12500 TI Boulevard, MS 8640, Dallas, Texas 75243

**PCN# 20231219018.1**
**Qualification of FFAB using qualified Process Technology, Die Revision and additional Assembly BOM options for select devices**
**Change Notification / Sample Request**

**Date:** December 22, 2023

Dear Customer:

This is an announcement of a change to a device that is currently offered by Texas Instruments (TI). The details of this change are on the following pages, and are in alignment with our standard product change notification (PCN) process.

TI 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, given that samples are not built ahead of the change.

The Proposed First Ship date in this PCN letter is the earliest possible date that customers could receive the changed material. It is our commitment that the changed device will not ship before that date. If samples are requested within the 30 day sample request window, customers will still have 30-days to complete their evaluation regardless of the proposed 1st ship date.

This particular PCN is related to TI's multiyear transition plan for our two remaining factories with 150-millimeter production (DFAB in Dallas, Texas, and SFAB in Sherman, Texas). DFAB will remain open, but will focus on 200-mm production, with a smaller set of technologies. SFAB will close no earlier than 2024 and no later than 2025. As referenced in the "reason for change" below, these changes are part of our multiyear plan to transition these products to newer, more efficient manufacturing processes and technologies, underscoring our commitment to product longevity and supply continuity.

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. As always, we thank you for your continued business.

Change Management Team
SC Business Services

**20231219018.1**
**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 |
|---|---|
| OPA2134UAG4 | null |
| OPA2134PA | null |
| OPA2134UA/2K5 | null |
| OPA4134UA/2K5 | null |
| OPA134UAE4 | null |
| OPA2134UA/2K5E4 | null |
| OPA2134UAE4 | null |
| OPA4134UAE4 | null |
| OPA134UA | null |
| OPA4134UA | null |
| OPA134UA/2K5 | null |
| OPA2134UA | null |

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

| PCN Number: | 20231219018.1 | PCN Date: | December 22, 2023 |
|---|---|---|---|
| Title: | Qualification of FFAB using qualified Process Technology, Die Revision and additional Assembly 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 (FFAB, BICOM3XHV) and assembly BOM options for selected devices as 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 | BIPOLAR | 150 mm | FFAB | BICOM3XHV | 200 mm |

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

Assembly BOM options are noted below:

**Group 1 Device:**

| | Current | Proposed |
|---|---|---|
| Wire composition, diam | Au, 1.15mil | Cu, 0.96mil |
| Die Coat | 4221706 | None |

**Group 2 Device:**

| | Current | Proposed |
|---|---|---|
| Wire composition, diam | Au, 1.15mil | Au, 0.96mil |

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 |
| **FR-BIP-1** | **TID** | **DEU** | **Freising** |

**Die Rev:**

| Current | New |
|---|---|
| Die Rev [2P] | **Die Rev [2P]** |
| A | **B** |

Sample product shipping label (not actual product label)


**Group 1 Product Affected:**

| | | |
|---|---|---|
| OPA2134UA | OPA2134UA/2K5E4 | OPA2134UAG4 |
| OPA2134UA/2K5 | OPA2134UAE4 | |

**Group 2 Product Affected:**

| | | |
|---|---|---|
| OPA134UA | OPA4134UA | OPA4134UAE4 |
| OPA134UA/2K5 | OPA4134UA/2K5 | |
| OPA134UAE4 | OPA4134UA/2K5E4 | |

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: OPA134UA | QBS Process Reference: OPA202ID | QBS Process Reference: OPA1662AIDGKRQ1 | QBS Package Reference: OPA2810IDR | QBS Package Process Reference: THP210DR | QBS Package Reference: OPA4991QDRQ1 |
|---|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | 3/231/0 | - | 3/231/0 | 3/231/0 | 3/231/0 |
| UHAST | A3 | Autoclave | 121C/15psig | 96 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 | - | 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 | 3/231/0 | - |
| HTSL | A6 | High Temperature Storage Life | 175C | 500 Hours | - | - | - | - | - | 1/45/0 |
| HTOL | B1 | Life Test | 150C | 300 Hours | - | 3/231/0 | - | - | - | - |
| HTOL | B1 | Life Test | 150C | 408 Hours | - | - | - | - | - | 1/77/0 |
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | - | - | 3/2400/0 | - | - | - |
| ESD | E2 | ESD CDM | - | 500 Volts | 1/3/0 | 3/9/0 | - | 1/3/0 | - | 1/3/0 |

| Type | # | Test Name | Condition | Duration | Qual Device: OPA134UA | QBS Process Reference: OPA202ID | QBS Process Reference: OPA1662AIDGKRQ1 | QBS Package Reference: OPA2810IDR | QBS Package Process Reference: THP210DR | QBS Package Reference: OPA4991QDRQ1 |
|---|---|---|---|---|---|---|---|---|---|---|
| ESD | E2 | ESD HBM | - | 2000 Volts | 1/3/0 | 3/9/0 | - | 1/3/0 | - | 1/3/0 |
| LU | E4 | Latch-Up | Per JESD78 | - | 1/3/0 | 1/3/0 | - | 1/6/0 | - | 1/6/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | 1/30/0 | 3/90/0 | 1/30/0 | - | - | - |

- QBS: Qual By Similarity
- Qual Device OPA134UA 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-2107-013

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | Qual Device: OPA4134UA | QBS Product Reference: OPA134UA | QBS Process Reference: INA828ID | QBS Process Reference: OPA1662AIDGKRQ1 | QBS Package Reference: OPA4187ID | QBS Package Reference: OPA4202ID | QBS Package Reference: OPA1644AID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| UHAST | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | - | 3/231/0 | - | 3/231/0 | 1/77/0 | - |
| TC | A4 | Temperature Cycle | -65C/150C | 500 Cycles | - | - | 3/231/0 | - | 3/231/0 | 1/77/0 | 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 | 125C | 1000 Hours | - | - | 3/231/0 | - | - | - | - |
| HTOL | B1 | Life Test | 140C | 300 Hours | - | - | - | - | - | 1/77/0 | - |

| Type | # | Test Name | Condition | Duration | Qual Device: OPA4134UA | QBS Product Reference: OPA134UA | QBS Process Reference: INA828ID | QBS Process Reference: OPA1662AIDGKRQ1 | QBS Package Reference: OPA4187ID | QBS Package Reference: OPA4202ID | QBS Package Reference: OPA1644AID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ELFR | B2 | Early Life Failure Rate | 125C | 48 Hours | - | - | - | 3/2400/0 | - | - | - |
| ESD | E2 | ESD CDM | - | 1000 Volts | - | - | - | - | - | - | 1/3/0 |
| ESD | E2 | ESD CDM | - | 250 Volts | 1/3/0 | 1/3/0 | 1/3/0 | - | 1/3/0 | 1/3/0 | - |
| ESD | E2 | ESD HBM | - | 1000 Volts | - | 1/3/0 | 1/3/0 | - | 1/3/0 | 1/3/0 | - |
| ESD | E2 | ESD HBM | - | 2000 Volts | - | 1/3/0 | 1/3/0 | - | - | 1/3/0 | 1/3/0 |
| LU | E4 | Latch-Up | Per JESD78 | - | 1/3/0 | 1/3/0 | 1/6/0 | - | 1/6/0 | 1/6/0 | 1/6/0 |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | - | 1/30/0 | 3/90/0 | - | 1/30/0 | 1/30/0 | 1/30/0 |
| FTY | E6 | Final Test Yield | - | - | 1/Pass | - | - | - | - | - | - |

- QBS: Qual By Similarity
- Qual Device OPA4134UA is qualified at MSL2 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-2107-019

**Qualification Results**

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

| Type | # | Test Name | Condition | Duration | Qual Device: OPA2134UA | QBS Product Reference: OPA1642AID | QBS Process Reference: OPA202ID | QBS Packege Reference: OPA2810IDR | QBS Package Reference: OPA862IDR |
|---|---|---|---|---|---|---|---|---|---|
| HAST | A2 | Biased HAST | 130C/85%RH | 96 Hours | - | - | 3/231/0 | 3/231/0 | 1/77/0 |
| UHAST | A3 | Unbiased HAST | 130C/85%RH | 96 Hours | - | 1/77/0 | 3/231/0 | 3/231/0 | 1/77/0 |
| TC | A4 | Temperature Cycle | -65C/150C | 500 Cycles | - | 1/77/0 | 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 | 1/77/0 |
| HTOL | B1 | Life Test | 150C | 300 Hours | - | - | 3/231/0 | - | 3/231/0 |
| ESD | E2 | ESD CDM | - | 250 Volts | - | 1/3/0 | 3/9/0 | 1/3/0 | 1/3/0 |
| ESD | E2 | ESD CDM | - | 500 Volts | 1/3/0 | | | | |
| ESD | E2 | ESD HBM | - | 1000 Volts | - | 1/3/0 | 3/9/0 | 1/3/0 | 1/3/0 |
| ESD | E2 | ESD HBM | - | 2000 Volts | - | 1/3/0 | - | - | - |
| LU | E4 | Latch-Up | Per JESD78 | - | 1/3/0 | 1/3/0 | 1/3/0 | 1/6/0 | 1/3/0 |

| Type | # | Test Name | Condition | Duration | Qual Device: OPA2134UA | QBS Product Reference: OPA1642AID | QBS Process Reference: OPA202ID | QBS Packege Reference: OPA2810IDR | QBS Package Reference: OPA862IDR |
|---|---|---|---|---|---|---|---|---|---|
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters | - | - | 1/30/0 | 3/90/0 | 1/30/0 | 3/90/0 |
| FTY | E6 | Final Test Yield | - | - | 1/Pass | - | - | - | - |

- QBS: Qual By Similarity
- Qual Device OPA2134UA is qualified at MSL2 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-2107-018

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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