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Quarterly Reliability Monitoring Results

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

ratory lity labs Q101 Test FEST Pre- and Post-Stress Electrical Test Preconditioning HTRB High Temperature Reverse Bias	PMEG4005EGW-Q Part Description Nexperia DHAM SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	Schottky Duration N/A 24 hours 168 hours 3 cycles	# Lots see below 1514	# Quantity all parts 64430	# Rejects see below
lity labs Q101 Test FEST Pre- and Post-Stress Electrical Test Preconditioning HTRB High Temperature Reverse	Nexperia DHAM SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	Duration N/A 24 hours 168 hours	see below	all parts	see below
Q101 Test TEST Pre- and Post-Stress Electrical Test PC Preconditioning HTRB High Temperature Reverse	SMD package Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	Duration N/A 24 hours 168 hours	see below	all parts	see below
Q101 Test TEST Pre- and Post-Stress Electrical Test PC Preconditioning HTRB High Temperature Reverse	Test Conditions Tamb = 25 °C JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	N/A 24 hours 168 hours	see below	all parts	see below
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Pre- and Post-Stress Electrical Test Preconditioning HTRB High Temperature Reverse	JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	24 hours 168 hours			
Electrical Test PC Preconditioning HTRB High Temperature Reverse	JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	24 hours 168 hours			
Preconditioning HTRB High Temperature Reverse	Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	24 hours 168 hours	1514		0
Preconditioning HTRB High Temperature Reverse	Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	168 hours	1514	64430	0
Preconditioning HTRB High Temperature Reverse	Soak Tamb = 85 °C, RH = 85% Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet	168 hours	1514	64430	0
- HTRB High Temperature Reverse	Reflow soldering MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet		1514	64430	0
- HTRB High Temperature Reverse	MIL-STD-750-1 M1038 Method A Tj = Tjmax, Vr = 100% of max. datasheet				
ligh Temperature Reverse	Tj = Tjmax, Vr = 100% of max. datasheet				
	reverse voltage ^[1]	1000 hours	206	9320	0
гс	JESD22-A104				
Femperature Cycling	-65 °C to Tjmax, not to exceed 150°C	1000 cycles	311	14080	0
JHAST	JESD22-A118				
Jnbiased HAST	Tamb = 130 °C, RH = 85 %		311	14080	0
	1FSD22-A102	-96 hours			
AC					
Autoclave	Pressure = 205 kPa (29.7 psia)				
IJTRB	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				
OL					
		1000 hours	312	14120	0
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RSH	JESD22-A111				
	260 °C ± 5 °C	10 s	269	8070	0
SD					
Solderability	1-STD-002		222	6660	0
	nbiased HAST C utoclave 3TRB igh Humidity High emperature Reverse Bias OL ntermittent Operating Life SH esistance to Solder Heat D	nbiased HASTTamb = 130 °C, RH = 85 %JESD22-A102CTamb = 121 °C, RH = 100 %Pressure = 205 kPa (29.7 psia) 3TRB JESD22-A101igh Humidity HighTamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^{[1], [2]} MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cyclesSHJESD22-A111 260 °C ± 5 °CDJESD22-A111 260 °C ± 5 °CDJ-STD-002	nbiased HASTTamb = 130 °C, RH = 85 % JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hoursCTamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hours3TRB igh Humidity High emperature Reverse BiasJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^{[1], [2]} ton = toff, devices powered to insure ΔTj = 1000 hours1000 hoursOLMIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles1000 hoursSH esistance to Solder HeatJESD22-A111 260 °C ± 5 °C10 s	nbiased HASTTamb = 130 °C, RH = 85 % JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)96 hours311CTamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)3113TRBJESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^{[1], [2]} 1000 hours311MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = intermittent Operating LifeMIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 1000 hours312SHJESD22-A111 260 °C ± 5 °C10 s269DD222	nbiased HAST Tamb = 130 °C, RH = 85 % 96 hours 311 14080 JESD22-A102 Tamb = 121 °C, RH = 100 % 96 hours 311 14080 C Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia) 96 hours 311 14080 3TRB JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage ^{[1], [2]} 1000 hours 311 14080 MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔT j = intermittent Operating Life JESD22-A111 1000 hours 312 14120 SH JESD22-A111 ESD22-A111 100 s 269 8070 Deletaribility J-STD-002 202 6660

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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