

## Quarterly Reliability Monitoring Results

Quarters: Q3/2021 to Q4/2022

Based on structural similarity

Supplier	User Part Number					
Nexperia B.V.	HPZR-C11-Q					
Name of Laboratory	Part Description					
Assembly reliability labs	Nexperia DHAM	Zener				
	SMD package					
Based on AEC-Q101 Test	Test Conditions	Duration	# Lots	# Quantity	# Rejects	
<b>TEST</b>						
# E1	Pre- and Post-Stress Electrical Test	Tamb = 25 °C	N/A	see below	all parts	see below
# A1	<b>PC</b> Preconditioning	JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering	24 hours 168 hours 3 cycles	1168	66640	0
# B1	<b>HTRB</b> High Temperature Reverse Bias	MIL-STD-750-1 M1038 Method A Tj = Tjmax, VR = 80 % of rated reverse voltage	1000 hours	198	11960	0
# B1b	<b>SSOP</b> Steady State Operational	MIL-STD-750-1 M1038 Method B Tj = Tjmax, Iz = 100% of max. datasheet reverse current	1000 hours	24	1760	0
# A4	<b>TC</b> Temperature Cycling	JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	1000 cycles	240	14800	0
# A3 or	<b>UHAST</b> Unbiased HAST	JESD22-A118 Tamb = 130 °C, RH = 85 %	96 hours	240	14800	0
# A3 alt	<b>AC</b> Autoclave	JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)				
# A2 alt	<b>H3TRB</b> High Humidity High Temperature Reverse Bias	JESD22-A101 Tamb = 85 °C, RH = 85%, VR = 80 % of rated reverse voltage <sup>[1]</sup>	1000 hours	240	14800	0
# A5	<b>IOL</b> Intermittent Operating Life	MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C for 15000 cycles	1000 hours	264	16720	0
# C8	<b>RSH</b> Resistance to Solder Heat	JESD22-A111 260 °C ± 5 °C	10 s	184	5520	0
# C10	<b>SD</b> Solderability	J-STD-002		501	5010	0

[1] The maximum applied voltage is limited by test chamber set up and does not exceed 115V.

### Calculation of FIT and MTF

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	Zener	11960	0	0,36	2,82E+09

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