12500 TI Boulevard, MS 8640, Dallas, Texas 75243

**PCN# 20231114002.1**
**Qualification of RFAB using qualified Process Technology, Die Revision and additional Assembly site/BOM options for select devices**
**Change Notification / Sample Request**

**Date:** November 15, 2023
**To:** AVNET PCN

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments. The details of this change are on the following pages.

Texas Instruments 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 and approval of this change. If samples or additional data are required, requests must be received within **30 days** of this notification.

The changes discussed within this PCN will not take effect any earlier than the proposed first ship date on Page 3 of this notification, unless customer agreement has been reached on an earlier implementation of the change.

This notice does not change the end-of-life status of any product. Should product affected be on a previously issued product withdrawal/discontinuance notice, this notification does not extend the life of that product or change the life time buy offering/discontinuance plan.

For questions regarding this notice or to provide acknowledgement of this PCN, you may contact your local Field Sales Representative or the change management team.

For sample requests or sample related questions, contact your local Field Sales Representative.

Sincerely,

Change Management Team
SC Business Services

**20231114002.1**
**Attachment: 1**

## Products Affected:

The devices listed on this page are a subset of the complete list of affected devices. According to our records, you have recently purchased these devices. The corresponding customer part number is also listed, if available.

| DEVICE | CUSTOMER PART NUMBER |
|---|---|
| NE5532DR | null |

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

| | | | |
|---|---|---|---|
| **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.