



## Product/Process Change Notice - PCN 23\_0146 Rev. -

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This notice is to inform you of a change that will be made to certain ADI products (see Appendix A) that you may have purchased in the last 2 years. **Any inquiries or requests with this PCN (additional data or samples) must be sent to ADI within 30 days of publication date.** ADI contact information is listed below.

|                              |                                                                                                 |
|------------------------------|-------------------------------------------------------------------------------------------------|
| <b>PCN Title:</b>            | Process Revision for Select Low Noise Amplifier Products                                        |
| <b>Publication Date:</b>     | 28-Sep-2023                                                                                     |
| <b>Effectivity Date:</b>     | 31-Dec-2023 <i>(the earliest date that a customer could expect to receive changed material)</i> |
| <b>Revision Description:</b> | Initial Release.                                                                                |

### Description Of Change:

Change in wafer fabrication to remove final Silicon Nitride.

### Reason For Change:

To tighten up transistor parameter distributions and improve performance uniformity.

### Impact of the change (positive or negative) on fit, form, function & reliability:

The device fit, form, function, and reliability as specified by Product Data Sheets will be unaffected by this change.

### Product Identification *(this section will describe how to identify the changed material)*

New material will be identified by date code.

### Summary of Supporting Information:

Qualification has been performed per Industry Standard Test Methods. See attached Qualification Results.

### Supporting Documents

**Attachment 1: Type:** Qualification Results Summary

[ADI\\_PCN\\_23\\_0146\\_Rev\\_-QualificationResults.pdf...](#)

Note: If applicable, the device material declaration will be updated due to material change.

### ADI Contact Information:

For questions on this PCN, please send an email to the regional contacts below or contact your local ADI sales representatives.

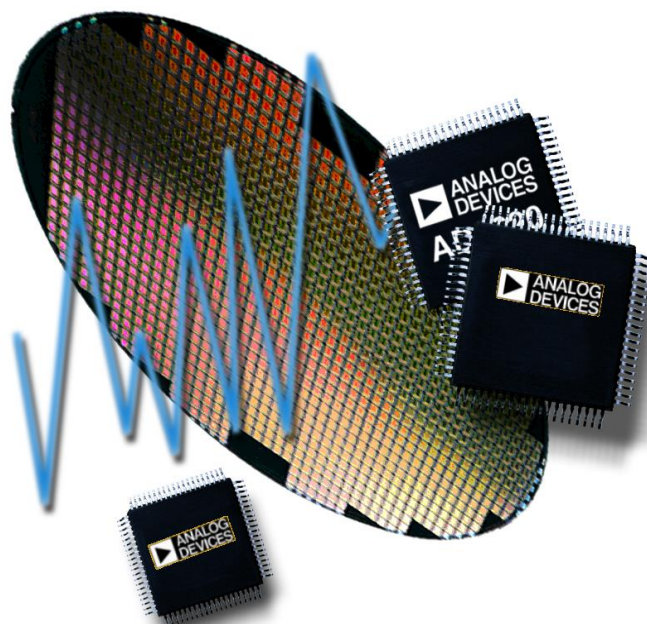
| <b>Americas:</b>        | <b>Europe:</b>        | <b>Japan:</b>        | <b>Rest of Asia:</b> |
|-------------------------|-----------------------|----------------------|----------------------|
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## Appendix A - Affected ADI Models:

### Added Parts On This Revision - Product Family / Model Number (43)

|                             |                             |                              |                           |                             |
|-----------------------------|-----------------------------|------------------------------|---------------------------|-----------------------------|
| ADL8100 / ADL8100ACPZN      | ADL8100 / ADL8100ACPZN-R7   | ADL8102 / ADL8102ACPZN       | ADL8102 / ADL8102ACPZN-R7 | ADL8104 / ADL8104ACPZN      |
| ADL8104 / ADL8104ACPZN-R7   | ADL8105 / ADL8105ACPZN      | ADL8105 / ADL8105ACPZN-R7    | ADL8107 / ADL8107ACPZN    | ADL8107 / ADL8107ACPZN-R7   |
| ADL8111 / ADL8111ACCZN      | ADL8111 / ADL8111ACCZN-R7   | ADL8112 / ADL8112ACCZ        | ADL8112 / ADL8112ACCZ-R7  | ADL8121 / ADL8121ACPZN      |
| ADL8121 / ADL8121ACPZN-R7   | ADL8141 / ADL8141ACPZN      | ADL8141 / ADL8141ACPZN-R7    | ADL8142 / ADL8142ACPZN    | ADL8142 / ADL8142ACPZN-R7   |
| ADL8142-2 / ADL8142-2C-CSL  | ADL8142-2 / ADL8142-2C-SX   | ADL8142-2 / ADL8142-2CHIP    | ADL9005 / ADL9005ACPZN    | ADL9005 / ADL9005ACPZN-R7   |
| HMC8411 / AD45294           | HMC8411 / AD45294TR         | HMC8411 / HMC8411LP2FE       | HMC8411 / HMC8411LP2FETR  | HMC8411 / HMC8411TCPZ-EP-PT |
| HMC8411 / HMC8411TCPZ-EP-R7 | HMC8412 / HMC8412CHIPS      | HMC8412 / HMC8412CHIPS-SX    | HMC8412 / HMC8412LP2FE    | HMC8412 / HMC8412LP2FETR    |
| HMC8412 / HMC8412TCPZ-EP-PT | HMC8412 / HMC8412TCPZ-EP-R7 | HMC8413 / AD45299            | HMC8413 / AD45299TR       | HMC8413 / HMC8413LP2FE      |
| HMC8413 / HMC8413LP2FE-CSL  | HMC8413 / HMC8413LP2FETR    | HMC8413 / HMC8413LP2FETR-CSL |                           |                             |

| Appendix B - Revision History: |              |                  |                  |
|--------------------------------|--------------|------------------|------------------|
| Rev                            | Publish Date | Effectivity Date | Rev Description  |
| Rev. -                         | 28-Sep-2023  | 31-Dec-2023      | Initial Release. |



# ***Reliability Report***

|                       |                                                       |
|-----------------------|-------------------------------------------------------|
| <b>Report Title:</b>  | <b>WIN PE15 and PE15-0P SiN Removal Qualification</b> |
| <b>Report Number:</b> | <b>18823</b>                                          |
| <b>Revision:</b>      | <b>A</b>                                              |
| <b>Date:</b>          | <b>13 September 2023</b>                              |

## Summary

This report documents the successful completion of the reliability qualification requirements for assessing the removal of SiN from select ADI products on this GaAs process.

## Die/Fab Product Characteristics

**Table 1.1: Die/Fab Product Characteristics- GaAs**

| Product Characteristics   | Product(s) to be qualified |                   |                   |
|---------------------------|----------------------------|-------------------|-------------------|
| Generic/Root Part #       | HMC8411 - PE15-0P          | HMC8413 - PE15-0P | ADL8104 - PE15-0P |
| Die Id                    | FP012 B                    | FP756 B           | FP786 B           |
| Die Size (mm)             | 0.94 x 0.85                | 0.94 x 1.47       | 1.85 x 1.85       |
| Wafer Fabrication Site    | WinSemi                    | WinSemi           | WinSemi           |
| Wafer Fabrication Process | GaAs                       | GaAs              | GaAs              |
| Die Substrate             | GaAs                       | GaAs              | GaAs              |
| Metallization / # Layers  | Au/2                       | Au/2              | Au/2              |
| Passivation               | SiN                        | SiN               | SiN               |

**Table 1.2: Die/Fab Product Characteristics- GaAs**

| Product Characteristics   | Product(s) to be qualified |                |                |
|---------------------------|----------------------------|----------------|----------------|
| Generic/Root Part #       | HMC8413 - PE15             | HMC8411 - PE15 | ADL8104 - PE15 |
| Die Id                    | FP756 A                    | FP012 A        | FP786 A        |
| Die Size (mm)             | 0.94 x 1.47                | 0.94 x 0.85    | 1.85 x 1.85    |
| Wafer Fabrication Site    | WinSemi                    | WinSemi        | WinSemi        |
| Wafer Fabrication Process | GaAs                       | GaAs           | GaAs           |
| Die Substrate             | GaAs                       | GaAs           | GaAs           |
| Metallization / # Layers  | Au/2                       | Au/2           | Au/2           |
| Passivation               | SiN                        | SiN            | SiN            |

## Die/Fab Test Results

**Table 2: Die/Fab Test Results - GaAs at WinSemi**

| Test Name                                           | Spec        | Conditions                          | Generic/Root Part # | Lot #        | Fail/SS |
|-----------------------------------------------------|-------------|-------------------------------------|---------------------|--------------|---------|
| High Temperature Operating Life (HTOL) <sup>1</sup> | JESD22-A108 | 150°C<Tj<175°C, Biased, 1,000 Hours | HMC8411 - PE15      | Q18823.1.HO1 | 0/77    |
|                                                     |             |                                     | ADL8104 - PE15      | Q18823.1.HO2 | 0/77    |
|                                                     |             |                                     | HMC8411 - PE15-0P   | Q18823.1.HO3 | 0/77    |
|                                                     |             |                                     | ADL8104 - PE15-0P   | Q18823.1.HO4 | 0/77    |
|                                                     |             |                                     | HMC8413 - PE15      | Q18823.1.HO5 | 0/77    |
|                                                     |             |                                     | HMC8413 - PE15-0P   | Q18823.1.HO6 | 0/77    |
| High Temperature Storage Life (HTSL)                | JESD22-A103 | 150°C, 1,000 Hours                  | ADL8104 - PE15      | Q18823.1.HS1 | 0/77    |
|                                                     |             |                                     | ADL8104 - PE15-0P   | Q18823.1.HS2 | 0/77    |

<sup>1</sup> These samples were subjected to preconditioning at MSL 3 with 3x reflow peak temp of 260°C prior to the start of the stress test.

## Package/Assembly Product Characteristics

**Table 3.1: Package/Assembly Product Characteristics - 16-LFCSP at ASE (AEK)**

| Product Characteristics            | Product(s) to be qualified   |                              |
|------------------------------------|------------------------------|------------------------------|
| Generic/Root Part #                | ADL8104 - PE15               | ADL8104 - PE15-0P            |
| Package                            | 16-LFCSP                     | 16-LFCSP                     |
| Body Size (mm)                     | 3.00 x 3.00 x 0.75           | 3.00 x 3.00 x 0.75           |
| Assembly Location                  | ASE (AEK)                    | ASE (AEK)                    |
| MSL/Peak Reflow Temperature(°C)    | 3 / 260°C                    | 3 / 260°C                    |
| Mold Compound                      | Sumitomo G700LYT             | Sumitomo G700LYT             |
| Die Attach/Underfill/TIM           | Hitachi EN 4900GC conductive | Hitachi EN 4900GC conductive |
| Leadframe Material                 | Copper                       | Copper                       |
| Wire Bond Material/Diameter (mils) | MKE R 2N Gold / 1.00         | MKE R 2N Gold / 1.00         |

**Table 3.2: Package/Assembly Product Characteristics - 6-LFCSP at ASE (AEK)**

| Product Characteristics            | Product(s) to be qualified      |                                 |                                 |                                 |
|------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Generic/Root Part #                | HMC8411 - PE15                  | HMC8411 - PE15-0P               | HMC8413 - PE15                  | HMC8413 - PE15-0P               |
| Package                            | 6-LFCSP                         | 6-LFCSP                         | 6-LFCSP                         | 6-LFCSP                         |
| Body Size (mm)                     | 2.00 x 2.00 x 0.85              | 2.00 x 2.00 x 0.85              | 2.00 x 2.00 x 0.85              | 2.00 x 2.00 x 0.85              |
| Assembly Location                  | ASE (AEK)                       | ASE (AEK)                       | ASE (AEK)                       | ASE (AEK)                       |
| MSL/Peak Reflow Temperature(°C)    | 3 / 260°C                       | 3 / 260°C                       | 3 / 260°C                       | 3 / 260°C                       |
| Mold Compound                      | Sumitomo G700LYT                | Sumitomo G700LYT                | Sumitomo G700LYT                | Sumitomo G700LYT                |
| Die Attach                         | Hitachi EN 4900GC<br>conductive | Hitachi EN 4900GC<br>conductive | Hitachi EN 4900GC<br>conductive | Hitachi EN 4900GC<br>conductive |
| Leadframe Material                 | Copper                          | Copper                          | Copper                          | Copper                          |
| Wire Bond Material/Diameter (mils) | MKE R 2N Gold / 1.00            | MKE R 2N Gold / 1.00            | MKE R 2N Gold / 1.00            | MKE R 2N Gold / 1.00            |

## Package/Assembly Test Results

**Table 4: Package/Assembly Test Results - LFCSP at ASE (AEK)**

| Test Name                             | Spec        | Conditions                 | Generic/Root Part # | Lot #        | Fail/SS |
|---------------------------------------|-------------|----------------------------|---------------------|--------------|---------|
| High Temperature Storage Life (HTSL)  | JESD22-A103 | 150°C, 1,000 Hours         | ADL8104 - PE15      | Q18823.1.HS1 | 0/77    |
|                                       |             |                            | ADL8104 - PE15-0P   | Q18823.1.HS2 | 0/77    |
| Temperature Cycling (TC) <sup>1</sup> | JESD22-A104 | -55°C/+125°C, P1000        | ADL8104 - PE15-0P   | Q18823.1.TC3 | 0/77    |
|                                       |             |                            | HMC8411 - PE15-0P   | Q18823.1.TC1 | 0/77    |
|                                       |             |                            | HMC8413 - PE15-0P   | Q18823.1.TC2 | 0/77    |
| Solder Heat Resistance (SHR)          | J-STD-020   | MSL-1                      | HMC8411 - PE15-0P   | Q18823.1.SH2 | 0/11    |
|                                       |             |                            | HMC8413 - PE15-0P   | Q18823.1.SH4 | 0/11    |
|                                       |             |                            | HMC8411 - PE15      | Q18823.1.SH1 | 0/11    |
|                                       |             |                            | HMC8413 - PE15      | Q18823.1.SH3 | 0/11    |
| Unbiased HAST (UHST) <sup>1</sup>     | JESD22-A118 | 110C 85%RH 17.7 psia, P264 | ADL8104 - PE15      | Q18823.1.UH3 | 0/77    |
|                                       |             |                            | ADL8104 - PE15-0P   | Q18823.1.UH6 | 0/77    |
|                                       |             |                            | HMC8411 - PE15      | Q18823.1.UH1 | 0/77    |
|                                       |             |                            | HMC8411 - PE15-0P   | Q18823.1.UH4 | 0/77    |
|                                       |             |                            | HMC8413 - PE15      | Q18823.1.UH2 | 0/77    |
|                                       |             |                            | HMC8413 - PE15-0P   | Q18823.1.UH5 | 0/77    |

<sup>1</sup> These samples were subjected to preconditioning at MSL 3 with 3x reflow peak temp of 260°C prior to the start of the stress test.

## ESD Test Results

The results of Human Body Model (HBM) and Field-Induced Charged Device Model (FICDM) ESD testing are summarized in Table 5. ADI measures ESD results using stringent test procedures based on the specifications listed. Any comparison with another supplier's results should ensure that the same ESD test procedures have been used. For further details, please see the EOS/ESD chapter of the ADI Reliability Handbook (available via the 'Quality and Reliability' link on [Analog Devices' web site](#)).

**Table 5: HMC8411 - PE15-0P ESD Test Results**

| ESD Model | Package | ESD Test Spec          | RC Network            | Highest Pass Level | Class |
|-----------|---------|------------------------|-----------------------|--------------------|-------|
| FICDM     | 6-LFCSP | JS-002                 | 1 $\Omega$ , Cpkg     | $\pm 1250V$        | C3    |
| HBM       | 6-LFCSP | ESDA/JEDEC JS-001-2011 | 1.5k $\Omega$ , 100pF | $\pm 500V$         | 1B    |

## Approvals

Reliability Engineer: Robert Parker-Mason