

Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

| Supplier | | User Part Number | | | | |
|--|---|-----------------------------|-----------|------------|-----------|--|
| Nexperia B.V. | | HEF40175BT | | | | |
| Part Description: Quad D-type flip-flop with reset; positive-edge trigger | | | | | | |
| Function Family: HEF4000B | | | | | | |
| 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 | 378 | 26431 | 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 | 14114 | 0 | |
| # 5b HTOL IFR High Temperature Operating Life Intrinsic | JESD22-A108 Tj = 150°C VCCMAX ≤ V ≤ 1.2*VCCMAX | ≥500 hours | 63 | 3044 | 0 | |
| # 7 TC Temperature Cycling | JESD22-A104 -65 °C to 150°C | ≥500 cycles | 49 | 15770 | 4 | |
| # 9 uHAST / HAST unbiased or biased High Accelerated Stress Test | JESD22-A101 Tamb = 130 °C, RH = 85%, V = VCCMAX | 96 hours | 187 | 10661 | 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) |
|----------------|----------------|----------|---------|------------------------------|------------------------------|------------|
| HEF4000B | SO | 3044 | 0 | 65 | 1.2 | 8.86 E+08 |