nexperia

Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023 Based on structural similarity

TEST Pre- and Post-Stress	Supplier Nexperia B.V.		User Part Number PDZ10B-Q				
Assembly reliability labsNexperia DHAM SMD packageZenerAssembly reliability labsFest ConditionsDuration# Lots# Quantity# RTEST Pre- and Post-StressTamb = 25 °CN/Asee belowall partssee# E1Electrical TestTamb = 25 °C24 hours168 hours3 cycles1514644300# A1PreconditioningReflow soldering3 cycles15146443000# A1PreconditioningReflow soldering3 cycles1514644300# B1BiasMIL-STD-750-1MIL-STD-750-11000 hours250114000# B1Steady State Operationalreverse1000 hours250114000# A4Temperature ReverseIJ = 100% of max. datasheet1000 hours4419200# A3 orUhASTJESD22-A104 reverse current1000 hours311140800# A3 aitAccTamb = 130 °C, RH = 85 % Pressure = 205 kPa (29.7 pisa)96 hours311140800# A3 aitAutoclavePressure = 205 kPa (29.7 pisa)1000 hours311140800# A2 aitTemperature Reverse Bias rated reverse voltage ⁽¹¹⁾ 1000 hours311140800# A2 aitTemperature Reverse Bias rated reverse voltage ⁽¹¹⁾ 1000 hours311140800# A3 aitAutoclavePressure = 205 kPa (29.7 pisa)1000 hours311140800							
Assembly reliability labsSMD packageBased on AEC-Q101 TestTest ConditionsDuration# Lots# Quantity# RTEST Pre- and Post-StressTamb = 25 °CN/Asee belowall partssee# E1Electrical TestTamb = 25 °C24 hourssee belowall partsseePCSoak Tamb = 325 °C24 hours168 hoursseesee# A1PreconditioningReflow soldering3 cycles1514644300HTRB High Temperature ReverseTj = Tjmax, VR = 80 % of rated reverse1000 hours250114000# B1Biasvoltage1000 nours250114000SSOPTj = Tjmax, VR = 80 % of rated reverse1000 hours250114000# A4Temperature ReverseTj = Tjmax, IZ = 100% of max. datasheet1000 hours4419200# A3 orUHAST Unbiased HASTJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles311140800# A3 aitAutoclavePressure = 205 kPa (29.7 psia)96 hours311140800# A3 aitJESD22-A101 Tamb = 85 °C, RH = 85 %, VR = 80 % of High Humidity High Tamb = 85 °C, RH = 85 %, VR = 80 % of311140800# A2 aitIntermetrave Reverse Bias rated reverse voltage ^[1] 1000 hours311140800# A2 aitIntermetrave Reverse Bias rated reverse voltage ^[1] 1000 hours312141200# A2 aitInterm	Assembly reliability labs		Part Description				
Based on AEC-Q101 TestTest ConditionsDuration# Lots# Quantity# RFre-TTST Pre-Pre-Tamb = 25 °CN/Asee belowall partssee# E1Electrical TestTamb = 25 °C24 hourssee belowall partssee# A1PreconditioningReflow soldering3 cycles1514644300HTRB High Temperature ReversMIL-STD-750-1 M1038 Method A High Temperature ReversMIL-STD-750-1 M1038 Method A1514644300# B1Biasvoltage1000 hours250114000SSOP # B1bT1 = Tjmax, IX = 100% of max. datasheet reverse current1000 hours4419200# A3 orUHAST Unbiased HASTJESD22-A104 Tamb = 130 °C, RH = 85 % JESD22-A10296 hours311140800# A3 altAutoclavePressure = 205 kPa (29.7 psia)96 hours311140800# A2 altTEmperature Reverse Bias rated reverse voltage ^{[11}]1000 hours311140800# A2 altTomperature Reverse Bias rated reverse voltage ^[12] 1000 hours311140800# A2 altTemperature Reverse Bias rated reverse voltage ^[13] 1000 hours311140800# A2 altTemperature Reverse Bias rated reverse voltage ^[13] 1000 hours311140800# A5Intermittent Operating Life 100 °C for 15000 cycles1000 hours312141200# A5In			Nexperia DHAM	Zener			
TEST Pre- and Post-Stress# E1Electrical TestTamb = 25 °CN/Asee belowall partsseeJESD22-A113 Bake Tamb = 125 °C24 hours DSQL TANDPCSoak Tamb = 25 °C, RH = 85%168 hours# A1PreconditioningReflow soldering3 cycles1514644300HTRB High Temperature ReverseTJ = Tjmax, VR = 80 % of rated reverse voltage1000 hours250114000# B1BiasVoltageMIL-STD-750-1 M1038 Method B TJ = Tjmax, VR = 80 % of rated reverse voltage1000 hours250114000# B1Steady State OperationalTerverse current1000 hours4419200# A4TcJESD22-A104 - 65 °C to Tjmax, not to exceed 150°C1000 cycles311140800# A3 orUHAST Unbiased HASTJESD22-A102 Tamb = 130 °C, RH = 85 % JESD22-A10296 hours311140800# A3 altAutoclavePressure = 205 kPa (29.7 psia)96 hours311140800# A2 altISD22-A101 Tamb = 121 °C, RH = 85%, VR = 80 % of ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to insure ΔT = ton = toff, devices powered to ins			SMD package				
			Test Conditions	Duration	# Lots	# Quantity	# Rejects
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	# E1	Electrical Test	Tamb = 25 °C	N/A	see below	all parts	see below
HTRBM1038 Method AHigh Temperature ReverseTj = Tjmax, VR = 80 % of rated reverse# B1BiasBiasvoltage1000 hours250114000SSOPTj = Tjmax, Iz = 100% of max. datasheet# B1bSteady State Operationalreverse current1000 hours4419200# A4Temperature Cycling-65 °C to Tjmax, not to exceed 150°C1000 cycles311140800# A3 orUHASTUnbiased HASTJESD22-A118 Tamb = 121 °C, RH = 85 % JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)# A3 altAC AutoclaveH3TRB High Humidity HighJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[11] 1000 hours311140800MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔT = 1000 hours# A5Intermittent Operating Life100 °C for 15000 cycles1000 hours# C8RSH Resistance to Solder Heat260 °C ± 5 °C10 s 26980700	# A1		Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85%	168 hours	1514	64430	0
# B1bSSOP Steady State OperationalM1038 Method B T = Tjmax, Iz = 100% of max. datasheet reverse current1000 hours4419200# A4TC 	# B1	High Temperature Reverse	M1038 Method A Tj = Tjmax, VR = 80 % of rated reverse	1000 hours	250	11400	0
# A4 Temperature Cycling -65 °C to Tjmax, not to exceed 150°C 1000 cycles 311 14080 0 # A3 or UHAST JESD22-A118 96 hours 311 14080 0 # A3 or Ubiased HAST Tamb = 130 °C, RH = 85 % 96 hours 311 14080 0 # A3 or JESD22-A102 Tamb = 121 °C, RH = 100 % 96 hours 311 14080 0 # A3 alt ACC Tamb = 121 °C, RH = 100 % 96 hours 311 14080 0 # A3 alt Autoclave Pressure = 205 kPa (29.7 psia) 96 hours 311 14080 0 # A2 alt Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 311 14080 0 # A2 alt Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 311 14080 0 # A5 Intermittent Operating Life O'C for 15000 cycles 1000 hours 312 14120 0 # C8 Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C 10 s 269 8070	# B1b		M1038 Method B Tj = Tjmax, Iz = 100% of max. datasheet	1000 hours	44	1920	0
# A3 or Unbiased HAST Tamb = 130 °C, RH = 85 % 96 hours 311 14080 0 # A3 or JESD22-A102 96 hours 311 14080 0 # A3 alt AC Tamb = 121 °C, RH = 100 % 96 hours 311 14080 0 # A3 alt Autoclave Pressure = 205 kPa (29.7 psia) 96 hours 311 14080 0 # A3 alt H3TRB JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 311 14080 0 # A2 alt Temperature Reverse Bias JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 311 14080 0 # A2 alt Temperature Reverse Bias JESD2-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours 311 14080 0 # A5 Intermittent Operating Life 100 °C for 15000 cycles 1000 hours 312 14120 0 # C8 Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C 10 s 269 8070 0	# A4			1000 cycles	311	14080	0
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High Humidity High H A2 altTamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^[1] 1000 hours311140800# A2 altTemperature Reverse Biasmatch reverse voltage ^[1] 1000 hours311140800IOLIOLmatch reverse voltage ^[1] 1000 hours311140800# A5Intermittent Operating Life100 °C for 15000 cycles1000 hours312141200RSHJESD22-A111 260 °C ± 5 °C10 s26980700	# A3 alt		Tamb = 121 °C, RH = 100 %	96 nours	311	14080	0
IOLton = toff, devices powered to insure $\Delta Tj =$ # A5Intermittent Operating Life100 °C for 15000 cycles1000 hours312141200RSHJESD22-A111# C8Resistance to Solder Heat260 °C ± 5 °C10 s26980700	# A2 alt	High Humidity High	Tamb = 85 °C, RH = 85%, VR = 80 % of	1000 hours	311	14080	0
# C8 Resistance to Solder Heat 260 °C ± 5 °C 10 s 269 8070 0	# A5		ton = toff, devices powered to insure ΔTj =	1000 hours	312	14120	0
	# 68			10 c	260	8070	0
# C10 Solderability J-STD-002 19 6660 0		SD		10.5			

[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

2,68E+09
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