

## Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

Supplier	User Part Number				
Nexperia B.V.	TL431AQDBZR-Q				
Name of Laboratory	Part Description				
Assembly reliability labs	Nexperia DHAM Bipolar Analog Power SMD package				
Based on AEC-Q100 Test	Test Conditions	Duration	# Lots	# Quantity	# Rejects
# E1	<b>TEST</b> 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	149	4320	0
# A2	<b>THB</b> Temperature Humidity Bias JESD22-A101 Tamb = 85 °C, RH = 85%, Vref = 0 V, VKA = 36 V	1000 hours	24	1080	0
# A3	<b>UHST</b> Unbiased HAST or JESD22-A118 Tamb = 130 °C, RH = 85 % <b>AC</b> Autoclave JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)	96 hours	24	1080	0
# A4	<b>TC</b> Temperature Cycling JESD22-A104 -65 °C to +150 °C	1000 cycles	24	1080	0
# A5	<b>IOL</b> Intermittent Operating Life MIL-STD-750 Method 1037 ton = toff = 2 minutes, Ptot = 250 mW to insure ΔTj = 100 °C for 15000 cycles	1000 hours	24	1080	0
# B1	<b>HTOL</b> High Temperature Operating Life Tamb = 150 °C, Vref = 0 V, VKA = 36 V	1000 hours	48	2160	0
# C3	<b>RSH</b> Resistance to Solder Heat JESD22-A111 / JESD22-B106 260 °C ± 5 °C <b>SD</b> Solderability JESD22-B102 245 °C ± 5 °C	10 s	29	870	0

### Calculation of FIT and MTTF

Test considered for FIT calculation: High Temperature Operating Life (HTOL, 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	Bipolar Analog Power	2160	0	1,97	5,09E+08

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