PCN Number:	20210315000.2	**PCN Date:**	Mar 16, 2021
Title:	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, Probe site, and additional AT site/BOM options for select devices		
Customer Contact:	PCN Manager	**Dept:**	Quality Services
Proposed 1st Ship Date:	Sept 12, 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 a new fab & process technology, (RFAB, LBC9), die revisions, probe site, and AT (MLA) site/BOM (MLA) options for selected devices as listed below in the product affected section. Construction differences are noted below:

Current Fab Site			Additional Fab Site		
Current Fab Site	**Process**	**Wafer Diameter**	**Additional Fab Site**	**Process**	**Wafer Diameter**
SFAB	HCMOS	150 mm	RFAB	LBC9	300 mm

The die was also changed as a result of the process change.

Probe site change:

	Current:	**New:**
Probe Site	TI Sherman-Probe (SH-BIP)	***TI Chengdu (CD-PR)***

Construction differences are noted below:

Group 1 RFAB/Process migration & MLA Assembly/Test qualification for D Devices:

	FMX	**MLA**
Lead finish	NiPdAu, non RLF	NiPdAu, RLF
Bond wire diameter	Cu, 0.96mils	Cu, 0.80 mils

Group 2 RFAB/Process migration & BOM qualification for PW devices:

	Current	**Proposed**
Lead finish	NiPdAu, Non RLF	NiPdAu, RLF
Bond wire diameter	Cu, 0.96 mils	Cu, 0.80 mils

Group 3 RFAB/Process migration & BOM qualification for PW devices:

	Current	**Proposed**
Lead finish	NiPdAu, Non RLF	NiPdAu, RLF
Bond wire diameter	Au, 0.96 mils	Cu, 0.80 mils

Group 4 RFAB/Process migration & BOM qualification for PW devices:

	Current	**Proposed**
Mount compound	4042500	4147858
Mold compound	4206193	4211471
Lead finish	NiPdAu, Non RLF	NiPdAu, RLF
Bond wire diameter	Cu, 0.96 mils	Cu, 0.80 mils

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

Reason for Change:

These changes are part of our multiyear plan to transition products from our 150-milimeter factories to newer, more efficient manufacturing processes and technologies, underscoring our commitment to product longevity and supply continuity.
Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):
None
Anticipated impact on Material Declaration

☐	No Impact to the Material Declaration	☒	Material Declarations or Product Content reports are driven from production data and will be available following the production release. Upon production release the revised reports can be obtained from the TI ECO website.

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
SH-BIP-1	SHE	USA	Sherman
RFAB	**RFB**	**USA**	**Richardson**

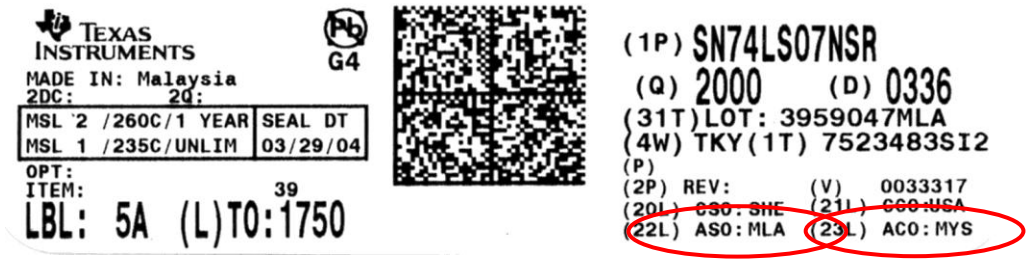
Die Rev:

Current	**New**
Die Rev [2P]	**Die Rev [2P]**
E, G	**A, B**

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
FMX	MEX	MEX	Aguascalientes
MLA	**MLA**	**MYS**	**Kuala Lumpur**

Sample product shipping label (not actual product label)



Product Affected:

Group 1 Device list (RFAB/Process migration & MLA/Test Assembly qualification for D Devices):

SN74HC21QDRQ1	SN74HC151QDRQ1	SN74HC138QDRG4Q1
SN74HC139QDRQ1	SN74HC165QDRQ1	SN74HC253QDRG4Q1

Group 2 Device list (RFAB/Process migration & BOM qualification for PW devices)

SN74HC138QPWRQ1	SN74HC165QPWRG4Q1	SN74HC166AIPWRG4Q1
SN74HC139QPWRQ1	SN74HC165QPWRQ1	

Group 3 Device list (RFAB/Process migration & BOM qualification for PW devices)

MSA00282PWRG4	SN74HC21QPWRG4Q1	SN74HC21QPWRQ1

Group 4 Device list (RFAB/Process migration & BOM qualification for PW devices)

SN74HC21QPWRQ1-NG

Group 1 (D Devices) Qual Memo:

TEXAS INSTRUMENTS

TI Information
Selective Disclosure

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

Approved 25-Jan-2021

Attributes	QBS Product Reference: SN74HCS595QDRQ1	QBS Process Reference: SN74HCS595QPWRQ1	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: SN74HCS74QDRQ1
Automotive Grade Level	Grade 1	Grade 1	Grade 1	-
Operating Temp Range	-40 to +125 C	-40 to +125 C	-40 to +125 C	-40 to +125 C
Product Function	Logic	Logic	Logic	Logic
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB
Die Revision	A2	A2	B1	B1
Assembly Site	MLA	MLA	MLA	MLA
Package Type	SOIC	TSSOP	TSSOP	SOIC
Package Designator	D	PW	PW	D(SOIC)
Ball/Lead Count	16	16	14	14

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	QBS Product Reference: SN74HCS595QDRQ1	QBS Process Reference: SN74HCS595QPWRQ1	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: SN74HCS74QDRQ1
Test Group A – Accelerated Environment Stress Tests										
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	1/77/0	3/276/0	3/828/0	3/1038/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	-	1/77/0	3/231/0	3/231/0
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	-	1/77/0	3/231/0	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	1/77/0	1/77/0	3/231/0	3/231/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	-	-	-	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 Hours	-	1/45/0	3/135/0	3/135/0
Test Group B – Accelerated Lifetime Simulation Tests										
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	300 Hours	-	1/77/0	3/231/0	1/77/0
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	-	-	-	-	-
Test Group C – Package Assembly Integrity Tests										
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear (Cpk>1.67)	Wires	1/30/0	1/30/0	3/90/0	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull (Cpk>1.67)	Wires	1/30/0	1/30/0	3/90/0	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	Pb Free Surface Mount Solderability	Pb Free/Solder-	1/15/0	-	3/45/0	3/45/0

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	QBS Product Reference: SN74HCS595QDRQ1	QBS Process Reference: SN74HCS595QPWRQ1	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: SN74HCS74QDRQ1
PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	1/30/0	3/90/0	3/90/0	3/90/0
Test Group D – Die Fabrication Reliability Tests										
EM	D1	JESD61	-	-	Electromigration	-	-	-	-	-
TDDB	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	-	-	-	-
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	-	-	-	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	-	-	-
SM	D5	-	-	-	Stress Migration	-	-	-	-	-
Test Group E – Electrical Verification Tests										
HBM	E2	AEC Q100-002	1	3	ESD - HBM	7000V	-	-	1/3/0	-
HBM	E2	AEC Q100-002	1	3	ESD - HBM	8000V	-	-	-	1/3/0
HBM	E2	AEC Q100-002	1	3	ESD - HBM	9000V	1/3/0	1/3/0	-	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM	1500V	-	-	1/3/0	-
CDM	E3	AEC Q100-011	1	3	ESD - CDM	2000V	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 test	3/90/0	3/90/0	3/90/0	3/90/0

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

Type:		ED	CDM	HBM	LU
Test Group E – Electrical Verification Tests					
Test Name / Condition:		Electrical Distributions	ESD - CDM	ESD - HBM	Latch-up
#		E5	E3	E2	E4
Test Spec		AEC Q100-009	AEC Q100-011	AEC Q100-002	AEC Q100-004
Min Lot Qty		3	1	1	1
SS/Lot		30	3	3	6
Duration:		Cpk>1.67 Room, hot, and cold test	1000V	2000V	(Per AEC Q100-004)
Qual Device:	SN74HC139QDRQ1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC138QDRG4Q1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC165QDRQ1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC151QDRQ1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC253QDRG4Q1	3/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC21QDRQ1	1/30/0	1/3/0	1/3/0	1/6/0

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
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

Group 2, 3, 4 (PW Devices) Qual Memo:

TEXAS INSTRUMENTS

TI Information
Selective Disclosure

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

Approved 21-Jan-2021

Product Attributes

Attributes	Qual Device: SN74HCS595QPWRQ1	QBS Product Reference: SN74HCS74QPWRQ1
Automotive Grade Level	Grade 1	Grade 1
Operating Temp Range	-40 to +125 C	-40 to +125 C
Product Function	Logic	Logic
Wafer Fab Supplier	RFAB	RFAB
Die Revision	A2	B1
Assembly Site	MLA	MLA
Package Type	TSSOP	TSSOP
Package Designator	PW	PW
Ball/Lead Count	16	14

- QBS: Qual By Similarity
- Qual Device SN74HCxxxQPWRQ1 are qualified at LEVEL1-260CG

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	QBS Product Reference: SN74HCS595QPWRQ1	QBS Product Reference: SN74HCS74QPWRQ1
Test Group A – Accelerated Environment Stress Tests									
	PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Preconditioning	Level 1-260C	3/276/0	3/828/0
	HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	1/77/0	3/231/0
	AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	1/77/0	3/231/0
	TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	1/77/0	3/231/0
	PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	-	-
	HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 Hours	1/45/0	3/135/0
Test Group B – Accelerated Lifetime Simulation Tests									
	HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	300 Hours	1/77/0	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	-	-	-
Test Group C – Package Assembly Integrity Tests									
	WBS	C1	AEC Q100-001	1	30	Wire Bond Shear (Cpk>1.67)	Wires	1/30/0	3/90/0
	WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull (Cpk>1.67)	Wires	1/30/0	3/90/0
	SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability >95% Lead Coverage	-	-	3/45/0
	PD	C4	JEDEC JESD22-B100 and B108	3	10	Physical Dimensions	Cpk>1.67	3/90/0	3/90/0
Test Group D – Die Fabrication Reliability Tests									
	EM	D1	JESD61	-	-	Electromigration	-	-	-
	TDDB	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	-	-

	Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	QBS Product Reference: SN74HCS595QPWRQ1	QBS Product Reference: SN74HCS74QPWRQ1
	HCI	D3	JESD60 &28	-	-	Hot Injection Carrier	-	-	-
	NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-	-
	SM	D5	-	-	-	Stress Migration	-	-	-
Test Group E – Electrical Verification Tests									
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	9000V	1/3/0	-
	HBM	E2	AEC Q100-002	1	3	ESD - HBM	7000V	-	1/3/0
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	2000V	1/3/0	-
	CDM	E3	AEC Q100-011	1	3	ESD - CDM	1500V	-	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 test	3/90/0	3/90/0

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

Type:		ED	CDM	HBM	LU
Test Group E – Electrical Verification Tests					
Test Name / Condition:		Electrical Distributions	ESD - CDM	ESD - HBM	Latch-up
#		E5	E3	E2	E4
Test Spec		AEC Q100-009	AEC Q100-011	AEC Q100-002	AEC Q100-004
Min Lot Qty		3	1	1	1
SS/Lot		30	3	3	6
Duration:		Cpk>1.67 Room, hot, and cold test	1000V	2000V	(Per AEC Q100-004)
Qual Device:	SN74HC138QPWRQ1	2/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC166AIPWRG4Q1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC139QPWRQ1	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC165QPWRG4Q1	2/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC165QPWRQ1	2/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	MSA00282PWRG4	1/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC21QPWRG4Q1	2/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC21QPWRQ1	2/30/0	1/3/0	1/3/0	1/6/0
Qual Device:	SN74HC21QPWRQ1-NG	2/30/0	1/3/0	1/3/0	1/6/0

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
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

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

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