

## Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

| Supplier                  |  | User Part Number  |                                   |           |            |           |
|---------------------------|--|---|-----------------------------------|-----------|------------|-----------|
| Nexperia B.V.             |  | NUP1301QA   |                                   |           |            |           |
| Name of Laboratory        |  | Part Description  |                                   |           |            |           |
| Assembly reliability labs |  | Nexperia DHAM<br>MCD package<br>Small Signal Bipolar Protection                                   |                                   |           |            |           |
| Based on AEC-Q101 Test    |  | Test Conditions   | Duration                          | # Lots    | # Quantity | # Rejects |
| # E1                      | <b>TEST</b><br>Pre- and Post-Stress<br>Electrical Test         | Tamb = 25 °C  | N/A                               | see below | all parts  | see below |
| # A1                      | <b>PC</b><br>Preconditioning                                   | JESD22-A113<br>Bake Tamb = 125 °C<br>Soak Tamb = 85 °C, RH = 85%<br>Reflow soldering              | 24 hours<br>168 hours<br>3 cycles | 142       | 11435      | 0         |
| # B1                      | <b>HTRB</b><br>High Temperature Reverse<br>Bias                | MIL-STD-750-1<br>M1038 Method A<br>Tj = Tjmax, Vr = 100% of max. datasheet<br>reverse voltage     | 1000 hours                        | 78        | 6240       | 0         |
| # A4                      | <b>TC</b><br>Temperature Cycling                               | JESD22-A104<br>-65 °C to Tjmax, not to exceed 150°C   | 1000 cycles                       | 53        | 4225       | 0         |
| # A3 alt                  | <b>AC</b><br>Autoclave   | JESD22-A102<br>Tamb = 121 °C, RH = 100 %<br>Pressure = 205 kPa (29.7 psia)                        | 96 hours                          | 39        | 3165       | 0         |
| # A2 alt                  | <b>H3TRB</b><br>High Humidity High<br>Temperature Reverse Bias | JESD22-A101<br>Tamb = 85 °C, RH = 85%, VR = 80 % of<br>rated reverse voltage <sup>[1]</sup>       | 1000 hours                        | 51        | 4045       | 0         |
| # A5                      | <b>IOL</b><br>Intermittent Operating Life                      | MIL-STD-750 Method 1037<br>ton = toff, devices powered to insure ΔTj =<br>100 °C for 15000 cycles | 1000 hours                        | n.a.      | n.a.       | n.a.      |
| # C8                      | <b>RSH</b><br>Resistance to Solder Heat                        | JESD22-A111<br>260 °C ± 5 °C  | 10 s                              | n.a.      | n.a.       | n.a.      |
| # C10                     | <b>SD</b><br>Solderability                                     | J-STD-002   |                                   | 78        | 780        | 0         |

[1] The maximum applied voltage is limited by test chamber set up and does not exceed 115V.

### Calculation of FIT and MTF

Test considered for FIT calculation: High Temperature Reverse Bias (HTRB, Test #B1)

Confidence level 60%, derated to 55 °C, activation energy 0.7 eV, test time 168 to 1000 hours

| Wafer Fab        | Technology                         | Quantity | Rejects | Failure Rate (FIT) | MTTF (hrs) |
|------------------|------------------------------------|----------|---------|--------------------|------------|
| Nexperia<br>DHAM | Small Signal Bipolar<br>Protection | 6240     | 0       | 0.68               | 1.47E+09   |

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