

Quarterly Reliability Monitoring Results

Quarters: Q1/2022 to Q4/2023

Based on structural similarity

Supplier	User Part Number	
Nexperia B.V.	TL431AFDT-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	TEST Pre- and Post-Stress Electrical Test Tamb = 25 °C	N/A see below all parts see below
# A1	PC 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	THB Temperature Humidity Bias JESD22-A101 Tamb = 85 °C, RH = 85%, Vref = 0 V, VKA = 36 V	1000 hours 24 1080 0
# A3	UHST Unbiased HAST or JESD22-A118 Tamb = 130 °C, RH = 85 % AC Autoclave JESD22-A102 Tamb = 121 °C, RH = 100 % Pressure = 205 kPa (29.7 psia)	96 hours 24 1080 0
# A4	TC Temperature Cycling JESD22-A104 -65 °C to +150 °C	1000 cycles 24 1080 0
# A5	IOL 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	HTOL High Temperature Operating Life Tamb = 150 °C, Vref = 0 V, VKA = 36 V	1000 hours 48 2160 0
# C3	RSH Resistance to Solder Heat JESD22-A111 / JESD22-B106 260 °C ± 5 °C SD Solderability JESD22-B102 245 °C ± 5 °C	10 s 29 870 0 436 13080 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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