

Product Analysis Report

Work Order:	237526	Quantity Received:	2500
Customer:	Novus T.D LTD	Quantity Inspected:	13
PO Number:	1812450	Report Date/Time:	2/27/23 7:08 PM
Prepared By:	Renzeng Li	Approved by:	Jerry Long

PRODUCT INFORMATION

Part Number:	OPA2277U/2K5	Package Type:	SOIC-8
Manufacturer:	Texas Instruments		
Product Description:	OPAx277 High Precision Operational Amplifiers		
Datasheet Reference:	https://www.ti.com/lit/ds/symlink/opa2277.pdf?ts=1677459596209		

REPORT SUMMARY

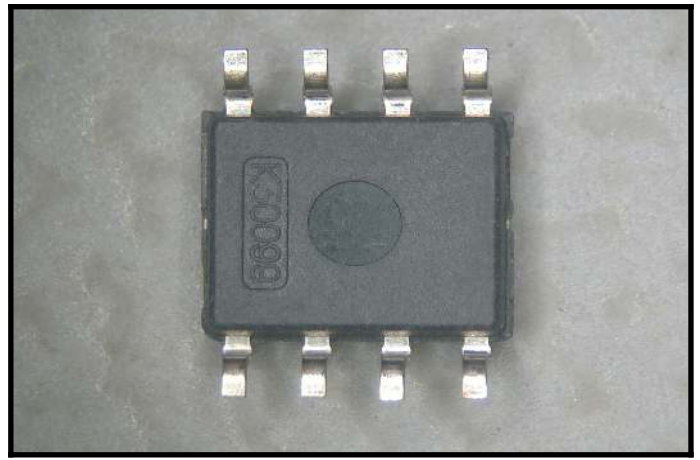
Result:	See Summary	Risk Level:	
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2500 pieces of Texas Instruments OPA2277U/2K5 were received for analysis, from which 13 pieces were used for External Visual Inspection(EVI), 5 pieces were used for X-ray analysis, 1 piece was used for XRF, Solderability test and Decapsulation. Product arrived in reel with appropriate ESD and MSL protective packaging.

9 piece of sample pass chemical solution and scrape tests for remarking and resurfacing, indicating that they are not remarked. 4 piece of samples fail chemical solution and scrape tests for remarking and resurfacing, and that samples exhibit coating on the body surface, indicating that they are remarked. Samples exhibit exposed base metal from trimming and stress marks from forming, indicating that they are not re-plated. The samples exhibit contamination, exposed copper and bent on the pins. Parts do not exhibit solder remnants or any indication of prior use. Dimensions D, E, E1, A, e and b were measured and were within manufacturer specification. The devices have the same exterior configuration as shown on the Package Outline Drawing (POD).

X-ray reveal consistent internal structures inside 5 pieces of sample, samples do not exhibit voids and other anomalies inside the components. XRF reveals the elements in the target area are consistent with the lead-free plating material specification of the manufacturer. The sample pass XRF. Solderability test is conducted to JEDEC standard J-STD-002E for "dip-and-look" for non-BGA devices. Sample was submitted for precondition before solderability test. Sample failed solderability test since the terminal pad area show less than 95% solder coverage after solderability testing. Decapsulation reveals Burr-Brown logo,CIC02336 and CIC02339 die markings, verifying that the part was manufactured by Texas Instruments since Burr-Brown was acquired by Texas Instruments but not traceable to the requested part number. Sample does not exhibit cracks or scratches on die surface.

The parts are classified as "Remarked, Passed XRF but Failed Solderability test" with poor pin's condition.



Body (top-side)

Body (bottom-side)

EXTERNAL VISUAL INSPECTION

REMARKING / RESURFACING TEST

Pass: <input style="width: 80%;" type="text" value="1"/>	Fail: <input style="width: 80%;" type="text" value="1"/>
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MARKING INSPECTION

Pass: <input style="width: 80%;" type="text" value="9"/>	Fail: <input style="width: 80%;" type="text" value="0"/>	F.A.R.: <input style="width: 80%;" type="text" value="4"/>
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BODY INSPECTION

Pass: <input style="width: 80%;" type="text" value="13"/>	Fail: <input style="width: 80%;" type="text" value="0"/>	F.A.R.: <input style="width: 80%;" type="text" value="0"/>
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TERMINAL INSPECTION

Pass: <input style="width: 80%;" type="text" value="0"/>	Fail: <input style="width: 80%;" type="text" value="1"/>	F.A.R.: <input style="width: 80%;" type="text" value="12"/>
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MECHANICAL CHARACTERISTICS INSPECTION

Pass: <input style="width: 80%;" type="text" value="13"/>	Fail: <input style="width: 80%;" type="text" value="0"/>	F.A.R.: <input style="width: 80%;" type="text" value="0"/>
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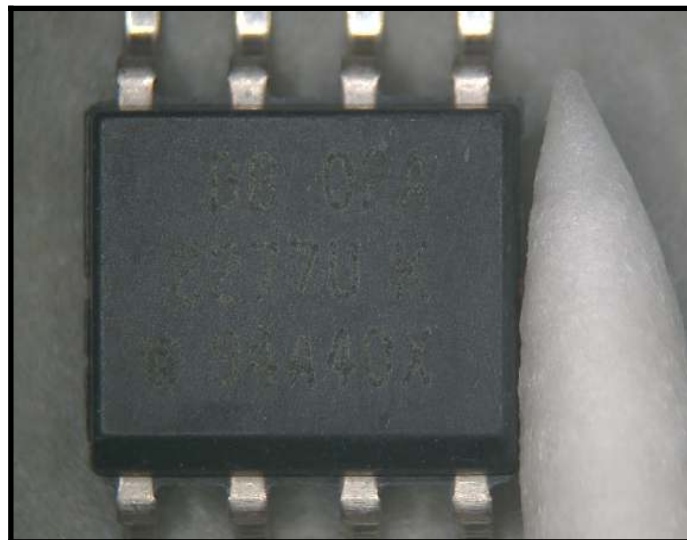
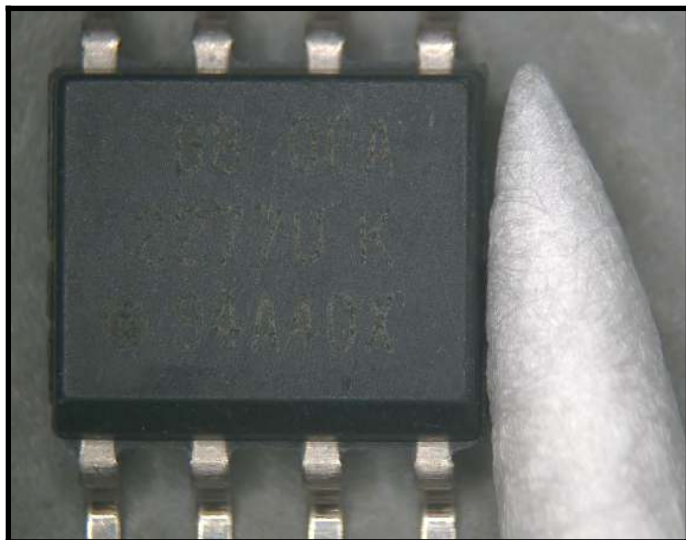
DOCUMENT AND PACKAGE INSPECTION

Number of Boxes:	<input style="width: 80%;" type="text" value="1"/>
Document & Labels:	<input style="width: 80%;" type="text" value="Match"/>
Date Code:	<input style="width: 80%;" type="text" value="1917"/>
Lot Code:	<input style="width: 80%;" type="text" value="9356142ML9(label)"/>

GENERAL INSPECTION

Package Carrier:	<input style="width: 80%;" type="text" value="Tape and Reel"/>
ESD Protection:	<input style="width: 80%;" type="text" value="Yes"/>
MSL Protection:	<input style="width: 80%;" type="text" value="MSL3,Yes"/>
Country of Mfg.:	<input style="width: 80%;" type="text" value="Malaysia"/>

APPENDIXES

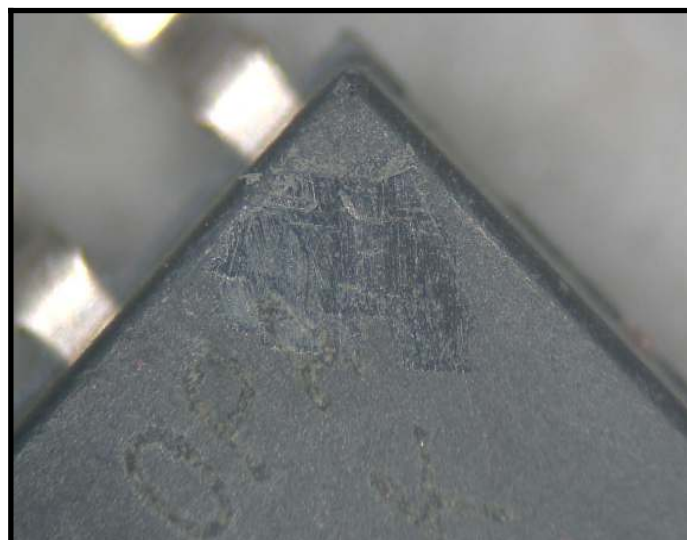
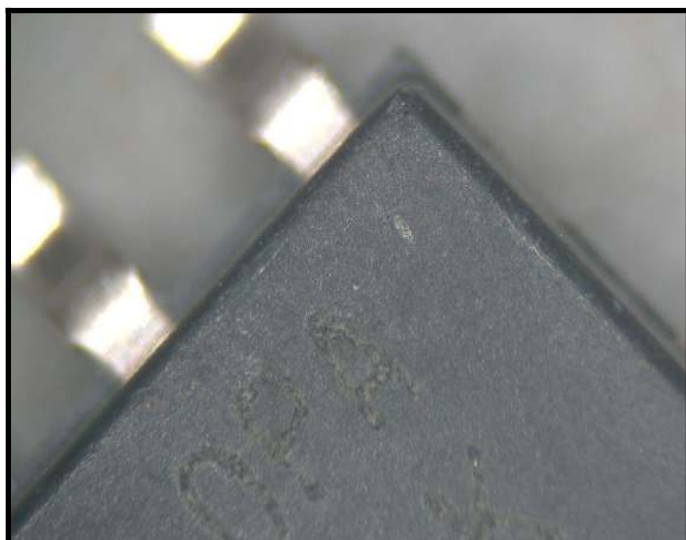


Marking (top-side)

Before chemical resurfacing test

Marking (top-side)

After chemical resurfacing test (Pass)

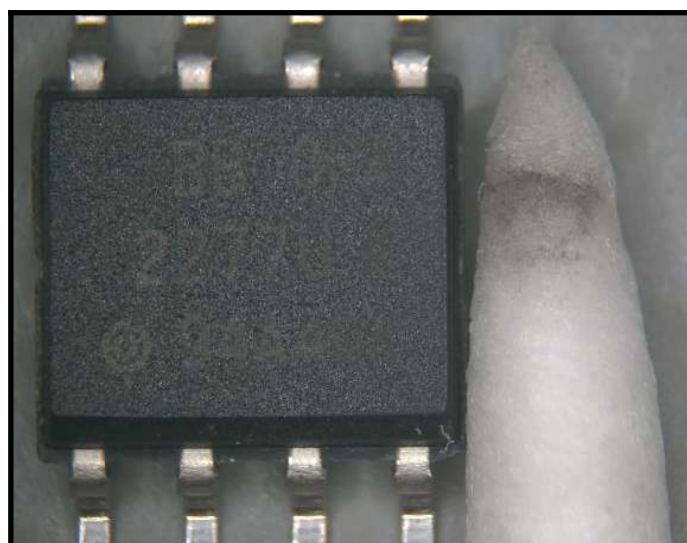
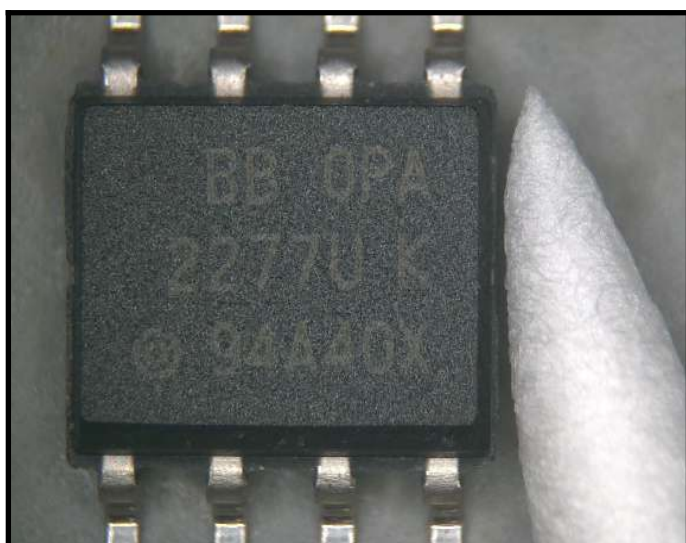


Marking (top-side)

Before mechanical resurfacing test

Marking (top-side)

After mechanical resurfacing test (Pass)



Marking (top-side)

Before chemical resurfacing test

Marking (top-side)

After chemical resurfacing (Fail)

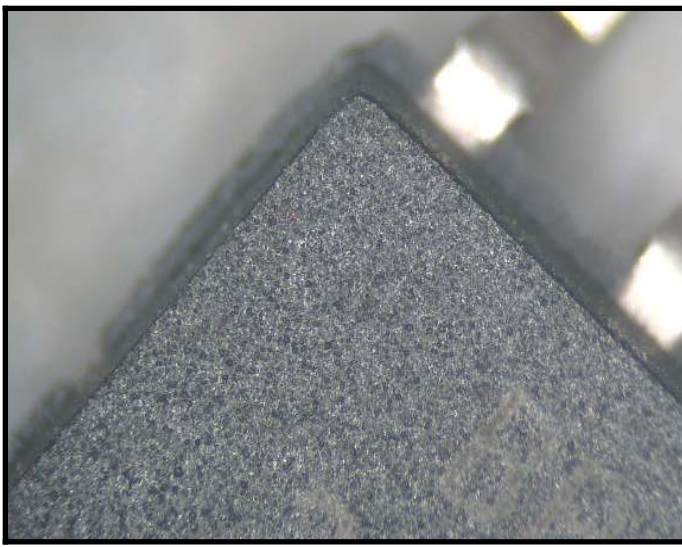
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Phone Number
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Wo Number 237526

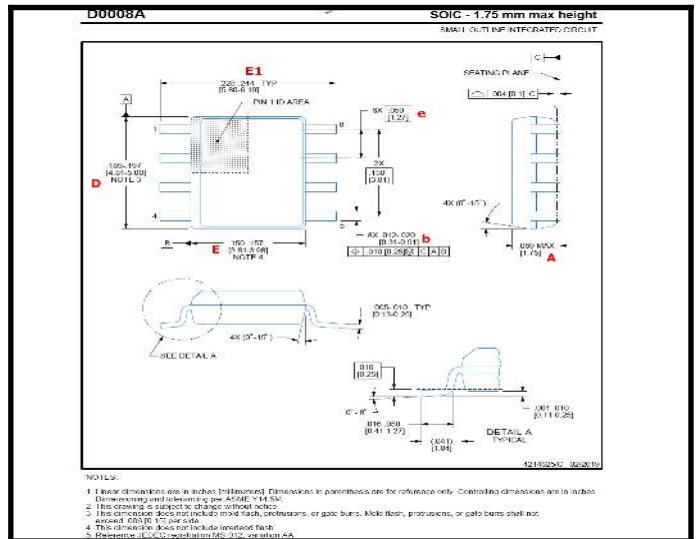


Marking (top-side) Before mechanical resurfacing test

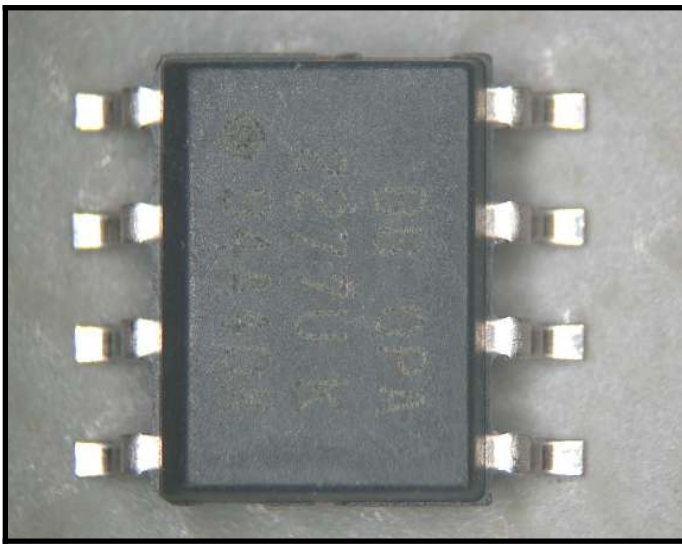


Marking (top-side) After mechanical resurfacing (Fail)

PACKAGING INFORMATION											
Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/Ball material (3)	MSL Peak Temp (4)	Op Temp (°C)	Device Marking (5)	Samples
OP92271AUBM1	ACTIVE	VSON	UBM	8	250	RoHS & Green	NiPdAu	Level 3-260C-100 HR		BHZ	Samples
OP92271ADMT04	ACTIVE	VSON	DFM	8	250	RoHS & Green	NiPdAu	Level 1-260C UNLIM		BHZ	Samples
OP92271F1	ACTIVE	PDIP	F1	8	50	RoHS & Green	Call TI	N/A for Pkg Type		OP92271F1 A	Samples
OP92271FA	ACTIVE	PDIP	F1	8	50	RoHS & Green	Call TI	N/A for Pkg Type		OP92271F1 A	Samples
OP92271UAG4	ACTIVE	PDIP	F1	8	50	RoHS & Green	Call TI	N/A for Pkg Type		OP92271F1 A	Samples
OPA2271U	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR		OPA 2271U A	Samples
OPA2271U2K5	ACTIVE	SOIC	D	8	2500	RoHS & Green	Call TI	Level 3-260C-100 HR	40 to 85	OPA 2271U A	Samples
OP92271U9K504	ACTIVE	SOIC	D	8	2500	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OPA2271UA	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OPA2271UA2K5	ACTIVE	SOIC	D	8	2500	RoHS & Green	NiPdAu	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OPA2271UA2K5E4	ACTIVE	SOIC	D	8	2500	RoHS & Green	NiPdAu	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OP92271UAE4	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OP92271UAG4	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OP92271UG4	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OP92271UG4	ACTIVE	SOIC	D	8	75	RoHS & Green	Call TI	Level 3-260C-100 HR	-40 to 85	OPA 2271U A	Samples
OP92271URMR	ACTIVE	VSON	DFM	8	3000	RoHS & Green	NiPdAu	Level 3-260C UNLIM		NSS	Samples



Ordering Information



Mechanical Dimensions Part as shown on POD

Mechanical Dimensions Package Outline Drawing



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=4.94 mm, (Pass)
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Dimension Measurement	E=3.86 mm, (Pass)
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Dimension Measurement	E1=6.19 mm, (Pass)
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Dimension Measurement	A=1.58 mm, (Pass)
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Dimension Measurement	b=0.40 mm, (Pass)
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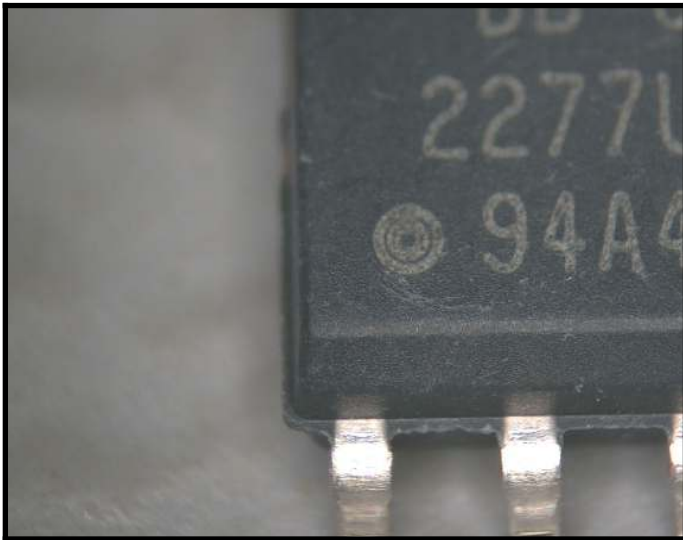
Wo Number	237526
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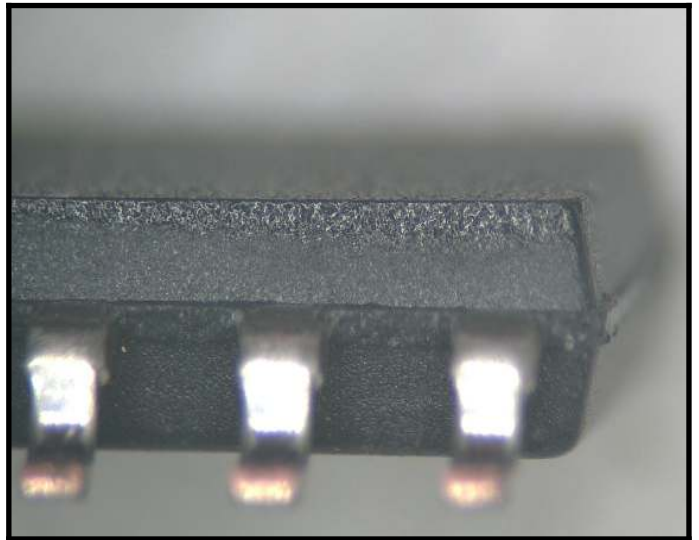
Dimension Measurement	e=1.28 mm
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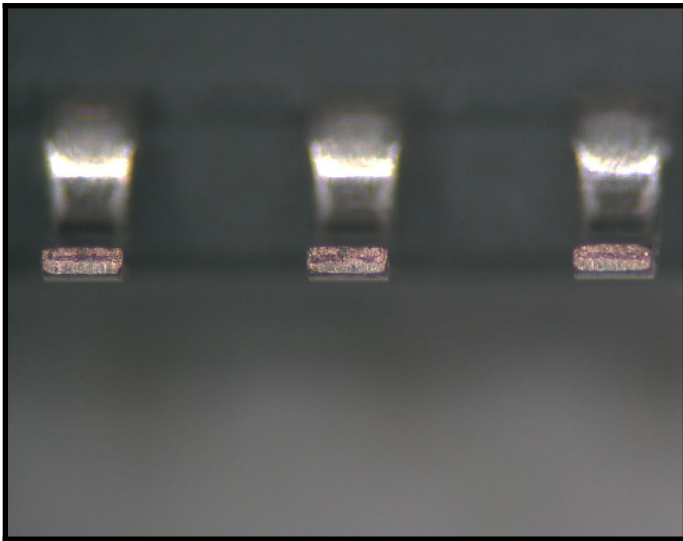
Dimension Measurement	Coplanarity Pass, 13pcs
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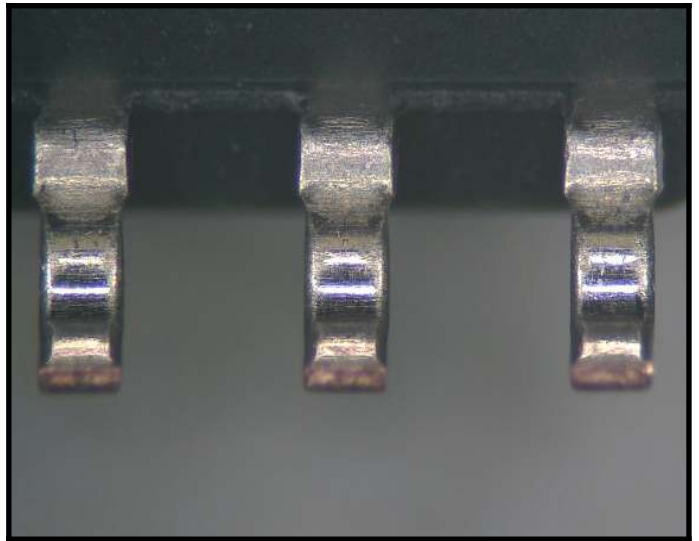
Body (top-side)	Pin 1 indicator
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Body	Coating, 4pcs
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Terminal	Exposed base metal from trimming
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Terminal	Stress marks from forming
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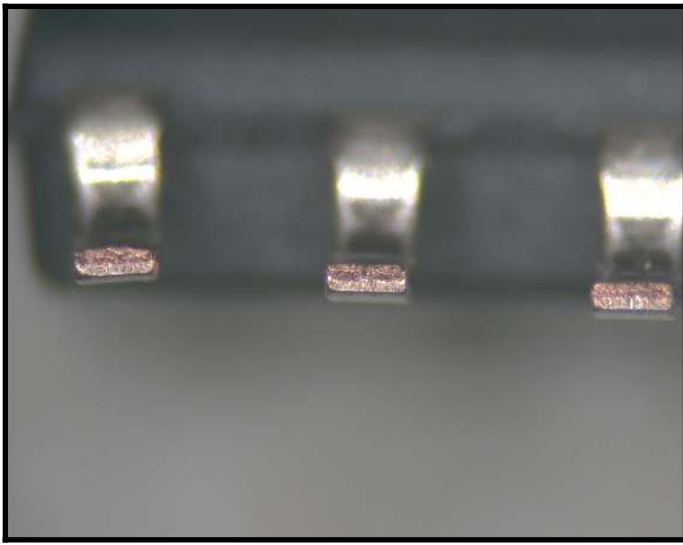
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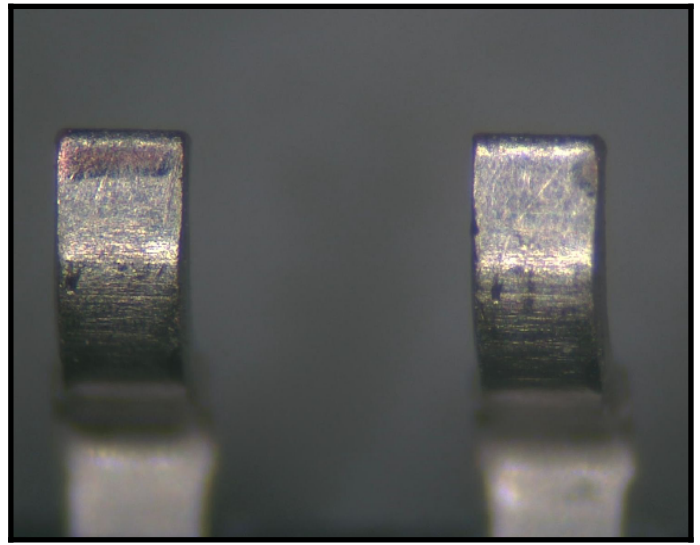
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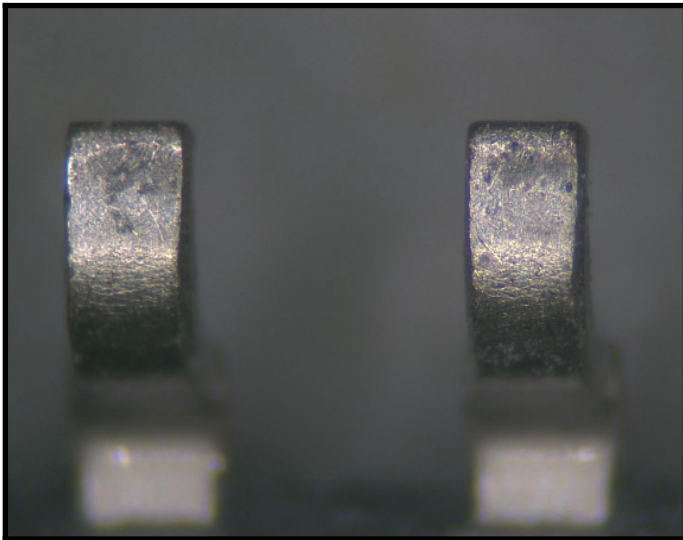
Wo Number	237526
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Terminal	Bent pins, 13pcs
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Terminal	Exposed copper, 13pcs
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Terminal	Contamination, 13pcs
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Packaging (Box)	Box as received
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Packaging (Box)	Open box
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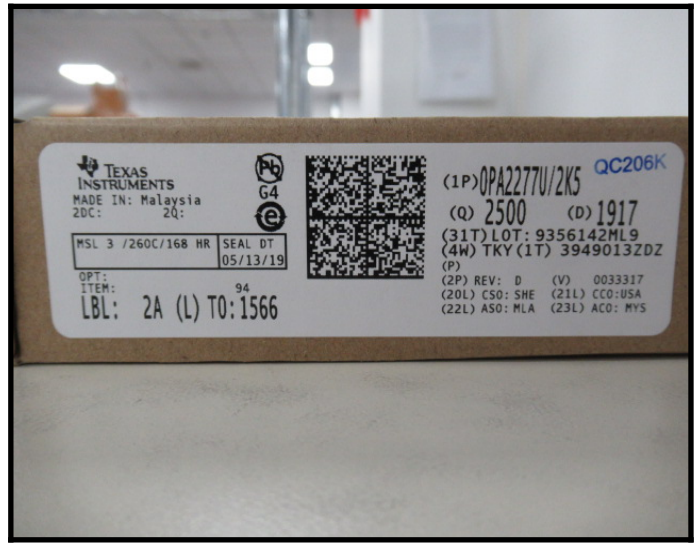
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Wo Number	237526
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Packaging (Box) Inner box



Packaging (Box) Inner box label



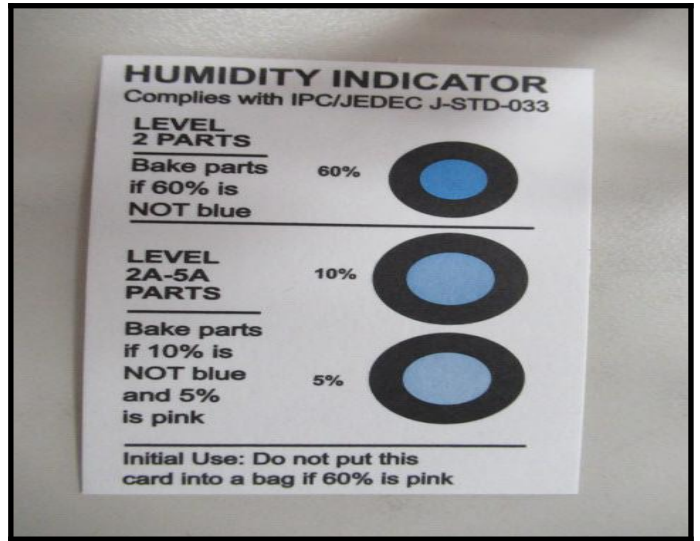
Packaging (Box) Open box



Packaging (MBB) Moisture Barrier Bag (MBB)



Packaging (MBB) HIC and Desiccant



Packaging (MBB) HIC reads 5%

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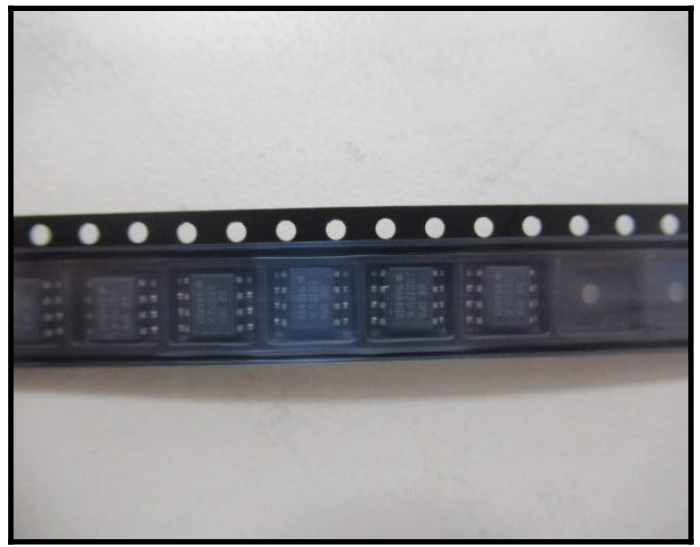
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Wo Number 237526



Packaging (Carrier)

Reel label



Packaging (Carrier)

Parts aligned in tape

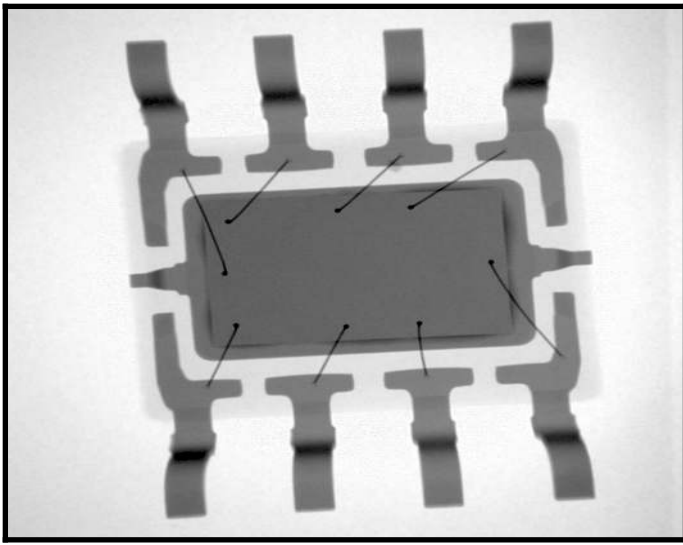
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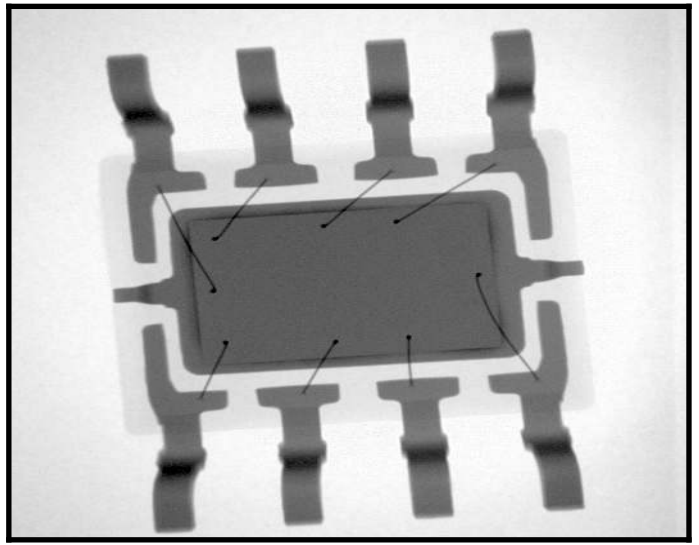
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Wo Number	237526
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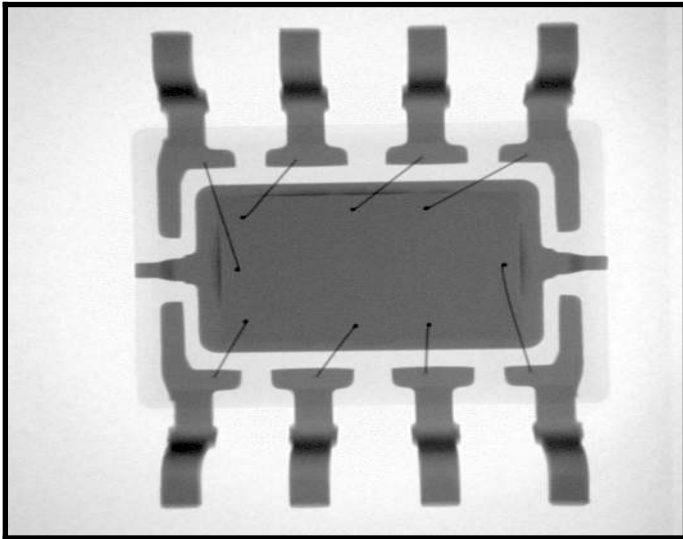
X-RAY SAMPLE 1

Internal profile



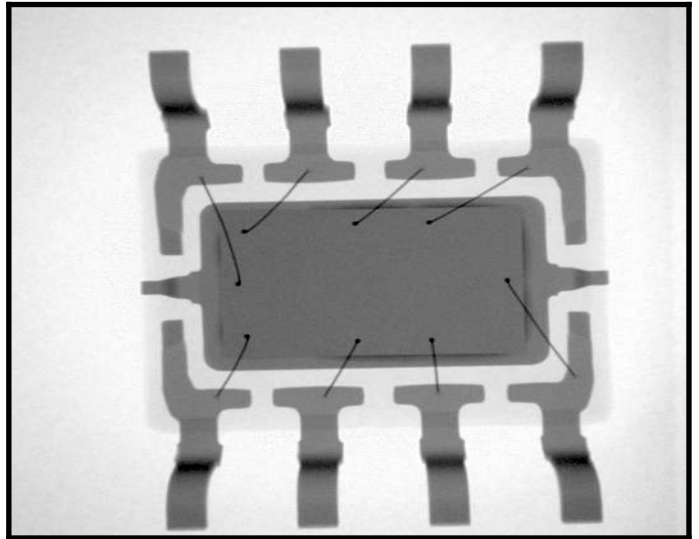
X-RAY SAMPLE 2

Internal profile



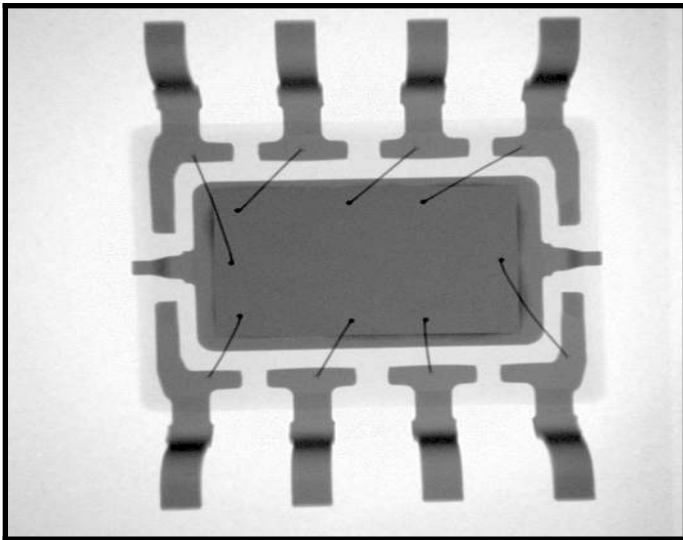
X-RAY SAMPLE 3

Internal profile



X-RAY SAMPLE 4 Coating

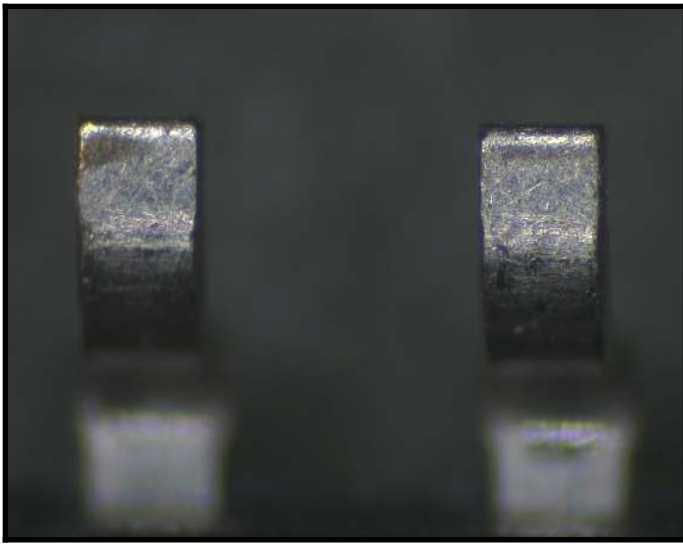
Internal profile



X-RAY SAMPLE 5 Coating

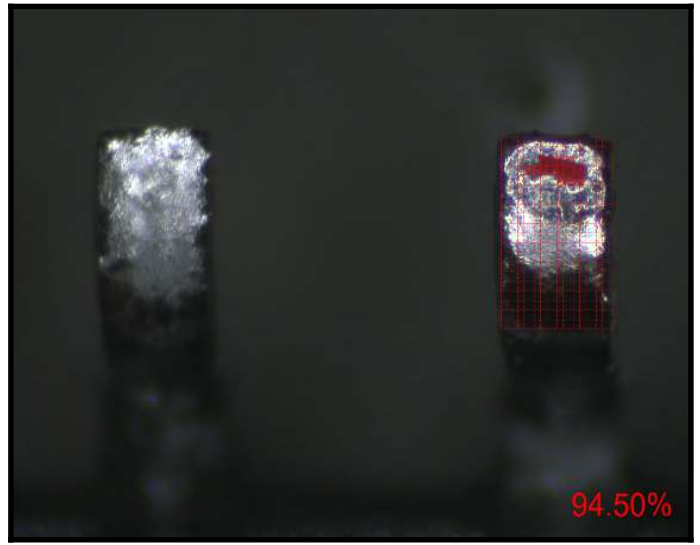
Internal profile





Solderability Test

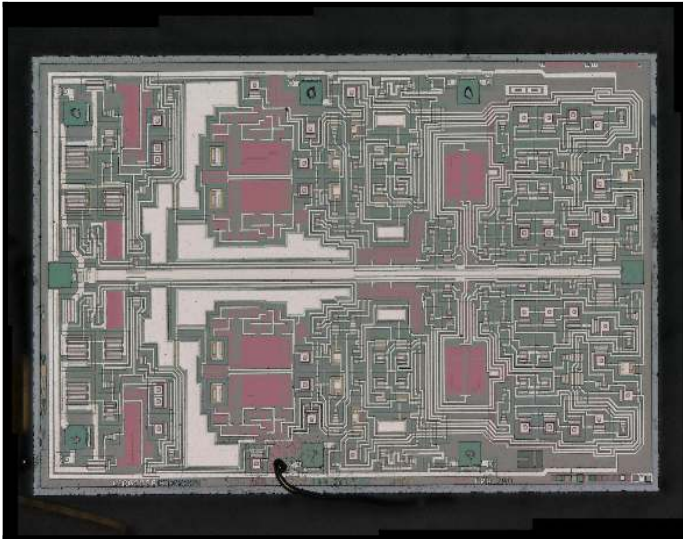
Before dipping



Solderability Test

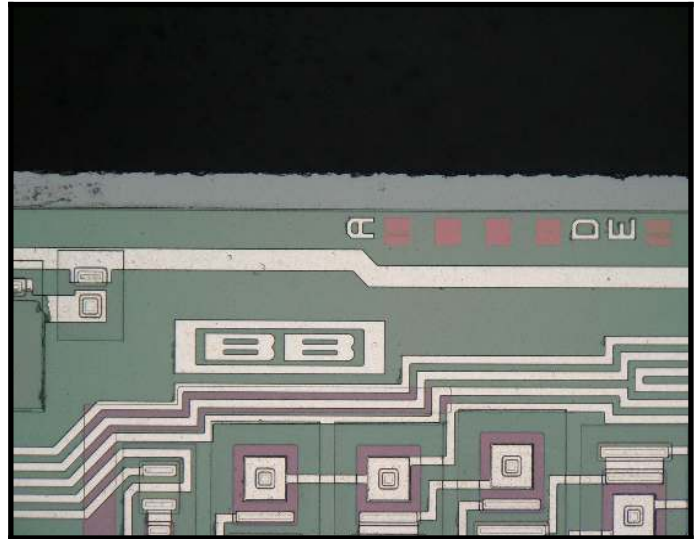
After dipping, (Fail)

94.50%



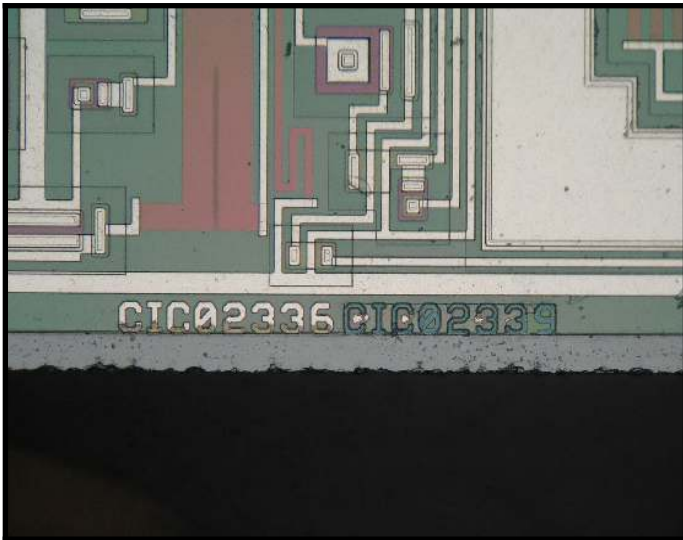
Decapsulation DC:1917

Die topography



Decapsulation DC:1917

Burr-Brown logo



Decapsulation DC:1917

CIC02336 CIC02339



Decapsulation DC:1917

Die marking

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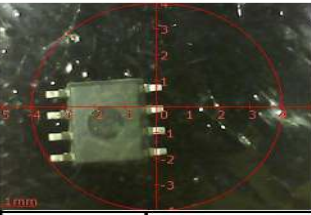
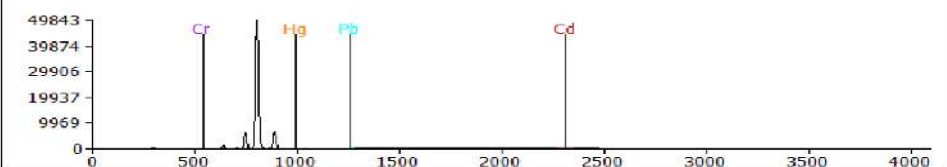
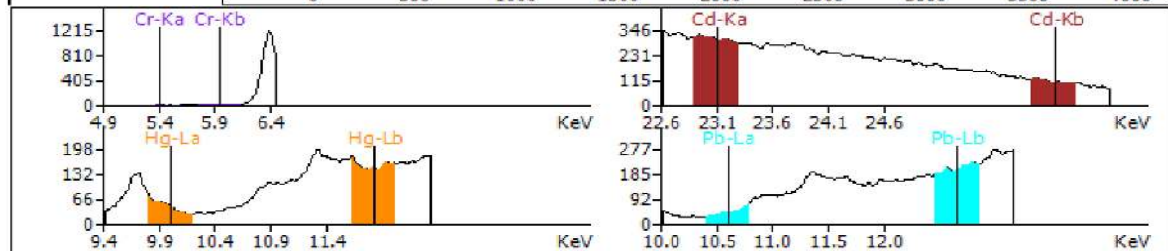
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Wo Number 237526

XRF Analysis Report

Work Order	237526	Part Number	OPA2277U/2K5		
Sample No.	D/C:1917	Voltage	29 (KV)		
Operator		Current	598 (μA)		
Test Date	2023/2/27 11:09:34	WorkCurve	SOLDER		
CO No.		Test Time	200(s)		
Lead-free status	RoHS-compliant	Result Match status?	Yes	Pass/Fail?	Pass
Element	Intensity	Content (ppm)	Error (ppm)	Limits	Results
Cr(ppm)	0.00006	ND	0.00	1000	Pass
Cd(ppm)	0.00064	ND	0.00	100	Pass
Hg(ppm)	0.00006	ND	0.00	1000	Pass
Pb(ppm)	0	ND	0.00	1000	Pass
Spectrum					
					
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 whose 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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9. White Horse Laboratories is an ISO 9001:2015 and ANSI/ESD S20.20-2014 certified company.

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