nexperia

Quarterly Reliability Monitoring Results

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

	User Part Number					
	PMEG1020EA-Q					
boratory	Part Description					
-	Nexperia DHAM Schottky					
liability labs						
,		Duration	# Lots	# Quantity	# Reiects	
-						
Pre- and Post-Stress						
Electrical Test	Tamb = 25 °C	N/A	see below	all parts	see below	
		.,				
		24 hours				
PC		168 hours				
Preconditioning	Reflow soldering	3 cycles	1514	64430	0	
-	MIL-STD-750-1	-				
HTRB	M1038 Method A					
	Tj = Tjmax, Vr = 100% of max. datasheet					
Bias	reverse voltage ^[1]	1000 hours	206	9320	0	
тс	JESD22-A104					
Temperature Cycling	-65 °C to Tjmax, not to exceed 150°C	1000 cvcles	311	14080	0	
UHAST	JESD22-A118					
Unbiased HAST	Tamb = 130 °C, RH = 85 %	96 hours	311	14080	0	
	1FSD22-A102					
AC						
Autoclave	Pressure = 205 kPa (29.7 psia)					
H3TRB	JESD22-A101					
High Humidity High	Tamb = 85 °C, RH = 85%, VR = 80 % of					
	rated reverse voltage ^{[1], [2]}	1000 hours	311	14080	0	
	MIL-STD-750 Method 1037					
IOL						
		1000 hours	312	14120	0	
	· · · · · · · · · · · · · · · · · · ·					
RSH	JESD22-A111					
Resistance to Solder Heat	260 °C ± 5 °C	10 s	269	8070	0	
SD						
Solderability	J-STD-002		222		0	
	iboratory iiability labs EC-Q101 Test TEST Pre- and Post-Stress Electrical Test PC Preconditioning HTRB High Temperature Reverse Bias TC Temperature Cycling UHAST Unbiased HAST AC Autoclave H3TRB High Humidity High Temperature Reverse Bias IOL Intermittent Operating Life RSH Resistance to Solder Heat SD	PMEG1020EA-QIboratoryPart Description Nexperia DHAMliability labsSMD packageEC-Q101 TestTest ConditionsTEST Pre- and Post-Stress Electrical TestTamb = 25 °CPCSoak Tamb = 125 °CPCSoak Tamb = 85 °C, RH = 85%PreconditioningReflow solderingMIL-STD-750-1MIL-STD-750-1HTRBM1038 Method AHigh Temperature ReverseTj = Tjmax, Vr = 100% of max. datasheetBiasJESD22-A104TCJESD22-A104Temperature Cycling-65 °C to Tjmax, not to exceed 150°CUHASTJESD22-A104Temperature QyclingJESD22-A102ACTamb = 121 °C, RH = 85 %AutoclavePressure = 205 kPa (29.7 psia)H3TRBJESD22-A101High Humidity High Temperature Reverse BiasTamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^{[1], [2]} MIL-STD-750 Method 1037 ton = toff, devices powered to insure Δ Tj = 100 °C for 15000 cyclesRSH Resistance to Solder HeatJESD22-A111 260 °C ± 5 °CSDSD	$\begin{tabular}{ c c c c } \hline PMEG1020EA-Q \\ \hline Part Description \\ Nexperia DHAM \\ Nexperia DHAM \\ Nexperia DHAM \\ Schottky \\ \hline SMD package \\ \hline EC-Q101 Test \\ TEST \\ Pre- and Post-Stress \\ Electrical Test \\ Tamb = 25 °C \\ N/A \\ \hline JESD22-A113 \\ Bake Tamb = 125 °C \\ Soak Tamb = 125 °C \\ Soak Tamb = 85 °C, RH = 85\% \\ PC \\ Soak Tamb = 85 °C, RH = 85\% \\ Preconditioning \\ Reflow soldering \\ Tj = Tjmax, Vr = 100\% of max. datasheet \\ Bias \\ reverse voltage^{[1]} \\ 1000 hours \\ \hline TC \\ Temperature Reverse \\ Bias \\ IDESD22-A104 \\ Temperature Cycling \\ AC \\ Autoclave \\ Pressure = 205 kPa (29.7 psia) \\ \hline HTRB \\ High Humidity High \\ Tamb = 130 °C, RH = 85\% \\ JESD22-A102 \\ AC \\ Autoclave \\ Pressure = 205 kPa (29.7 psia) \\ \hline H3TRB \\ High Humidity High \\ Tamb = 85 °C, RH = 85\%, VR = 80 % of \\ Temperature Reverse Bias \\ IESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 % of \\ Temperature Reverse Bias \\ IESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 % of \\ Temperature Reverse Bias \\ IDESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 % of \\ Temperature Reverse Bias \\ IESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 % of \\ Temperature Reverse Bias \\ IDESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 \% of \\ Temperature Reverse Bias \\ IDESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 \% of \\ Temperature Reverse Bias \\ IDESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 \% of \\ Temperature Reverse Bias \\ IDESD22-A101 \\ Tamb = 85 °C, RH = 85\%, VR = 80 \% of \\ Temperature Reverse Bias \\ RSH \\ Resistance to Solder Heat \\ JESD22-A111 \\ 260 °C \pm 5 °C \\ 10 s \\ SD \\ \end{tabular}$	PMEG1020EA-QuboratoryPart Description Nexperia DHAMSchottkyliability labsSMD packageEC-Q101 TestTest ConditionsDuration# LotsTEST Pre- and Post-StressTamb = 25 °CN/Asee belowJESD22-A113 Bake Tamb = 125 °C24 hours 168 hoursSee belowPCBake Tamb = 65 °C, RH = 85% 168 hours168 hours 3 cycles1514HTRB High Temperature ReverseMIL-STD-750-1 1 = Tjmax, Vr = 100% of max. datasheet Bias1000 hours206TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles311UHAST Unbiased HASTJESD22-A104 Tamb = 130 °C, RH = 85 % JESD22-A10496 hours311High Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles311JHAST Unbiased HASTJESD22-A104 Tamb = 130 °C, RH = 85 % JESD22-A10296 hours311JESD22-A102 AC AC Tamb = 130 °C, RH = 85 %, VR = 80 % of rated reverse voltage ^{[11], [2]} 1000 hours311JESD22-A102 AC ALC Temperature Reverse BiasJESD22-A102 rated reverse voltage ^{[11], [2]} 1000 hours311MIL-STD-750 Method 1037 ton = toff, devices powered to insure ATj = Intermittent Operating LifeJESD22-A111 260 °C ± 5 °C269SDJESD22-A111 260 °C ± 5 °CJESD2-A111 260 °C ± 5 °C269269	PMEG1020EA-QubboratoryPart Description Nexperia DHAM SMD packageSchottkyEC-Q101 TestTest ConditionsDuration# Lots# QuantityTEST Pre- and Post-Stress Electrical TestTamb = 25 °CN/Asee belowall partsJESD22-A113 Bake Tamb = 125 °C24 hours 168 hours64430PCSoak Tamb = 85 °C, RH = 85% MIL-STD-750-1 HTRB151464430High Temperature ReverseTj = Tjmax, Vr = 100% of max. datasheet reverse voltage ^[11] 1000 hours2069320TC Temperature CyclingJESD22-A104 -65 °C to Tjmax, not to exceed 150°C1000 cycles31114080UHAST AutoclaveJESD22-A104 resure = 205 kPa (29.7 psia)96 hours31114080MIL-STD-750MIL-STD-750 hert Tamb = 130 °C, RH = 85 % JESD22-A104 Temperature Cycling96 hours31114080UHAST AutoclaveJESD22-A104 resure = 205 kPa (29.7 psia)96 hours31114080K Resistance to Solder Heat Discoverse voltage Li L211000 hours31114080K Bisplaz-Atio2 Temperature Reverse BiasJESD22-A101 rated reverse voltage ^{[1], [2]} 1000 hours31114080K C C AutoclaveJESD22-A101 rated reverse voltage ^{[1], [2]} 1000 hours31114080K C R C Temperature Reverse BiasJESD22-A101 rated reverse voltage ^{[1], [2]} 1000 hours31114080K R C C Temperature Reverse BiasJESD22-A101 rated reverse voltage ^{[1],}	

The physical limitations of Schottky diodes have to be considered (thermal runaway).
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	Schottky	9320	0	0,46	2,19E+09

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