nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

oratory bility labs C-Q101 Test TEST Pre- and Post-Stress Electrical Test	PUMH17 Part Description Nexperia DHAM SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85%	Small Signal E Duration N/A 24 hours	Bipolar Transist # Lots see below	or # Quantity all parts	# Rejects
billity labs C-Q101 Test TEST Pre- and Post-Stress Electrical Test PC	Nexperia DHAM SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C	Duration N/A	# Lots	# Quantity	# Rejects
bility labs C-Q101 Test TEST Pre- and Post-Stress Electrical Test PC	SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C	Duration N/A	# Lots	# Quantity	# Rejects
C-Q101 Test TEST Pre- and Post-Stress Electrical Test PC	Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C	N/A			# Rejects
TEST Pre- and Post-Stress Electrical Test PC	Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C	N/A			# Rejects
Pre- and Post-Stress Electrical Test	JESD22-A113 Bake Tamb = 125 °C		see below	all parts	
Electrical Test PC	JESD22-A113 Bake Tamb = 125 °C		see below	all parts	
PC	JESD22-A113 Bake Tamb = 125 °C		see below	all parts	
PC	Bake Tamb = 125 °C	24 hours			see below
	30ak Tallib = 65 C, KII = 85%	168 hours			
eeonaleionnig	Reflow soldering		840	61170	0
		5 676.65	049	01170	0
Bias	reverse voltage	1000 hours	202	16160	0
тс	JESD22-A104				
Temperature Cycling	-65 °C to Tjmax, not to exceed 150°C	1000 cycles	171	13680	0
	JESD22-A102				
AC	Tamb = 121 °C, RH = 100 %				
Autoclave	Pressure = 205 kPa (29.7 psia)	96 hours	173	13840	0
HOTRO					
			. ===		
Temperature Reverse bias		1000 hours	173	13840	0
101					
		1000 hours	107	15760	0
Internation Operating Life	100 C 101 10000 Cycles	1000 Hours	191	13/00	U
RSH	IFSD22-4111				
		10 s	135	4050	0
		10.5	133	1000	0
	J-STD-002		342	3420	0
	HTRB High Temperature Reverse Bias TC Temperature Cycling AC Autoclave H3TRB High Humidity High Temperature Reverse Bias IOL Intermittent Operating Life RSH Resistance to Solder Heat SD Solderability	MIL-STD-750-1 M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet reverse voltageHTRB High Temperature Reverse BiasMIL-STD-750-1 Tj = Tjmax, Vr = 100% of max. datasheet reverse voltageTC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°CAC AutoclaveJESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)H3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] IOL Intermittent Operating LifeMIL-STD-750 Method 1037 ton = toff, devices powered to insure Δ Tj = 100 °C for 15000 cyclesRSH Resistance to Solder HeatJESD22-A111 260 °C ± 5 °C	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	$\begin{array}{ccccc} & MIL-STD-750-1 \\ MTRB & M1039 \ Method \ A \\ High \ Temperature \ Reverse & Tj = Tjmax, \ Vr = 100\% \ of \ max. \ datasheet \\ Bias & reverse \ voltage & 1000 \ hours & 202 \\ \hline \mathbf{TC} & JESD22-A104 \\ Temperature \ Cycling & -65\ ^\circ C \ to \ Tjmax, \ not \ to \ exceed \ 150^\circ C & 1000 \ cycles & 171 \\ \hline \mathbf{AC} & Tamb = 121\ ^\circ C, \ RH = 100\ \% \\ Autoclave & Pressure \ 205\ \mathsf{kPa} \ (29.7\ psia) & 96\ hours & 173 \\ \hline \mathbf{H3TRB} & JESD22-A101 \\ High \ Humidity \ High & Tamb \ e \ 85\ ^\circ C, \ RH \ e \ 85\ ^\circ C, \ RH \ escore \ 1000\ hours & 173 \\ \hline \mathbf{MIL-STD-750\ Method} \ 1037 \\ ton \ ton \ tof \ reverse \ voltage^{[1]} & 1000\ hours & 197 \\ \hline \mathbf{RSH} \\ Resistance\ to\ Solder\ Heat & JESD22-A111 \\ 260\ ^\circ C \ t \ 5\ ^\circ C \\ \mathbf{SD} \end{array}$	MIL-STD-750-1 M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet reverse voltage1000 hours20216160TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles17113680AC AutoclaveJESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hours17313840H3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[11] 1000 hours17313840IOL IOL Intermittent Operating LifeMIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔT j = $100 \circ$ C for 15000 cycles100 s19715760RSH Resistance to Solder HeatJESD22-A111 260 °C ± 5 °C10 s1354050

[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

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