PCN Number:	20231219013.1	**PCN Date:**	December 22, 2023
Title:	Qualification of RFAB using qualified Process Technology, Die Revision and additional Assembly site/BOM options for select devices		
Customer Contact:	Change Management team	**Dept:**	Quality Services
Proposed 1st Ship Date:	Mar 20, 2024	**Estimated Sample Availability:**	Jan 20, 2024*

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

Change Type:					
☒	Assembly Site	☒	Design	☐	Wafer Bump Material
☐	Assembly Process	☐	Data Sheet	☐	Wafer Bump Process
☒	Assembly Materials	☐	Part number change	☒	Wafer Fab Site
☐	Mechanical Specification	☐	Test Site	☒	Wafer Fab Materials
☒	Packing/Shipping/Labeling	☐	Test Process	☒	Wafer Fab Process

PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new fab & process technology (RFAB, LBC9/TIB) and additional Assembly site (MLA, HTFT) and BOM options 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**
DFAB	EXCAL2, BICOM2	150 mm	RFAB	LBC9	300 mm
SFAB	JI1	150 mm	RFAB	TIB	300 mm
CFAB	JI3	200 mm			

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

Additionally, there will be BOM/Assembly options introduced for these devices:

Group 1 BOM Table:

	Current	**Proposed**
Wire composition, diam	Cu, 0.96mil Au, 0.8mil	Cu, 0.80mil

Group 2 BOM Table:

	TI Mexico	**TI Malaysia**
Wire composition, diam	Cu, 0.96mil	Cu, 0.80mil

Group 3 BOM Table:

	HNA	**HFTF**
Mount compound	400180	A-18
Mold compound	450179	R-30
Wire composition, diam	Au, 1.0mil	Cu, 0.80mil
Lead finish	NiPdAu	Matte Sn

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
SH-BIP-1	SHE	USA	Sherman
DL-LIN	DLN	USA	Dallas
CFAB	CU3	CHN	Chengdu
RFAB	**RFB**	**USA**	**Richardson**

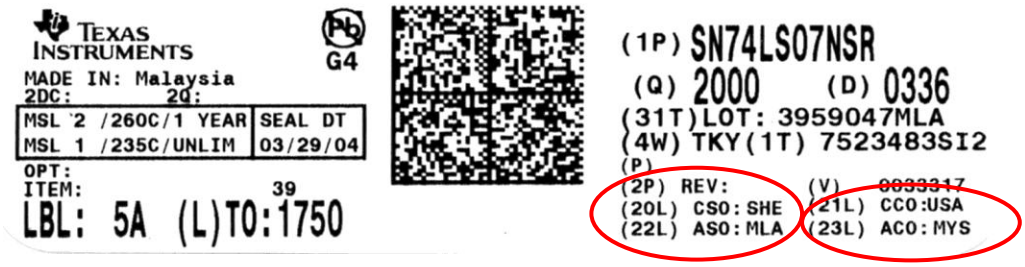
Die Rev:

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

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
TI Mexico	MEX	MEX	Aguascalientes
HNA	HNT	THA	Ayutthaya
TI Malaysia	**MLA**	**MYS**	**Kuala Lumpur**
HFTF	**HFT**	**CHN**	**Hefei**

Sample product shipping label (not actual product label)



Group 1 Product Affected: Wafer fab site, Die rev, BOM update

LM2904BAIPWR	LM358PWR	TLE2071CP	TLE2081AIP
LM2904PWR	TL972IP	TLE2072ACP	TLE2081CP
LM358APWR	TL972IPWR	TLE2072CP	TLE2082ACP
LM358BAIPWR	TL974IPWR	TLE2072IDR	TLE2082CP
LM358BIPWR	TLE2071ACP	TLE2072IP	

Group 2 Product Affected: Wafer fab site, Die rev, Assembly site

TL971IDR	TLE2071AIDR	TLE2081ACDR	TLE2082AIDR
TL972IDR	TLE2071IDR	TLE2081CDR	TLE2082CDR
TL974IDR	TLE2072AIDR	TLE2081IDR	TLE2082IDR
TLE2071ACDR	TLE2072CDR	TLE2082ACDR	

Group 3 Product Affected: Wafer fab site, Die rev, Assembly site
TL972IDGKR

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

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: TLE2071CP	QBS Reference: OPA4990IDR	QBS Reference: NE5532P	QBS Reference: UCC37322P	QBS Reference: OPA992IDCKR
HAST	A2	Biased HAST	130C	96 Hours	-	3/231/0	-	-	-
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-
UHAST	A3	Autoclave	121C, 2 atm	96 Hours	-	-	-	3/231/0	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-		-
TC	A4	Temperature Cycle	-65/150C	500 Cycles	-	3/231/0	-	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	-	3/231/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	3/231/0	-	3/231/0	-
HTOL	B1	Life Test	150C	300 Hours	-	-	3/231/0	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	1/800/0	-	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	-	3/66/0	3/66/0	-
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	1/3/0
ESD	E2	ESD HBM	-	3000 Volts	-	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	-	-	1/3/0
CHAR	E5	Electrical Characterization	Min, Typ, Max Temp	-	-	3/90/0	-	-	1/30/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	3/90/0	-	-	1/30/0

- QBS: Qual By Similarity
- Qual Device TLE2071CP 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/

Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

TI Qualification ID: R-CHG-2201-013

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

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IDR	QBS Package Reference: OPA2991IDR
	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	-	3/231/5 (1)	-	1/77/0
	UHAST	Unbiased HAST 130C/85%RH	96 Hours	-	-	3/231/0	-
	TC	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	3/231/0	1/77/0
	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	1/77/0	3/231/10 (2)	3/231/0	-
	ELFR	Early Life Failure Rate, 125C	48 Hours	-	1/800/0	-	-
	HBM	ESD - HBM	3000 V	1/3/0	3/18/0	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	Automotive Moist Sens. L2	Level 2-260C	-	3/36/0	-	-
	MSL	Moisture Sensitivity, L1	Level 1-260C	1/12/0	-	-	-

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IDR	QBS Package Reference: OPA2991IDR
	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 OPA2992IDR 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 were due to mechanical damage from mishandling at test. Discounted.
Note (2): Fails due to faulty BI sockets. See 8D attached to the eQDB.
TI Qualification ID: 20200916-136222

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

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

TI Qualification ID: R-CHG-2307-068

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

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IDGKR	QBS Product Reference: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: LM5008MM_PCC
	PC	Preconditioning, L2	Level 2-260C	-	-	3/1477/0	-
	PC	Preconditioning, L1	Level 1- 260C	-	-	-	3/693/0
	ED	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	-
	HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0
	uHAST	Unbiased HAST, 130C	96 Hours	-	-	-	3/231/0
	AC	Autoclave 121C	96 Hours	-	-	3/231/5 (1)	-
	TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	3/231/0
	HTSL	High Temp Storage Bake 175C	500 Hours	-	-	3/231/0	-
	HTSL	High Temp. Storage Bake, 170C	420 Hours	-	-	-	3/231/0
	HTOL	Life Test, 150C	300 Hours	-	1/77/0	3/231/10 (2)	-
	ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0	-
	CDM	ESD - CDM	1500 V	-	1/3/0	2/6/0	-
	HBM	ESD - HBM	3000 V	-	1/3/0	3/9/0	-
	LU	Latch-up	Per JESD78	-	1/6/0	3/18/0	-
	MSL	Moisture Sensitivity, L2	Level 2-260C	-	-	3/36/0	-
	MSL	Moisture Sensitivity, L1	Level 1-260C	-	1/12/0	-	3/36/0

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IDGKR	QBS Product Reference: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: LM5008MM_PCC
	DS	Die Shear	Die	1/10/0	-	-	3/30/0
	WBP	Wire Bond Pull	Wires	1/76/0	1/76/0	3/228/0	3/228/0
	WBS	Ball Bond Shear	Wires	1/76/0	1/76/0	3/228/0	3/228/0

- QBS: Qual By Similarity
- Qual Device OPA2992IDGKR 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 were due to mechanical damage from mishandling at test. Discounted.
NOTE (2): Fails due to faulty BI sockets. See 8D attached to the eQDB.
TI Qualification ID: 20200916-136220

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: TLE2071AIDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IDR	QBS Product Reference: OPA992IDCKR	QBS Package Reference: OPA2991IDR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	3/231/0	-	-
UHAST	A3	Autoclave	121C, 2 atm	96 Hours	-	3/231/5[1]	-	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	-	1/77/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	3/231/0	-	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	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	-	-	-
HTOL	B1	Life Test	150C	300 Hours	-	3/231/10[2,3]	-	-	-
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	1/800/0	-	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes); PB-Free Solder;	-	-	-	1/22/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: TLE2071AIDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IDR	QBS Product Reference: OPA992IDCKR	QBS Package Reference: OPA2991IDR
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	1/3/0	-
ESD	E2	ESD CDM	-	250 Volts	-	-	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	-	1/3/0	-	-
ESD	E2	ESD HBM	-	3000 Volts	-	-	-	1/3/0	-
LU	E4	Latch-Up	Per JESD78	-	-	3/18/0	1/3/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	3/90/0	1/30/0	1/30/0	-
FTY	E6	Final Test Yield	-	-	1/Pass	-	-	-	-

- QBS: Qual By Similarity
- Qual Device TLE2071AIDR 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-2112-015

[1]-Mechanical damage from mis-handling @ test.
[2]-Faulty BI sockets.
[3]-Faulty BI sockets.

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: TLE2082ACP	QBS Package Reference: NE5532P	QBS Package Reference: TPS2041P	QBS Package Reference: TS12A4514P	QBS Package Reference: UCC37322P	QBS Product Reference: OPA2992IDR	QBS Process Reference: PCM6260QRTVRQ1	QBS Package Reference: OPA2277P	QBS Package Reference: OP07CP
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	-	-	-	-	3/231/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	-	1/77/0	3/231/0	-	-	-	-
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	-	3/231/0	1/77/0	1/77/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	-	3/231/0	1/77/0	3/231/0	-	3/231/0	1/77/0	1/77/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	-	-	-	-	-	3/135/0	-	-
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	-	3/231/0	-	-	-	1/77/0	-	-	-
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	-	-
SD	C3	PB-Free Solderability	Precondition w.155C Dry Bake (4 hrs +/- 15 minutes)	-	-	-	-	-	-	-	1/15/0	-	-
SD	C3	PB-Free Solderability	8 Hours Steam Age	-	-	3/66/0	-	-	3/66/0	-	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	-	-	-	3/30/0	-	-
ESD	E2	ESD CDM	-	1000 Volts	-	-	-	-	-	-	-	-	1/3/0
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	-	-	1/3/0	-	-	-

Type	#	Test Name	Condition	Duration	Qual Device: TLE2082ACP	QBS Package Reference: NE5532P	QBS Package Reference: TPS2041P	QBS Package Reference: TS12A4514P	QBS Package Reference: UCC37322P	QBS Product Reference: OPA2992IDR	QBS Process Reference: PCM6260QRTVRQ1	QBS Package Reference: OPA2277P	QBS Package Reference: OP07CP
ESD	E2	ESD CDM	-	250 Volts	-	-	-	-	-	-	-	1/3/0	-
ESD	E2	ESD CDM	-	500 Volts	-	-	-	-	-	-	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	-	-	-	-	-	-	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	-	-	-	1/3/0	-	-
ESD	E2	ESD HBM	-	3000 Volts	-	-	-	-	-	1/3/0	-	-	-
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	-	1/3/0	1/6/0	1/3/0	-
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	-	1/30/0	-	1/30/0	1/30/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	-	-	-	-	-	3/90/0	-	-
FTY	E6	Final Test Yield	-	-	1/1/0	-	-	-	-	-	-	-	-

- QBS: Qual By Similarity
- Qual Device TLE2082ACP 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-2307-004

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

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IPWR	QBS Product Reference: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IPWR
	PC	PreCon Level 1	Level 1-260C	1/160/0	-	-	-
	ED	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	1/30/0
	HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	3/231/0
	AC	Autoclave 121C	96 Hours	1/77/0	-	3/231/5 (1)	-
	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	-	1/77/0	3/231/10 (2)	-
	ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0	-
	HBM	ESD - HBM	2500 V	-	-	-	1/3/0
	HBM	ESD - HBM	3000 V	-	1/3/0	-	-
	CDM	ESD - CDM	1500 V	-	1/3/0	2/6/0	1/3/0
	LU	Latch-up	Per JESD78	-	1/6/0	3/18/0	1/6/0
	MSL	Moisture Sensitivity, L1	Level 1-260C	1/12/0	1/12/0	-	-
	WBP	Bond Pull	Wires	1/76/0	1/76/0	3/228/0	-

	Type	Test Name / Condition	Duration	Qual Device: OPA2992IPWR	QBS Product Reference: OPA2992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA2990IPWR
	WBS	Ball Bond Shear	Wires	1/76/0	1/76/0	3/288/0	-

- QBS: Qual By Similarity
- Qual Device OPA2992IPWR 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 were due to mechanical damage from mishandling at test. Discounted.

NOTE (2): Fails due to faulty BI sockets. See 8D attached to the eQDB.

TI Qualification ID: 20200916-136224

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

	Type	Test Name / Condition	Duration	Qual Device: OPA4992IDR	QBS Process / Package Reference: OPA4990IDR	QBS Package Reference: OPA4991IDR
	PC	PreCon Level 2	Level 2-260C	-	3/1477/0	-
	PC	PreCon Level 1	Level 1-260C	-	-	1/80/0
	ED	Electrical Characterization	Per Datasheet Parameters	1/30/0	3/90/0	-
	HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/231/0	-
	AC	Autoclave 121C	96 Hours	-	3/231/5 (1)	1/77/0
	TC	Temperature Cycle, -65/150C	500 Cycles	-	3/231/0	1/77/0
	HTSL	High Temp Storage Bake 175C	500 Hours	-	3/231/0	-
	HTOL	Life Test, 150C	300 Hours	-	3/231/10 (2)	-
	ELFR	Early Life Failure Rate, 125C	48 Hours	-	1/800/0	-
	HBM	ESD - HBM	4000 V	1/3/0	-	-
	HBM	ESD - HBM	3000 V	-	3/9/0	-
	CDM	ESD - CDM	1500 V	1/3/0	2/6/0	-
	LU	Latch-up	Per JESD78	1/6/0	3/18/0	-
	MSL	Moisture Sensitivity, L2	Level 2-260C	-	3/36/0	-
	MSL	Moisture Sensitivity, L1	Level 1-260C	-	-	1/12/0
	WBP	Bond Pull	Wires	1/76/0	3/228/0	-

	Type	Test Name / Condition	Duration	Qual Device: OPA4992IDR	QBS Process / Package Reference: OPA4990IDR	QBS Package Reference: OPA4991IDR
	WBS	Ball Bond Shear	Wires	1/76/0	3/228/0	-

- QBS: Qual By Similarity
- Qual Device OPA4992IDR 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 were due to mechanical damage from mishandling at test. Discounted.

NOTE (2): Fails due to faulty BI sockets. See 8D attached to the eQDB.

TI Qualification ID: 20210308-139012

Qualification Results

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

	Type	Test Name / Condition	Duration	Qual Device: OPA4992IPWR	QBS Product Reference: OPA4992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA4991QPWRQ1
	PC	Preconditioning	Level 1-260C	-	-	-	3/1199/0
	PC	Preconditioning	Level 2-260C	-	-	3/1477/0	-
	ED	Electrical Characterization	Per Datasheet Parameters	-	1/30/0	3/90/0	3/90/0
	HAST	Biased HAST, 110C/85%RH	264 Hours	-	-	-	3/231/1 (3)
	HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	-
	AC	Autoclave 121C	96 Hours	-	-	3/231/5 (1)	3/231/0
	TC	Temperature Cycle, -65/150C	500 Cycles	-	-	3/231/0	3/231/0
	HTSL	High Temp Storage Bake 150C	1000 Hours	-	-	-	3/135/0
	HTSL	High Temp Storage Bake 175C	500 Hours	-	-	3/231/0	-
	HTOL	Life Test, 150C	300 Hours	-	-	3/231/10 (2)	-
	HTOL	Life Test, 150C	408 Hours	-	-	-	3/231/2 (3)
	ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	1/800/0	-
	HBM	ESD - HBM	4000 V	-	1/3/0	-	-
	HBM	ESD - HBM	3000 V	-	-	3/9/0	-
	HBM	ESD - HBM	4000 V	-	-	-	1/3/0
	CDM	ESD - CDM	1500 V	-	1/3/0	2/6/0	-

	Type	Test Name / Condition	Duration	Qual Device: OPA4992IPWR	QBS Product Reference: OPA4992IDR	QBS Process Reference: OPA4990IDR	QBS Package Reference: OPA4991QPWRQ1
	LU	Latch-up	Per JESD78	-	1/6/0	3/18/0	3/18/0
	MSL	Moisture Sensitivity, L1	Level 1-260C	-	-	-	1/12/0
	MSL	Moisture Sensitivity, L2	Level 2-260C	-	-	3/36/0	-
	WBP	Bond Pull	Wires	1/76/0	1/76/0	3/228/0	1/30/0
	WBS	Ball Bond Shear	Wires	1/76/0	1/76/0	3/228/0	1/30/0

- QBS: Qual By Similarity
- Qual Device OPA4992IPWR 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 were due to mechanical damage from mishandling at test. Discounted.

NOTE (2): Fails due to faulty BI sockets. See 8D attached to the eQDB.

NOTE (3): Units failed Vio due to bad BI socket contact, see 8D attached to eQDB.

TI Qualification ID: 20210323-139241

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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