PCN Number:	20231114002.1	**PCN Date:**	November 15, 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:	Feb 14, 2024	**Sample requests accepted until:**	Dec 14, 2023*

***Sample requests received after December 14, 2023 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 Material
☒	Packing/Shipping/Labeling	☐	Test Process	☒	Wafer Fab Process

PCN Details

Description of Change:

Texas Instruments is pleased to announce the addition of RFAB using the TIB qualified process technology and additional Assembly site (MLA) and BOM options for select 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	JI1	150 mm	RFAB	TIB	300 mm

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

Construction differences are as follows:

Group 1 BOM Table (Process migration & BOM option qualification):

	Current	Proposed
Wire type/diam	0.8mil Au, 0.96mil Cu	0.8mil Cu

Group 2 BOM Table (Process migration & MLA as an additional Assembly site):

	TI Mexico	TI Malaysia
Wire type/diam	0.96mil Cu	0.8mil Cu

Group 3 BOM Table (Process migration & MLA as an additional Assembly site):

	UTL2	TI Malaysia
Wire type/diam	1.0mil au	0.8mil Cu
Mount compound	PZ0013	4147858
Mold compound	CZ0094	4211880

Qual details are provided in the Qual Data Section.

Reason for Change:

Continuity of supply

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
RFAB	**RFB**	**USA**	**Richardson**

Die Rev:

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

Assembly Site Information:

Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City
TI Mexico	MEX	MEX	Aguascalientes
UTL2	NS2	THA	Bangpakong, Chachoengsao
TI Malaysia	**MLA**	**MYS**	**Kuala Lumpur**

Sample product shipping label (not actual product label)

Product Affected:

Group 1 Device list: (Process migration & BOM option qualification)

LM833DR	RC4560IP	RC4580IP	TL5580IPWR
MC33078DR	RC4560IPWR	RC4580IPWR	
NE5532AP	RC4580IDR	SA5532AP	
NE5532P	RC4580IDR-NF	SA5532P	

Group 2 Device list: (Process migration & MLA as an additional Assembly site)

NE5532ADR	RC4560IDR	SA5532DR	TL5580IDR
NE5532DR	SA5532ADR	TL5580AIDR	

Group 3 Device list: (Process migration & MLA as an additional Assembly site)

LM833DGKR	MC33078DGKR

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IDGKR	QBS Process Reference: LM324BIPWR	QBS Package Reference: SN74LV244AQDGSRQ1	QBS Package Reference: SN74LV273AQDGSRQ1	QBS Package Reference: SN74LV541AQDGSRQ1	QBS Package Reference: SN74LV8T245DGSR	QBS Product/Process Reference: RC4580IPWR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	1/77/0	1/77/0	1/77/0	-	-
UHAST	A3	Autoclave	121C/15psig	96 Hours	-	-	1/77/0	1/77/0	1/77/0	-	-
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	1/77/0	1/77/0	1/77/0	1/77/0	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	1/45/0	1/45/0	1/45/0	-	-
HTSL	A6	High Temperature Storage Life	175C	500 Hours	-	-	-	-	-	1/45/0	-
HTOL	B1	Life Test	125C	1000 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	-	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	1/10/0	1/10/0	1/10/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IDGKR	QBS Process Reference: LM324BIPWR	QBS Package Reference: SN74LV244AQDGSRQ1	QBS Package Reference: SN74LV273AQDGSRQ1	QBS Package Reference: SN74LV541AQDGSRQ1	QBS Package Reference: SN74LV8T245DGSR	QBS Product/Process Reference: RC4580IPWR
ESD	E2	ESD CDM	-	250 Volts	1/3/0	1/3/0	-	-	-	1/3/0	1/3/0
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	1/3/0	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	-	1/3/0	-	-	-	1/3/0	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	-	1/3/0	1/3/0	1/3/0	-	-
LU	E4	Latch-Up	Per JESD78	-	-	1/3/0	1/6/0	1/6/0	1/6/0	1/3/0	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	-	-	-	1/30/0	1/30/0	1/30/0	-	-

- QBS: Qual By Similarity
- Qual Device RC4580IDGKR 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: LM833DGKR, MC33078DGKR**

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

TI Qualification ID: R-NPD-2307-104

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IPWR	QBS Reference: SN74AXC4T245QPWRQ1	QBS Reference: LM324BIPWR	QBS Reference: OPA2990IPWR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	1/77/0	3/231/0	3/231/0
UHAST	A3	Unbiased HAST	130C/85%RH	96 Hours	-	1/77/0	3/231/0	3/231/0
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	1/77/0	3/231/0	3/231/0
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	1/45/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	3/231/0
HTOL	B1	Life Test	125C	1000 Hours	-	1/77/0	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	-	-
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	-	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IPWR	QBS Reference: SN74AXC4T245QPWRQ1	QBS Reference: LM324BIPWR	QBS Reference: OPA2990IPWR
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	1/3/0
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	1/3/0	-
ESD	E2	ESD CDM	-	500 Volts	-	1/3/0	-	-
ESD	E2	ESD HBM	-	1000 Volts	1/3/0	-	1/3/0	-
ESD	E2	ESD HBM	-	2000 Volts	-	1/3/0	-	-
ESD	E2	ESD HBM	-	2500 Volts	-	-	-	1/3/0
LU	E4	Latch-Up	Per JESD78	-	1/3/0	1/6/0	1/3/0	1/6/0
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	-	-	1/30/0	-	-

- QBS: Qual By Similarity
- Qual Device RC4580IPWR 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: RC4560IPWR, TL5580IPWR**

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

TI Qualification ID: R-CHG-2307-065

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IP	QBS Package Reference: NE5532P	QBS Package Reference: UCC37322P	QBS Package Reference: LM2902BQPWRQ1	QBS Process Reference: OPA2277P	QBS Product Reference: RC4580IPWR
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	-	-
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	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	-	3/231/0	-	-	-	-
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-Free Solderability	8 Hours Steam Age	-	-	3/66/0	3/66/0	-	-	-
PD	C4	Physical Dimensions	Cpk>1.67	-	-	-	-	3/30/0	-	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IP	QBS Package Reference: NE5532P	QBS Package Reference: UCC37322P	QBS Package Reference: LM2902BQPWRQ1	QBS Process Reference: OPA2277P	QBS Product Reference: RC4580IPWR
ESD	E2	ESD CDM	-	1500 Volts	-	-	-	3/9/0	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	-	1/3/0	1/3/0
ESD	E2	ESD HBM	-	1000 Volts	-	-	-	-	1/3/0	1/3/0
ESD	E2	ESD HBM	-	2000 Volts	-	-	-	3/9/0	-	-
LU	E4	Latch-Up	Per JESD78	-	-	-	-	-	1/3/0	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	-	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 RC4580IP 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
- **Note: This report also applies to the following part numbers: NE5532P, NE5532AP, SA5532AP, SA5532P, RC4560IP**

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

TI Qualification ID: R-CHG-2307-067

Qualification Results

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

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IDR	QBS Process Reference: LM2902BQPWRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: MC33063ADR	QBS Package Reference: OPA2991QDRQ1	QBS Product Reference: RC4580IPWR
HAST	A2	Biased HAST	130C/85%RH	96 Hours	-	3/231/0	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	-	-	3/231/0	3/231/0	3/231/0	-
TC	A4	Temperature Cycle	-65C/150C	500 Cycles	-	3/231/0	3/231/0	3/231/0	3/231/0	-
HTSL	A6	High Temperature Storage Life	150C	1000 Hours	-	3/231/0	3/135/0	-	3/135/0	-
HTSL	A6	High Temperature Storage Life	170C	420 Hours	-	-	-	3/231/0	-	-
HTOL	B1	Life Test	125C	1000 Hours	-	-	-	2/154/0	-	-
HTOL	B1	Life Test	150C	300 Hours	-	-	3/231/0	-	-	-
HTOL	B1	Life Test	150C	408 Hours	-	3/231/0	-	-	1/77/1[1]	-

Type	#	Test Name	Condition	Duration	Qual Device: RC4580IDR	QBS Process Reference: LM2902BQPWRQ1	QBS Package Reference: LM2903BQDRQ1	QBS Package Reference: MC33063ADR	QBS Package Reference: OPA2991QDRQ1	QBS Product Reference: RC4580IPWR
ELFR	B2	Early Life Failure Rate	125C	48 Hours	-	3/2400/0	3/2400/0	1/800/0	-	-
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	-	3/30/0	-
ESD	E2	ESD CDM	-	1500 Volts	-	3/9/0	-	-	-	-
ESD	E2	ESD CDM	-	250 Volts	1/3/0	-	-	1/3/0	-	1/3/0
ESD	E2	ESD CDM	-	500 Volts	-	-	1/3/0	-	1/3/0	-
ESD	E2	ESD HBM	-	1000 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	1/6/0	1/3/0
CHAR	E5	Electrical Characterization	Per Datasheet Parameters	-	-	-	-	1/30/0	-	1/30/0
CHAR	E5	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	-	3/90/0	3/90/0	-	3/90/0	-
FTY	E6	Final Test Yield	-	-	1/1/0	-	-	-	-	-

- QBS: Qual By Similarity
- Qual Device RC4580IDR 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: NE5532ADR, RC4560IDR, LM833DR, NE5532DR, SA5532ADR, SA5532DR, MC33078DR, RC4580IDR-NF, MC33078DR-NG, TL5580AIDR, TL5580IDR**

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

TI Qualification ID: R-CHG-2307-066

[1]-HTOL failed due to rejects mixed back in with tested good units.

For questions regarding this notice, e-mails can be sent to Change Management team or your local Field Sales Representative.