

## Quarterly Reliability Monitoring Results

Quarters: Q3/2021 to Q4/2022

Based on structural similarity

Supplier		User Part Number				
Nexperia B.V.		PQMD12				
Name of Laboratory		Part Description				
Assembly reliability labs		Nexperia DHAM MCD package Small Signal Bipolar Transistor				
Test	Test Conditions	Duration	# Lots	# Quantity	# Rejects	
# 1	<b>TEST</b> Pre- and Post-Stress Electrical Test Tamb = 25 °C	N/A	see below	all parts	see below	
# 2	<b>PC</b> Preconditioning JESD22-A113 Bake Tamb = 125 °C Soak Tamb = 85 °C, RH = 85% Reflow soldering	24 hours 168 hours 3 cycles	344	20320	0	
# 5	<b>HTRB</b> High Temperature Reverse Bias MIL-STD-750-1 M1039 Method A Tj = Tjmax, Vr = 100% of max. datasheet reverse voltage	1000 hours	316	18920	0	
# 7	<b>TC</b> Temperature Cycling JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	500 cycles	86	5080	0	
# 8 or	<b>UHAST</b> Unbiased HAST JESD22-A118 Tamb = 130 °C, RH = 85 %	96 hours	86	5080	0	
# 8a	<b>AC</b> Autoclave JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)					
# 9	<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	86	5080	0	
# 10	<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	86	5080	0	
# 20	<b>RSH</b> Resistance to Solder Heat JESD22-A111 260 °C ± 5 °C	10 s	n.a.	n.a.	n.a.	
# 21	<b>SD</b> Solderability J-STD-002		192	1920	0	

[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 # 5)

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	18920	0	0,22	4,46E+09

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