

Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

| Supplier                  |                                                                | User Part Number                                                                                  |                                   |           |            |           |
|---------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------|-----------|------------|-----------|
| Nexperia B.V.             |                                                                | BC856A-Q                                                                                          |                                   |           |            |           |
| Name of Laboratory        |                                                                | Part Description                                                                                  |                                   |           |            |           |
| Assembly reliability labs |                                                                | Nexperia DHAM<br>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         | Tamb = 25 °C                                                                                      | N/A                               | see below | all parts  | see below |
| # A1                      | <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 | 1674      | 70490      | 0         |
| # B1                      | <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                        | 415       | 18680      | 0         |
| # A4                      | <b>TC</b><br>Temperature Cycling                               | JESD22-A104<br>-65 °C to Tjmax, not to exceed 150°C                                               | 1000 cycles                       | 343       | 15360      | 0         |
| # A3 or                   | <b>UHAST</b><br>Unbiased HAST                                  | JESD22-A118<br>Tamb = 130 °C, RH = 85 %                                                           | 96 hours                          | 362       | 15920      | 0         |
| # A3 alt                  | <b>AC</b><br>Autoclave                                         | 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 | JESD22-A101<br>Tamb = 85 °C, RH = 85%, VR = 80 % of<br>rated reverse voltage <sup>[1]</sup>       | 1000 hours                        | 343       | 15360      | 0         |
| # A5                      | <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 | 1000 hours                        | 343       | 15360      | 0         |
| # C8                      | <b>RSH</b><br>Resistance to Solder Heat                        | JESD22-A111<br>260 °C ± 5 °C                                                                      | 10 s                              | 283       | 8490       | 0         |
| # C10                     | <b>SD</b><br>Solderability                                     | J-STD-002                                                                                         |                                   | 214       | 6420       | 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 | 18680    | 0       | 0,23               | 4,40E+09   |

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