PCN Number:	20210203000.2A	**PCN Date:**	Apr 15, 2021
Title:	Qualification of RFAB as an additional Fab site option for select ABCD6 devices		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	Aug 3, 2021	**Estimated Sample Availability:**	Date provided at sample request.

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 source for the selected devices listed in the "Product Affected" section.

Revision A is to announce the addition of new devices that were not included on the original PCN notification. The new devices are highlighted in yellow and **bolded** in the product affected section below. The expected first shipment date for the new devices will be 180 days from this notice for these newly added devices only. The proposed 1st ship date of Aug 3, 2021 still applies for the original set of devices.

Current Fab Site				**Additional Fab Site**			
Current Fab Site	**Process**	**Passivation**	**Wafer Diameter**	**Additional Fab Site**	**Process**	**Passivation**	**Wafer Diameter**
MAINEFAB	ABCD6	SiN	200 mm	RFAB	ABCD6	SiON	300 mm

Qual details are provided in the Qual Data Section.

Reason for Change:

Continuity of Supply

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

None

Changes to product identification resulting from this PCN:

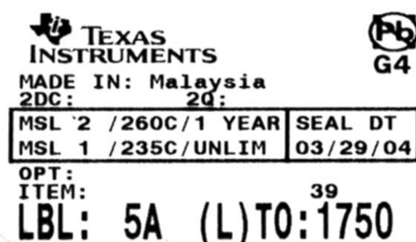
Current:

Current Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City
MAINEFAB	CUA	USA	South Portland

New Fab Site:

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

Sample product shipping label (not actual product label)



Product Affected:			
INA240A1EDRQ1	**INA240A2QDRQ1**	**INA240A4EDRQ1**	LM25141QRGETQ1
INA240A1QDRQ1	**INA240A3EDRQ1**	**INA240A4QDRQ1**	LM5141QRGERQ1
INA240A2EDRQ1	**INA240A3QDRQ1**	LM25141QRGERQ1	LM5141QRGETQ1

Automotive New Product Qualification Summary

(As per AEC-Q100 and JEDEC Guidelines)

Approved 25-January-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: LM5141QRGERQ1
Test Group A – Accelerated Environment Stress Tests								
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	231	Automotive Preconditioning	Level 2-260C	Pass
	uHAST	A3	JEDEC JESD22-A102	3	77	Unbiased HAST, 110C/85%RH	264 Hours	3/231/0
	THB		JEDEC JESD22-A101	3	77	Biased Temperature and Humidity, 85C/85%RH	1000 Hours	3/231/6 (Note 1)
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A
	HTSL	A6	JEDEC JESD22-A103	1	45	High Temp. Storage Life, 175C	500 Hours	3/231/0
Test Group B – Accelerated Lifetime Simulation Tests								
	HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 125C	1000 Hours	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	10000 Cycles	3/231/0
Test Group C – Package Assembly Integrity Tests								
	WBS	C1	AEC Q100-001	1	30	Bond Shear (Cpk>1.67)	Wires	3/90/0
	WBP	C2	MIL-STD883 Method 2011	1	30	Bond Pull (Cpk>1.67)	Wires	3/90/0
	PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	30 units	3/90/0
	SBS	C5	AEC Q100-010	3	50	Solder Ball Shear (Cpk>1.67)	Solder Balls	N/A
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 Injection Carrier	--	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								
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	2000 V	1/3/0
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	750 V	1/3/0
	LU	E4	AEC Q100-004	1	6	Latch-up	+/100mA, 125C	1/6/0
	ED	E5	AEC Q100-005	3	30	Electrical Distribution	Cpk > 1.67	3/30/0

- QBS: Qual By Similarity
- Qual Device LM5141QRGERQ1 is qualified at LEVEL2-260C

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST, TC & PTC 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 attributed these to board issues and were discounted as not related
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

Note 1: 6 fails across 3 lots (as well as 6 fails on control material) were attributed to electrically induced physical damage. Extensive FA and 8D (attached to eQDB) attributed these to board issues and were discounted as not related to the fab change.

Revision A Qual Memo

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

Approved 25-Mar-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: INA240A1EDQ1	Qual Device: INA240A2EDQ1	Qual Device: INA240A3EDQ1	Qual Device: INA240A4EDQ1
Test Group A – Accelerated Environment Stress Tests											
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning	Level 2-260C	Pass	Pass	Pass	
	HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hrs/+130C/85% RH	1/77/0	1/77/0	1/77/0	-
	UHAST	A3	JEDEC JESD22-A102,A118 or A101	3	77	Unbiased HAST 130C/85%RH	96 Hrs/130C/85% RH	1/77/0	1/77/0	1/77/0	-
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1000 Cycs/-65C/+150C	1/77/0	1/77/0	1/77/0	-
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	1820 Cycs/-65C/+150C	1/77/0	1/77/0	1/77/0	-
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	2000 Cycs/-65C/+150C	1/77/0	1/73/0	1/73/0	-
	TC-WBP	A4	MIL-STD883 Method 2011	1	60	Auto Post TC Bond Pull	30 ball bonds, min. 5 units	1/5/0	-	-	-
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	N/A	N/A	N/A
	HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 175C	1000 Hrs/175C	1/45/0	-	-	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: INA240A1EDQ1	Qual Device: INA240A2EDQ1	Qual Device: INA240A3EDQ1	Qual Device: INA240A4EDQ1
Test Group B – Accelerated Lifetime Simulation Tests										
HTOL	B1	JEDEC JESD22-A108	3	77	HTOL	1000 Hrs/150C	1/77/0	1/77/0	1/77/0	-
ELFR	B2	ACE Q100-008	3	800	ELFR	48 Hrs/150C	1/800/0	1/800/0	1/800/0	-
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	N/A	N/A	N/A
Test Group C – Package Assembly Integrity Tests										
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear (Cpk>1.67)	-	1/3/0/0*	-	-	-
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull (Cpk>1.67)	-	1/30/0*	-	-	-
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability >95% Lead Coverage	Pb and Pb-free	1/15/0* 1/15/0*	-	-	-
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions (Cpk>1.67)	-	1/10/0*	-	1/10/0*	1/10/0*
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
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
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
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
SM	D5	-	-	-	Stress Migration	-	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 - Q100	2500 V	1/3/0	1/3/0	-	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: INA240A1EDQ1	Qual Device: INA240A2EDQ1	Qual Device: INA240A3EDQ1	Qual Device: INA240A4EDQ1
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	4000 V	-	-	1/3/0	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	1/3/0	1/3/0	1/3/0	-
LU	E4	AEC Q100-004	1	6	Latch-up	150C	1/6/0	1/6/0	1/6/0	-
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67 Room, hot, and cold test	1/30/0	1/30/0	1/30/0	1/30/0

- QBS: Qual By Similarity
- Qual Device INA240A4EDQ1 is qualified at LEVEL2-260C
- Qual Device INA240A3EDQ1 is qualified at LEVEL2-260C
- Qual Device INA240A1EDQ1 is qualified at LEVEL2-260C
- Qual Device INA240A2EDQ1 is qualified at LEVEL2-260C

A1 (PC): Preconditioning:
Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.
*From 20160922-119344

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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