

<b>PCN Number:</b>	20240327005.1	<b>PCN Date:</b>	March 28, 2024
<b>Title:</b>	Qualification of RFAB using qualified Process Technology, Die Revision, and additional Assembly site options		
<b>Customer Contact:</b>	Change Management team	<b>Dept:</b>	Quality Services
<b>Proposed 1<sup>st</sup> Ship Date:</b>	June 26, 2024	<b>Estimated Sample Availability:</b>	April 27, 2024*

**\*Sample requests received after April 27, 2024 will not be supported.**

<b>Change Type:</b>			
<input checked="" type="checkbox"/>	Assembly Site	<input checked="" type="checkbox"/>	Design
<input checked="" type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change
<input type="checkbox"/>	Mechanical Specification	<input type="checkbox"/>	Test Site
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Bump Material
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Bump Process
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Site
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Materials
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Wafer Fab Process

### PCN Details

#### Description of Change:

Texas Instruments is pleased to announce the addition of RFAB using the TIB qualified process technology and additional Assembly/Test site (MLA) options for the devices listed below.

Current Fab Site			Additional Fab Site		
Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter
SFAB	J11	150 mm	RFAB	TIB	300 mm
CFAB	J13	200 mm			

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

#### Group 1 BOM Table (RFAB/Process migration, Die Change + BOM options qualification):

	Current	Additional
Mount Compound	4147858	<b>4147858 Or 4211470</b>
Mold Compound	4211880	<b>4211880 or 4228573</b>
Lead finish	NiPdAu	<b>NiPdAu or Matte Sn</b>

#### Group 2 BOM Table (RFAB/Process migration, Die Change + MLA (Currently FMX) as additional Assembly site/BOM options qualification):

	FMX	MLA
Mount Compound	4147858	<b>4147858 Or 4211470</b>
Mold Compound	4211880	<b>4211880 or 4228573</b>
Lead finish	NiPdAu	<b>NiPdAu or Matte Sn</b>

#### Group 3 BOM Table (RFAB/Process migration, Die Change + MLA (Currently TAI) as additional Assembly site/BOM options qualification):

	TAI	MLA
Mount Compound	4147858	<b>4147858 Or 4211470</b>
Mold Compound	4211880	<b>4211880 or 4228573</b>
Bond Wire composition/diameter	Au, 0.96 mil	<b>Cu, 0.8 mil</b>

Lead finish	NiPdAu	<b>NiPdAu or Matte Sn**</b>
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\*\* Note: the LM193DRG4 will only be built with NiPdAu lead finish  
 Upon expiry of this PCN, there will be a transition period where TI will combine lead free solutions in a single **standard part number**. For example; **LM2903DR** – can ship with both Matte Sn and NiPdAu.

Example:

- Customer order for 7500 units of LM2903DR 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.

Qual details are provided in the Qual Data Section.

**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

**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.

<b>RoHS</b>	<b>REACH</b>	<b>Green Status</b>	<b>IEC 62474</b>
<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-BIP1	SHE	USA	Sherman
CFAB	CU3	CHN	CHENGDU
<b>RFAB</b>	<b>RFB</b>	<b>USA</b>	<b>Richardson</b>

**Die Rev:**

<b>Current</b>	<b>New</b>
Die Rev [2P]	<b>Die Rev [2P]</b>
A,B	<b>A</b>

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
TI Mexico	MEX	MEX	Aguascalientes
TI Taiwan	TAI	TWN	Chung Ho, New Taipei City
<b>TI Malaysia</b>	<b>MLA</b>	<b>MYS</b>	<b>Kuala Lumpur</b>

Sample product shipping label (not actual product label)

**TEXAS INSTRUMENTS**  
 MADE IN: Malaysia  
 2DC: 2Q:

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 (P) 0000  
 (31T) LOT: 3959047MLA  
 (4W) TKY(1T) 7523483SI2  
 (P)  
 (2P) REV: (V) 0033317  
 (20L) CS0: SHE (21L) CCO:USA  
 (22L) AS0: MLA (23L) ACO: MYS

G3 = Matte Sn  
 G4 = NiPdAu

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**Product Affected:**

**Group 1 Device List (RFAB/Process migration, Die Change + BOM options qualification):**

LM2903DR	LM293ADR	LM393ADR	SN293DR
LM2903DR-S	LM293DR	LM393DR	SN393DR

**Group 2 Device List (RFAB/Process migration, Die Change + MLA (Currently FMX) as additional Assembly site/BOM options qualification):**

LM2903AVQDR	LM2903AVQDRG4	LM2903VQDR
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**Group 3 Device List (RFAB/Process migration, Die Change + MLA (Currently TAI) as additional Assembly site/BOM options qualification):**

LM193DR	LM193DRG4
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For alternate parts with similar or improved performance, please visit the product page on [TI.com](http://TI.com)

## Qualification Report

### LMX93 / LM2903 Commercial Device Using TIB Die and LCB in MLA. Approve Date 23-FEBRUARY -2024

#### Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: <a href="#">LM2903AVQDR</a>	QBS Reference: <a href="#">LM324BIPWR</a>	QBS Reference: <a href="#">LM2901BQDRQ1</a>	QBS Reference: <a href="#">LM358BIDR</a>
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	1/77/0	3/231/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	1/77/0	3/231/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	1/77/0	3/231/0
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	1/77/0	3/231/0
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	1/77/0	-
WBS	C1	Ball Shear	76 balls, 3 units min	Wires	-	-	-	3/228/0
WBP	C2	Bond Pull	76 Wires, 3 units min	Wires	-	-	-	3/228/0
ESD	E2	ESD CDM	-	1000 Volts	1/3/0	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	1/3/0	-	-	-
LU	E4	Latch-Up	Per JESD78	-	1/3/0	-	-	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	-	-	-

- QBS: Qual By Similarity
- Qual Device LM2903AVQDR 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
- 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/>

TI Qualification ID: R-CHG-2402-033

### Qualification Report

#### LM393 / LM2903 Legacy Die Redesign on TIB Process with Assembly in MLA. Approve Date 23-FEBRUARY -2024

#### Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM2903AVQDR (NIPDAU Finish)	QBS Reference: LM324BIPWR	QBS Reference: LM2901BQDRQ1	QBS Reference: OPA2991QDRQ1	QBS Reference: LM2903AVQDR (MATTE SN) Finish)
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	1/77/0	3/231/0	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	1/77/0	3/231/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	1/77/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	3/135/0	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	1/77/0	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	1/77/0	-	-
ESD	E2	ESD CDM	-	1000 Volts	1/3/0	-	-	-	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	-	-	-	1/30/0

- QBS: Qual By Similarity
- Qual Device LM2903AVQDR 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
- 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/>

TI Qualification ID: R-CHG-2402-027

For questions regarding this notice, e-mails can be sent to the Change Management team or your local Field Sales Representative.

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