nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

	User Part Number						
	BCX53 Part Description						
boratory							
	Nexperia DHAM Small Signal Bipolar Transistor						
liability labs	SMD package						
EC-Q101 Test	Test Conditions	Duration	# Lots	# Quantity	# Rejects		
TEST							
Electrical Test	Tamb = 25 °C	N/A	see below	all parts	see below		
		241					
PC							
			849	61170	0		
		5 676165	045	01170	0		
HTRB							
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		
		10001	170	10010			
Temperature Reverse bias		1000 hours	1/3	13840	0		
101							
		1000 hours	107	15760	0		
Internitient Operating Life		1000 Hours	191	13/00	U		
RSH	1FSD22-4111						
		10 s	135	4050	0		
		10.5	100	1050	0		
Solderability	J-STD-002		342	3420	0		
	Iability labs EC-Q101 Test TEST Pre- and Post-Stress Electrical Test PC Preconditioning 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	BCX53 boratory Part Description Nexperia DHAM iiability labs SMD package EC-Q101 Test Test Conditions TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C PC Soak Tamb = 125 °C PC Soak Tamb = 85 °C, RH = 85% Preconditioning Reflow soldering HTRB MIL-STD-750-1 High Temperature Reverse Ti = Tjmax, Vr = 100% of max. datasheet reverse voltage TC JESD22-A104 .65 °C to Tjmax, not to exceed 150°C AC Tamb = 121 °C, RH = 100 % Autoclave H3TRB JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia) H3TRB JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[11] High Humidity High Temperature Reverse Bias Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[11] MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles RSH Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C SD	BCX53boratoryPart Description Nexperia DHAMSmall Signal EIsomal Signal ESignal EIsomal Signal ESignal EIsomal Signal EIsomal Signal ESignal EIsomal Signal ESignal EIsomal Signal E <th cols<="" td=""><td>BCX53 boratory Part Description Nexperia DHAM Small Signal Bipolar Transist iability labs SMD package EC-Q101 Test Test Conditions Duration # Lots TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below JESD22-A113 Bake Tamb = 125 °C 24 hours 68 hours PC Soak Tamb = 85 °C, RH = 85% 168 hours Preconditioning Reflow soldering 3 cycles 849 HTRB MIL-STD-750-1 MI033 Method A 1000 hours 202 TC JESD22-A104 reverse voltage 1000 hours 202 AC Tamb = 121 °C, RH = 100 % Autoclave JESD22-A104 -65 °C to 1jmax, not to exceed 150°C 1000 cycles 171 JESD22-A102 AC Tamb = 121 °C, RH = 100 % Autoclave JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage^[11] 1000 hours 173 H3TRB High Humidity High Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage^[11] 1000 hours 173 KSH Resistance to Solder Heat JESD22-A111 260 °C to 15000 cycles 1000 hours 197</br></td><td>boratory Part Description Nexperia DHAM Small Signal Bipolar Transistor Biability labs SMD package BC-Q101 Test Test Conditions Duration # Lots # Quantity TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below all parts Bake Tamb = 125 °C AC Soak Tamb = 85 °C, RH = 85% 168 hours SO SD COUNT SO SD SD</td></th>	<td>BCX53 boratory Part Description Nexperia DHAM Small Signal Bipolar Transist iability labs SMD package EC-Q101 Test Test Conditions Duration # Lots TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below JESD22-A113 Bake Tamb = 125 °C 24 hours 68 hours PC Soak Tamb = 85 °C, RH = 85% 168 hours Preconditioning Reflow soldering 3 cycles 849 HTRB MIL-STD-750-1 MI033 Method A 1000 hours 202 TC JESD22-A104 reverse voltage 1000 hours 202 AC Tamb = 121 °C, RH = 100 % Autoclave JESD22-A104 -65 °C to 1jmax, not to exceed 150°C 1000 cycles 171 JESD22-A102 AC Tamb = 121 °C, RH = 100 % Autoclave JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage^[11] 1000 hours 173 H3TRB High Humidity High Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage^[11] 1000 hours 173 KSH Resistance to Solder Heat JESD22-A111 260 °C to 15000 cycles 1000 hours 197</br></td> <td>boratory Part Description Nexperia DHAM Small Signal Bipolar Transistor Biability labs SMD package BC-Q101 Test Test Conditions Duration # Lots # Quantity TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below all parts Bake Tamb = 125 °C AC Soak Tamb = 85 °C, RH = 85% 168 hours SO SD COUNT SO SD SD</td>	BCX53 boratory Part Description Nexperia DHAM Small Signal Bipolar Transist iability labs SMD package EC-Q101 Test Test Conditions Duration # Lots TEST Pre- and Post-Stress 	boratory Part Description Nexperia DHAM Small Signal Bipolar Transistor Biability labs SMD package BC-Q101 Test Test Conditions Duration # Lots # Quantity TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below all parts Bake Tamb = 125 °C AC Soak Tamb = 85 °C, RH = 85% 168 hours SO SD COUNT SO SD	

[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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