

Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

Supplier	User Part Number	
Nexperia B.V.	PUMD20	
Name of Laboratory	Part Description	
Assembly reliability labs	Nexperia DHAM Small Signal Bipolar Transistor SMD package	
Based on AEC-Q101 Test	Test Conditions	Duration # Lots # Quantity # Rejects
# E1	TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C	N/A see below all parts see below
# A1	PC Preconditioning JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering	24 hours 168 hours 3 cycles 1674 70490 0
# B1	HTRB High Temperature Reverse Bias MIL-STD-750-1 M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet reverse voltage	1000 hours 415 18680 0
# A4	TC Temperature Cycling JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	1000 cycles 343 15360 0
# A3 or	UHAST Unbiased HAST JESD22-A118 Tamb = 130 °C, RH = 85 %	96 hours 362 15920 0
# A3 alt	AC Autoclave JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)	
# A2 alt	H3TRB High Humidity High Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1]	1000 hours 343 15360 0
# A5	IOL Intermittent Operating Life MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles	1000 hours 343 15360 0
# C8	RSH Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C	10 s 283 8490 0
# C10	SD 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	Small Signal Bipolar				
DHAM	Transistor	18680	0	0,23	4,40E+09

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