



## Final Product/Process Change Notification

Document #:FPCN24911XF

Issue Date: 03 Aug 2023

|                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                  |                                      |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------|
| <b>Title of Change:</b>                                                                                                                                                                                                                                                                                                                                                                                                            | Qualify JCET/ISMF as alternative site for process of Bump and Silicon etch for x4DFN products.                                                                                                                                                                                                                                                                   |                                      |                |
| <b>Proposed First Ship date:</b>                                                                                                                                                                                                                                                                                                                                                                                                   | 10 Nov 2023 or earlier if approved by customer                                                                                                                                                                                                                                                                                                                   |                                      |                |
| <b>Contact Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                        | Contact your local onsemi Sales Office or <a href="mailto:Lan.Vu@onsemi.com">Lan.Vu@onsemi.com</a>                                                                                                                                                                                                                                                               |                                      |                |
| <b>PCN Samples Contact:</b>                                                                                                                                                                                                                                                                                                                                                                                                        | Contact your local onsemi Sales Office.<br>Sample requests are to be submitted no later than 30 days from the date of first notification, Initial PCN or Final PCN, for this change.<br>Samples delivery timing will be subject to request date, sample quantity and special customer packing/label requirements.                                                |                                      |                |
| <b>Additional Reliability Data:</b>                                                                                                                                                                                                                                                                                                                                                                                                | Contact your local onsemi Sales Office or <a href="mailto:Nicky.Siu@onsemi.com">Nicky.Siu@onsemi.com</a>                                                                                                                                                                                                                                                         |                                      |                |
| <b>Type of Notification:</b>                                                                                                                                                                                                                                                                                                                                                                                                       | This is a Final Product/Process Change Notification (FPCN) sent to customers. FPCNs are issued 90 days prior to implementation of the change.<br>onsemi will consider this change accepted, unless an inquiry is made in writing within 30 days of delivery of this notice. To do so, contact <a href="mailto:PCN.Support@onsemi.com">PCN.Support@onsemi.com</a> |                                      |                |
| <b>Marking of Parts/ Traceability of Change:</b>                                                                                                                                                                                                                                                                                                                                                                                   | No change in device marking.<br>Affected parts with this changing will be identified by the date code                                                                                                                                                                                                                                                            |                                      |                |
| <b>Change Category:</b>                                                                                                                                                                                                                                                                                                                                                                                                            | Assembly Change                                                                                                                                                                                                                                                                                                                                                  |                                      |                |
| <b>Change Sub-Category(s):</b>                                                                                                                                                                                                                                                                                                                                                                                                     | Manufacturing Site Addition                                                                                                                                                                                                                                                                                                                                      |                                      |                |
| <b>Sites Affected:</b>                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                  |                                      |                |
| <b>onsemi Sites</b>                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                  | <b>External Foundry/Subcon Sites</b> |                |
| onsemi, ISMF Malaysia                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                  | JCET, China                          |                |
| <b>Description and Purpose:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                  |                                      |                |
| <p>This Final Product Change Notification (FPCN) is to announce the qualification of JCET (China) and ISMF (Malaysia) for bumping and Silicon-etching process of devices in X4DFN package (molded- WLCSP).</p> <p>Upon expiration of this FPCN, new manufacturing flow of JCET/ISMF will be utilized as an alternative flow to produce X4DFN products.</p> <p>There are no product marking changes as a result of this change.</p> |                                                                                                                                                                                                                                                                                                                                                                  |                                      |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>From</b>                                                                                                                                                                                                                                                                                                                                                      | <b>To</b>                            |                |
| <b>Bumping/Silicon etching</b>                                                                                                                                                                                                                                                                                                                                                                                                     | Niigata/Niigata                                                                                                                                                                                                                                                                                                                                                  | Niigata/Niigata                      | JCET/ISMF      |
| <b>Bump/Pillar Structure</b>                                                                                                                                                                                                                                                                                                                                                                                                       | CuSnAg                                                                                                                                                                                                                                                                                                                                                           | No change                            | CuSnAg         |
| <b>Polymer Material, Thickness</b>                                                                                                                                                                                                                                                                                                                                                                                                 | PBO, 5um                                                                                                                                                                                                                                                                                                                                                         | No change                            | PBO, 5um       |
| <b>Bump/Pillar Height</b>                                                                                                                                                                                                                                                                                                                                                                                                          | 15um                                                                                                                                                                                                                                                                                                                                                             | No change                            | 15um           |
| <b>UBM Material, Thickness, Diameter</b>                                                                                                                                                                                                                                                                                                                                                                                           | TiCu 1750/3500                                                                                                                                                                                                                                                                                                                                                   | No change                            | TiCu 1000/4000 |



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### Reliability Data Summary:

QV DEVICE NAME: NSR02301MX4T5G

RMS: S89327, S90898

PACKAGE: X4DFN-2, 0.445x0.24mm, 0.27P

| Test                                    | Specification                | Condition                                                           | Interval   | Results |
|-----------------------------------------|------------------------------|---------------------------------------------------------------------|------------|---------|
| High Temperature Reverse Bias           | JESD22-A108                  | Ta = 95°C, 100% max rated V                                         | 1008 hrs   | 0/231   |
| High Temperature Storage Life           | JESD22-A103                  | Ta = 150°C                                                          | 1008 hrs   | 0/231   |
| Preconditioning                         | J-STD-020, JESD-A113         | MSL 1 @ 260°C, Pre IOL, TC, uHAST, HAST for surface mount pkgs only |            | 0/924   |
| Intermittent Operating Life             | MIL-STD-750 (M1037) AEC-Q101 | Ta=+25°C, delta Tj=100°C On/off = 2 mins                            | 15000 cycs | 0/231   |
| Temperature Cycling                     | JESD22-A104                  | Ta = -40°C to +125°C                                                | 1700 cycs  | 0/231   |
| High Temp. High Humidity Reverse Bias   | JESD22-A101                  | 85°C, 85% RH, bias                                                  | 1008 hrs   | 0/231   |
| Unbiased Highly Accelerated Stress Test | JESD22-A118                  | 130°C, 85% RH, 18.8psig, unbiased                                   | 96 hrs     | 0/231   |
| Physical Dimensions                     | JESD22-B120                  |                                                                     |            | 0/30    |

### Electrical Characteristics Summary:

Electrical characteristics are not impacted.

### List of Affected Parts:

**Note:** Only the standard (off the shelf) part numbers are listed in the parts list. Any custom parts affected by this PCN are shown in the customer specific PCN addendum in the PCN email notification, or on the [PCN Customized Portal](#).

| Part Number    | Qualification Vehicle |
|----------------|-----------------------|
| NSR05201MX4T5G | NSR02301MX4T5G        |
| NSR01301MX4T5G | NSR02301MX4T5G        |
| NSR05301MX4T5G | NSR02301MX4T5G        |
| NSR02301MX4T5G | NSR02301MX4T5G        |