

<b>PCN Number:</b>	20211220002.1	<b>PCN Date:</b>	December 22, 2021
<b>Title:</b>	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, and additional Assembly & BOM options for select devices		
<b>Customer Contact:</b>	<a href="#">PCN Manager</a>	<b>Dept:</b>	Quality Services
<b>Proposed 1<sup>st</sup> Ship Date:</b>	Mar 22, 2022	<b>Estimated Sample Availability:</b>	Date provided at sample request.
<b>Change Type:</b>			
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Assembly Process
<input checked="" type="checkbox"/>	Design	<input type="checkbox"/>	Electrical Specification
<input type="checkbox"/>	Test Site	<input type="checkbox"/>	Packing/Shipping/Labeling
<input type="checkbox"/>	Wafer Bump Site	<input type="checkbox"/>	Wafer Bump Material
<input checked="" type="checkbox"/>	Wafer Fab Site	<input checked="" type="checkbox"/>	Wafer Fab Materials
		<input type="checkbox"/>	Part number change

### PCN Details

#### Description of Change:

Texas Instruments is pleased to announce the qualification of a new fab & process technology (RFAB, LBC9) and Assembly & BOM option 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.

Additionally, there will be a BOM/Assembly options introduced for these devices:

#### Group 1 - RFAB/Process migration & BOM Update for N & NS Packaged Devices

	Current	Additional
Bond wire diameter (Cu)	0.96 mils	0.8 mils

#### Group 2 - RFAB/Process migration, BOM update & HFTF as alternate Assembly site for SOIC Packaged Devices

	MLA Current	MLA New	HFTF
Bond wire diameter (Cu)	0.96 mil	0.8 mils	0.8 mils
Mount Compound	4147858	4147858	SID#A-03
Mold Compound	4211880	4211880	SID#R-30

#### Group 3 - RFAB/Process migration BOM update & TFME as alternate Assembly site for PW Packaged devices

	MLA Current	MLA New	TFME
Bond wire diameter (Cu)	0.96 mil	0.8 mils	0.8 mils
Mount Compound	4147858	4147858	SID#A-03
Mold Compound	4211471	4211471	SID#R-31
Lead Finish	NiPdAu	NiPdAu	Matte Sn

Upon expiry of this PCN TI will combine lead free solutions in a single **standard part number**, for the devices in group 3. For example; **SN74HCT04PWR** – can ship with both Matte Sn and NiPdAu/Ag.

Example:

- Customer order for 7500 units of SN74HCT04PWR with 2500 units SPQ (Standard Pack Quantity per Reel).

- TI can satisfy the above order in one of the following ways.
  - I. 3 Reels of NiPdAu finish.
  - II. 3 Reels of Matte Sn finish
  - III. 2 Reels of Matte Sn and 1 reel of NiPdAu finish.
  - IV. 2 Reels of NiPdAu and 1 reel of Matte Sn finish.

The following table provides the updated thermal characteristics to all devices contained within this PCN. All thermal values can be compared to the existing devices by reviewing the datasheets currently on TI.com. The impact to the customer system is anticipated to be negligible, however the customer must review their system design to assess any risk due to the change in thermal characteristics. Please see the table below which provides a summary of thermal values that the devices will be updated to based on each pin/pkg combination.

THERMAL METRIC		D (SOIC)	N (PDIP)	NS (SO)	PW (TSSOP)	UNIT
		14 PINS	14 PINS	14 PINS	14 PINS	
RθJA	Junction-to-ambient thermal resistance	138.7	103.8	129.3	157.6	°C/W
RθJC(top)	Junction-to-case (top) thermal resistance	93.8	91.6	85.7	84.1	°C/W
RθJB	Junction-to-board thermal resistance	94.7	83.5	89.9	100.8	°C/W
ψJT	Junction-to-top characterization parameter	49.1	71.1	48.2	27.5	°C/W
ψJB	Junction-to-board characterization parameter	94.3	83.4	89.4	100.2	°C/W
RθJC(bot)	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	°C/W

**Reason for Change:**

These changes are part of our multiyear plan to transition products from our 150-millimeter 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

**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
<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> No Change	<input checked="" type="checkbox"/> 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
SH-BIP-1	SHE	USA	Sherman
<b>RFAB</b>	<b>RFB</b>	<b>USA</b>	<b>Richardson</b>

**Die Rev:**

Current	New
Die Rev [2P]	<b>Die Rev [2P]</b>
G,E,K, -	<b>A</b>

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
MLA	MLA	MYS	Kuala Lumpur
<b>HFTFAT</b>	<b>HFT</b>	<b>CHN</b>	<b>Hefei</b>
<b>TFME</b>	<b>NFM</b>	<b>CHN</b>	<b>Economic Development Zone</b>

Sample product shipping label (not actual product label)

**TEXAS INSTRUMENTS**  
 MADE IN: Malaysia  
 2DC: 20:  
 MSL 2 /260C/1 YEAR SEAL DT  
 MSL 1 /235C/UNLIM 03/29/04  
 OPT:  
 ITEM: 39  
**LBL: 5A (L)T0:1750**

(1P) SN74LS07NSR  
 (Q) 2000 (D) 0336  
 (31T) LOT: 3959047MLA  
 (4W) TKY (1T) 7523483SI2  
 (P)  
 (2P) REV: (V) 0033317  
 (20L) CSO: SHE (21L) CCO: USA  
 (22L) ASO: MLA (23L) ACO: MYS

**Product Affected:**

**Group 1 Device list (RFAB/Process migration & BOM Update for select N & NS Packaged Devices)**

SN74HCT08N	SN74HCT04NSR	SN74HCT32NE4	SN74HCT04ANSRE4
SN74HCT32N	SN74HCT08NE4	SN74HCT04ANSR	

**Group 2 Device list (RFAB/Process migration BOM update & HFTF as alternate Assembly site for select SOIC Packaged devices)**

SN74HCT00DR	SN74HCT74DR	CD74HCT11M96	CD74HCT86M96
SN74HCT02DR	CD74HCT02M96	CD74HCT27M96	SN74HCT125DR
SN74HCT04DR	CD74HCT03M96	CD74HCT32M96	CD74HCT125M96
SN74HCT08DR	CD74HCT04M96	CD74HCT74M96	CD74HCT126M96
SN74HCT32DR	CD74HCT08M96		

**Group 3 Device list (RFAB/Process migration BOM Update & TFME as alternate Assembly site for select PW packaged devices)**

SN74HCT00PWR	SN74HCT04PWR	SN74HCT32PWR	SN74HCT74PWR
SN74HCT02PWR	SN74HCT08PWR		

**Group 1 Qual Memo:**



TI Information  
Selective Disclosure

**Qualification Report**

**Approve Date 05-Nov-2021**

**Qualification Results**

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

Type	Test Name / Condition	Duration	Qual Device: SN74HCT04NSR	QBS Product Reference: SN74HCT04PWR	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: 1P8T245NSR
AC	Autoclave 121C	96 Hours	-	-	3/231/0	3/231/0
CDM	ESD - CDM	1500 V	1/3/0	1/3/0	1/3/0	-
ED	Electrical Characterization	Per Datasheet Parameters	-	Pass	Pass	-
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	3/2400/0	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	-
HBM	ESD - HBM	2000V	-	1/3/0	1/3/0	-
HTOL	Life Test, 150C	300 Hours	-	-	3/231/0	-
HTSL	High Temp Storage Bake 150C	1000 Hours	-	-	3/135/0	-
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	-	3/135/0
LU	Latch-up	(Per JESD78)	-	1/6/0	1/6/0	-
PC	Preconditioning	Level 1-260C	-	-	No Fails	-
TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	3/231/0

- QBS: Qual By Similarity  
 - Qual Device SN74HCT04NSR is qualified at LEVEL1-260C  
 - 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  
 - The following are equivalent Temp Cycle options per JESD47: -55C/125C/700 Cycles and -65C/150C/500 Cycles  
 Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>  
**Green/Pb-free Status:**  
 Qualified Pb-Free(SMT) and Green

TI Qualification ID: 20210330-139366



TI Information  
Selective Disclosure

**Qualification Report**  
**Approve Date 05-Nov-2021**

**Qualification Results**

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

Type	Test Name / Condition	Duration	Qual Device: SN74HCT32N_FMX	QBS Product Reference: SN74HCT00PWR	QBS Product Reference: SN74HCT04PWR	QBS Product Reference: SN74HCT08PWR	QBS Product Reference: SN74HCT32PWR	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: L293DNE
AC	Autoclave 121C	96 Hours	-	-	-	-	-	3/231/0	3/231/0
CDM	ESD - CDM	1500 V	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	-
ED	Electrical Characterization	Per Datasheet Parameters	-	Pass	Pass	Pass	Pass	Pass	-
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	-	-	-	3/2400/0	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	-	-	-	3/231/0	-
HBM	ESD - HBM	2000V	-	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	-
HTOL	Life Test, 150C	300 Hours	-	-	-	-	-	3/231/0	-
HTSL	High Temp Storage Bake 150C	1000 Hours	-	-	-	-	-	3/135/0	-
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	-	-	-	-	3/135/0
LU	Latch-up	(Per AEC-Q100-004)	-	-	-	-	-	1/6/0	-
LU	Latch-up	(Per JESD78)	-	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0	-
PC	Preconditioning	Level 1-260C	-	-	-	-	-	No Fails	No Fails
TC	Temperature Cycle, -65/150C	500 Cycles	-	-	-	-	-	3/231/0	3/225/0
WBP	Wire Bond Pull (Cpk>1.67)	Wires	-	-	-	-	-	3/90/0	-
WBS	Wire Bond Shear (Cpk>1.67)	Wires	-	-	-	-	-	3/90/0	-

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

Type	Test Name / Condition	Duration	QBS Package Reference: MSP430F2013IN	QBS Package Reference: SN74HC00N	QBS Package Reference: SN74HC574QDRQ1
WBP	Wire Bond Pull	Wires	-	-	3/90/0
AC	Autoclave 121C	96 Hours	3/231/0	-	3/231/0
CDM	ESD - CDM	2000V	-	1/3/0	1/3/0
ED	Electrical Characterization	Per Datasheet Parameters	-	-	Pass
HAST	Biased HAST, 130C/85%RH	96 Hours	-	1/77/0	3/231/0
HBM	ESD - HBM	2000V	-	-	1/3/0
HTOL	Life Test, 150C	300 Hours	-	-	1/77/0
HTSL	High Temp Storage Bake 150C	1000 Hours	-	-	3/135/0
HTSL	High Temp Storage Bake 170C	420 Hours	3/231/0	-	-
LU	Latch-up	(Per JESD78)	-	-	1/6/0
PC	Preconditioning	Level 1-260C	No Fails	-	No Fails
TC	Temperature Cycle, -65/150C	500 Cycles	3/231/0	1/77/0	3/231/0
WBS	Wire Bond Shear (Cpk>1.67)	Wires	-	-	3/90/0

- QBS: Qual By Similarity
  - Qual Device SN74HCT32N\_FMX is qualified at LEVEL1-260C
  - 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
  - The following are equivalent Temp Cycle options per JESD47: -55C/125C/700 Cycles and -65C/150C/500 Cycles
- Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Green/Pb-free Status:**  
 Qualified Pb-Free(SMT) and Green

TI Qualification ID: 20210329-139365

## Group 2 Qual Memo:



TI Information  
Selective Disclosure

### Qualification Report

Approve Date 29-Nov-2021

#### Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: CD74HCT03M96	Qual Device: CD74HCT04M96	Qual Device: CD74HCT11M96	Qual Device: CD74HCT125M96	Qual Device: CD74HCT126M96	Qual Device: CD74HCT27M96	Qual Device: CD74HCT86M96
CDM	ESD - CDM	1500 V	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
ED	Electrical Characterization	Per Datasheet Parameters	Pass	-	Pass	Pass	Pass	Pass	Pass
HBM	ESD - HBM	2000V	1/3/0	-	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
LU	Latch-up	(Per JESD78)	1/6/0	-	1/6/0	1/6/0	1/6/0	1/6/0	1/6/0

#### Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: SN74HCT00DR_MLA	QBS Process Reference: SN74HCS74QPWRQ1	QBS Package Reference: SN74HCS74DR	QBS Package Reference: SN74HCS74QDRQ1
AC	Autoclave 121C	96 Hours	-	3/231/0	-	3/231/0
CDM	ESD - CDM	1500V	-	1/3/0	3/9/0	1/3/0
ED	Electrical Characterization	Per Datasheet Parameters	-	Pass	Pass	Pass
ELFR	Early Life Failure Rate, 125C	48 Hours	-	3/2400/0	-	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/231/0	3/231/0	3/231/0
HTOL	Life Test, 150C	300 Hours	-	3/231/0	3/231/0	1/77/0
HTSL	High Temp Storage Bake 150C	1000 Hours	-	3/135/0	-	3/135/0
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	3/1350	-
LU	Latch-up	(Per JESD78)	-	1/6/0	-	1/6/0
PC	Preconditioning	Level 1-260C	-	No Fails	No Fails	No Fails
TC	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0
UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	3/231/0	-
WBP	Wire Bond Pull (Cpk>1.67)	Wires	-	3/90/0	-	3/90/0
WBS	Wire Bond Shear (Cpk>1.67)	Wires	-	3/90/0	-	3/90/0

- QBS: Qual By Similarity
- Qual Device CD74HCT125M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT86M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT04M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT11M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT126M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT27M96 is qualified at LEVEL1-260C
- Qual Device CD74HCT03M96 is qualified at LEVEL1-260C
- Qual Device SN74HCT00DR\_MLA is qualified at LEVEL1-260C
- 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
- The following are equivalent Temp Cycle options per JESD47: -55C/125C/700 Cycles and -65C/150C/500 Cycles

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

#### Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: 20210326-139325

## Group 3 Qual Memo:



TI Information  
Selective Disclosure

### Qualification Report

Approve Date 29-Nov-2021

#### Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: SN74HCT00PWR	Qual Device: SN74HCT00PWR_MLA	Qual Device: SN74HCT02PWR	Qual Device: SN74HCT04PWR	Qual Device: SN74HCT04PWR_MLA	Qual Device: SN74HCT08PWR	Qual Device: SN74HCT32PWR
CDM	ESD CDM	1500V	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0	1/3/0
ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	1/30/0	1/30/0	1/30/0	-	1/30/0	1/30/0
HBM	ESD HBM	2000V	1/3/0	1/3/0	1/3/0	1/3/0	-	1/3/0	1/3/0
LU	Latch-up	(Per JESD78)	1/6/0	1/6/0	1/6/0	1/6/0	-	1/6/0	1/6/0

#### Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: SN74HCT74PWR	QBS Process/Package Reference: SN74HCS74QPWRQ1	QBS Package Reference: SN74HCS595QPWRQ1	QBS Package Reference: SN74HCS74PWR
AC	Autoclave 121C	96 Hours	-	3/231/0	1/77/0	-
CDM	ESD - CDM	2000V	-	1/3/0	1/3/0	3/9/0
CDM	ESD CDM	1500V	1/3/0	1/3/0	-	-
ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	3/90/0	3/90/0	3/90/0
ELFR	Early Life Failure Rate, 125C	48 Hours	-	3/2400/0	-	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/231/0	1/77/0	3/231/0
HBM	ESD HBM	2000V	1/3/0	-	-	-
HTOL	Life Test, 150C	300 Hours	-	3/231/0	1/77/0	3/231/0
HTSL	High Temp Storage Bake 150C	1000 Hours	-	3/135/0	1/45/0	-
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	-	3/231/0
LU	Latch-up	(Per JESD78)	1/6/0	1/6/0	1/6/0	-
PC	Preconditioning	Level 1-260C	-	No Fails	No Fails	No Fails
TC	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	1/77/0	3/231/0
UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	-	3/231/0
WBP	Wire Bond Pull (Cpk>1.67)	Wires	-	3/90/0	1/30/0	-
WBS	Wire Bond Shear (Cpk>1.67)	Wires	-	3/90/0	1/30/0	-

- QBS: Qual By Similarity
- Qual Device SN74HCT00PWR\_MLA is qualified at LEVEL1-260CG
- Qual Device SN74HCT02PWR is qualified at LEVEL1-260C
- Qual Device SN74HCT08PWR is qualified at LEVEL1-260C
- Qual Device SN74HCT00PWR is qualified at LEVEL1-260C
- Qual Device SN74HCT04PWR\_MLA is qualified at LEVEL1-260CG
- Qual Device SN74HCT04PWR is qualified at LEVEL1-260C
- Qual Device SN74HCT32PWR is qualified at LEVEL1-260C
- Qual Device SN74HCT74PWR is qualified at LEVEL1-260C
- 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
- The following are equivalent Temp Cycle options per JESD47: -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>  
Green/Pb-free Status:  
Qualified Pb-Free(SMT) and Green

TI Qualification ID: 20210326-139322

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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Asia Pacific	<a href="mailto:PCNAsiaContact@list.ti.com">PCNAsiaContact@list.ti.com</a>
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