## nexperia

## **Quarterly Reliability Monitoring Results**

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

	User Part Number						
	BCX18 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		
	JESD22-A113	241					
PC							
			840	61170	0		
		5 676165	049	01170	0		
HTPR							
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		
			. ===				
Temperature Reverse Blas		1000 hours	173	13840	0		
101							
		1000 hours	107	15760	0		
Internitient Operating Life		1000 Hours	191	12/00	U		
RSH	IESD22-4111						
		10 s	135	4050	0		
		10.3	133	1000	0		
Solderability	J-STD-002		342	3420	0		
	boratory liability 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	BCX18           boratory         Part Description Nexperia DHAM           liability 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         M1L3TD-750-1           HIGH Temperature Reverse         Tamb = 121 °C, RH = 100% of max. datasheet reverse voltage           TC         JESD22-A104           Temperature Cycling         -65 °C to Tjmax, not to exceed 150°C           AC         Tamb = 121 °C, RH = 100 %           Autoclave         Pressure = 205 kPa (29.7 psia)           High Humidity High Temperature Reverse Bias         Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[11]</sup> High Humidity High Temperature Reverse Bias         Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[11]</sup> MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles         Tool = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles           RSH Resistance to Solder Heat         JESD22-A111 260 °C ± 5 °C	BCX18boratoryPart Description Nexperia DHAMSmall Signal Eliability labsSMD packageEC-Q101 TestTest ConditionsDurationTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/AJESD22-A113 Bake Tamb = 125 °CSoak Tamb = 85 °C, RH = 85%168 hoursPC PCSoak Tamb = 85 °C, RH = 85%168 hoursPreconditioningReflow soldering3 cyclesHTRB High Temperature Reverse BiasMIL-STD-750-1 HTRB1000 hoursTC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cyclesAC AutoclaveJESD22-A104 -65 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hoursH3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[11]</sup> 1000 hoursIOL ton = toff, devices powered to insure $\Delta$ Tj = Intermittent Operating LifeJESD22-A111 260 °C to 7 15000 cycles1000 hoursRSH Resistance to Solder HeatJESD22-A111 260 °C to 5 °C10 s	BCX18           boratory         Part Description Nexperia DHAM         Small Signal Bipolar Transist           ilability 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         1000 hours         202           TC         JESD22-A104         1000 hours         202           TC         JESD22-A102         1000 hours         202           AC         Tamb = 121 °C, RH = 100 %         1000 cycles         171           JESD22-A102         Tamb = 121 °C, RH = 100 %         1000 hours         173           H3TRB         JESD22-A101         Tamb = 85 °C, RH = 85%, VR = 80 % of         173           H3TRB         JESD22-A101         1000 hours         173           H3TRB         JESD22-A101         1000 hours         173           High Humidity High Temperature Reverse Bias         rated reverse voltage <sup>[11]</sup> 1000 hour	BCX18boratoryPart Description Nexperia DHAM Seperia DHAM Seperia DHAMSmall Signal Bipolar Transistorliability labsSMD packagePuration# Lots# QuantityTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowall partsJESD22-A113 Bake Tamb = 125 °C24 hours 168 hoursSee belowall partsPCSoak Tamb = 85 °C, RH = 85%168 hours84961170HTRB High Temperature ReverseMIL-STD-750-1 Timax, Vr = 100% of max. datasheet reverse voltage1000 hours20216160TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C Temperature Cycling125 °C, RH = 100 % Autoclave13840H3TRB High Humidity High Tamb = 21 °C, RH = 100 % rated reverse voltage <sup>[1]</sup> 1000 hours17313840H3TRB High Humidity High Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[1]</sup> 1000 hours17313840KSH Resistance to Solder Heat SDJESD2-A101 Tom = 50°C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[1]</sup> 1000 hours19715760KSH Resistance to Solder Heat SDJESD2-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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