

## Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

Supplier		User Part Number				
Nexperia B.V.		NHUMB13				
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	<b>TEST</b> Pre- and Post-Stress Electrical Test	Tamb = 25 °C	N/A	see below	all parts	see below
# A1	<b>PC</b> 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	<b>HTRB</b> 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	<b>TC</b> Temperature Cycling	JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	1000 cycles	343	15360	0
# A3 or	<b>UHAST</b> Unbiased HAST	JESD22-A118 Tamb = 130 °C, RH = 85 %	96 hours	362	15920	0
# A3 alt	<b>AC</b> Autoclave	JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)				
# A2 alt	<b>H3TRB</b> High Humidity High Temperature Reverse Bias	JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[1]</sup>	1000 hours	343	15360	0
# A5	<b>IOL</b> 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	<b>RSH</b> Resistance to Solder Heat	JESD22-A111 260 °C ± 5 °C	10 s	283	8490	0
# C10	<b>SD</b> 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 DHAM	Small Signal Bipolar Transistor	18680	0	0,23	4,40E+09

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