nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2021 to Q4/2021

Based on structural similarity

boratory	PEMZ7							
boratory	Doub Decovirtion		PEMZ7					
	Part Description							
	Nexperia DHAM Small Signal Bipolar Transistor							
iability 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							
		24 hours						
Preconditioning	Reflow soldering	3 cycles	849	61170	0			
	MIL-STD-750-1							
HTRB	M1039 Method A							
Bias	reverse voltage	1000 hours	202	16160	0			
тс	1ESD22-4104							
			171	13680	0			
		1000 cycles	1/1	15000	0			
AC								
Autoclave		96 hours	173	13840	0			
		50 110015	175	15010	0			
H3TRB	JESD22-A101							
		1000 hours	173	13840	0			
					-			
IOL								
		1000 hours	197	15760	0			
	,	2000 10010	1.57	10,00				
RSH	JESD22-A111							
		10 s	135	4050	0			
SD		200	100					
	J-STD-002		342	3420	0			
	C-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 Solderability	C-Q101 TestTest ConditionsTEST Pre- and Post-Stress Electrical TestTamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% PreconditioningPCSoak Tamb = 85 °C, RH = 85% PreconditioningHTRBMIL-STD-750-1 M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet BiasTCJESD22-A104 -65 °C to Tjmax, not to exceed 150°CTCJESD22-A104 -65 °C to Tjmax, not to exceed 150°CACTamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)H3TRBJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltageIOLIntermittent Operating LifeIOLION °C for 15000 cyclesRSH Resistance to Solder HeatJESD22-A111 260 °C ± 5 °CSD	C-Q101 TestTest ConditionsDurationTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/AJESD22-A113 Bake Tamb = 125 °C24 hoursPCSoak Tamb = 125 °C24 hoursPCSoak Tamb = 85 °C, RH = 85%168 hoursPreconditioningReflow soldering3 cyclesHTRB High Temperature ReverseMIL-STD-750-11000 hoursHTR BiasMIL-STD-750-11000 hoursTC Temperature CyclingJESD22-A104 -65 °C to Tjmax, vr = 100% of max. datasheet reverse voltage1000 hoursTC Temperature CyclingJESD22-A104 	C-Q101 TestTest ConditionsDuration# LotsTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowJESD22-A113 Bake Tamb = 125 °C24 hours24 hoursPCSoak Tamb = 85 °C, RH = 85%168 hoursPreconditioningReflow soldering3 cycles849HTRB High Temperature ReverseMIL-STD-750-11000 hours202TCJESD22-A104 Temperature Cycling-65 °C to Tjmax, not to exceed 150°C1000 hours202ACTamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hours173H3TRBJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage1000 hours173H3TRBJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage1000 hours173MIL-STD-750 Method 1037 Ton Intermittent Operating LifeISED22-A111 100 °C for 15000 cycles1000 hours197RSH SolderabilityJESD22-A111 260 °C ± 5 °C10 s135342	CC-Q101 TestTest ConditionsDuration# Lots# QuantityTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowall partsJESD22-A113 Bake Tamb = 125 °CJESD22-A113 Bake Tamb = 85 °C, RH = 85%168 hoursall partsPCSoak Tamb = 85 °C, RH = 85%168 hoursall partsPreconditioningReflow soldering3 cycles84961170HTRB BiasMIL-STD-750-1 MI039 Method AMIL-STD-750-1 Tight Persevoltage1000 hours20216160TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles17113680AC AutoclaveJESD22-A102 Tamb = 121 °C, RH = 100 % AutoclaveJESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hours17313840H3TRB High Humidity High Temperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of Temperature Reverse Bias1000 hours17313840MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔT j = Intermittent Operating LifeJESD22-A111 Tool °C for 15000 cycles100 hours19715760RSH SolderabilityJ-STD-00234234203420			

[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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