Free(SMT) and Green

ZVEI ID reference: SEM-PA-18, SEM-PA-08, SEM-PA-07, SEM-PA-11, SEM-PA-13, SEM-DE-01, SEM-DE-02, SEM-DE-03, SEM-TF-01, SEM-PW-13, SEM-PW-02, SEM-PW-03

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