

Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

| Supplier Nexperia B.V. | | User Part Number | | | | | | |
|---|---|---|-----------------------|-----------|------------|-----------|--|--|
| | | BC856AQC | | | | | | |
| Name of Laboratory Assembly reliability labs | | Part Description | | | | | | |
| | | Nexperia DHAM Small Signal Bipolar Transistor | | | | | | |
| | | MCD package | | | | | | |
| Test | | Test Conditions | Duration | # Lots | # Quantity | # Rejects | | |
| | TEST | | | | | | | |
| | Pre- and Post-Stress | | | | | | | |
| # 1 | Electrical Test | Tamb = 25 °C | N/A | see below | all parts | see below | | |
| | | JESD22-A113 | | | | | | |
| | DC. | Bake Tamb = 125 °C | 24 hours | | | | | |
| # 2 | PC Preconditioning | Soak Tamb = 85 °C, RH = 85% Reflow soldering | 168 hours 3 cycles | 464 | 20060 | 0 | | |
| # 2 | Freconditioning | <u> </u> | 3 Cycles | 464 | 20960 | 0 | | |
| | HTRB | MIL-STD-750-1 | | | | | | |
| | | M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet | | | | | | |
| # 5 | Bias | reverse voltage | 1000 hours | 415 | 18680 | 0 | | |
| # 3 | <u> </u> | Total so voltage | 1000 110013 | 413 | 10000 | 0 | | |
| | тс | JESD22-A104 | | | | | | |
| # 7 | Temperature Cycling | -65 °C to Tjmax, not to exceed 150°C | 500 cycles | 116 | 5240 | 0 | | |
| " ' | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | , , , , , , , , , , , , , , , , , , , | 300 cycles | 110 | 32 10 | <u> </u> | | |
| | UHAST | JESD22-A118 | | | | | | |
| # 8 or | Unbiased HAST | Tamb = 130 °C, RH = 85 % | — 96 hours | 116 | 5240 | 0 | | |
| | | JESD22-A102 | | | | | | |
| | AC | Tamb = 121 °C, RH = 100 % | | | | | | |
| # 8a | Autoclave | Pressure = 205 kPa (29.7 psia) | | | | | | |
| | | | | | | | | |
| | H3TRB | JESD22-A101 | | | | | | |
| | High Humidity High | Tamb = 85 °C, RH = 85%, VR = 80 % of | | | | | | |
| # 9 | Temperature Reverse Bias | rated reverse voltage ^[1] | 1000 hours | 116 | 5240 | 0 | | |
| | | MIL-STD-750 Method 1037 | | | | | | |
| | IOL | ton = toff, devices powered to insure ΔTj = | | | | | | |
| # 10 | Intermittent Operating Life | 100 °C | 333 hours | 116 | 5240 | 0 | | |
| | | | | | | | | |
| | RSH | JESD22-A111 | | | | | | |
| # 20 | Resistance to Solder Heat | 260 °C ± 5 °C | 10 s | n.a. | n.a. | n.a. | | |
| | SD Caldanahilihu | 1 CTD 003 | | | | _ | | |
| # 21 | Solderability | 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 MTTF

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 | Small Signal Bipolar | | | | |
| DHAM | Transistor | 18680 | 0 | 0,23 | 4,40E+09 |

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