

Quarterly Reliability Monitoring Results

Quarters: Q1/2020 to Q4/2020

Based on structural similarity

| Supplier | | User Part Number | | | | |
|---------------------------|--|---|-----------|------------|-----------|--|
| Nexperia B.V. | | PEMB4 | | | | |
| Name of Laboratory | | Part Description | | | | |
| Assembly reliability labs | | Nexperia DHAM Small Signal Bipolar Transistor SMD package | | | | |
| AEC-Q101 Test | Test Conditions | Duration | # Lots | # Quantity | # Rejects | |
| # 1 | TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C | N/A | see below | all parts | see below | |
| # 2 | PC Preconditioning JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering | 24 hours 168 hours 3 cycles | 679 | 48870 | 0 | |
| # 5 | HTRB High Temperature Reverse Bias MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet reverse voltage | 1000 hours | 156 | 12480 | 0 | |
| # 7 | TC Temperature Cycling JESD22-A104 -65 °C to Tjmax, not to exceed 150°C | 1000 cycles | 144 | 11520 | 0 | |
| # 8 | AC Autoclave JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia) | 96 hours | 144 | 11520 | 0 | |
| # 9 | H3TRB High Humidity High Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR > 80 % of rated reverse voltage | 1000 hours | 140 | 11200 | 0 | |
| # 10 | IOL Intermittent Operating Life MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles | 1000 hours | 142 | 11360 | 0 | |
| # 20 | RSH Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C | 10 s | 109 | 3270 | 0 | |
| # 21 | SD Solderability J-STD-002 Test method B and D | | 264 | 2640 | 0 | |

Calculation of FIT and MTTF

Test considered for FIT calculation: High Temperature Reverse Bias (HTRB, AEC-Q101 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 DHAM | Small Signal Bipolar Transistor | 12480 | 0 | 0,34 | 2,94E+09 |

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