Product Analysis Report

Work Order:	259182	Quantity Received:	600
Customer:	N/A	Quantity Inspected:	13
PO Number:	N/A	Report Date/Time:	4/20/24 4:41 PM
Prepared By:	Summer Cao	Approved by:	Jerry Long

PRODUCT INFORMATION

Part Number:	XC6SLX9-2TQG144C	Package Type:	TQFP-144
Manufacturer:	Xilinx		
Product Description:	Spartan®-6 LX Field Programmable Gate Array (FPGA) IC		
Datasheet Reference:	https://www.xilinx.com/support/documentation/data_sheets/ds160.pdf		

REPORT SUMMARY

Result:	Acceptable	Quality Risk Level:	

600 pieces of Xilinx XC6SLX9-2TQG144C were received for analysis, from which 13 pieces were used for External Visual Inspection (EVI), 1 piece was used for Decapsulation analysis. Product arrived in trays with appropriate ESD and MSL protective packaging.

Sample pass chemical solution and scrape tests for remarking and resurfacing, indicating that the samples are not remarked.

Samples exhibit exposed base metal from trimming and stress marks from forming, indicating that they are not re-plated.

Dimensions A, A2 and b were measured and were within manufacturer specification, and dimensions D, E, D1, E1 and e were measured for reference since the manufacturer POD dimensions have no tolerance. The samples have the same exterior configuration as shown on the Package Outline Drawing (POD).

Decapsulation reveals die architecture with "XILINX, X9610, L2A" die markings, verifying that the sample was manufactured by Xilinx, but not traceable to requested part number. The traceability to requested manufacturer indicates that the sample is authentic. Sample does not exhibit cracks or scratches on the die surface. The die architecture and die markings are consistent with WO: 238362 in White Horse Labs.

All tests were conducted according to the referenced standards and methods. The parts are “Acceptable” based on the testing performed.

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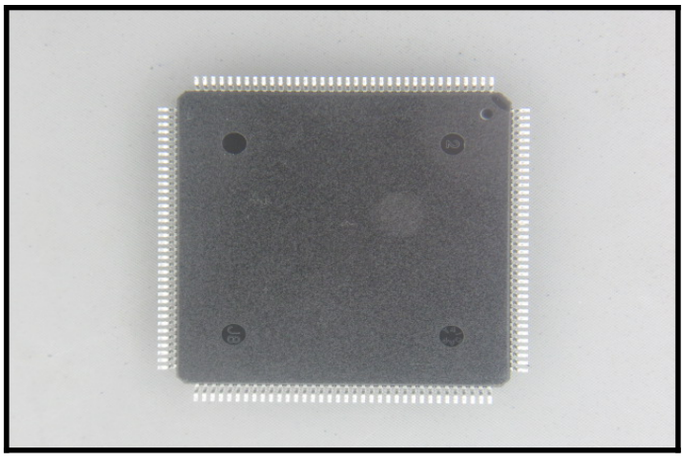
Body (top-side)	



Body (bottom-side)	

EXTERNAL VISUAL INSPECTION

REMARKING / RESURFACING TEST

Pass:	1	Fail:	0

MARKING INSPECTION

Pass:	13	Fail:	0	F.A.R:	0

BODY INSPECTION

Pass:	13	Fail:	0	F.A.R:	0

TERMINAL INSPECTION

Pass:	13	Fail:	0	F.A.R:	0

MECHANICAL CHARACTERISTICS INSPECTION

Pass:	13	Fail:	0	F.A.R:	0

DOCUMENT AND PACKAGE INSPECTION

Number of Boxes:	1
Document & Labels:	Match
Date Code:	2405
Lot Code:	D4ARX939A

GENERAL INSPECTION

Package Carrier:	Tray
ESD Protection:	Yes
MSL Protection:	MSL 3, Yes
Country of Mfg.:	Taiwan

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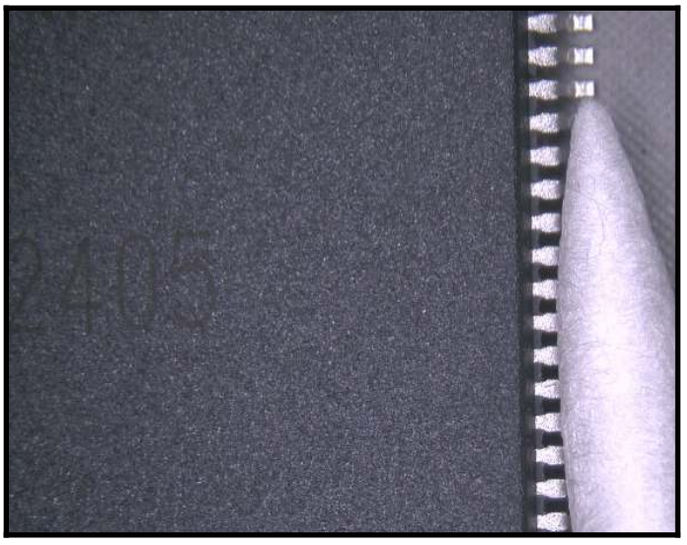
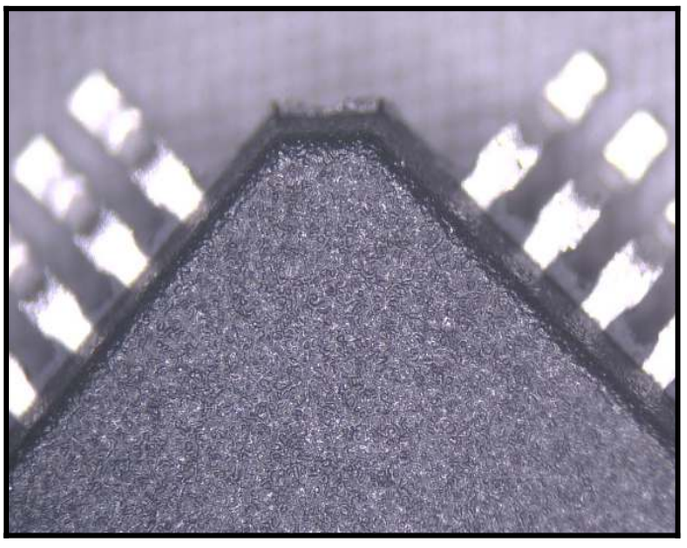
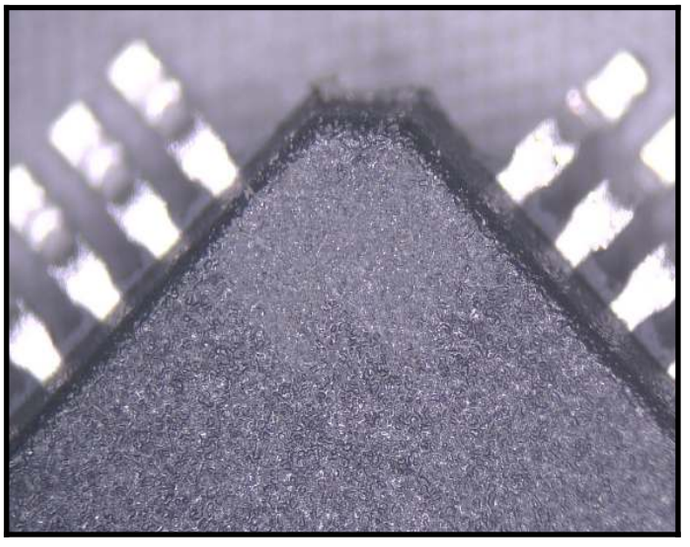


Marking (top-side)	Before chemical resurfacing test

Marking (top-side)	After chemical resurfacing test (Pass)



Marking (top-side)	Before mechanical resurfacing test



Marking (top-side)	After mechanical resurfacing test (Pass)

The Spartan-6 devices in the TQ, CS, and FG packages have package top-markings similar to the example shown in Figure 6-1 and explained in Table 6-1. In BGA packages, the ball A1 indicator is in the top-left corner. In the TQG144 packages, the pin P1 indicator is in the bottom left of the mark.

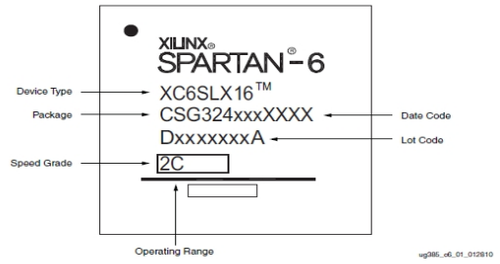
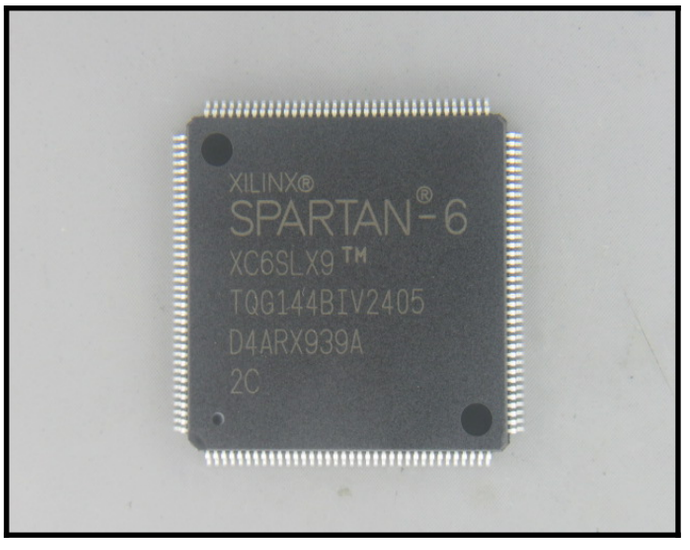


Figure 6-1: **Spartan-6 Device Package Marking**

Marking (top-side)	Marking code



Marking (top-side)	

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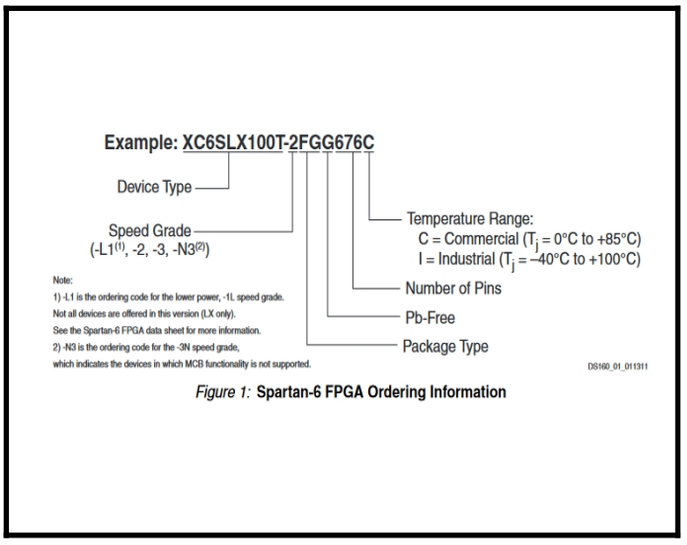


Figure 1: **Spartan-6 FPGA Ordering Information**

Ordering Information	

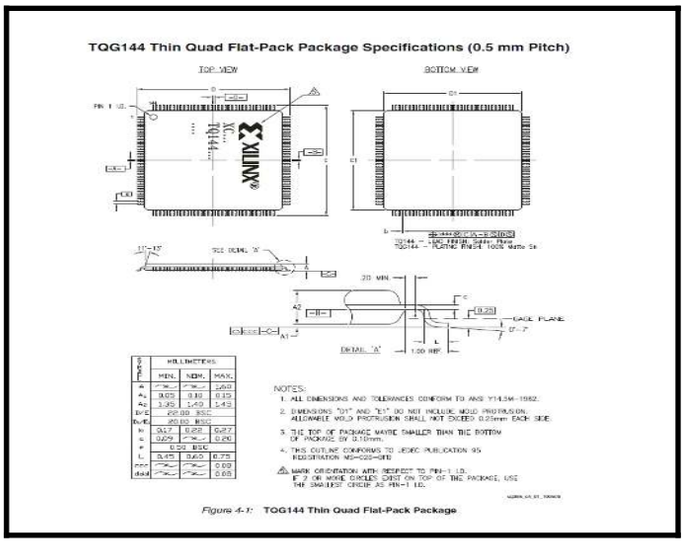
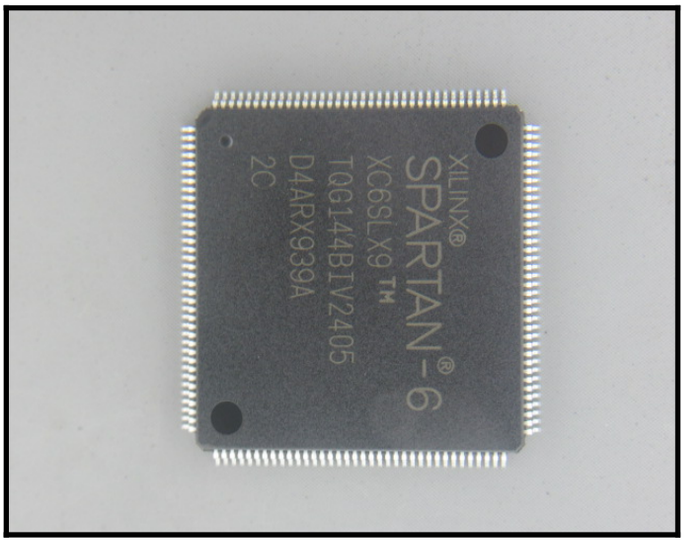
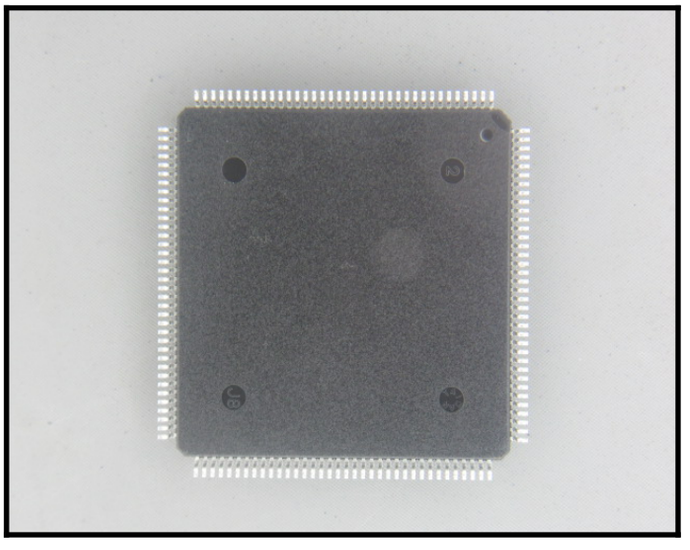


Figure 4-1: **TQG144 Thin Quad Flat-Pack Package**

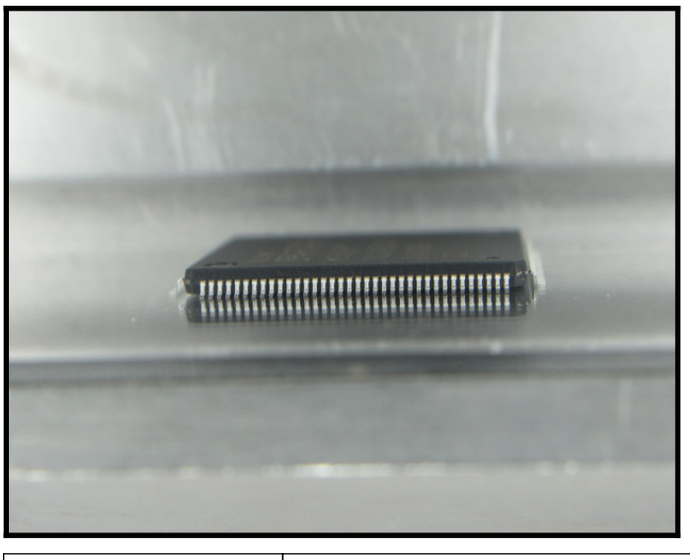
Mechanical Dimensions	Package Outline Drawing



Mechanical Dimensions	Part as shown on POD



Mechanical Dimensions	Part as shown on POD



Mechanical Dimensions	Part as shown on POD

Dimension Measurement	D=22.00mm

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Dimension Measurement	E=21.99mm

Dimension Measurement	A=1.52mm (Pass)

Dimension Measurement	D1=19.90mm

Dimension Measurement	E1=19.90mm

Dimension Measurement	A2=1.43mm (Pass)

Dimension Measurement	b=0.21mm (Pass)

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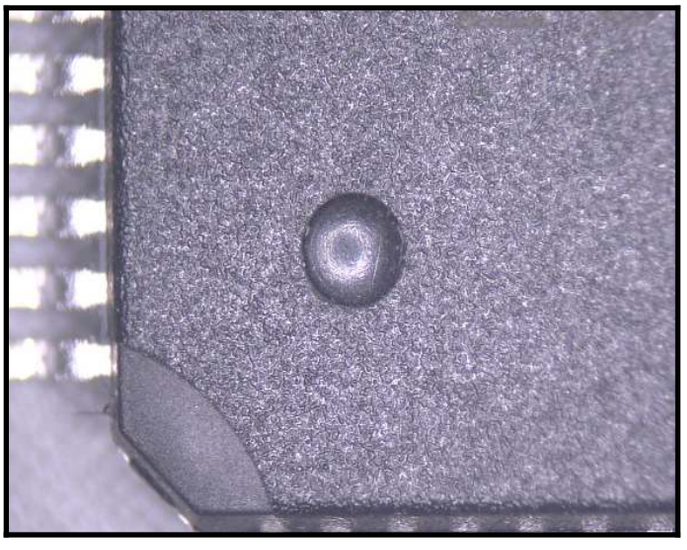
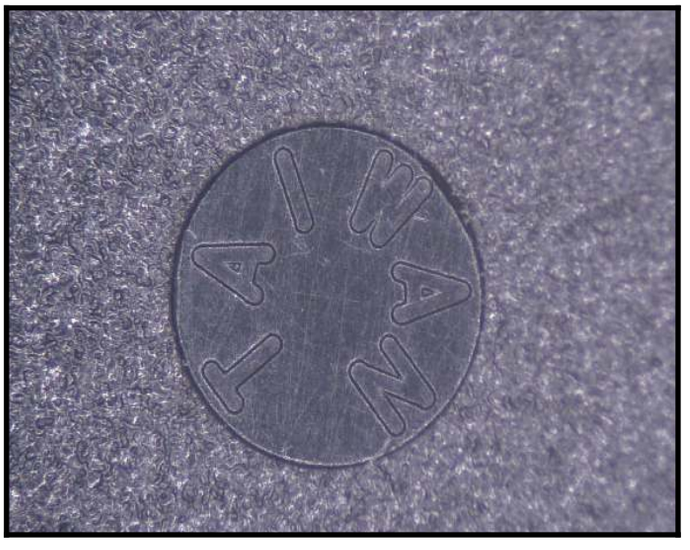
WO Number	259182

Dimension Measurement	e=0.50mm

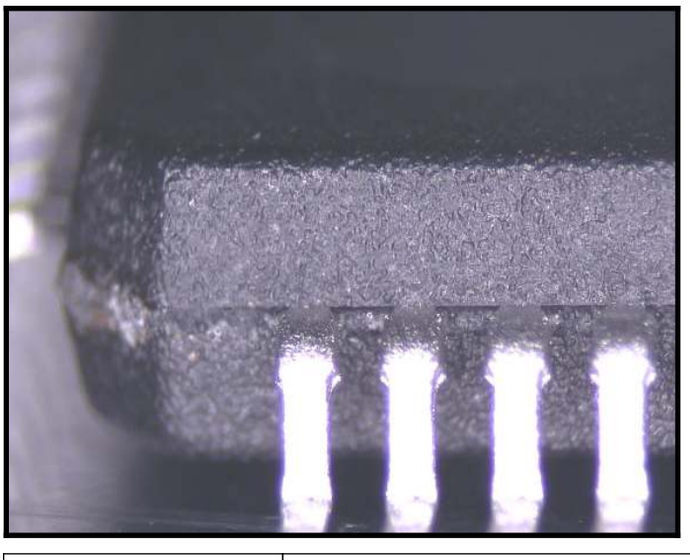
Dimension Measurement	Coplanarity Pass, 13pcs



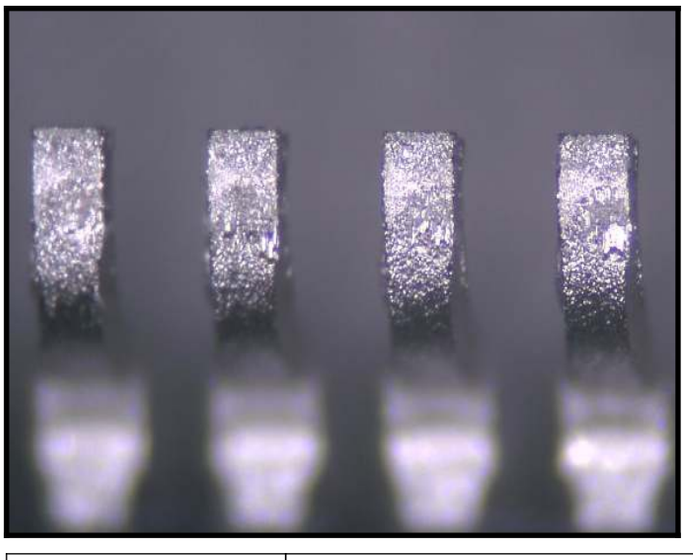
Body (top-side)	Pin 1 indicator



Body (bottom-side)	Country of origin toolmark



Body (side view)	



Terminal	Test contact marks

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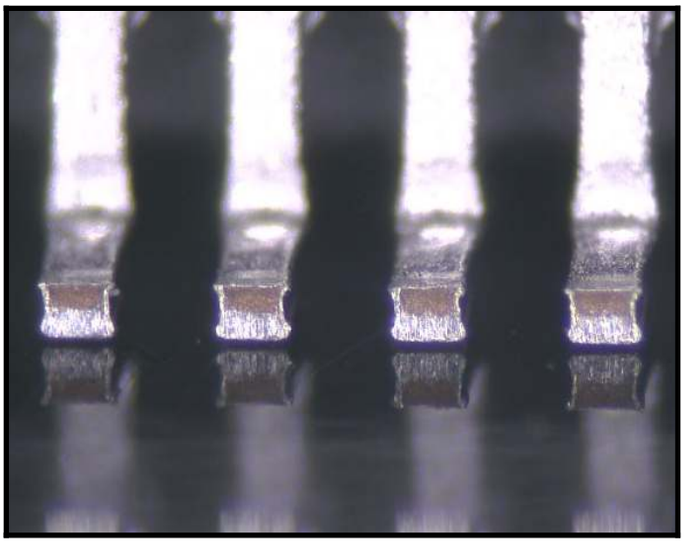
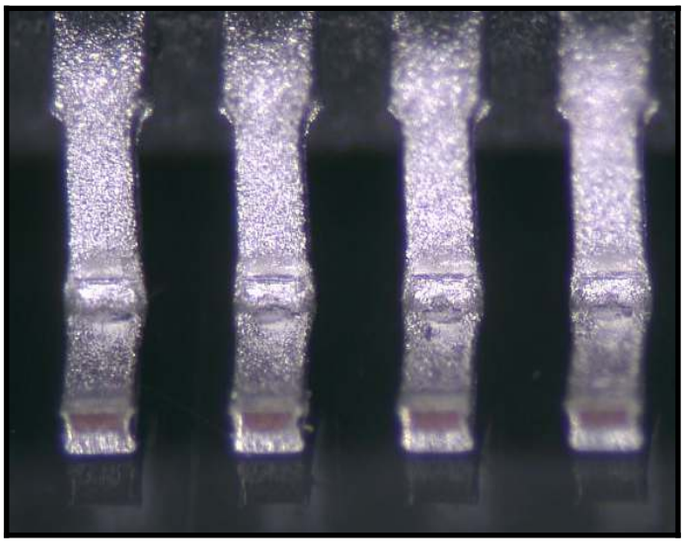


Terminal	Exposed base metal from trimming



Terminal	Stress marks from forming

Packaging (Box)	Box as received

Packaging (Box)	Box label

Packaging (Box)	Open box

Packaging (MBB)	Moisture Barrier Bag (MBB)

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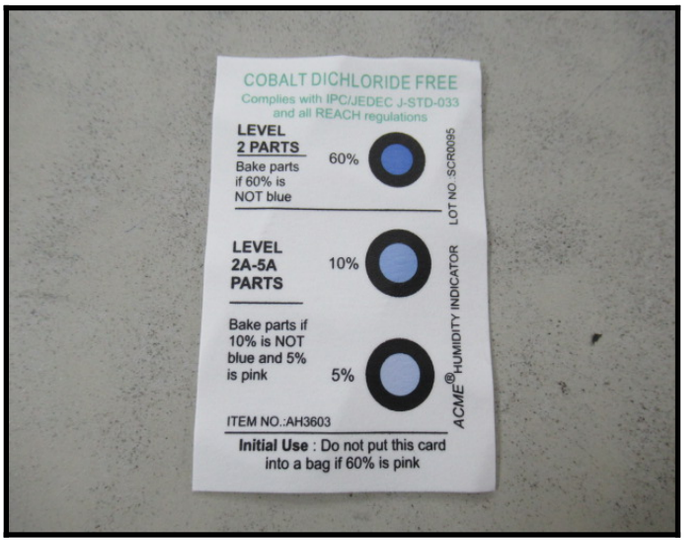
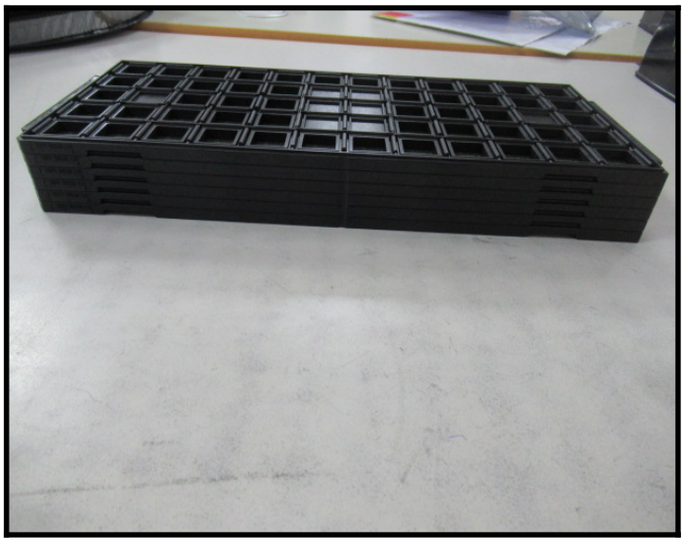
Packaging (MBB)	MBB label

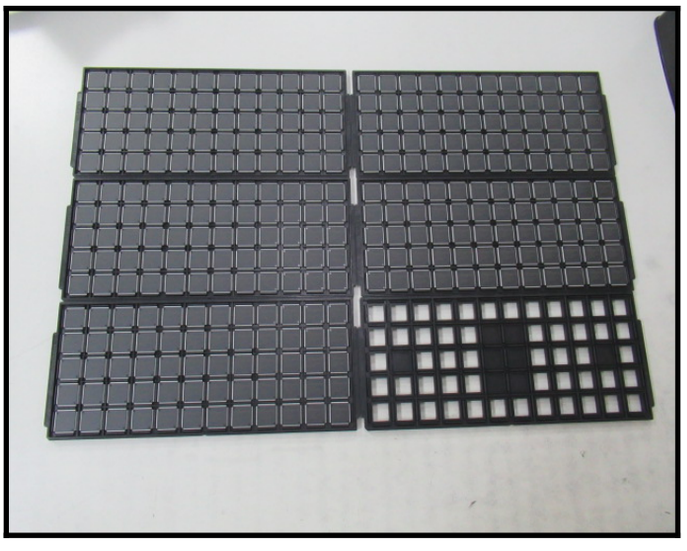
Packaging (MBB)	HIC and Desiccant



Packaging (MBB)	HIC reads 5%



Packaging (Carrier)	Trays stack aligned



Packaging (Carrier)	Parts aligned in tray

Packaging (Carrier)	Tray temperature

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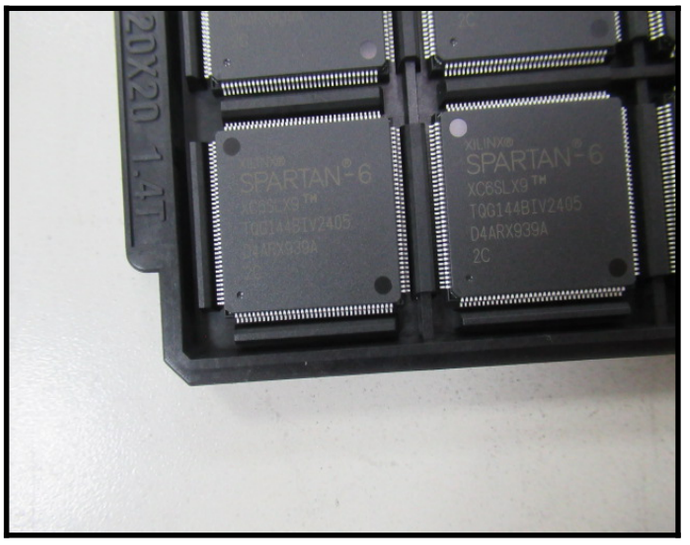
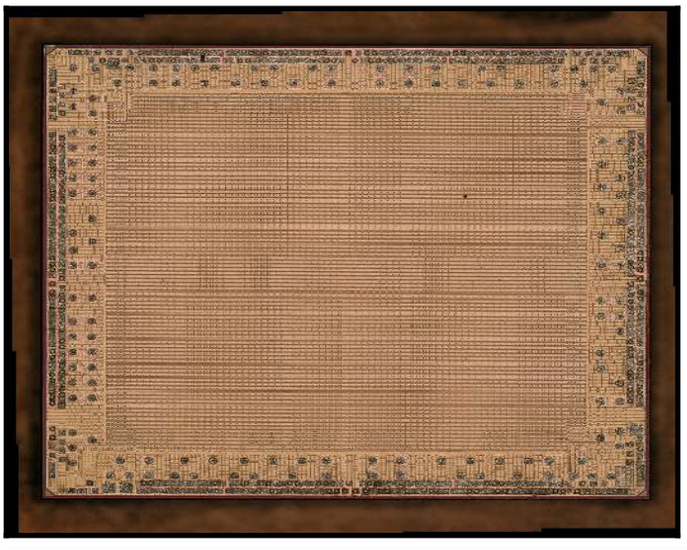
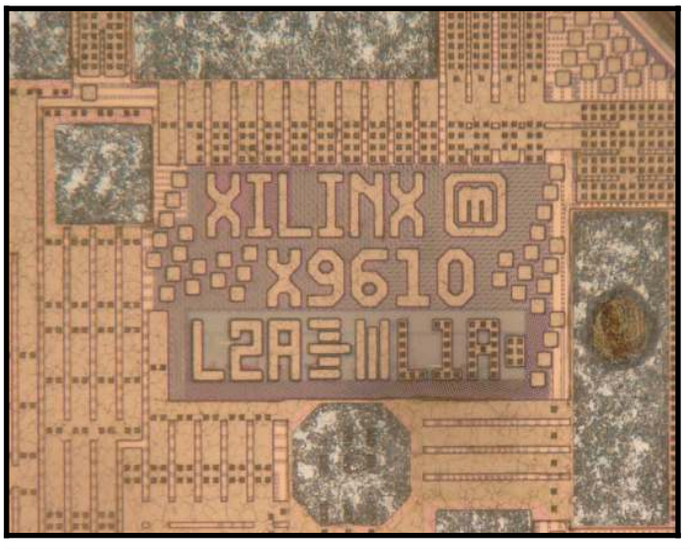
Packaging (Carrier)	Tray size



Packaging (Carrier)	Parts aligned in tray



Decapsulation	Die architecture



Decapsulation	XILINX X9610 L2A

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WO Number	259182

Definitions (as **defined within AS6081)**

- KNOWN AUTHENTIC PART (Golden Sample) –A part which has either been purchased directly from the manufacturer, their authorized distributors, or authenticated by the manufacturer with supporting documentation.
- UNUSED – Electronic parts that have not been previously used (i.e., attached to a board or powered up since leaving the supply chain). Unused material can contain mixed date codes, lot codes, or countries of origin, and should be received in original factory or third-party packaging. The material may have minor scratches or other physical defects as a result of handling, but the leads should be in good condition and should not be refurbished. The material should be guaranteed to meet the manufacturer's full specifications. Unused programmable parts should be received without having been previously programmed.
- USED (REFURBISHED OR PULLED) – Product that has been electrically charged and subsequently pulled or removed from a socket or other electronic application. Used product may be received in non-standard packaging, and may contain mixed lots, date codes, be from different facilities, etc. Parts may have physical defects such as scratches, slightly bent leads, test dots, faded markings, chemical residue or other signs of use, but the leads should be intact. Used product may be sold with a limited warranty, and programmable parts may still contain partial or complete programming which could impact the part's functionality.
- REFURBISHED – Parts that have been renovated to restore them to a "like new" condition, e.g., leaded parts may have had their leads realigned and re-tinned and subjected to cleaning agents and chemical processing.
- COUNTERFEIT PART –A fraudulent part that has been confirmed to be a copy, imitation, or substitute that has been represented, identified, or marked as genuine, and/or altered by a source without legal right.

Report Explanations:

- Result is either Acceptable, Unacceptable, or Suspect Counterfeit based upon the test methods conducted in the requested test plan and the acceptance criteria defined within AS6171A, section 3.7.1.
- "Risk Factor" is a calculation of the remaining risk of a device being counterfeit or substandard from the results of the processer conducted, and risk associated with not conducting some processes. Green codes are acceptable with minimal risk of counterfeit or being substandard quality. Yellow codes are potential problems that can be verified with additional testing or physical defects that can be removed. Red codes are unacceptable and either high risk of being counterfeit, fail electrical testing, physically unusable condition.
- Minor observations such as scratches and loose contamination from normal handling, packaging, storage and aging are defined and allowed within the JEDEC manufacturing standards. Images of minor observations are not included in the report but are on file and available upon request.
- "FAR" in the process summary on Page 2 means "Further Analysis Recommended". It is not always possible to reach a conclusion on a single process. When we recommend additional tests to verify an observation found in one process, or gaps in the requested test plan, we will identify those areas of risk as "FAR".
- Note that definitions are as defined within the AS6081 and AS6171 standard.
- Measurements of uncertainty are not included in the report. The reported measurements are valid and measurements of uncertainty are available on request.
- The decision rule for statement(s) of conformity is based on Binary Statement for Simple Acceptance Rule specified in Decision Rules Clause 4.2.1 in ILAC-G8:09/2019.

Notes and Disclaimers:

1. Product analysis results are applicable for the inspected samples only. White Horse Laboratories is not liable for the value of the product and any liability is limited to the value of the services provided.
2. "Reference samples" are previously tested and/or inspected product which are used for comparison purposes to the devices analyzed for this report. "Known-good samples" are provided by the customer to compare to unverified product. "Golden samples" are acquired by WHL with direct traceability to the original manufacturer.
3. All source and measurement equipment are calibrated and suitable for the processes conducted with calibration certifications available upon request.
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6. All conducted methods are established, and test plan approved, by the customer.