

## Quarterly Reliability Monitoring Results

Quarters: Q3/2021 to Q4/2022

Based on structural similarity

| Supplier                  |  | User Part Number  |                                   |            |           |           |
|---------------------------|--|---|-----------------------------------|------------|-----------|-----------|
| Nexperia B.V.             |  | BC857A  |                                   |            |           |           |
| Name of Laboratory        |  | Part Description  |                                   |            |           |           |
| Assembly reliability labs |  | Nexperia DHAM<br>SMD 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         | Tamb = 25 °C  | N/A                               | see below  | all parts | see below |
| # 2                       | <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 | 1265       | 69890     | 0         |
| # 5                       | <b>HTRB</b><br>High Temperature Reverse<br>Bias                | MIL-STD-750-1<br>M1039 Method A<br>Tj = Tjmax, Vr = 100% of max. datasheet<br>reverse voltage     | 1000 hours                        | 316        | 18920     | 0         |
| # 7                       | <b>TC</b><br>Temperature Cycling                               | JESD22-A104<br>-65 °C to Tjmax, not to exceed 150°C   | 200 cycles                        | 260        | 15680     | 0         |
| # 8 or                    | <b>UHAST</b><br>Unbiased HAST                                  | JESD22-A118<br>Tamb = 130 °C, RH = 85 %   | 96 hours                          | 270        | 16360     | 0         |
| # 8a                      | <b>AC</b><br>Autoclave   | 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 | JESD22-A101<br>Tamb = 85 °C, RH = 85%, VR = 80 % of<br>rated reverse voltage <sup>[1]</sup>       | 1000 hours                        | 262        | 15760     | 0         |
| # 10                      | <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 | 333 hours                         | 262        | 15760     | 0         |
| # 20                      | <b>RSH</b><br>Resistance to Solder Heat                        | JESD22-A111<br>260 °C ± 5 °C  | 10 s                              | 211        | 6330      | 0         |
| # 21                      | <b>SD</b><br>Solderability                                     | 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 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 | 18920    | 0       | 0,22               | 4,46E+09   |

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