nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

	User Part Number						
	PUMH1 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		
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 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	PUMH1 Iboratory 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 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	PUMH1 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 Ton = toff, devices powered to insure ΔTj = Intermittent Operating Life MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = Intermittent Operating Life 1000 c f = 5 °C 1000 hours SD SD	PUMH1 Mboratory Part Description Nexperia DHAM Small Signal Bipolar Transist Ilability labs SMD package Fec-Q101 Test Test Conditions Duration # Lots FEST Pre- and Post-Stress Electrical Test Tamb = 25 °C N/A see below JESD22-A113 Bake Tamb = 125 °C 24 hours Small Signal Bipolar Transist PC Soak Tamb = 85 °C, RH = 85% 168 hours Preconditioning Reflow soldering 3 cycles 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 JESD22-A104 -65 °C to Tjmax, not to exceed 150°C 1000 hours 171 JESD22-A102 AC Tamb = 121 °C, RH = 100 % Autoclave JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 173 H3TRB High Humidity High Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 173 KSH Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C 10 s 135	PUMH1uboratoryPart Description Nexperia DHAMSmall Signal Bipolar TransistorItability labsSMD packageFerena DHAMSmall Signal Bipolar TransistorElec-Q101 TestTest ConditionsDuration# Lots# QuantityTEST Pre- and Post-StressTamb = 25 °CN/Asee belowall partsElectrical TestTamb = 25 °CN/Asee belowall partsPCSoak Tamb = 85 °C, RH = 85%168 hours3 cycles84961170HTRB 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 Tamb = 121 °C, RH = 100 % AutoclaveJESD22-A104 Tamb = 121 °C, RH = 100 % Tamb = 121 °C, RH = 80 % of Tamb = 121 °C, RH = 80 % of Tamb = 121 °C, RH = 80 % of Temperature Reverse BiasJESD22-A101 Tamb = 121 °C, RH = 80 % of Tamb = 121 °C, RH = 100 °C for 15000 cycles		

[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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