

|  |  |                                       |                            |                |                       |
|--|--|---------------------------------------|----------------------------|----------------|-----------------------|
| <b>PCN Number:</b>   | <b>20240202010.1</b>   | <b>PCN Date:</b>                      | February 02, 2024          |                |                       |
| <b>Title:</b>  | Qualification of FFAB using qualified Process Technology, Die Revision and BOM option qualification for select devices |                                       |                            |                |                       |
| <b>Customer Contact:</b>   | Change Management team   | <b>Dept:</b>                          | Quality Services           |                |                       |
| <b>Proposed 1<sup>st</sup> Ship Date:</b>  | May 02, 2024   | <b>Estimated Sample Availability:</b> | March 03, 2024*            |                |                       |
| <b>*Sample requests received after March 03, 2024 will not be supported.</b>   |  |                                       |                            |                |                       |
| <b>Change Type:</b>  |  |                                       |                            |                |                       |
| <input type="checkbox"/>   | Assembly Site  | <input checked="" type="checkbox"/>   | Design                     |                |                       |
| <input checked="" type="checkbox"/>  | Assembly Process   | <input type="checkbox"/>              | Data Sheet                 |                |                       |
| <input checked="" type="checkbox"/>  | Assembly Materials   | <input type="checkbox"/>              | Part number change         |                |                       |
| <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"/>   |  | <input type="checkbox"/>              | Wafer Bump Material        |                |                       |
| <input type="checkbox"/>   |  | <input type="checkbox"/>              | Wafer Bump Process         |                |                       |
| <input checked="" type="checkbox"/>  |  | <input checked="" type="checkbox"/>   | Wafer Fab Site             |                |                       |
| <input type="checkbox"/>   |  | <input checked="" type="checkbox"/>   | Wafer Fab Materials        |                |                       |
| <input checked="" type="checkbox"/>  |  | <input checked="" type="checkbox"/>   | Wafer Fab Process          |                |                       |
| <b>PCN Details</b>   |  |                                       |                            |                |                       |
| <b>Description of Change:</b>  |  |                                       |                            |                |                       |
| Texas Instruments is pleased to announce the qualification of a new fab & process technology (FFAB, BICOM3XHV) and BOM option qualification for selected devices as listed below in the product affected section.                                |  |                                       |                            |                |                       |
| <b>Current Fab Site</b>  |  |                                       | <b>Additional Fab Site</b> |                |                       |
| <b>Current Fab Site</b>  | <b>Processes</b>   | <b>Wafer Diameter</b>                 | <b>Additional Fab Site</b> | <b>Process</b> | <b>Wafer Diameter</b> |
| SFAB   | JIBB   | 150 mm                                | FFAB                       | BICOM3XHV      | 200 mm                |
| The die was also changed as a result of the process change.  |  |                                       |                            |                |                       |
| BOM option comparisons are as follows:   |  |                                       |                            |                |                       |
| What   | <b>Current</b>   | <b>Additional</b>                     |                            |                |                       |
| Bond Wire composition, diameter  | Au, 1.2mil   | Cu, 1.0 mil                           |                            |                |                       |
| Mold Compound  | 4209640  | 4211880                               |                            |                |                       |
| Mount Compound   | 4205846  | 4147858                               |                            |                |                       |
| Die Coat   | 4221706  | None                                  |                            |                |                       |
| MSL  | 3  | 2                                     |                            |                |                       |
| Qual details are provided in the Qual Data Section.  |  |                                       |                            |                |                       |
| <b>Reason for Change:</b>  |  |                                       |                            |                |                       |
| 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. |  |                                       |                            |                |                       |
| <b>Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):</b>  |  |                                       |                            |                |                       |
| None   |  |                                       |                            |                |                       |
| <b>Impact on Environmental Ratings:</b>  |  |                                       |                            |                |                       |
| 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.  |  |                                       |                            |                |                       |
| <b>RoHS</b>  | <b>REACH</b>   | <b>Green Status</b>                   | <b>IEC 62474</b>           |                |                       |

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         |
| <b>FR-BIP-1</b> | <b>TID</b>                  | <b>DEU</b>                   | <b>Freising</b> |

**Die Rev:**

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

Sample product shipping label (not actual product label)

**TEXAS INSTRUMENTS**  
 MADE IN: Malaysia  
 2DC: 2Q  
 MSL 2 /260C/1 YEAR SEAL DT  
 MSL 1 /235C/UNLIM 03/29/04  
 OPT:  
 ITEM: 39  
**LBL: 5A (L)T0:1750**

(1P) SN74LS07NSR  
 (Q) 2000 (D) 0336  
 (31T) LOT: 3959047MLA  
 (4W) TKY (1T) 7523483SI2  
 (P)  
 (2P) REV: (V) 0033317  
 (20L) 030: SHE (21L) 060: USA  
 (22L) ASO: MLA (23L) ACO: MYS

**Product Affected:**

|              |          |              |              |
|--------------|----------|--------------|--------------|
| OPA130UA     | OPA131U  | OPA131UA/2K5 | OPA131UJ/2K5 |
| OPA130UA/2K5 | OPA131UA | OPA131UJ     |              |

For alternate parts with similar or improved performance, please visit the product page on [TI.com](http://TI.com)

TI Information  
Selective Disclosure

**Qualification Results**

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

| Type  | #  | Test Name                     | Condition                | Duration   | Qual Device:<br>OPA130UA/2K5 | QBS Reference:<br>XTHP210DR | QBS Reference:<br>OPA1662AIDGKRQ1 | QBS Reference:<br>OPA2145ID | QBS Reference:<br>INA826AIDGK | QBS Reference:<br>OPA209AID | QBS Reference:<br>OPA827AIDGKR | QBS Reference:<br>OPA145ID |
|-------|----|-------------------------------|--------------------------|------------|------------------------------|-----------------------------|-----------------------------------|-----------------------------|-------------------------------|-----------------------------|--------------------------------|----------------------------|
| HAST  | A2 | Biased HAST                   | 130C/85%RH               | 96 Hours   | -                            | 3/231/0                     | -                                 | 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 | -                            | -                           | -                                 | -                           | 1/77/0                        | 1/77/0                      | 1/77/0                         | -                          |
| HTSL  | A6 | High Temperature Storage Life | 170C                     | 420 Hours  | -                            | 3/231/0                     | -                                 | -                           | -                             | -                           | -                              | -                          |
| HTOL  | B1 | Life Test                     | 150C                     | 300 Hours  | -                            | -                           | -                                 | -                           | 1/77/0                        | 1/77/0                      | 1/77/3 <sup>1</sup>            | 1/77/0                     |
| ELFR  | B2 | Early Life Failure Rate       | 125C                     | 48 Hours   | -                            | -                           | 3/2400/0                          | -                           | -                             | -                           | -                              | -                          |
| ESD   | E2 | ESD CDM                       | -                        | 250 Volts  | 1/3/0                        | -                           | -                                 | 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                          | 1/3/0                      |
| LU    | E4 | Latch-Up                      | Per JESD78               | -          | 1/3/0                        | -                           | -                                 | 1/6/0                       | 1/3/0                         | 1/3/0                       | 1/3/0                          | 1/3/0                      |
| CHAR  | E5 | Electrical Characterization   | Per Datasheet Parameters | -          | 1/30/0                       | -                           | -                                 | 1/30/0                      | 1/30/0                        | 1/30/0                      | 1/30/0                         | 1/30/0                     |

- QBS: Qual By Similarity
- Qual Device OPA130UA/2K5 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-2304-051

[1]-1 damaged in socket/1 failed due to fab defect (FA450073-1)/One unit was a minor parametric.

Qualification Results

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

| Type  | #  | Test Name                     | Condition   | Duration   | Qual Device:<br><a href="#">OPA131UA/2K5</a> | QBS Product Reference:<br><a href="#">OPA145ID</a> | QBS Process Reference:<br><a href="#">OPA1662AIDGKRQ1</a> | QBS Process Reference:<br><a href="#">OPA1612AQDRQ1</a> | QBS Package Reference:<br><a href="#">OPA2863QDRQ1</a> | QBS Package/Process Reference:<br><a href="#">INA821ID</a> |
|-------|----|-------------------------------|-------------|------------|--|--|---|---|--|--|
| HAST  | A2 | Biased HAST                   | 130C/85%RH  | 96 Hours   | -  | 1/77/0   | -   | 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  |
| HTSL  | A6 | High Temperature Storage Life | 150C        | 1000 Hours | -  | -  | -   | -   | 3/135/0  | -  |
| HTSL  | A6 | High Temperature Storage Life | 170C        | 420 Hours  | -  | -  | -   | -   | -  | 3/231/0  |
| HTSL  | A6 | High Temperature Storage Life | 175C        | 500 Hours  | -  | -  | -   | 1/45/0  | -  | -  |
| HTOL  | B1 | Life Test                     | 125C        | 1000 Hours | -  | -  | -   | 3/231/0   | -  | -  |

| Type | #  | Test Name                   | Condition   | Duration   | Qual Device:<br><a href="#">OPA131UA/2K5</a> | QBS Product Reference:<br><a href="#">OPA145ID</a> | QBS Process Reference:<br><a href="#">OPA1662AIDGKRQ1</a> | QBS Process Reference:<br><a href="#">OPA1612AQDRQ1</a> | QBS Package Reference:<br><a href="#">OPA2863QDRQ1</a> | QBS Package/Process Reference:<br><a href="#">INA821ID</a> |
|------|----|-----------------------------|---|------------|--|--|---|---|--|--|
| HTOL | B1 | Life Test                   | 150C  | 300 Hours  | -  | 1/77/0   | -   | -   | 3/231/0  | 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  | -          | -  | -  | -   | 1/10/0  | 3/30/0   | -  |
| 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  | -   | -   | -  | 1/3/0  |
| ESD  | E2 | ESD HBM                     | -   | 2000 Volts | -  | -  | -   | 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  |
| CHAR | E5 | Electrical Characterization | Per Datasheet Parameters                            | -          | 1/30/0                                       | 1/30/0   | -   | 3/90/0  | 3/90/0   | 3/90/0   |

- QBS: Qual By Similarity
- Qual Device [OPA131UA/2K5](#) 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-2303-114

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

### **IMPORTANT NOTICE AND DISCLAIMER**

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale ([www.ti.com/legal/termsofsale.html](http://www.ti.com/legal/termsofsale.html)) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.