

Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2022

Based on structural similarity

| Supplier | | User Part Number | | | | |
|---|---|---|-----------------------------|-----------|------------|-----------|
| Nexperia B.V. | | 74HCT109D-Q100 | | | | |
| Part Description: Dual J-/K flip-flop with set and reset; positive-edge trigger; TTL enabled | | | | | | |
| Function Family: HC(T) Process family: Super micron Package family: SO | | | | | | |
| JESD47 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 MSL 1 | N/A | 460 | 29380 | 0 |
| # 5a | HTOL EFR High Temperature Operating Life Extrinsic | JESD22-A108 Tj = 150°C VCCMAX ≤ V ≤ 1.2*VCCMAX | 48 hours or 168 hours | 63 | 23993 | 0 |
| # 5b | HTOL IFR High Temperature Operating Life Intrinsic | JESD22-A108 Tj = 150°C VCCMAX ≤ V ≤ 1.2*VCCMAX | ≥500 hours | 59 | 3272 | 0 |
| # 7 | TC Temperature Cycling | JESD22-A104 -65 °C to 150°C | ≥500 cycles | 69 | 17630 | 4 |
| # 9 | uHAST / HAST unbiased or biased High Accelerated Stress Test | JESD22-A101 Tamb = 130 °C, RH = 85%, V = VCCMAX | 96 hours | 202 | 11750 | 0 |

Calculation of PPM, FIT and MTTF

Test considered for PPM calculation: High Temperature Operating LifeTest Extrinsic (HTOL EFR, Test # 5a above)
 Test considered for FIT and MTTF calculations: High Temperature Operating LifeTest Intrinsic (HTOL IFR, Test # 5b above)

Confidence level 60%, derated to 55 °C, activation energy 0.7 eV, test time 168 to 1000 hours

| Product Family | Package Family | Quantity | Rejects | Extrinsic Failure Rate (PPM) | Intrinsic Failure Rate (FIT) | MTTF (hrs) |
|----------------|----------------|----------|---------|------------------------------|------------------------------|------------|
| HC(T) | SO | 3272 | 0 | 39 | 1.2 | 8.84 E+08 |