## nexperia

## **Reliability Monitoring Results**

## Quarters: Q1/2021 to Q4/2021

Based on structural similarity

| Suppli        | ier   | User Part Number   |                             |           |            |              |  |  |  |
|---------------|---|--|-----------------------------|-----------|------------|--------------|--|--|--|
| Nexperia B.V. |   | 74HCT4053D   | 74HCT4053D                  |           |            |              |  |  |  |
| Fur<br>Pro    | Description: Triple single-po<br>nction Family: HC(T)<br>ocess family: Super micron<br>ckage family: SO | le. double-throw analog sw   | itch; TTL enabled           | 1         |            |              |  |  |  |
| JESD4         | 17 Test   | Test Conditions  | Duration                    | # Lots    | # Quantity | #<br>Rejects |  |  |  |
| # 1           | <b>TEST</b><br>Pre- and Post-Stress<br>Electrical Test  | Tamb = 25 °C   | N/A                         | see below | all parts  | see<br>below |  |  |  |
| # 2           | <b>PC</b><br>Preconditioning  | JESD22-A113<br>MSL 1   | N/A                         | 378       | 26431      | 0            |  |  |  |
| # 5a          | HTOL EFR<br>High Temperature<br>Operating Life Extrinsic  | JESD22-A108<br>Tj = 150°C<br>V <sub>CCMAX</sub> $\leq$ V $\leq$ 1.2*V <sub>CCMAX</sub> | 48 hours<br>or<br>168 hours | 58        | 23674      | 0            |  |  |  |
| # 5b          | HTOL IFR<br>High Temperature<br>Operating Life Intrinsic  | JESD22-A108<br>Tj = 150°C<br>V <sub>CCMAX</sub> $\leq$ V $\leq$ 1.2*V <sub>CCMAX</sub> | ≥500 hours                  | 55        | 2997       | 0            |  |  |  |
| # 7           | TC<br>Temperature Cycling   | JESD22-A104<br>-65 °C to 150°C   | ≥500 cycles                 | 49        | 15770      | 4            |  |  |  |
| # 9           | uHAST / HAST<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<br>Family | Package<br>Family | Quantity | Rejects | Extrinsic<br>Failure Rate (PPM) | Intrinsic<br>Failure Rate (FIT) | MTTF (hrs) |
|-------------------|-------------------|----------|---------|---------------------------------|---------------------------------|------------|
| HC(T)             | SO                | 2997     | 0       | 39                              | 1.3                             | 8.12 E+08  |

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