



12500 TI Boulevard, MS 8640, Dallas, Texas 75243

PCN# 20221216011.1

**Qualification of new Fab site (RFAB) using qualified Process Technology, Die
Revision and additional Assembly site/BOM options for select devices
Change Notification / Sample Request**

Date: December 22, 2022

To: TOKYO ELECTRON DEVICE (DSTR) PCN

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 of the 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.

This particular PCN is related to TI's multiyear transition plan for our two remaining factories with 150-millimeter production (DFAB in Dallas, Texas, and SFAB in Sherman, Texas). DFAB will remain open, but will focus on 200-mm production, with a smaller set of technologies. SFAB will close no earlier than 2024 and no later than 2025. As referenced in the "reason for change" below, these changes are part of our multiyear plan to transition these products to newer, more efficient manufacturing processes and technologies, underscoring our commitment to product longevity and supply continuity.

For questions regarding this notice or to provide acknowledgement of this PCN, you may contact your local Field Sales Representative or the PCN Team (PCN_admin_team@list.ti.com). For sample requests or sample related questions, contact your local Field Sales Representative. As always, we thank you for your continued business.

PCN Team
SC Business Services

20221216011.1
Attachment: 1

Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, these are the devices that you have purchased within the past twenty-four (24) months. The corresponding customer part number is also listed, if available.

DEVICE	CUSTOMER PART NUMBER
TLC272AIDR	null
TL052ACDR	null
TLC271AIDR	null
TL052IDR	null
TL054AIDR	null
TL054CDR	null
TLC272BCDR	null
TLC272CPWR	null
TL3474MIPWR	null
TLC272CDR	null
TL052AIDR	null
TL3472IDR	null
TL3474IDR	null
TLC271BIDR	null
TL3474AIDR	null
TL3474AIPWR	null
TL3474CPWR	null
TL3472CDR	null
TL072BCDR	null
LF412CDR	null
TLC274CPWR	null
TLV9154IPWR	null
TL3474IPWR	null

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

PCN Number:	20221216011.1		PCN Date:	December 22, 2022	
Title:	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, Datasheet update and additional Assembly site options for select devices				
Customer Contact:	PCN Manager		Dept:	Quality Services	
Proposed 1st Ship Date:	Mar 22, 2023		Sample requests accepted until:	Jan 22, 2023*	
*Sample requests received after January 22, 2023 will not be supported.					
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) and additional Assembly site (MLA) for selected devices listed below in the product affected section.					
Current Fab Site			Additional Fab Site		
Current Fab Site	Process	Wafer Diameter	Additional Fab Site	Process	Wafer Diameter
DL-LIN	55 LINCMOS	150 mm	RFAB	LBC9	300 mm
SFAB	J11	150 mm			
The die was also changed as a result of the process change.					
Construction Differences are as follows:					
Group 1 – BOM option at MLA					
	Current		Additional		
Wire diameter	0.96mil Cu		0.8mil Cu		
Group 2 – MLA as an additional Assembly site					
	MEX	TIEM	TAI	ASESH	MLA
Mount Compound	4147858	4213245	4147858	SID#EY1000063	4147858
Bond Wire Composition/diameter	Au/0.96 or 0.8 mil or Cu/0.96	Au 0.96 mil	Au/0.96	Cu, 0.8 mil	Cu/0.96 or 0.8 mil
Mold Compound	4211880	8095179	4211880	SID#EN2000508	4211880 or 4211471
Lead finish	NiPdAu	Matte Sn	NiPdAu	Matte Sn	NiPdAu
Additionally, 3 devices in this group will have symbolization changes as follows:					
OPA4991PWR		TLV9154IPWR		TLV9354IPWR	
ASESHAT (current)	MLA (new)	ASESHAT (current)	MLA (new)	ASESHAT (current)	MLA (new)
OP4991PW \T/ YMSG3 o LLLL	OP4991 \T/ YMSG4 o LLLL	TL9154PW \T/ YMSG3 o LLLL	TL9154 \T/ YMSG4 o LLLL	TL9354PW \T/ YMSG3 o LLLL	TL9354 \T/ YMSG4 o LLLL
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
☒ No Change	☒ No Change	☒ No Change	☒ 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
DL-LIN	DLN	USA	Dallas
SH-BIP-1	SHE	USA	Sherman
RFAB	RFB	USA	Richardson

Die Rev:

Current

New

Die Rev [2P]	Die Rev [2P]
A, B, C, D, E, F, G	A, B, C, D

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
FMX	MEX	MEX	Aguascalientes
TIEM	CU6	MYS	Melaka
TAI	TAI	TWN	Chung Ho, New Taipei City
ASESH	ASH	CHN	Shanghai
MLA	MLA	MYS	KUALA LUMPUR

Sample product shipping label (not actual product label)



(1P) SN74LS07NSR
(Q) 2000 (D) 0336
(31T) LOT: 3959047MLA
(4W) TKY (1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
(20L) CS0: SHE (21L) CCO:USA
(22L) AS0: MLA (23L) ACO: MYS

Product Affected:

Group 1 device list - RFAB/Process migration and BOM Option in MLA:

TL3472CDR	TL3474IPWR	TLC274AIDR	TLC274CPWR
TL3472IDR	TL3474MIPWR	TLC274BCDR	TLC274CPWRG4
TL3474ACPWR	TLC272CPWR	TLC274BIDR	TLC274IDR
TL3474AIPWR	TLC272CPWRG4	TLC274BIDRG4	TLC274IPWR

TL3474CPWR	TLC274ACDR	TLC274CDR	
Group 2 device list - RFAB/Process migration and adding MLA Assembly site:			
LF411CDR	TL052CDRE4	TL3474CDR	TLC272AIDR
LF411CDRG4	TL052CDRG4	TL3474IDR	TLC272BCDR
LF412CDR	TL052IDR	TLC271ACDR	TLC272BCDRG4
LF412CDRE4	TL054ACDR	TLC271AIDR	TLC272BIDR
LF412CDRG4	TL054AIDR	TLC271BCDR	TLC272CDR
LM7301IMX/E7002184	TL054CDR	TLC271BIDR	TLC272CDRG4
LM7301IMX/NOPB	TL054IDR	TLC271CDR	TLC272IDR
OPA4991IPWR	TL072BCDR	TLC271IDR	TLC272IDRG4
TL051CDR	TL082BCDR	TLC271MDR	TLC274MDRG4
TL052ACDR	TL3474ACDR	TLC271MDRG4	TLV9154IPWR
TL052AIDR	TL3474AIDR	TLC272ACDR	TLV9354IPWR
TL052CDR			

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

Qualification Report
Approve Date 18-AUGUST -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA2991IPWR	QBS Reference: TLV7031QDCKRQ1	QBS Reference: OPA2991QDGKRQ1	QBS Reference: TLV9032QPWRQ1
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/2	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	-	1/77/0
UHA	A3	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-
UHA	A3	Unbiased HAST	130C/85%RH	96 Hours	-	3/231/0	-	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	-	1/77/0
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	1/77/0
HTSL	A6	High Temperature Storage Life	175C	630 Hours	-	-	3/135/0	-
HTOL	B1	Life Test	125C	1000 Hours	-	3/231/0	-	1/77/0
HTOL	B1	Life Test	150C	408 Hours	-	-	3/231/1 ¹	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	-	3/2400/4 ²	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	3/30/0	2/20/0
ESD	E2	ESD CDM	-	500 Volts	-	1/3/0	-	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	1/3/0	1/3/0

CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0	3/90/0
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- QBS: Qual By Similarity
- Qual Device OPA2991IPWR 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/>

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

[1]-One unit failed Vio due to bad BI socket contact
see 8D attached to eQDB.
[2]-Three units failed Vio due to bad BI socket contact
one EOS failure due to reverse-insertion - discounted
see 4C & 8D attached to eQDB.

Qualification Report

Approve Date 21-May-2021

Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: OPA4991IDR	QBS Product Reference: OPA4991IDR	QBS Process / Package Reference: OPA4990IDR
PC	PreCon Level 1	Level 1-260C	1/80/0	-	-
PC	PreCon Level 2	Level 2-260C	-	1/166/0	3/1477/0
ED	Electrical Characterization	Per Datasheet Parameters	-	3/90/0	3/90/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0
AC	Autoclave 121C	96 Hours	1/77/0	1/77/0	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	1/77/0	1/77/0	3/231/0
HTSL	High Temp Storage Bake 175C	500 Hours	-	-	3/231/0
HTOL	Life Test, 150C	300 Hours	-	1/77/0	3/231/10 (1)
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0
HBM	ESD - HBM	4000 V	-	3/9/0	-
HBM	ESD - HBM	3000 V	-	-	3/9/0
CDM	ESD - CDM	1500 V	-	3/9/0	2/6/0
LU	Latch-up	Per JESD78	-	3/18/0	3/18/0
MSL	Moisture Sensitivity, L1	Level 1-260C	1/12/0	-	-
MSL	Moisture Sensitivity, L2	Level 2-260C	-	1/12/0	3/36/0
WBP	Bond Pull	Wires	-	1/76/0	3/228/0
WBS	Ball Bond Shear	Wires	-	1/76/0	3/228/0

- QBS: Qual By Similarity
- Qual Device OPA4991IDR is qualified at LEVEL2-260C
- 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

NOTE (1): Fails due to faulty BI sockets. See 8D attached to the eQDB.

Approve Date 21-May-2021

Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: OPA2991IDR	QBS Product Reference: OPA2991IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IDR
PC	PreCon Level 1	Level 1-260C	1/160/0	-	-	-
PC	PreCon Level 2	Level 2-260C	-	-	3/1477/0	3/990/0
ED	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	3/90/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0
AC	Autoclave 121C	96 Hours	1/77/0	-	3/231/0	-
UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	-	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	1/77/0	-	3/231/0	3/231/0
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	-	3/231/0
HTSL	High Temp Storage Bake 175C	500 Hours	-	-	3/231/0	-
HTOL	Life Test, 150C	300 Hours	-	-	3/231/10 (1)	3/231/0
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0	-
HBM	ESD - HBM	2500 V	-	1/3/0	-	-
HBM	ESD - HBM	3000 V	-	-	3/9/0	3/9/0
CDM	ESD - CDM	1500 V	-	1/3/0	2/6/0	3/9/0
LU	Latch-up	Per JESD78	-	1/6/0	3/18/0	6/36/0
MSL	Moisture Sensitivity, L2	Level 2-260C	-	1/12/0	3/36/0	-
WBP	Bond Pull	Wires	-	1/76/0	3/228/0	3/228/0
WBS	Ball Bond Shear	Wires	-	1/76/0	3/228/0	3/228/0

- QBS: Qual By Similarity
- Qual Device OPA2991IDR 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

NOTE (1): Fails due to faulty BI sockets. See 8D attached to the eQDB.

Qualification Report
Approve Date 15-NOVEMBER -2022

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: OPA4991IPWR	QBS Reference: OPA2991QDGKRQ1	QBS Reference: OPA4991QPWRQ1	QBS Reference: SN65HVD1040AQDSJR	QBS Reference: OPA4376AQPWRQ1
HAST	A2	Biased HAST	110C/85%RH	264 Hours	-	-	3/231/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	3/231/0	3/231/0	3/231/0	2/154/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	2/154/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	2/90/0	1/45/0	-
HTSL	A6	High Temperature Storage Life	175C	630 Hours	-	3/135/0	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/1 ¹	3/231/0	3/231/0	2/154/0
ELFR	B2	Early Life Failure Rate	150C	24 Hours	-	3/2400/4 ²	-	3/2400/0	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	1/15/0	-	1/15/0	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	3/30/0	1/10/0	3/30/0	3/30/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	1/3/0	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	1/3/0	1/3/0	1/3/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0	3/90/0	3/90/0

- 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

[1]-Discounted

[2]-Discounted.

Qualification Report

Approve Date 1-Aug-2022

Qualification Results

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

Type	Test Name / Condition	Duration	Qual Device: LM7301IMX/NOPB	QBS Product Reference: OPA991IDBVR	QBS Process Reference: OPA990IDR	QBS Package Reference: OPA2991IDR
-	Bond Pull, over ball	Minimum of 5 devices, 76 wires Cpk>1.67	-	-	3/228/0	-
-	Bond Pull, over stitch	Minimum of 5 devices, 76 wires Cpk>1.67	-	-	3/228/0	-
AC	Autoclave 121C	96 Hours	-	-	3/231/5	1/77/0
CDM	ESD - CDM	1500 V	-	3/9/0	-	-
CDM	ESD - CDM - Q100	1500 V	-	-	2/6/0	-
CDM	ESD CDM	+/- 250V, 500V*, 750V*, 1000V*, 1500V*	1/3/0	-	-	-
ED	Electrical Characterization	Per Datasheet Parameters	-	3/90/0	3/90/0	-
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	-
HBM	ESD - HBM	2500 V	-	1/3/0	-	-
HBM	ESD - HBM	3000 V	-	1/3/0	-	-
HBM	ESD - HBM	4000 V	-	1/3/0	-	-
HBM	ESD - HBM - Q100	1500 V	-	-	1/3/0	-
HBM	ESD - HBM - Q100	3000 V	-	-	3/9/0	-
HTOL	Life Test, 150C	300 Hours	-	-	3/231/10	-
HTSL	High Temp Storage Bake 175C	500 Hours	-	-	3/231/0	-
LI	Lead Pull to Destruction	Leads	-	-	1/24/0	-
LU	Latch-up	Per JESD78	-	3/18/0	3/18/0	-
MQ	Manufacturability (Assembly)	(per mfg. Site specification)	1/Pass	1/Pass	3/Pass	-
MQ	Manufacturability (Wafer Fab)	(per mfg. Site specification)	-	1/Pass	1/Pass	-
MSL	Automotive Moist Sens. L2	Level 2-260C	-	-	3/36/0	-
PC	Automotive Preconditioning Level 2	Level 2-260C	-	-	3/1477/1	-
PC	PreCon Level 1	Level 1-260C	-	-	-	1/160/0
TC	**T/C -65C/150C	-65C/+150C (500 Cycles)	1/77/0	-	-	-
TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	1/77/0
WBP	Bond Pull	76 Wires, 3 units min	-	1/76/0	-	-
WBS	Ball Bond Shear	5 units, >76 balls, 0 fails	-	-	3/228/0	-
WBS	Ball Bond Shear	76 balls, 3 units min	-	1/76/0	-	-

- 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

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

Location	E-Mail
WW Change Management Team	PCN_ww_admin_team@list.ti.com

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