

## Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

| Supplier                  |                                                                                                                                                               | User Part Number                                                |           |            |           |  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------|------------|-----------|--|
| Nexperia B.V.             |                                                                                                                                                               | PDTTC114EQB                                                     |           |            |           |  |
| Name of Laboratory        |                                                                                                                                                               | Part Description                                                |           |            |           |  |
| Assembly reliability labs |                                                                                                                                                               | Nexperia DHAM<br>MCD package<br>Small Signal Bipolar Transistor |           |            |           |  |
| Test                      | Test Conditions                                                                                                                                               | Duration                                                        | # Lots    | # Quantity | # Rejects |  |
| # 1                       | <b>TEST</b><br>Pre- and Post-Stress<br>Electrical Test<br>Tamb = 25 °C                                                                                        | N/A                                                             | see below | all parts  | see below |  |
| # 2                       | <b>PC</b><br>Preconditioning<br>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                               | 464       | 20960      | 0         |  |
| # 5                       | <b>HTRB</b><br>High Temperature Reverse<br>Bias<br>MIL-STD-750-1<br>M1039 Method A<br>Tj = Tjmax, Vr = 100% of max. datasheet<br>reverse voltage              | 1000 hours                                                      | 415       | 18680      | 0         |  |
| # 7                       | <b>TC</b><br>Temperature Cycling<br>JESD22-A104<br>-65 °C to Tjmax, not to exceed 150°C                                                                       | 500 cycles                                                      | 116       | 5240       | 0         |  |
| # 8 or                    | <b>UHAST</b><br>Unbiased HAST<br>JESD22-A118<br>Tamb = 130 °C, RH = 85 %                                                                                      | 96 hours                                                        | 116       | 5240       | 0         |  |
| # 8a                      | <b>AC</b><br>Autoclave<br>JESD22-A102<br>Tamb = 121 °C, RH = 100 %<br>Pressure = 205 kPa (29.7 psia)                                                          |                                                                 |           |            |           |  |
| # 9                       | <b>H3TRB</b><br>High Humidity High<br>Temperature Reverse Bias<br>JESD22-A101<br>Tamb = 85 °C, RH = 85%, VR = 80 % of<br>rated reverse voltage <sup>[1]</sup> | 1000 hours                                                      | 116       | 5240       | 0         |  |
| # 10                      | <b>IOL</b><br>Intermittent Operating Life<br>MIL-STD-750 Method 1037<br>ton = toff, devices powered to insure ΔTj =<br>100 °C                                 | 333 hours                                                       | 116       | 5240       | 0         |  |
| # 20                      | <b>RSH</b><br>Resistance to Solder Heat<br>JESD22-A111<br>260 °C ± 5 °C                                                                                       | 10 s                                                            | n.a.      | n.a.       | n.a.      |  |
| # 21                      | <b>SD</b><br>Solderability<br>J-STD-002                                                                                                                       |                                                                 | 86        | 2580       | 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 # 5)

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>Transistor | 18680    | 0       | 0,23               | 4,40E+09   |

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