



TIN WHISKERS FAMILY QUALIFICATION – CLASS 2

ALL INTEGRATED PASSIVE COMPONENTS, ANTENNAS & CHIP INDUCTORS

PRODUCED BY JOHANSON TECHNOLOGY INC.

RESULTS:

All Johanson Integrated Passive Components (IPC's) and Chip Inductors are qualified by similarity based on the test results herein.

Three (3) separate, representative, Johanson Integrated Passive Components (IPC's) all plated on the same Johanson plating line, completed and meet all requirements of:

- JEDEC JESD201 Environmental Acceptance Requirements for Tin Whisker Susceptibility of Tin and Tin Alloy Surface Finishes for Class 2 products
- JEDEC JESD22-A121A Test Method for Measuring Whisker Growth on Tin & Tin Alloy Surface Finishes

All samples exhibited no (zero) tin whisker growth during both specified storage tests, and ≤ 26 micron tin whisker growth during temperature cycling, therefore meeting the 45 micron specified maximum. This qualifies all Johanson IPC's, Antennas and Chip Inductors by similarity.

DETAILS: Johanson IPC's tested:

JTI Part Number	Part Description	EIA Size	Manufacturing Order Number	Lot Number	Test ID
2450AT18A100	Antenna, 2.45 GHz	1206	354746-01	403-8044	A1
2450BM14E0003	Impedance Matched Balun	0603	454381-01	505-X028	B2
5425BL07B0100	Balun, 5.5GHz	0402	423145-00	416-8029	B1

Nine (9) samples of each part number were tested in each of the three (3) Tin Whisker tests conducted in parallel and described in Figure 1. All three (3) tests were run as specified for **Class 2 products**, i.e., 1500 temperature cycles, and 4000 hours for each of the storage tests.

Whiskers Tests to perform according to the JEDEC Standards			
Test definition	Temperature cycling	Room temperature/Humidity storage	High temperature/humidity storage
Condition	-55 +0/-10°C to 85 +10/-0°C or -40 +0/-10°C to 85 +10/-0°C Soak : 10 mn / 3 cycles/hr Readout : every 500 cycles Minimum duration : 1000 ^v cycles Minimum duration : 1500 ⁱⁱⁱ cycles for class 2 products	30±2°C 60±3 %RH ^v Readout : every 1000hr Minimum duration : 3000 hr ^v Minimum duration : 4000 hr ⁱⁱⁱ for class 2 products	60±5°C 87+3/-2 %RH ^v or 55±3°C 85±3 %RH ⁱⁱⁱ Readout : every 1000hr Minimum duration : 3000 hr ^v Minimum duration : 4000 hr ⁱⁱⁱ for class 2 products
Whisker control and sampling	<ul style="list-style-type: none"> - Scanning Electron Microscope (SEM) with a magnification X300 - 3 sample locations for coupons and 3 visible sides for components Sample <ul style="list-style-type: none"> - 3 Lots per stress with 2 samples with 96 screening inspection and 18 Detailed inspection per read-out for Multi-leaded component - 3 Lots per stress with 3 samples with 18 screening inspection and 18 Detailed inspection per read-out for passive and discrete components with 4 leads or fewer 		
Criteria	Equivalent or better to reference part with Pb or if not: < 40µm for Room temperature/Humidity storage and High temperature/humidity storage < 45µm for Temperature cycling		

Figure 1

* **Class 2 products** are business critical applications such as Telecom Infrastructure equipment, High-end Servers, Automotive, etc., requiring long product lifetimes and minimal downtime.

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