Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

Supplier		**User Part Number**				
Nexperia B.V.		PBSS4540X				
Name of Laboratory		**Part Description**				
Assembly reliability labs		Nexperia DHAM SMD package	Small Signal Bipolar Transistor			
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 DHAM	Small Signal Bipolar Transistor	18680	0	0,23	4,40E+09

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