

## Quarterly Reliability Monitoring Results

Quarters: Q3/2021 to Q4/2022

Based on structural similarity

| Supplier                  | User Part Number  |  |
|---------------------------|---|--|
| Nexperia B.V.             | PHPT610030NK-Q  |  |
| Name of Laboratory        | Part Description  |  |
| Assembly reliability labs | Nexperia DHAM Small Signal Bipolar Transistor<br>SMD package  |  |
| Based on AEC-Q101 Test    | Test Conditions   | Duration # Lots # Quantity # Rejects           |
| # E1                      | <b>TEST</b><br>Pre- and Post-Stress<br>Electrical Test<br>Tamb = 25 °C  | N/A see below all parts see below              |
| # A1                      | <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 1265 69890 0 |
| # B1                      | <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 316 18920 0                         |
| # A4                      | <b>TC</b><br>Temperature Cycling<br>JESD22-A104<br>-65 °C to Tjmax, not to exceed 150°C   | 1000 cycles 260 15680 0                        |
| # A3 or                   | <b>UHAST</b><br>Unbiased HAST<br>JESD22-A118<br>Tamb = 130 °C, RH = 85 %  | 96 hours 270 16360 0                           |
| # A3 alt                  | <b>AC</b><br>Autoclave<br>JESD22-A102<br>Tamb = 121 °C, RH = 100 %<br>Pressure = 205 kPa (29.7 psia)  |  |
| # A2 alt                  | <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 262 15760 0                         |
| # A5                      | <b>IOL</b><br>Intermittent Operating Life<br>MIL-STD-750 Method 1037<br>ton = toff, devices powered to insure ΔTj =<br>100 °C for 15000 cycles                | 1000 hours 262 15760 0                         |
| # C8                      | <b>RSH</b><br>Resistance to Solder Heat<br>JESD22-A111<br>260 °C ± 5 °C   | 10 s 211 6330 0                                |
| # C10                     | <b>SD</b><br>Solderability<br>J-STD-002   | 468 4680 0                                     |

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

### Calculation of FIT and MTTF

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>Transistor | 18920    | 0       | 0,22               | 4,46E+09   |

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