

## Product Analysis Report

Work Order:	238252	Quantity Received:	81
Customer:	Novus T.D LTD	Quantity Inspected:	13
PO Number:	1812488	Report Date/Time:	3/6/23 11:49 AM
Prepared By:	Liuxiangmin	Approved by:	Jose Rey Redoblado

### PRODUCT INFORMATION

Part Number:	AD7899ARZ-1	Package Type:	SOIC-28
Manufacturer:	Analog Devices		
Product Description:	5 V Single Supply 14-Bit 400 kSPS ADC		
Datasheet Reference:	<a href="https://www.mouser.cn/datasheet/2/609/AD7899-1502108.pdf">https://www.mouser.cn/datasheet/2/609/AD7899-1502108.pdf</a>		

### REPORT SUMMARY

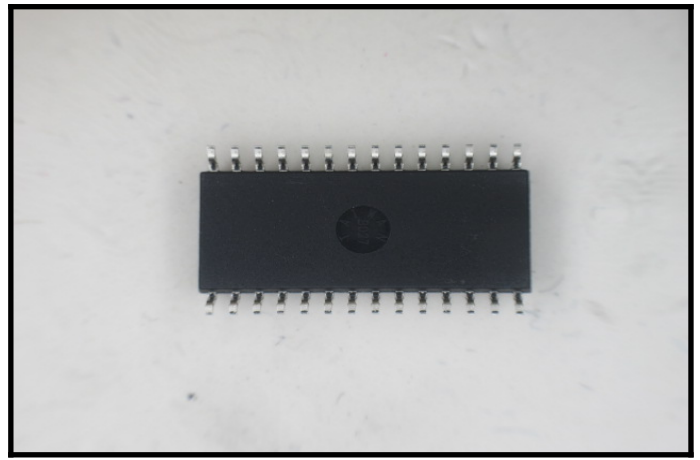
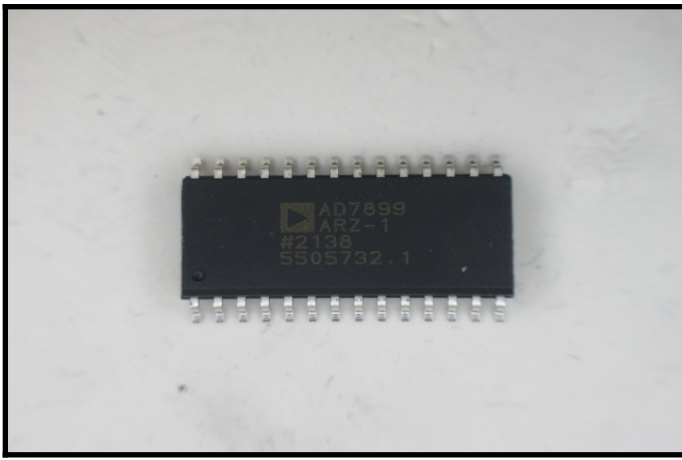
Result:	See Summary	Risk Level:	
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81 pieces of Analog Devices AD7899ARZ-1 were received for analysis, from which 13 pieces were used for External Visual Inspection (EVI), including 5 pieces were used for X-ray analysis, and 1 piece used for XRF analysis, Solderability test, and Decapsulation analysis. Product arrived in cut tape with appropriate ESD protective packaging. The COO from the label is different from the actual marking COO: Taiwan.

Sample passed chemical solution and scrape tests for remarking and resurfacing, indicating that it is not remarked. Samples exhibit exposed base metal from trimming and stress marks from forming, indicating that they are not re-plated. 1 piece with minor discoloration on the pins. Minor observations are not considered problematic. Parts do not exhibit solder remnants or any indication of prior use. Dimensions D, E, E1, A, b, and e were measured and were within manufacturer specification. The devices have the same exterior configuration as shown on the Package Outline Drawing (POD).

XRF reveals the elements in the target area are consistent with the lead-free plating material specification of the manufacturer. The sample passed XRF testing. X-ray analysis reveals consistent internal structure. Samples do not exhibit voids or other apparent anomalies inside the component. Solderability test is conducted to JEDEC standard J-STD-002E for "dip-and-look" for non-BGA devices. Sample was submitted for precondition before the solderability test. 1 piece passed since the terminal pad area showed more than 95% solder coverage after Pb-free solderability testing. Decapsulation reveals die topography with "Analog Devices logo, BVN46, B, ADI, 02" die markings, verifying that parts were manufactured by Analog Devices, but not traceable to the requested part number. The sample does not exhibit cracks or damage on the die surface.

The parts are classified as "Authentic Analog Devices products, Passed XRF and Solderability test, Unused" with consistent internal structure.



Body (top-side)

Body (bottom-side)

### EXTERNAL VISUAL INSPECTION

#### REMARKING / RESURFACING TEST

Pass:	<input type="text" value="1"/>	Fail:	<input type="text" value="0"/>
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#### MARKING INSPECTION

Pass:	<input type="text" value="13"/>	Fail:	<input type="text" value="0"/>	F.A.R.:	<input type="text" value="0"/>
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#### BODY INSPECTION

Pass:	<input type="text" value="13"/>	Fail:	<input type="text" value="0"/>	F.A.R.:	<input type="text" value="0"/>
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#### TERMINAL INSPECTION

Pass:	<input type="text" value="13"/>	Fail:	<input type="text" value="0"/>	F.A.R.:	<input type="text" value="0"/>
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#### MECHANICAL CHARACTERISTICS INSPECTION

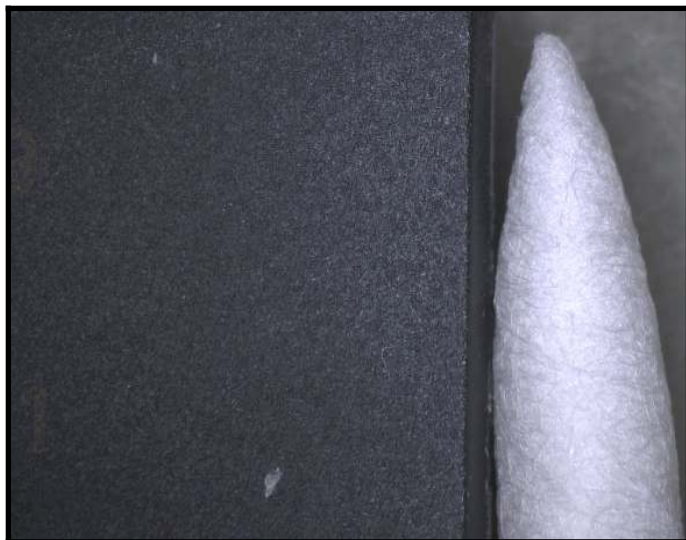
Pass:	<input type="text" value="13"/>	Fail:	<input type="text" value="0"/>	F.A.R.:	<input type="text" value="0"/>
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### DOCUMENT AND PACKAGE INSPECTION

Number of Boxes:	<input type="text" value="1"/>
Document & Labels:	<input type="text" value="Match"/>
Date Code:	<input type="text" value="2138"/>
Lot Code:	<input type="text" value="5505732.1"/>

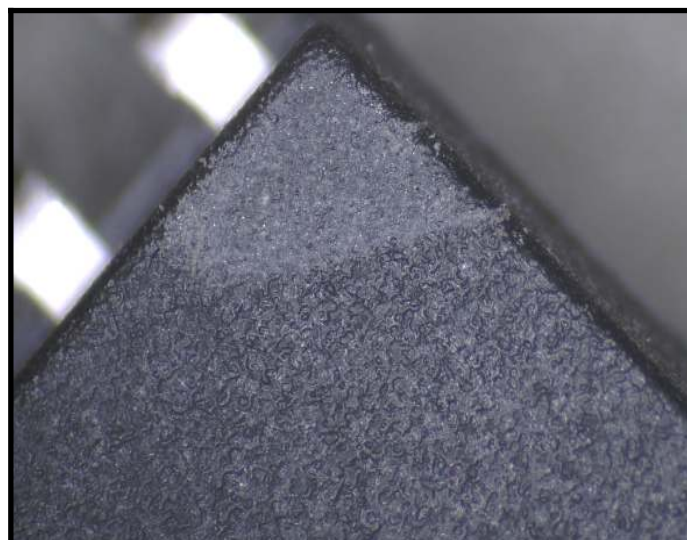
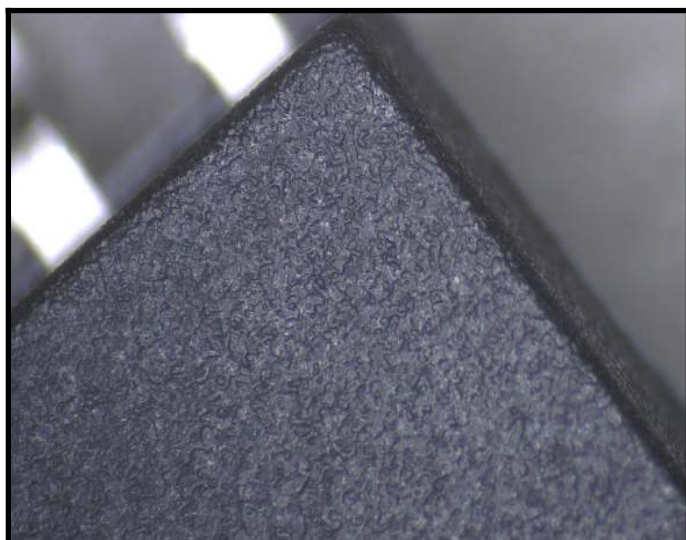
### GENERAL INSPECTION

Package Carrier:	<input type="text" value="Cut tape"/>
ESD Protection:	<input type="text" value="Yes"/>
MSL Protection:	<input type="text" value="MSL 1, N/A"/>
Country of Mfg.:	<input type="text" value="Taiwan"/>



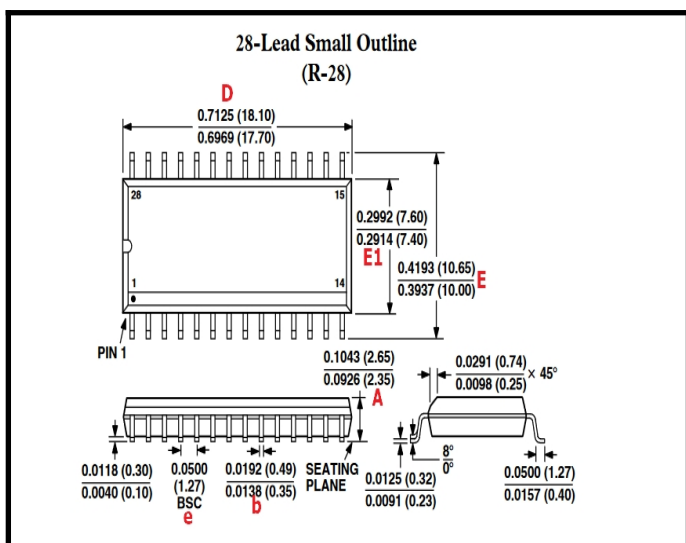
Marking (top-side) Before chemical resurfacing test

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



Marking (top-side) Before mechanical resurfacing test

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



Mechanical Dimensions Package Outline Drawing

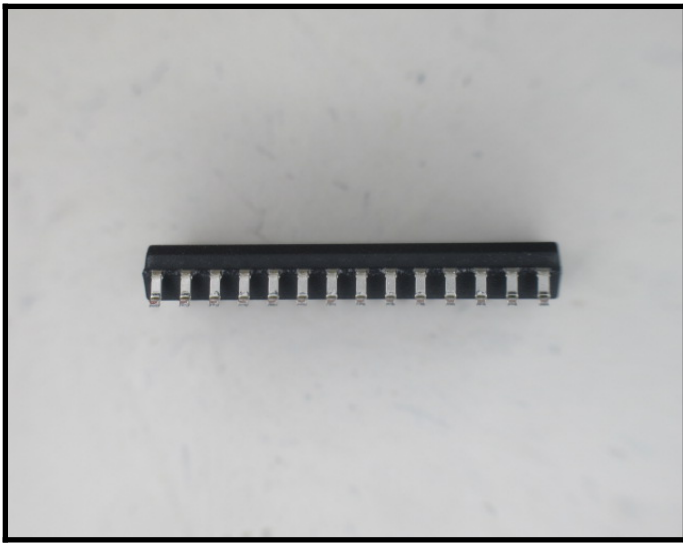
Mechanical Dimensions Part as shown on POD

Address:  
White Horse Laboratories Ltd.

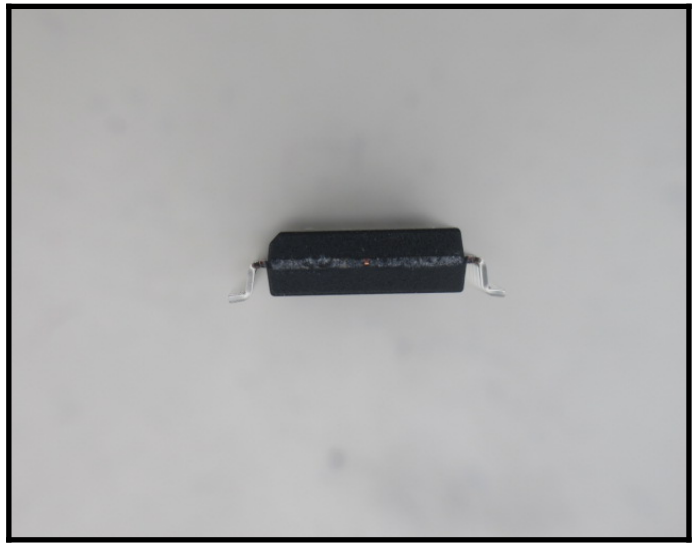
Phone Number  
+86-755-8374-1887

URL:  
<http://whitehorselabs.com>

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Mechanical Dimensions	Part as shown on POD
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Mechanical Dimensions	Part as shown on POD
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Dimension Measurement	D=17.85mm ( Pass )
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Dimension Measurement	E1=7.40mm ( Pass )
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Dimension Measurement	E=10.37mm ( Pass )
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Dimension Measurement	A=2.55mm ( Pass )
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<b>Wo Number</b>	238252
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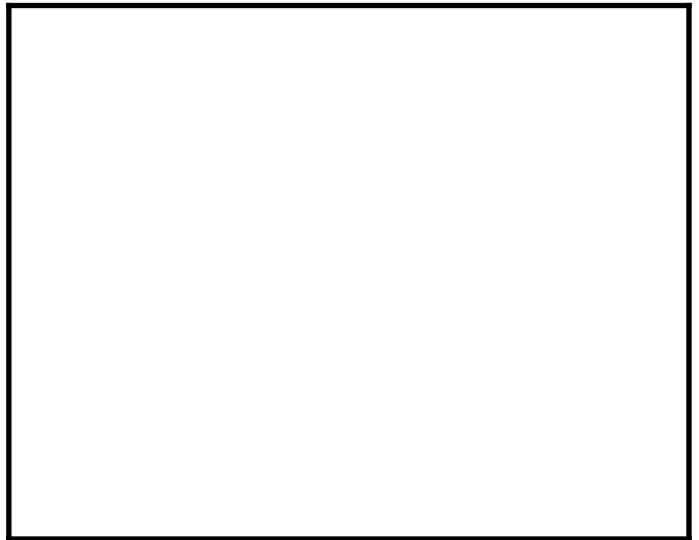
Dimension Measurement	b=0.37mm ( Pass )
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Dimension Measurement	e=1.26mm
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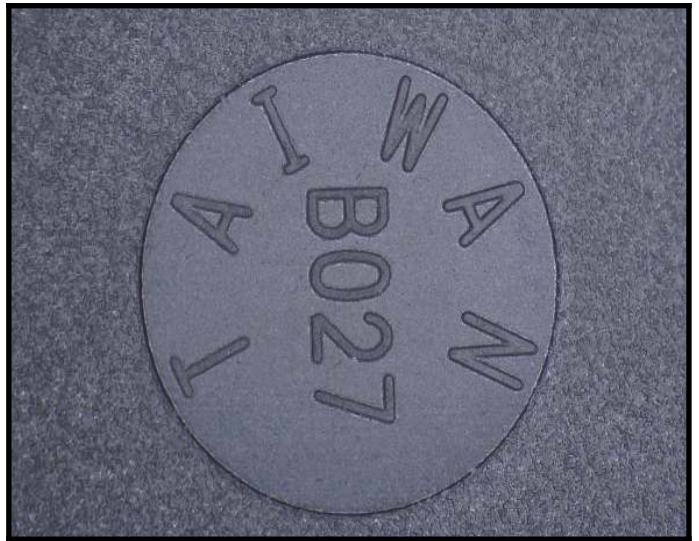
Dimension Measurement	Coplanarity Pass, 13pcs
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Body (top-side)	Pin 1 indicator
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Body (bottom-side)	Country of origin toolmark
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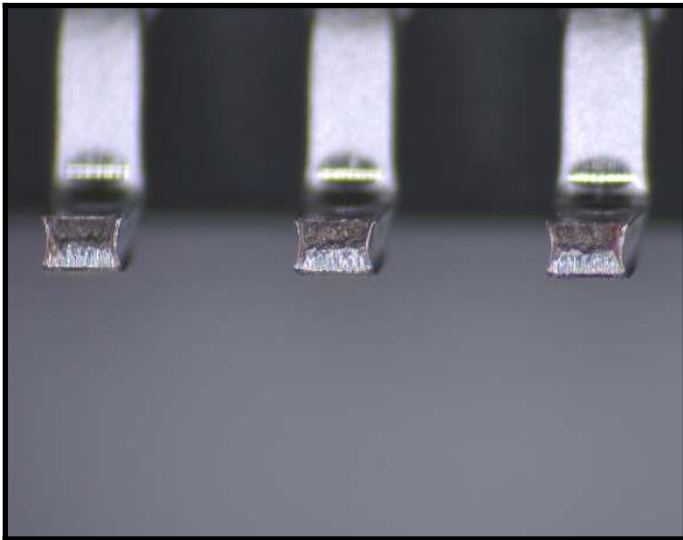
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<b>Wo Number</b>	238252
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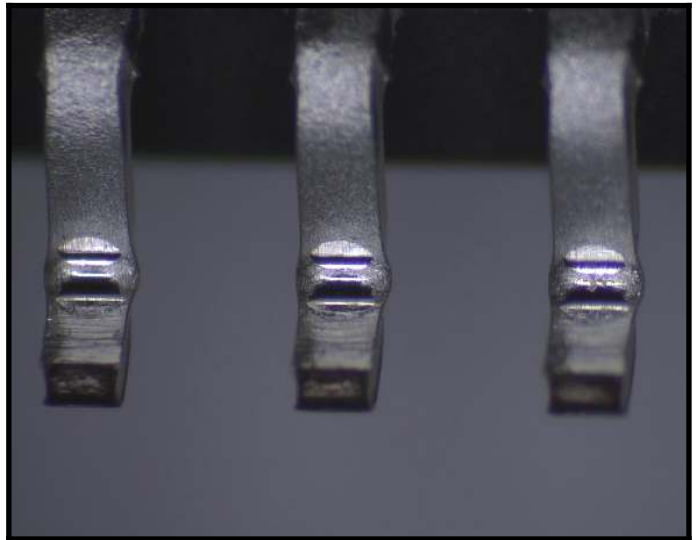


Body (side view)



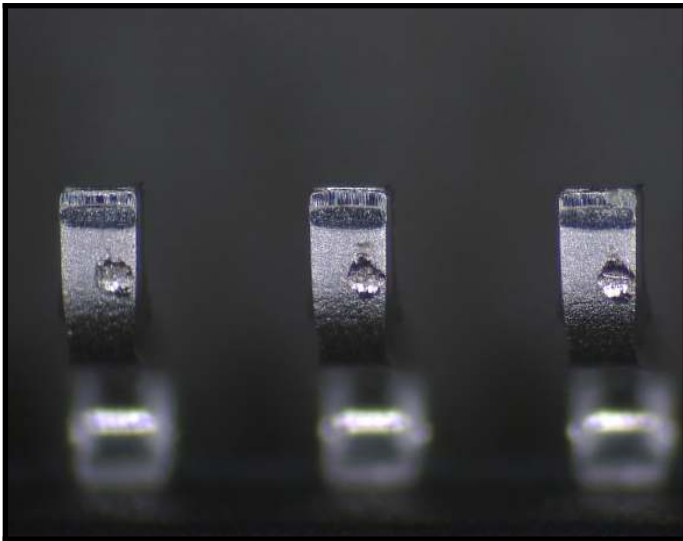
Terminal

Exposed base metal from trimming



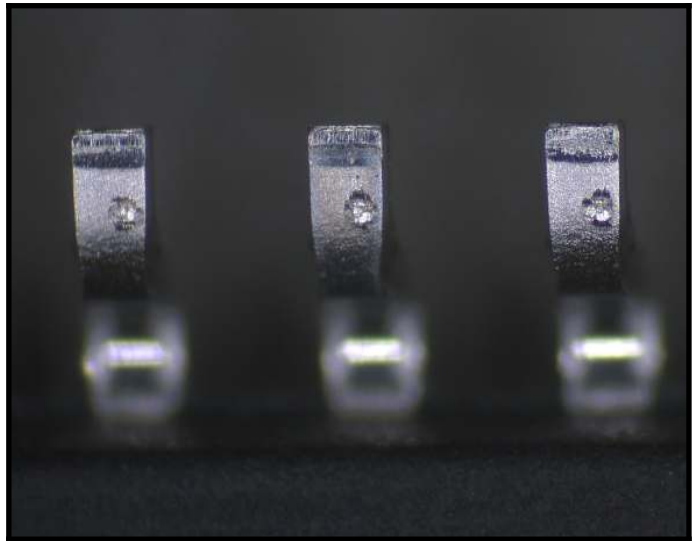
Terminal

Stress marks from forming



Terminal

Test contact marks



Terminal

Minor discoloration , 1pc

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<b>Wo Number</b>	238252
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Packaging (Box)

Box as received



Packaging (Box)

Open box



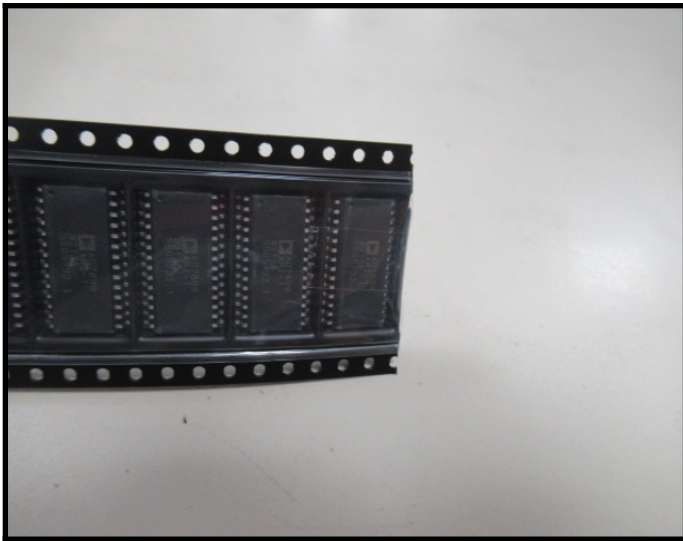
Packaging (Carrier)

ESD bag (Cut tape)



Packaging (Carrier)

Bag label (label COO:China is different with marking COO:Taiwan)



Packaging (Carrier)

Parts aligned in tape



Packaging (Carrier)

Tape with crease marked

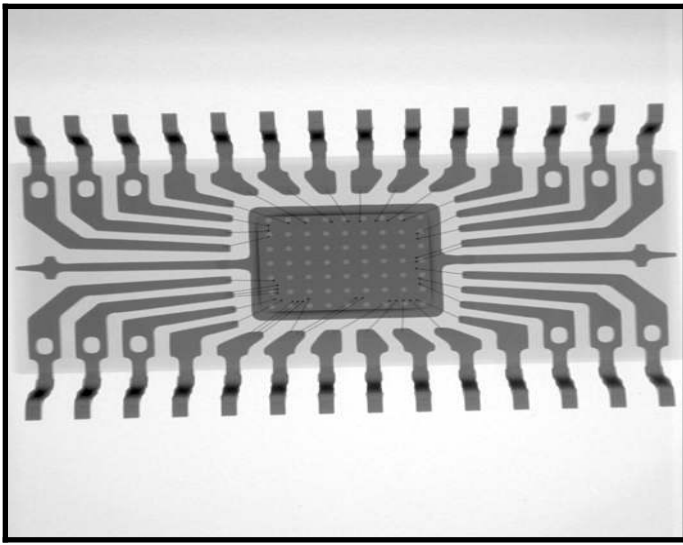
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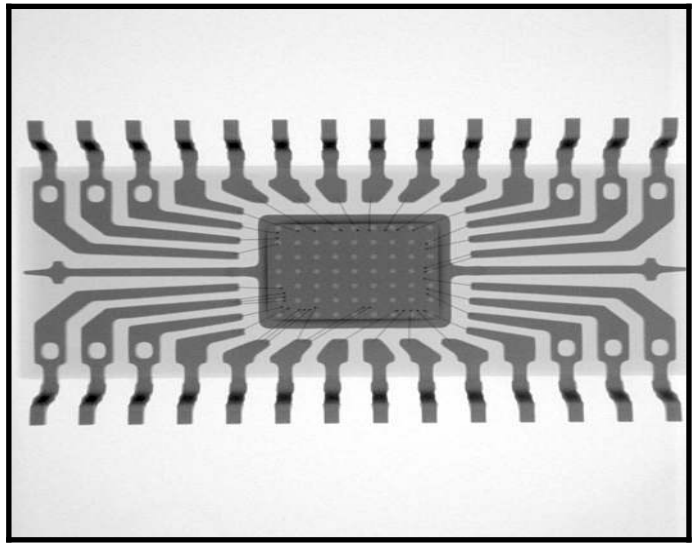
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<b>Wo Number</b>	238252
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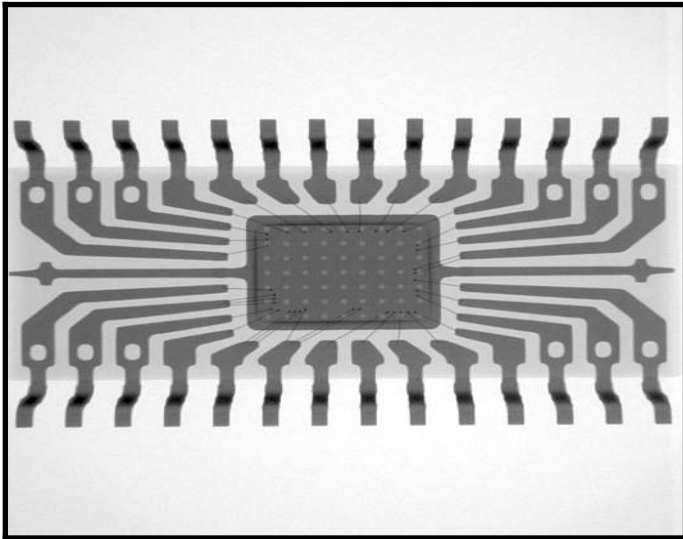
X-RAY SAMPLE 1

Internal profile



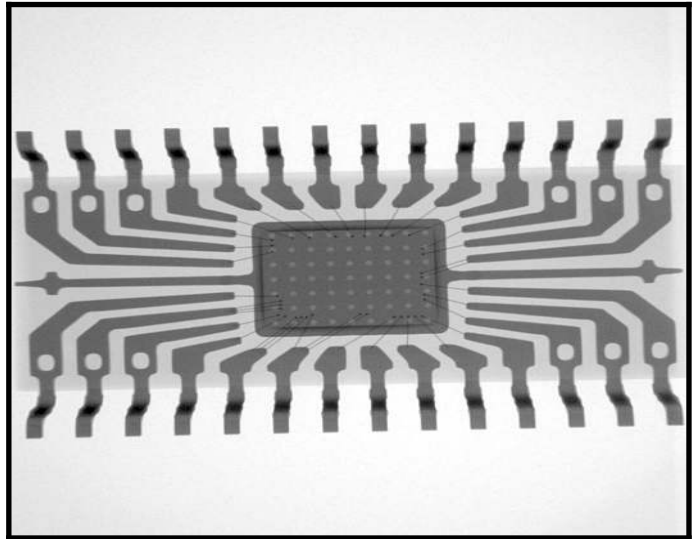
X-RAY SAMPLE 2

Internal profile



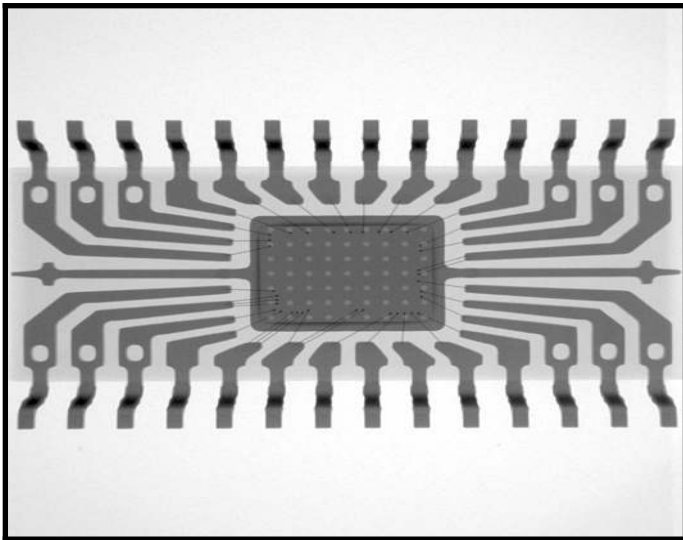
X-RAY SAMPLE 3

Internal profile



X-RAY SAMPLE 4

Internal profile



X-RAY SAMPLE 5

Internal profile



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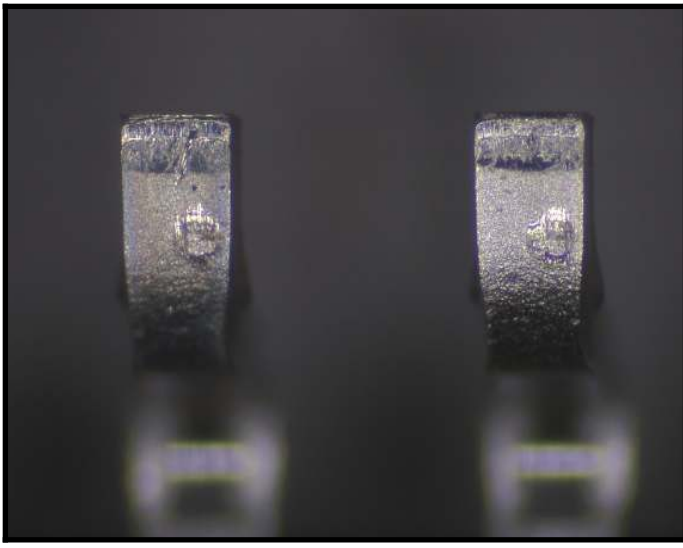
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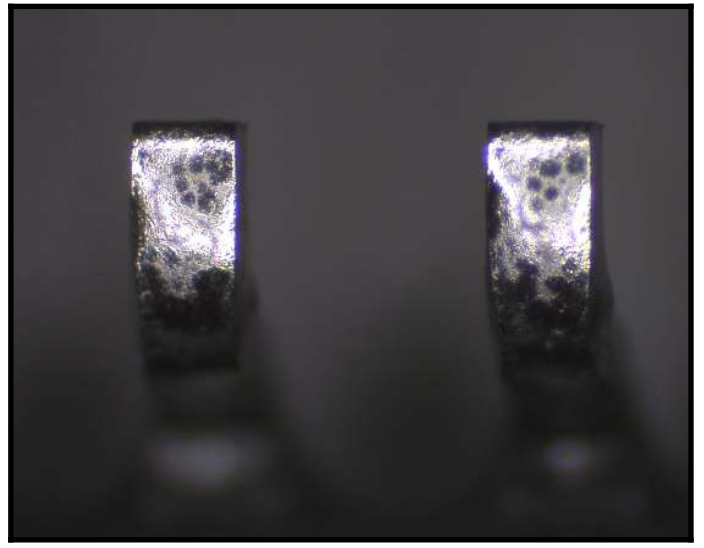
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**Wo Number** 238252

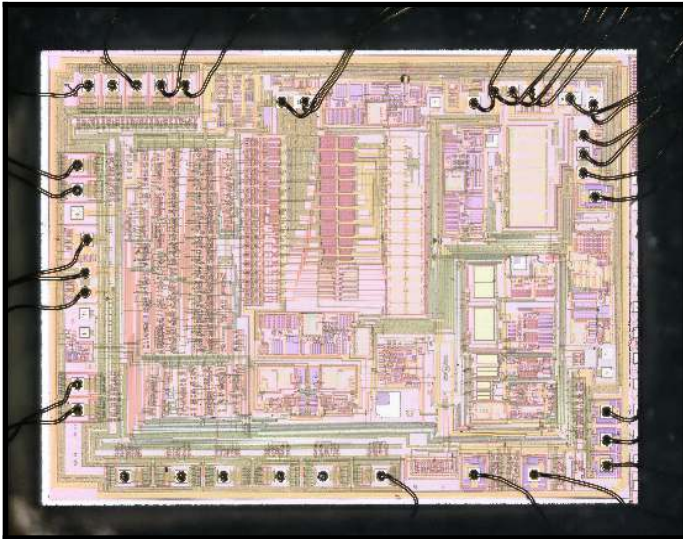




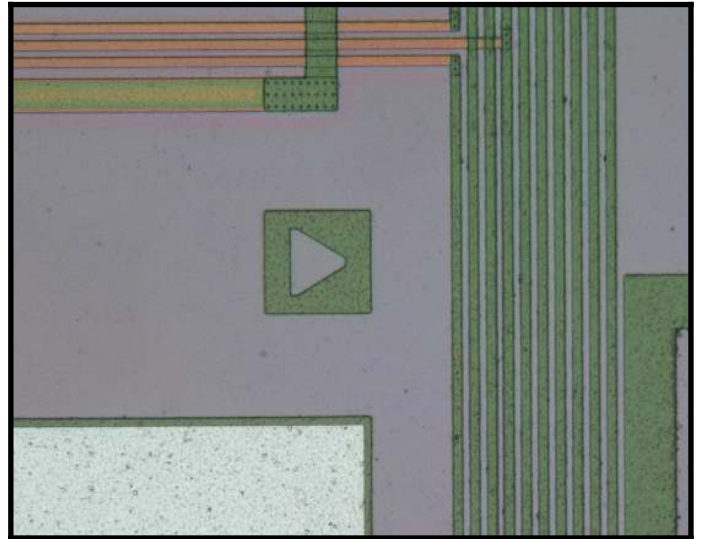
Solderability Test	Before dipping
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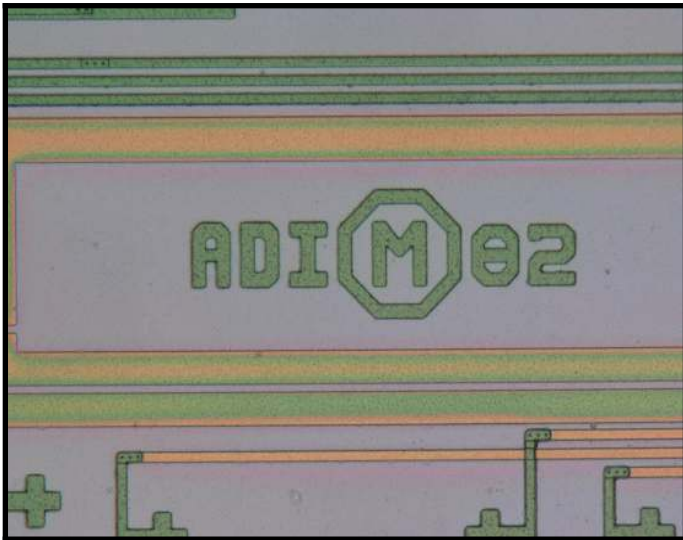
Solderability Test	After dipping, (Pass)
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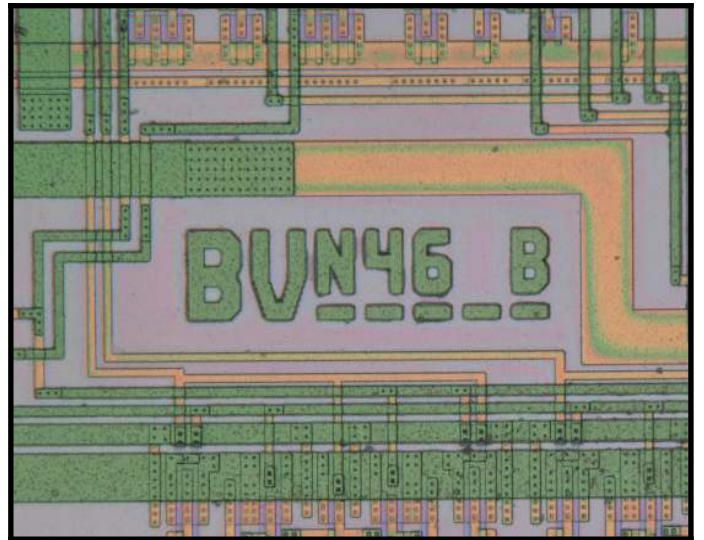
Decapsulation	Die topography
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Decapsulation	Analog Devices logo
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Decapsulation	ADI 02
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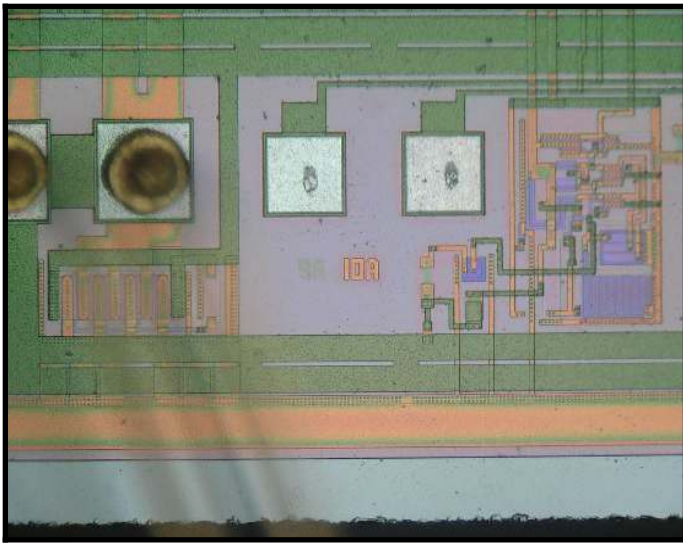
Decapsulation	BVN46 B
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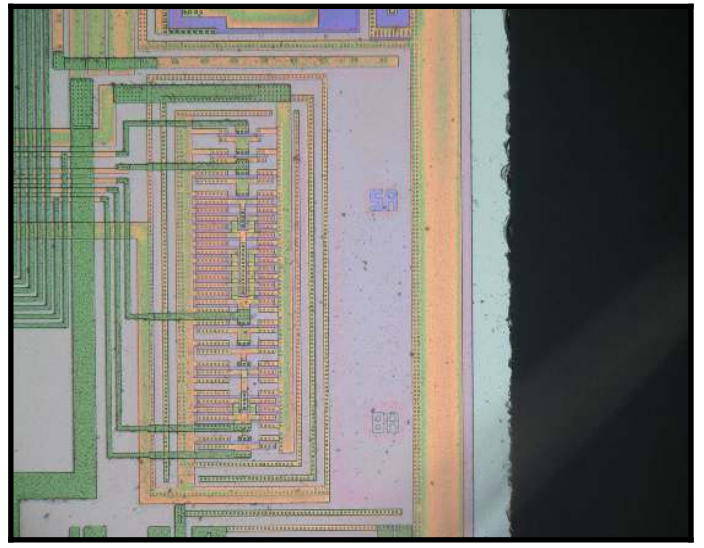
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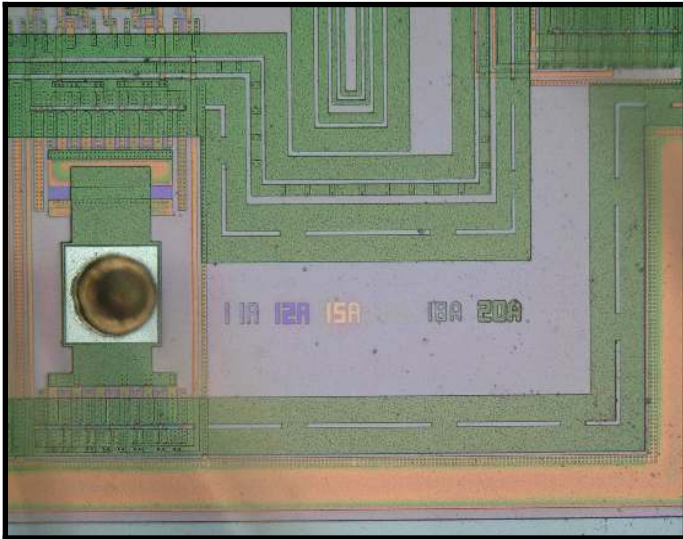
Decapsulation

Die marking



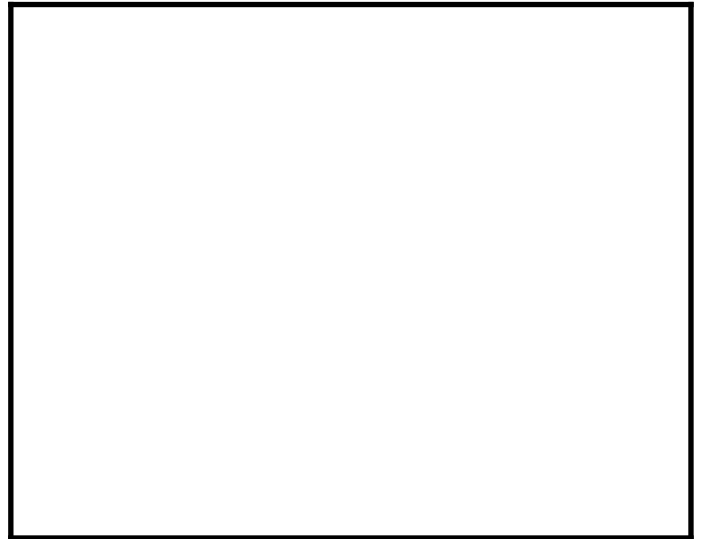
Decapsulation

Die marking


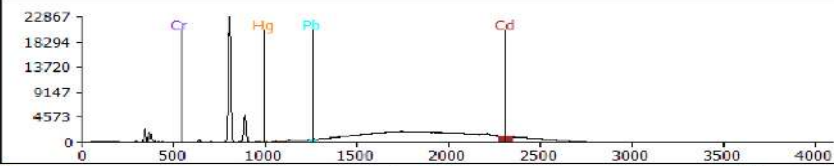
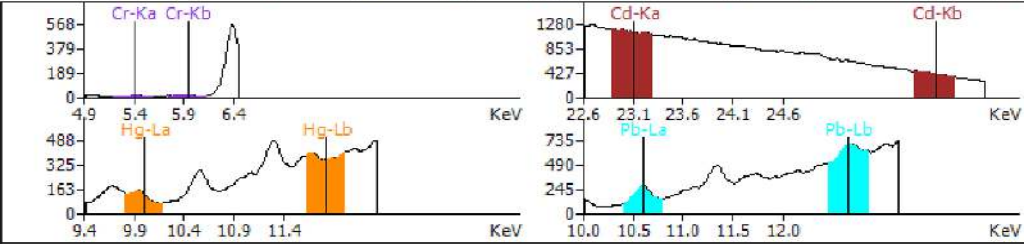


Decapsulation

Die marking



### XRF Analysis Report

<b>Work Order</b>	238252	<b>Part Number</b>	AD7899BRZ-1		
<b>Sample No.</b>	D/C:21+	<b>Voltage</b>	29 (KV)		
<b>Operator</b>	ZDD	<b>Current</b>	599 ( μ A)		
<b>Test Date</b>	2023/3/2 15:37:12	<b>WorkCurve</b>	SOLDER		
<b>CO No.</b>	C044876	<b>Test Time</b>	200(s)		
<b>Lead-free status</b>	RoHS-compliant	<b>Result Match status?</b>	Yes	<b>Pass/Fail?</b>	Pass
<b>Element</b>	<b>Intensity</b>	<b>Content (ppm)</b>	<b>Error (ppm)</b>	<b>Limits</b>	<b>Results</b>
Cr(ppm)	0.00002	ND	0.00	1000	Pass
Cd(ppm)	0.00001	ND	0.00	100	Pass
Hg(ppm)	0.00051	ND	0.00	1000	Pass
Pb(ppm)	0.00171	33.80	0.22	1000	Pass
<b>Spectrum</b>					
					
Note: ND means Concentration ≤ 2ppm					
XRF tests on surface only.					
The content of "Cr" or "Br" is the total amount of this element. The reading data does not represent.					

**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 the condition of devices, per the definitions provided by AS6081 (above) with the addition of “Remarked”, which is any device who’s original marking has been replaced. A device could, for example, be Unused but also have been remarked, so the Result would be “Unused/Remarked”.
- “Risk Factor” is a calculation of the remaining risk of a device being counterfeit or substandard from the results of the processes conducted, and risk associated with not conducting some processes.
- 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 standard.

**Notes and Disclaimers**

1. Product analysis results are applicable for the inspected samples only.
2. Inspection methods are assigned Pass/Fail Criteria based upon JEDEC JES9B manufacturing standard. Military-grade products are inspected to MIL-STD specifications. Observations outside of those tolerances are deemed to make the product unfit for use.
3. Observations defined by IDEA-STD-1010B, AS6081, AS6171 and WHL expertise and experimentation affect the risk level and classification of the inspected product.
4. “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.
5. All source and measurement equipment are calibrated and suitable for the processes conducted with calibration certifications available upon request.
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7. WHL is obligated by our Nondisclosure and Confidentiality policy and agreements with our customers. Reports will be verified but no additional information will be supplied by WHL without the prior written approval of the party that requested and ordered the analysis.
8. All conducted methods are established, and test plan approved, by the customer.
9. White Horse Laboratories is an ISO 9001:2015 and ANSI/ESD S20.20-2014 certified company.