

Quarterly Reliability Monitoring Results

Quarters: Q1/2023 to Q4/2024

Based on structural similarity

Supplier		User Part Number				
Nexperia B.V.		PMBT3946VPN				
Name of Laboratory		Part Description				
Assembly reliability labs		Nexperia DHAM Small Signal Bipolar Transistor SMD package				
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	1644	62950	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	394	15760	0
# 7	<b>TC</b> Temperature Cycling	JESD22-A104 -65 °C to Tjmax, not to exceed 150°C	500 cycles	340	13600	0
# 8 or	<b>UHAST</b> Unbiased HAST	JESD22-A118 Tamb = 130 °C, RH = 85 %	96 hours	342	13680	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	340	13600	0
# 10	<b>IOL</b> Intermittent Operating Life	MIL-STD-750 Method 1037 ton = toff, devices powered to insure ΔTj = 100 °C	333 hours	341	13640	0
# 20	<b>RSH</b> Resistance to Solder Heat	JESD22-A111 260 °C ± 5 °C	10 s	281	8430	0
# 21	<b>SD</b> Solderability	J-STD-002		211	6330	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	15760	0	0,27	3,71E+09