nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

	User Part Number						
	PUMB4 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	13/00	U		
RSH	IESD22-4111						
		10 s	135	4050	0		
		10.3	133	1000	0		
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	PUMB4 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 ^[1] High Humidity High Temperature Reverse Bias Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles Tou = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles RSH Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C	PUMB4 Iboratory Part Description Nexperia DHAM Small Signal E Itability labs SMD package Duration TEST Pre- and Post-Stress Test Conditions Duration Electrical Test Tamb = 25 °C N/A JESD22-A113 Bake Tamb = 125 °C 24 hours PC Soak Tamb = 85 °C, RH = 85% 168 hours Preconditioning Reflow soldering 3 cycles MIL-STD-750-1 M1039 Method A 1000 hours HTRB M1039 Method A 1000 hours TC JESD22-A104 reverse voltage 1000 hours TC JESD22-A104 reverse voltage 1000 cycles AC Tamb = 121 °C, RH = 100 % Autoclave Pressure = 205 kPa (29.7 psia) 96 hours H3TRB JESD22-A101 rated reverse voltage ^[11] 1000 hours IOL MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = Intermittent Operating Life 100 °C for 15000 cycles 1000 hours RSH JESD22-A111 Z60 °C for 5 °C 10 s 100	PUMB4AbboratoryPart Description Nexperia DHAMSmall Signal Bipolar TransistIdability labsSMD packageDuration# LotsEC-Q101 TestTest ConditionsDuration# LotsTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowPCSoak Tamb = 125 °C24 hours68 hoursPCSoak Tamb = 85 °C, RH = 85%168 hoursPre-onditioningReflow soldering3 cycles849HTRB High Temperature ReverseMIL-STD-750-1 (1000 hours)1000 hours202TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 hours202AC AutoclaveJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours173H3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours173KSH Resistance to Solder HeatJESD22-A111 260 °C ± 5 °C10 s135	PUMB4uboratoryPart Description Nexperia DHAM SMD packageSmall Signal Bipolar TransistorItability labsSMD packagePuration# Lots# QuantityTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowall partsPCDisplay Soak Tamb = 85 °C, RH = 85% Soak Tamb = 85 °C, RH = 85% 168 hours 3 cycles24 hours 168 hours 3 cycles61170HTRB High Temperature ReverseMIL-STD-750-1 Timmax, Vr = 100% of max. datasheet reverse voltage1000 hours 1000 hours20216160TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C Tamb = 121 °C, RH = 100 % Fresure 205 KPa (29.7 psia)1000 hours 96 hours17313840H3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 80 % of Tated reverse voltage ^[1] 1000 hours17313840KSH Resistance to Solder Heat 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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