

## Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

| Supplier   |  | User Part Number            |           |            |           |  |
|--|--|-----------------------------|-----------|------------|-----------|--|
| Nexperia B.V.  |  | 74HC109D-Q100               |           |            |           |  |
| <b>Part Description:</b> Dual J-/K flip-flop with set and reset; positive-edge trigger |  |                             |           |            |           |  |
| Function Family: HC(T)<br>Process family: Super micron<br>Package family: SO           |  |                             |           |            |           |  |
| JESD47 Test  | Test Conditions  | Duration                    | # Lots    | # Quantity | # Rejects |  |
| # 1<br><b>TEST</b><br>Pre- and Post-Stress<br>Electrical Test                          | Tamb = 25 °C   | N/A                         | see below | all parts  | see below |  |
| # 2<br><b>PC</b><br>Preconditioning  | JESD22-A113<br>MSL 1   | N/A                         | 378       | 26431      | 0         |  |
| # 5a<br><b>HTOL EFR</b><br>High Temperature<br>Operating Life Extrinsic                | JESD22-A108<br>Tj = 150°C<br>V <sub>CCMAX</sub> ≤ V ≤ 1.2*V <sub>CCMAX</sub> | 48 hours<br>or<br>168 hours | 58        | 23674      | 0         |  |
| # 5b<br><b>HTOL IFR</b><br>High Temperature<br>Operating Life Intrinsic                | JESD22-A108<br>Tj = 150°C<br>V <sub>CCMAX</sub> ≤ V ≤ 1.2*V <sub>CCMAX</sub> | ≥500 hours                  | 55        | 2997       | 0         |  |
| # 7<br><b>TC</b><br>Temperature Cycling  | JESD22-A104<br>-65 °C to 150°C   | ≥500 cycles                 | 49        | 15770      | 4         |  |
| # 9<br><b>uHAST / HAST</b><br>unbiased or biased High<br>Accelerated Stress Test       | JESD22-A101<br>Tamb = 130 °C,<br>RH = 85%, V = V <sub>CCMAX</sub>            | 96 hours                    | 187       | 10661      | 0         |  |

### Calculation of PPM, FIT and MTTF

Test considered for PPM calculation: High Temperature Operating LifeTest Extrinsic (HTOL EFR, Test # 5a above)

Test considered for FIT and MTTF calculations: High Temperature Operating LifeTest Intrinsic (HTOL IFR, Test # 5b above)

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

| Product Family | Package Family | Quantity | Rejects | Extrinsic Failure Rate (PPM) | Intrinsic Failure Rate (FIT) | MTTF (hrs) |
|----------------|----------------|----------|---------|------------------------------|------------------------------|------------|
| HC(T)          | SO             | 2997     | 0       | 39                           | 1.3                          | 8.12 E+08  |