Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

Supplier		**User Part Number**				
Nexperia B.V.		NHDTA114ET				
Name of Laboratory		**Part Description**				
		Nexperia DHAM	Small Signal Bipolar Transistor			
Assembly reliability labs		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	849	61170	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	202	16160	0
# A4	**TC** Temperature Cycling	JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	1000 cycles	171	13680	0
# A3 alt	**AC** Autoclave	JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)	96 hours	173	13840	0
# 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	173	13840	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	197	15760	0
# C8	**RSH** Resistance to Solder Heat	JESD22-A111 260 °C ± 5 °C	10 s	135	4050	0
# C10	**SD** Solderability	J-STD-002		342	3420	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	16160	0	0.26	3.81E+09