

PCN Number:	20230328000.2		PCN Date:	March 30, 2023	
Title:	Qualification of new Fab site (RFAB) using qualified Process Technology, Die Revision, and additional Assembly site options for select devices				
Customer Contact:	PCN Manager		Dept:	Quality Services	
Proposed 1st Ship Date:	Sep 28, 2023		Sample requests accepted until:	April 28, 2023*	
*Sample requests received after April 28, 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
SFAB	J11	150 mm	RFAB	LBC9	300 mm
DL-LIN	LINCMOS	150 mm			
The die was also changed as a result of the process change.					
Construction Differences are as follows:					
	FMX	TAI	MLA		
Mount Compound	4147858	4042500	4147858		
Mold Compound	4211880 or 4205694	4205694	4211880		
Bond wire composition, diameter	Au, 0.96 mil	Au, 0.96 mil	Cu, 0.8 mil		
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]	Die Rev [2P]
D, E	A

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
FMX	MEX	MEX	Aguascalientes
TAI	TAI	TWN	Chung Ho, New Taipei City
MLA	MLA	MYS	Kuala Lumpur

Sample product shipping label (not actual product label)

Product Affected:

LBT-TLC272IDR	TL082IDRQ1	TL3472QDRCT	TL3472QDRQ1
MLA00063DR	TL082QDRQ1		

For alternate parts with similar or improved performance, please visit the product page on TI.com

**Automotive New Product Qualification Summary
(As per AEC-Q100 and JEDEC Guidelines)**

Approved 23-Sep-2021

Qualification Results

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

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: OPA2991QDRQ1	QBS Product Reference: TLV9002QDRQ 1_AB	QBS Product Reference: TLV9002QDRQ 1_AC	QBS Product Reference: TLV9004QDRQ 1_AB	QBS Product Reference: TLV9004QDRQ 1_AC	QBS Product Reference: TLV9062QDRQ 1_BA	QBS Product Reference: TLV9062QDRQ 1_BC
Test Group A – Accelerated Environment Stress Tests													
PC	A1	JEDEC J-STD-020 JESD2 2-A113	3	77	Automotive Preconditioning Level 1	Level 1-260C	3/1412/0	-	-	-	-	-	-
PC	A1	JEDEC J-STD-020 JESD2 2-A113	3	77	Automotive Preconditioning Level 2	Level 2-260C	-	1/210/0	-	1/240/0	1/80/0	3/552/0	1/77/0
HAS T	A2	JEDEC JESD2 2-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/1 (1)	-	-	1/77/1 (2)	-	3/231/0	-
AC	A3	JEDEC JESD2 2-A102	3	77	Autoclave 121C	96 Hours	3/231/0	1/77/0	-	1/77/0	-	3/231/0	-
TC	A4	JEDEC JESD2 2-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0	1/77/0	-	-	1/77/0	3/231/0	1/77/0
TC-BP	A4	MIL-STD88	1	30	Post TC Bond Pull	Wires	-	1/30/0	-	-	1/30/0	1/30/0	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: OPA2991QDRQ1	QBS Product Reference: TLV9002QDRQ 1_AB	QBS Product Reference: TLV9002QDRQ 1_AC	QBS Product Reference: TLV9004QDRQ 1_AB	QBS Product Reference: TLV9004QDRQ 1_AC	QBS Product Reference: TLV9062QDRQ 1_BA	QBS Product Reference: TLV9062QDRQ 1_BC
		3 Method 2011											
PTC	A5	JEDEC JESD2 2-A105	1	45	Power Temperature Cycle	1000 Cycles	N/A	-	-	-	-	-	-
HTSL	A6	JEDEC JESD2 2-A103	1	45	High Temp Storage Bake 150C	1000 Hours	3/135/0	-	-	-	-	-	-
HTSL	A6	JEDEC JESD2 2-A103	1	45	High Temp Storage Bake 175C	500 Hours	-	1/45/0	-	1/45/0	-	1/45/0	-
Test Group B – Accelerated Lifetime Simulation Tests													
HTOL	B1	JEDEC JESD2 2-A108	3	77	Life Test, 150C	408 Hours	1/77/1 (1)	1/77/0	-	1/77/2 (3)	-	1/77/0	-
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	-	-	-	-	-	-	-
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	N/A	-	-	-	-	-	-
Test Group C – Package Assembly Integrity Tests													
WBS	C1	AEC Q100-001	1	30	Auto Wire Bond Shear (Cpk>1.67)	Wires	3/90/0	-	-	-	1/30/0	-	1/30/0
WBP	C2	MIL-STD883 Method 2011	1	30	Auto Wire Bond Pull (Cpk>1.67)	Wires	3/90/0	-	-	-	1/30/0	-	1/30/0
SD	C3	JEDEC JESD2 2-B102	1	15	Surface Mount Solderability	Pb	-	-	-	-	-	1/15/0	-

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: OPA2991QDRQ1	QBS Product Reference: TLV9002QDRQ 1 AB	QBS Product Reference: TLV9002QDRQ 1 AC	QBS Product Reference: TLV9004QDRQ 1 AB	QBS Product Reference: TLV9004QDRQ 1 AC	QBS Product Reference: TLV9062QDRQ 1 BA	QBS Product Reference: TLV9062QDRQ 1 BC
SD	C3	JEDEC JESD2 2-B102	1	15	Surface Mount Solderability	Pb free	-	-	-	-	-	1/15/0	-
PD	C4	JEDEC JESD2 2-B100 and B108	3	10	Auto Physical Dimensions	Cpk>1.67	-	-	-	-	-	3/30/0	-
LI	C6	JEDEC JESD2 2-B105	1	50	Lead Pull to Destruction	Leads	1/24/0	-	-	-	-	-	-
Test Group D – Die Fabrication Reliability Tests													
EM	D1	JESD6 1	-	-	Electromigration	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
TDD B	D2	JESD3 5	-	-	Time Dependant Dielectric Breakdown	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
HCI	D3	JESD6 0 & 28	-	-	Hot Injection Carrier	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
NBT I	D4	-	-	-	Negative Bias Temperature Instability	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
SM	D5	-	-	-	Stress Migration	-	Completed Per Process Technology Requirements	-	-	-	-	-	-
Test Group E – Electrical Verification Tests													

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: OPA2991QDRQ1	QBS Product Reference: TLV9002QDRQ 1 AB	QBS Product Reference: TLV9002QDRQ 1 AC	QBS Product Reference: TLV9004QDRQ 1 AB	QBS Product Reference: TLV9004QDRQ 1 AC	QBS Product Reference: TLV9062QDRQ 1 BA	QBS Product Reference: TLV9062QDRQ 1 BC
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	3000 V	1/3/0	-	-	-	-	-	-
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	4000 V	-	-	1/3/0	-	1/3/0	-	1/3/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1000 V	-	-	1/3/0	-	1/3/0	-	1/3/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	1/3/0	-	-	-	-	-	-
LU	E4	AEC Q100-004	1	6	Latch-up	Per AEC-Q100-004	3/18/0	-	1/6/0	-	1/6/0	-	1/6/0
ED	E5	AEC Q100-009	3	30	Auto Electrical Distributions	Cpk>1.67	3/90/0	-	1/30/0	-	1/30/0	2/60/0	1/30/0
Additional Tests													
MSL	-	-	3	12	Automotive Moist Sens. L1	Level 1-260C	3/36/0	-	-	-	-	-	-
MSL	-	-	3	12	Moisture Sensitivity, L2	Level 2-260C	-	1/12/0	-	1/12/0	-	3/36/0	-

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

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	QBS Process Reference: OPA2991QDGKRQ1
Test Group A – Accelerated Environment Stress Tests							
PC	A1	JEDEC J-STD-020 JESD22-A113	3	77	Automotive Preconditioning Level 1	Level 1-260C	3/1095/0
HAST	A2	JEDEC JESD22-A110	3	77	Biased HAST, 130C/85%RH	96 Hours	3/231/2 (4)

Type	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	QBS Process Reference: OPA2991QDGRQ1
AC	A3	JEDEC JESD22-A102	3	77	Autoclave 121C	96 Hours	3/231/0
TC	A4	JEDEC JESD22-A104 and Appendix 3	3	77	Temperature Cycle, -65/150C	500 Cycles	3/231/0
PTC	A5	JEDEC JESD22-A105	1	45	Power Temperature Cycle	1000 Cycles	-
HTSL	A6	JEDEC JESD22-A103	1	45	High Temp Storage Bake 150C	1000 Hours	1/45/0
Test Group B – Accelerated Lifetime Simulation Tests							
HTOL	B1	JEDEC JESD22-A108	3	77	Life Test, 150C	408 Hours	3/231/1 (4)
ELFR	B2	AEC Q100-008	3	800	Early Life Failure Rate, 125C	48 Hours	3/2400/4 (5)
EDR	B3	AEC Q100-005	3	77	NVM Endurance, Data Retention, and Operational Life	-	-
Test Group C – Package Assembly Integrity Tests							
WBS	C1	AEC Q100-001	1	30	Wire Bond Shear (Cpk>1.67)	Wires	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull (Cpk>1.67)	Wires	3/90/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb	1/15/0
SD	C3	JEDEC JESD22-B102	1	15	Surface Mount Solderability	Pb Free	1/15/0
PD	C4	JEDEC JESD22-B100 and B108	3	10	Auto Physical Dimensions	Cpk>1.67	-
LI	C6	JEDEC JESD22-B105	1	50	Lead Pull to Destruction	Leads	1/24/0
Test Group D – Die Fabrication Reliability Tests							
EM	D1	JESD61	-	-	Electromigration	-	-
TDDB	D2	JESD35	-	-	Time Dependant Dielectric Breakdown	-	-
HCI	D3	JESD60 & 28	-	-	Hot Injection Carrier	-	-
NBTI	D4	-	-	-	Negative Bias Temperature Instability	-	-
SM	D5	-	-	-	Stress Migration	-	-
Test Group E – Electrical Verification Tests							
HBM	E2	AEC Q100-002	1	3	ESD - HBM - Q100	2000 V	1/3/0
CDM	E3	AEC Q100-011	1	3	ESD - CDM - Q100	1500 V	1/3/0
Additional Tests							
MSL	-	-	3	12	Automotive Moist Sens. L1	Level 1-260C	3/36/0

A1 (PC): Preconditioning:

Performed for THB, Biased HAST, AC, uHAST, TC & PTC samples, as applicable.

Ambient Operating Temperature by Automotive Grade Level:

Grade 0 (or E): -40°C to +150°C
Grade 1 (or Q): -40°C to +125°C
Grade 2 (or T): -40°C to +105°C
Grade 3 (or I): -40°C to +85°C

E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):

Room/Hot/Cold: HTOL, ED

Room/Hot: THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU

Room: AC/uHAST

Note (1): HAST fail due to corrosion from foreign material. See attached 8D.

Note (2): HAST fail due to floating pins during BI stress. See attached 8D.

Note (3): HTOL fails due to rejects mixed back in with tested good units. See attached 4C.

Note (4): Units failed Vio due to bad BI socket contact, see 8D attached to eQDB.

Note (5): Three units failed Vio due to bad BI socket contact, one EOS failure due to reverse-insertion - discounted; see 4C & 8D attached to eQDB.

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

- QBS: Qual By Similarity

- Qual Device OPA2991QDRQ1 is qualified at LEVEL1-260C

Affected ZVEI IDs: SEM-PW-02, SEM-PW-13, SEM-PW-09, SEM-DE-03, SEM-PW-05, SEM-PA-08, SEM-PA-18, SEM-PA-05, SEM-PA-11, SEM-PA-07

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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