## nexperia

## **Quarterly Reliability Monitoring Results**

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

	User Part Number						
	BCV46 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	5 676165	049	01170	0		
HTDR							
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		
Internittent Operating Life		1000 10015	191	13/00	U		
RSH	IESD22-4111						
		10 s	135	4050	0		
		10.5	100	1050	v		
Solderability	J-STD-002		342	3420	0		
	iboratory iiability 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	BCV46           bboratory         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         M1039 Method A           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 % Pressure = 205 kPa (29.7 psia)           H3TRB         JESD22-A101 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         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	BCV46           bboratory         Part Description Nexperia DHAM         Small Signal E           liability labs         SMD package         Duration           TEST Pre- and Post-Stress Electrical Test         Test Conditions         Duration           PC PC         Soak Tamb = 25 °C         N/A           Preconditioning         Reflow soldering         3 cycles           HTRB         MIL-STD-750-1 M1039 Method A         1000 hours           TC         JESD22-A104 -65 °C to Tjmax, not to exceed 150°C         1000 hours           TC         JESD22-A104 -65 °C to Tjmax, not to exceed 150°C         1000 cycles           MCLClave         JESD22-A104 -65 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[11]</sup> 1000 hours           H3TRB         JESD22-A101 Tamb = 121 °C, RH = 100 % Autoclave         JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[11]</sup> 1000 hours           MIL-STD-750 Method 1037 too = toff, devices powered to insure ΔTj = Intermittent Operating Life         MIL-STD-750 Method 1037 too = toff, devices powered to insure ΔTj = 1000 hours           RSH Resistance to Solder Heat         JESD22-A111 260 °C 5 °C         10 s	BCV46           abboratory         Part Description Nexperia DHAM         Small Signal Bipolar Transist           liability labs         SMD package         Duration         # Lots           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         508 hours         90 hours         849           PC         Soak Tamb = 85 °C, RH = 85%         168 hours         91 hours         849           HTRB         MIL-STD-750-1 MI039 Method A         1000 hours         202           TC         JESD22-A104 reverse voltage         1000 hours         202           AC         Tamb = 121 °C, RH = 100 % Autoclave         1000 hours         171           JESD22-A102 AC         Tamb = 121 °C, RH = 100 % Autoclave         173         173           H3TRB High Humidity High Temperature Reverse Bias         JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[1]</sup> 1000 hours         173           KSH Resistance to Solder Heat         JESD22-A111 260 °C ± 5 °C         10 s         135	BCV46aboratoryPart Description Nexperia DHAMSmall Signal Bipolar TransistorItability labsSMD packageFerena DHAMSmall Signal Bipolar TransistorTEST Pre- and Post-StressTest ConditionsDuration# Lots# QuantityTEST Pre- and Post-StressTamb = 25 °CN/Asee belowall partsBake Tamb = 125 °C24 hours 168 hoursSee belowall partsPCSoak Tamb = 85 °C, RH = 85% Soak Tamb = 85 °C, RH = 85% 168 hours24 hours 168 hoursSee belowall partsHTRB High Temperature ReverseJESD22-A104 Temperature CyclingSee black of Timax, not to exceed 150°C Tamb = 121 °C, RH = 100 % Temperature Reverse BiasJESD22-A104 Tamb = 121 °C, RH = 100 % Tamb = 121 °C, RH = 100 % Temperature Reverse BiasJESD22-A102 Tamb = 121 °C, RH = 100 % Tamb = 121 °C, RH = 80 % of Tamb = 121 °C, RH = 80 % of Temperature Reverse BiasJESD22-A101 Tamb = 131 °C, RH = 80 % of Tamb = 131 °C, RH = 80 % of Temperature Reverse BiasJESD22-A101 Tamb = 131 °C, RH = 80 % of Tamb = 130 °C for 15000 cyclesJON hoursJ97J3840H3RB High Humidity High Temperature Reverse Bias Tamb = 50°C, RH = 85 %, VR = 80 % of Ta		

[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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