

PCN Number:	20221216011.1	PCN Date:	December 22, 2022
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Title:	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, Datasheet update and additional Assembly site options for select devices
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Customer Contact:	PCN Manager	Dept:	Quality Services
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Proposed 1st Ship Date:	Mar 22, 2023	Sample requests accepted until:	Jan 22, 2023*
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***Sample requests received after January 22, 2023 will not be supported.**

Change Type:					
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Assembly Process	<input checked="" type="checkbox"/>	Assembly Materials
<input checked="" type="checkbox"/>	Design	<input type="checkbox"/>	Electrical Specification	<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"/>	Wafer Bump Site	<input type="checkbox"/>	Wafer Bump Material	<input type="checkbox"/>	Wafer Bump Process
<input checked="" type="checkbox"/>	Wafer Fab Site	<input checked="" type="checkbox"/>	Wafer Fab Materials	<input checked="" type="checkbox"/>	Wafer Fab Process
		<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 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	JI1	150 mm			

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

Construction Differences are as follows:

	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		TLV9154PWR		TLV9354PWR	
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
<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
DL-LIN	DLN	USA	Dallas
SH-BIP-1	SHE	USA	Sherman
RFAB	RFB	USA	Richardson

Die Rev:

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

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) 0033317
 (2P) REV: (20L) CSO: SHE (21L) CCO: USA
 (22L) ASO: 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

**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
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	3/231/0	-
UHAST	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: OPA2991QDQKRO1	QBS Reference: OPA4991QPWRO1	QBS Reference: SN65HVDA1040AQDSJR	QBS Reference: OPA4376AQPWRO1
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: OPA4990IDR	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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