



12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN#20241119003.1

**Qualification of RFAB using qualified Process Technology, Die Revision, Assembly site (MLA & FMX) & alternate BOM qualification for select devices
Change Notification / Sample Request**

Date: November 20, 2024

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments (TI). The details of this change are on the following pages, and are in alignment with our standard product change notification (PCN) [process](#)

TI requires acknowledgement of receipt of this notification within 30 days of the date of this notice. Lack of acknowledgement of this notice within 30 days constitutes acceptance and approval of this change. If samples or additional data are required, requests must be received within 30 days of this notification, given that samples are not built ahead of the change.

The Proposed First Ship date in this PCN letter is the earliest possible date that customers could receive the changed material. It is our commitment that the changed device will not ship before that date. If samples are requested within the 30 day sample request window, customers will still have 30-days to complete their evaluation regardless of the proposed 1st ship date.

Changes outlined in this notification underscore our commitment to product longevity and supply continuity, as well as our continued efforts to transition to newer, more efficient manufacturing processes and technologies. Specifically, this particular notification is related to TI's multiyear transition plan for our two remaining 150-millimeter production lines (DFAB in Dallas, Texas, and SFAB in Sherman, Texas). SFAB closure activities are expected to begin by the end of 2025. DFAB will remain open with a smaller set of 200mm technologies and GaN.

For questions regarding this notice or to provide acknowledgement of this PCN, you may contact your local Field Sales Representative or the Change Management team. For sample requests or sample related questions, contact your local Field Sales Representative. As always, we thank you for your continued business.

Change Management Team
SC Business Services

20241119003.1
Attachment: 1

Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, you have recently purchased these devices. The corresponding customer part number is also listed, if available.

DEVICE	CUSTOMER PART NUMBER
LM224KDR	
LM324APWRG4	
LM324N	
MC3403DR	
LM324AN	
LM324PWR	
LM324DR	
LM2902KVQPWR	
LM2902PWR	
LM324KN	
MC3403N	
LM324PWR	
LM324KADR	
LM2902PWRG4	
LM2904BIPWR	
LM324KPWR	
LM224ADR	
LM2902KVQDR	
LM224DRG4	
MC3403DR	
LM2902DR	
UA747CN	
LM324ADR	
LM224DR	
MC3403N	
LM324N	
LM348N	
LM2902KAVQPWR	
LM224N	
LM2902KAVQPWRG4	
LM248DR	
LM2902KDR	
LM2902N	
LM324KAPWR	
LM224ADR	
LM2902DR	
LM324BIPWR	
LM224KADR	
LM324DRG4	
LM348N	
UA747CN	
LM224ADRG4	
MC3303PWR	
LM324DR	
LM2902KAVQPWR	
LM324AN	
LM224AN	
LM2902KPWR	
LM2902PWR	
LM348DR	
LM2902BIPWR	

LM324APWR	
LM324KADR	
LM324KAN	
MC3303N	
LM324KDR	
LM2902KAVQDR	
LM324APWR	
LM224DR	
MC3303DR	
LM248DR	
LM248N	
LM2902DRG4	
LM2902KN	
LM324PWRG4	

Technical details of this Product Change follow on the next page(s).

PCN Number:	20241119003.1	PCN Date:	November 20, 2024
Title:	Qualification of RFAB using qualified Process Technology, Die Revision, Assembly site (MLA & FMX) & alternate BOM qualification for select devices		
Customer Contact:	Change Management Team	Dept:	Quality Services
Proposed 1st Ship Date:	February 18, 2025	Sample requests accepted until:	December 20, 2024*

***Sample requests received after December 20, 2024 will not be supported.**

Change Type:

<input checked="" type="checkbox"/>	Assembly Site	<input checked="" type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Material
<input checked="" type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Process
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change	<input checked="" type="checkbox"/>	Wafer Fab Site
<input type="checkbox"/>	Mechanical Specification	<input type="checkbox"/>	Test Site	<input checked="" type="checkbox"/>	Wafer Fab Material
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input checked="" type="checkbox"/>	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 for the devices listed below as well as new assembly sites (MLA & FMX) and BOM options:

Current Fab Site			Additional Fab Site		
Fab Site	Process	Wafer Diameter	Fab Site	Process	Wafer Diameter
SFAB	JI1	150 mm	RFAB	TIB	300 mm
CFAB	JI3	200 mm			

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

Group 1 BOM Table (FAB/Process migration, die change plus BOM update):

	Current	New
Bond Wire composition/diameter	Cu, 0.8 or 0.96 mil or Au, 0.96 mil	Cu, 0.8 mil
Symbolization	Pin one Stripe, TI Logo	Pin one dot, TI Letters

Group 2 BOM Table (RFAB/Process migration, die change plus MLA as new Assembly site & BOM update):

	*JCETCZ	FMX	MLA
* Lead finish	Matte Sn	NiPdAu	NiPdAu
Bond Wire composition/diameter	Cu, 1.0 mil	Cu, 0.96 mil	Au, 0.96 or Cu, 0.8 mil
Mold Compound	S#013102024401	4211880	4042503 or 4211880
Mount Compound	S#011204001701	4147858	4042500 or 4147858

*applies to LM324N only

Group 3 BOM Table (RFAB/Process migration, die change only):

Note: the LM2904BIPWR is the only device in this notification that is currently in CFAB, all other devices are in SFAB.

Group 4 BOM Table (RFAB/Process migration, die change plus FMX as new Assembly site & BOM update):

	MLA	FMX
Bond Wire composition/diameter	Cu, 0.96 mil	Cu, 0.8 mil
Symbolization	Pin one Stripe, TI Logo	Pin one dot, TI Letters

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-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
CFAB	CU3	CHN	Chengdu
RFAB	RFB	USA	Richardson

Die Rev:

Current	New
Die Rev [2P]	Die Rev [2P]
A,C,H,-	A,B

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
JCETCZ	JCC	CHN	Chuzhou
TI Mexico	MEX	MEX	Aguascalientes
MLA	MLA	MYS	KUALA LUMPUR

Sample product shipping label (not actual product label):

Product Affected:

Group 1 Device List (FAB/Process migration, die change plus BOM update):

LM2902BAIPWR	LM2902KPWR	LM324APWRG4	LM324PWRG4
LM2902BIPWR	LM2902KVQDR	LM324BAIPWR	LM324PWRE4
LM2902DR	LM2902KVQPWR	LM324BIPWR	LM348DR
LM2902DRG4	LM2902PWR	LM324KAPWR	LM348DRE4
LM2902DRE4	LM2902PWRG4	LM324KN	LM348DRG4
LM2902KAVQDR	LM2902PWRE4	LM324KPWR	MC3303PWR
LM2902KAVQPWR	LM324APWR	LM324PWR	MC3403DR
LM2902KAVQPWRG4			

Group 2 Device List (RFAB/Process migration, die change plus MLA as new Assembly site & BOM update):

LM224AN	LM248N	LM324KAN	MC3403N
LM224KAN	LM2902KN	LM324N	MC3403NE4
LM224KN	LM2902N	LM348N	UA747CN
LM224N	LM324AN	MC3303N	

Group 3 Device List (RFAB/Process migration, die change only):

LM2904BIPWR

Group 4 Device List (RFAB/Process migration, die change plus FMX as new Assembly site & BOM update):

LM224ADR	LM224DRG4	LM2902KDR	LM324DRE4
LM224ADRG4	LM224KADR	LM324ADR	LM324KADR
LM224ADRE4	LM224KDR	LM324DR	LM324KDR
LM224DR	LM248DR	LM324DRG4	MC3303DR

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

TI Information
Selective Disclosure

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM324BIDR	QBS Reference: LM2902BQPWRQ1	QBS Reference: LM2901BQDRQ1	QBS Reference: MC33063ADR	QBS Reference: LM2902BQDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	1/77/0	3/231/0	1/77/0
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	1/77/0	3/231/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	1/77/0	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	3/231/0	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	1/77/0	-	1/45/0
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	1/77/0	-
HTOL	B1	Life Test	150C	300 Hours	-	-	1/77/0	-	1/77/0
HTOL	B1	Life Test	150C	408 Hours	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	2/1600/0	-

Type	#	Test Name	Condition	Duration	Qual Device: LM324BIDR	QBS Reference: LM2902BQPWRQ1	QBS Reference: LM2901BQDRQ1	QBS Reference: MC33063ADR	QBS Reference: LM2902BQDRQ1
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	1/15/0	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	1/15/0	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	1/10/0	-	1/10/0
ESD	E2	ESD CDM	-	1500 Volts	-	3/9/0	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	3/9/0	1/3/0	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	1/6/0	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	1/30/0	-
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	1/30/0	-	3/90/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM324BIDR 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-NPD-2212-022

TI Information
Selective Disclosure

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM324BIPWR	QBS Reference: LM2902BQPWRQ1	QBS Reference: TLV1812QPWRQ1	QBS Reference: LM2902BQDRQ1	QBS Reference: LM2902BQPWRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	1/77/0	1/77/0	1/77/0
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	1/77/0	1/77/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	1/77/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	-	-	1/45/0
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	1/77/0	1/45/0	-
HTOL	B1	Life Test	150C	300 Hours	-	-	1/77/0	1/77/0	1/77/0
HTOL	B1	Life Test	150C	408 Hours	-	3/231/0	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	-	-	-
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	1/15/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: LM324BIPWR	QBS Reference: LM2902BQPWRQ1	QBS Reference: TLV1812QPWRQ1	QBS Reference: LM2902BQDRQ1	QBS Reference: LM2902BQPWRQ1
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	1/15/0	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	1/10/0	1/10/0	1/10/0
ESD	E2	ESD CDM	-	1500 Volts	-	3/9/0	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	1/3/0	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	3/9/0	1/3/0	1/3/0	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	1/6/0	1/3/0	1/3/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	1/30/0	3/90/0	3/90/0
FTY	E6	Final Test Yield	-	-	1/1/0	-	-	-	-

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM324BIPWR 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-2308-025

TI Information
Selective Disclosure

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM358BIPWR	QBS Package, Product Reference: SN74HCS74QPWRQ1	QBS Process, Package, Product Reference: LM2902BQPWRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	3/231/0	-
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	-	3/231/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/135/0	3/231/0
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	-
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/0
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	3/2400/0
SD	C3	PB Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	1/15/0	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	1/15/0	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	3/30/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0

Type	#	Test Name	Condition	Duration	Qual Device: LM358BIPWR	QBS Package, Product Reference: SN74HCS74QPWRQ1	QBS Process, Package, Product Reference: LM2902BQPWRQ1
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-
ESD	E2	ESD CDM	-	500 Volts	-	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	3/9/0
LU	E4	Latch-Up	Per JESD78	-	-	1/6/0	3/18/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-

- QBS: Qual By Similarity
- Qual Device LM358BIPWR 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
- **Note: This report also applies to the following part numbers: LM358PWR, LM2904PWR, LM2904BAIPWR, LM358BAIPWR, LM358BIPWR, LM358APWR**

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

TI Qualification ID: R-CHG-2307-068

TI Information
Selective Disclosure

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: LM324N	QBS Reference: SN74LS03N	QBS Reference: LM2902BQPWRQ1	QBS Reference: LF444ACN/NOPB	QBS Reference: LM2594HVN-ADJ/NOPB	QBS Reference: LM2902BQDRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	3/231/0	1/77/0
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	3/231/0	-	3/231/0	3/231/0	-
UHAST	A3	Unbiased HAST	110C/85%RH	264 Hours	-	-	3/231/0	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	3/231/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	3/231/0	-	-	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	-	3/231/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	1/45/0
HTOL	B1	Life Test	150C	300 Hours	-	-	-	-	-	1/77/0
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/0	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: LM324N	QBS Reference: SN74LS03N	QBS Reference: LM2902BQPWRQ1	QBS Reference: LF444ACN/NOPB	QBS Reference: LM2594HVN-ADJ/NOPB	QBS Reference: LM2902BQDRQ1
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/0	-	-	-
WBS	C1	Ball Shear	76 balls, 3 units min	Wires	-	-	-	3/228/0	3/228/0	-
WBP	C2	Bond Pull	76 Wires, 3 units min	Wires	-	-	-	3/228/0	3/228/0	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	3/66/0	-	3/66/0	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder;	-	-	3/66/0	-	3/66/0	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	3/30/0	3/15/0	3/15/0	1/10/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	3/9/0	-	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	-	-	-
ESD	E2	ESD CDM	-	500 Volts	-	-	3/9/0	-	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	-	3/9/0	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	-	3/18/0	-	-	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	3/90/0	1/30/0	1/30/0	3/90/0
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-	-

- QBS: Qual By Similarity, also known as Generic Data
- Qual Device LM324N is qualified at NOT CLASSIFIED NOT CLASSIFIED

- 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-2305-097

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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