Laboratory Analysis Report

Report Number:	**2000-XXXXXX**
Date:	
Customer:	
Customer Address:	
Customer PO Number:	**N/A**
Customer Internal P/N:	**NOT AVAILABLE**
Manufacturer:	**TEXAS INSTRUMENTS**
Manufacturer Part Number:	**SN74HC165N**
Quantity:	**18**
Date Code:	**2212**
Lot Code:	**2086242WDH**
Part Description:	**SHIFT REGISTER SINGLE 8-BIT SERIAL/PARALLEL TO SERIAL 16-PIN PDIP TUBE**

Global ETS USA

1-727-807-7991

2631 Success Dr
Odessa, FL. 33556
USA

www.gets-usa.com

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

Summary Of Inspection Results

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations	Inspector
1.0.0	Incoming - Documentation and Packaging Inspection (AS6171/2A) (Non-Destructive)						
	Incoming Packaging Conditions	18	18	0		18 Devices were received in acceptable condition.	KMR
2.0.0	External Visual inspection - General Without Magnification (AS6171/2A) (Non-Destructive)						
	General Inspection	18	18	0		18 devices were visually inspected without magnification. No anomalies were observed.	LDR
3.0.0	External Visual inspection - Detailed (AS6171/2A) (Non-Destructive)						
	External Visual, Detailed Criteria	10	10	0		10 devices were visually inspected under 40x microscopy. No anomalies were observed. Leads are in acceptable condition. Devices passed external visual inspection.	LDR
4.0.0	Mechanical Inspection - Dimensions (AS6171/2A) (Non-Destructive)						
	Part Dimensions	1	1	0		Dimensions match datasheet specification. 16-Pin PDIP	LDR
5.0.0	Mechanical inspection - Parts weight measurement (AS6171/2A) (Non-Destructive)						
	Part Weight	18	18	0		18 randomly selected devices were weighed and recorded. The weight deviation of each individual device is within 20% of the mean value.	LDR
6.0.0	X-Ray - Standard 2D (AS6081 (4.2.6.4.4), (AS6171/5) (Non-Destructive)						
	X-Ray Analysis	10	10	0		10 devices were X-rayed. Construction and size are the same. No anomalies were found.	MMB
7.0.0	XRF - RoHS 1.0 / 6 Elements (AS6171/3) (Non-Destructive)						
	XRF, Lead Finish Analysis	3	3	0		3 samples were XRF tested. These 3 devices are RoHs compliant with minimal restricted elements observed. Devices are RoHs compliant per EU RoHS Directive (2011/65/EU) restriction. XRF Equipment: Ux-220	MMB
8.0.0	XRF - Lead Finish Analysis (AS6171/3) (Non-Destructive)						
	XRF, Lead Finish Analysis	3	3	0		XRF were performed on 3 samples. Devices material composition percentages are Sample 1 Cu 81.04% Ni 17.05% Fe 1.64% Sample 2 Cu 78.59% Ni 19.65% Fe 1.43% Sample 3 Cu 78.05% Ni 20.20% Fe 1.42% XRF Equipment: XF-A5	MMB
9.0.0	Electrical - QTST- FSC 5962 (Semiconductors) Test 10 devices max, c=0 (Non-destructive) AS6171/7 Test Temperature 68 °F (20 °C) - 76 °F (24.4 °C), Humidity 30%-60% Groups A1, A4, A7, and A9 electrical tests for QML-38535/38534. non-QML-19500 / non-QML-38535/38534 all parametric at 25°C with Exceptions per QTSL-5961/5962 Rev B section 3.1.3.1						
	Electrical Test	10	10	0		Tested 10 functionally at 25C via verify DUT's AC/DC characteristic, switching and function. Passed: 10. *Please reference appendix for detail data.	LXX

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Approved by:		**Page:**
(JASON HOUSTON)	**Global Electronics Testing Services, LLC | 2631 Success Dr., Odessa, FL, 33556, USA | 1-727-807-7991**	

GLOBAL ETS	Analysis Report - 2000-XXXXXX			
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	Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
	Date Code:	2212	**Lot Code:**	2086242WDH

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations	Inspector
10.0.0	Materials Analysis - SEM _Scanning Electron Microscope (AS6171/2 (SEM) Method F) (Destructive)						
	Material Composition Analysis	3	3	0		Tested 3 devices at 25˚C via verified DUT surface quantitative with Scanning Electron Microscopy (SEM) Analysis: DUT was compared at three different areas on the top surface with the following conditions: 1)15.0 kV, x200 (magnification) 2)15.0 kV, x400 (magnification) 3)15.0 kV, x3000 (magnification) A detailed surface analysis of DUT were successfully compared. There is a clear surface structure consistency between samples. No micro blasting, resurfacing, remarking, or other anomalies found. *DUT= Device Under Test	SXT
11.0.0	Materials Analysis - EDS/EDX_Energy Dispersive Spectroscopy (AS6171/3) (Destructive)						
	Material Composition Analysis	3	3	0		Tested 3 devices at 25˚C via verified DUT Substance with Energy Dispersive X-Ray Spectroscopy (EDS) Analysis: (20kV) The main composition of DUT 1 Lead: Nickel: 83.4 wt.% Copper: 6.8 wt.% Palladium: 6.5 wt.% Gold: 3.3 wt.% The main composition of DUT 2 Lead: Nickel: 84.7 wt.% Palladium: 7.7 wt.% Copper: 4.4 wt.% Gold: 3.2 wt.% The main composition of DUT 3 Lead: Nickel: 83.9 wt.% Palladium: 7.1 wt.% Copper: 5.7 wt.% Gold: 3.3 wt.% *DUT= Device Under Test	SXT
12.0.0	Materials Analysis - C-SAM_Scanning Acoustic Microscopy (AS6171/6) (Non-Destructive)						
	Acoustic Microscopy	3	3	0		3 samples were subjected to C-Mode Scanning Acoustic Microscopy using a 25 MHz transducer at the circuit side with a scanning resolution of 20µm. The devices were inspected at the die surface to epoxy interface and at the die paddle/substrate to epoxy interface. No anomalies were detected.	SXT
13.0.0	Materials Analysis - FTIR Spectroscopy_Material Analysis (AS6171/9) (Non-Destructive)						
	Material Composition Analysis	3	3	0		Tested 3 devices at 25˚C via verified DUT Encapsulant Material via Fourier Transform Infrared (FTIR) Spectroscopy Analysis with a mounted Single-Reflection ATR with diamond prism and stainless steel presser head at a resolution of 4.0cm-1 and 16 scans. No sample preparation process was required previous to the measurements. No impregnated blasting materials present and DUT hasn't been exposed to foreign materials such as cleaners. DUT Encapsulant Composition: The 3 DUTs were compared against each other, and their outer shells were found to be made of the same material. *DUT= Device Under Test	SAP
14.0.0	Materials Analysis - Raman Spectroscopy_Material Analysis (AS6171/8) (Non-Destructive)						
	Material Composition Analysis	1	1	0		Tested 1 device at 25˚C via verified DUT Encapsulant Material via Dispersive Microscopic Raman Spectroscopy Analysis: The DUT was exposed for 2 accumulations, each of 100 seconds, and they were tested using a laser wavelength of 785nm with power of 1.5mW. The spectra measurement was made with a slit of 50x8000µm and a spectral resolution was 6.69cm-1. No sample preparation process was required previous to the measurements. No impregnated blasting materials present and DUT hasn't been exposed to foreign materials such as cleaners. DUT Encapsulant Composition: The device was compared with library spectra from KnowItAll database and the device was found to have the highest Hit Quality Index (HQI) with Carboxyl terminated polyester with a polyepoxy, coating formulation. *DUT= Device Under Test	SAP
15.0.0	Solderability Test - Dip & Look Method (J-STD-002, (MIL-STD-883L METHOD 2003.14) (Destructive)						
	Solderability Test	1	1	0		1 device was tested using dip and look method. Device was inspected under magnification. All leads have over 95% solder coverage. No pinholes or voids are found.	JXM

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Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations	Inspector
16.0.0	Solvent Test - Re-Marking_Marking Permanency Test (AS6171/2A) (Destructive)						
	Testing for Remarking	3	3	0		Permanency test was performed on 3 devices using 3 parts Mineral Spirits, 1 part Isopropyl Alcohol mixture. Devices were cotton swabbed, no marking was removed during this process. Devices passed marking permanency testing.	JXM
17.0.0	Solvent Test - Re-Surfacing _Non Aggressive_Acetone Test AS6171/2A (Destructive)						
	Re-Surfacing Test	3	3	0		Non-Aggressive Acetone test was performed on 3 devices using 100% pure acetone. Devices were cotton swabbed several times with pressure, no secondary coating or marking was removed during this process. Devices passed aggressive acetone testing.	JXM
18.0.0	Solvent Test - Re-Surfacing _Aggressive_Acetone Test AS6171/2A (Destructive)						
	Re-Surfacing Test	3	3	0		Aggressive Acetone test was performed on 3 devices using 100% pure acetone. Devices were cotton swabbed several times with pressure, no secondary coating or marking was removed during this process. Devices passed aggressive acetone testing.	N/A
19.0.0	Solvent Test - Re-surfacing test - Scrape Test (AS6171/2A) (Destructive)						
	Re-Surfacing (Destructive)	3	3	0		Scrape Test was performed on 3 devices using IDEA 1010.3.2.3 method. No coating was removed during this process. Devices passed scrape testing.	N/A
20.0.0	Solvent Test - Re-surfacing_1-Methyl 2-Pyrrolidinone (AS6171/2A) (Destructive)						
	Re-Surfacing / Re-Marking Testing	3	3	0		1-Methyl 2-Pyrrolidinone was performed on 3 devices. Devices were submerged in solution and heated to 115 - 120 °C for 2 to 5 min. No secondary coating was removed during this process. Devices passed 1-Methyl 2-Pyrrolidinone testing.	N/A
21.0.0	Solvent Test - Re-surfacing_Dynasolve (AS6171/2A) (Destructive)						
	Re-Surfacing (Destructive)	3	3	0		HST (Heated Solvent Test) was performed on 3 devices using Dynasolve 750 solution. Dynasolve 750 was preheated to 105 °C. Devices were submerged in solution for 45 min. No secondary coating was removed during this process. Devices passed Dynasolve testing.	N/A
22.0.0	Delid/Decapsulation - Thermomechanical (AS6171/4) (Destructive)						
	Physical (INTERNAL)	3	3	0		Internal inspection was performed on 3 devices. Each one of the 3 devices have the same die structure and markings. Devices revealed Texas Instruments logo with 1984 copyright. Die marking HC165E was also found. Die marking correlates with devices family marking.	JXM

(End Of Summary. Continue Reviewing Test Report On Next Page.)

1.0.0 Incoming - Documentation and Packaging Inspection (AS6171/2A) (Non-Destructive)

Results Summary
18 Devices were received in acceptable condition.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
1.1.0	Incoming Packaging Conditions (Non-Destructive)					
1.1.1	Invalid or Missing Identification Indicator on the Part Packaging	X				
1.1.2	Invalid Part Packaging Labels	X				
1.1.3	Invalid Part Packaging	X				
1.1.4	Missing or Non-Functional Packaging	X				
1.1.5	Missing/Forged Paperwork	X				
1.1.6	Multiple Date Codes Identified in Documentation	X				
1.1.7	Multiple Date Codes within a Lot	X				
1.1.8	Part Orientation within Part Packaging	X				
1.1.9	Missing or Non-Functional Condition Indicator	X				
1.1.10	Missing or Non-Functional Part Protector	X				
1.1.11	Invalid Identification Indicator on the Part Package	X				
1.1.12	Multiple Identification Indicator within an Expected Homogenous Lot	X				

Images For Incoming - Documentation and Packaging Inspection.

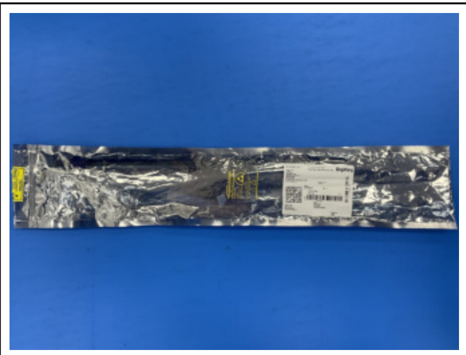

Figure 1. INCOMING 1

Figure 2. INCOMING 2

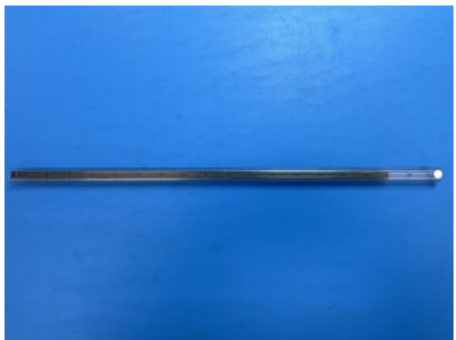

Figure 3. INCOMING 3

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

Images For Incoming - Documentation and Packaging Inspection. **(Continued From Previous Page)**

Figure 4. INCOMING 4

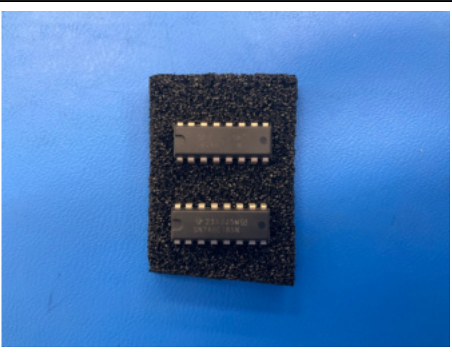

Figure 5. INCOMING 5

Figure 6. INCOMING 6

Prepared by:
(MANDY ANDERSON)

Approved by:
(JASON HOUSTON)

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2.0.0 External Visual inspection - General Without Magnification (AS6171/2A) (Non-Destructive)

Results Summary
18 devices were visually inspected without magnification. No anomalies were observed.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
2.1.0	General Inspection (Non-Destructive)					
2.1.1	Parts are received in a single shipment	X				Acceptable
2.1.2	All parts are identical in appearance to the unaided eye (parts and packaging)	X				Acceptable
2.1.3	Parts appear to have been subjected to the same handling, packaging, and/or storage conditions	X				Acceptable
2.1.4	Parts are marked or otherwise identified with identical lot, batch, run, and identification information	X				Acceptable

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3.0.0 External Visual inspection - Detailed (AS6171/2A) (Non-Destructive)

Results Summary
10 devices were visually inspected under 40x microscopy. No anomalies were observed. Leads are in acceptable condition. Devices passed external visual inspection.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
3.1.0	External Visual, Detailed Criteria (Non-Destructive)					
3.1.1	Status					Active
3.1.2	Search of GIDEP database found suspect/counterfeit report(s)					No high risk parts were found
3.1.3	Search of GETS database found suspect/counterfeit report(s)					No high risk parts were found
3.2.0	Overview of Part Inspection (Device specification) (Non-Destructive)					
3.2.1	Number of leads per part	X				16
3.2.2	Package Type	X				PDIP
3.2.3	Pin 1 placement in tape and reel (if applicable)	X				Acceptable
3.2.4	Correctly marked part number for the package (if applicable)	X				Acceptable
3.3.0	Package Body Inspection (Non-Destructive)					
3.3.1	Different marking styles for parts with the same date and lot codes	X				None were observed.
3.3.2	Different country of origin for parts with the same date and lot codes	X				None were observed.
3.3.3	Different body molds for parts with the same date and lot codes	X				None were observed.
3.3.4	Different backside markings for parts with the same date and lot codes	X				None were observed.
3.3.5	Different dice in glass seal components	X				None were observed.
3.3.6	Previous marking partially visible on the surface	X				None were observed.
3.3.7	Logo variations: If available, compare part logo(s) to a known good part received from the OCM or OCM-authorized distributor, information available on the OCM's website, data sheets, etc.	X				None were observed.
3.3.8	Excessive ink or poor ink quality	X				None were observed.
3.3.9	Excessive, deep, or inconsistent laser marking, or laser burn marks	X				None were observed.

("External Visual inspection - Detailed " continued on next page)

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("External Visual inspection - Detailed " continued from previous page)

3.0.0	External Visual inspection - Detailed (AS6171/2A) (Non-Destructive)

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
3.4.0	External Package Inspection (Non-Destructive)					
3.4.1	Visible package variations for parts with the same date and lot codes	X				None was observed
3.4.2	Visible scratch marks or unidirectional abrasions	X				None was observed
3.4.3	Cracks, chip-outs, or visible damage such as burn marks	X				None was observed
3.4.4	Glue, adhesive, or other residues on the surface of the package Also, signs of debris such as ink, dirt, water or other residue, uneven discoloration or shading.	X				None was observed
3.4.5	Signs of corrosion on the body of the part or exposed areas of the lead frame	X				None was observed
3.4.6	Evidence of blacktop	X				None was observed
3.4.7	Mold indents filled or blacktopped	X				None was observed
3.4.8	Solder residue on packages	X				None was observed
3.4.9	Uneven thickness of the packages	X				None was observed
3.4.10	Dimples with uneven depth	X				None was observed
3.4.11	Differences in the corner radius between the top, bottom, and side surfaces	X				None was observed
3.4.12	Color discrepancy between the top, bottom, and sides of the part. On ceramic packages with metal top and frit seal, note differences in the frit color across the part	X				None was observed
3.4.13	Texture discrepancy between the top, bottom, and sides of the part	X				None was observed
3.4.14	Evidence of color fade on the body of the part	X				None was observed

("External Visual inspection - Detailed " continued on next page)

("External Visual inspection - Detailed " continued from previous page)

3.0.0 External Visual inspection - Detailed (AS6171/2A) (Non-Destructive)

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
3.5.0	Leads/Terminations inspection (Non-Destructive)					
3.5.1	Nonuniform color	X				None was observed
3.5.2	Lack of tooling marks (for formed leads)	X				None was observed
3.5.3	Lack of exposed copper or other base material on the ends of the leads (typically, the base material will be visible on the ends of the leads for a new, unused component)	X				None was observed
3.5.4	Repaired leads	X				None were observed
3.5.5	Bent or noncoplanar leads	X				None was observed
3.5.6	Excessive or uneven plating	X				None was observed
3.5.7	Missing leads	X				None was observed
3.5.8	Discoloration, dirt, or residues on the leads	X				None were observed.
3.5.9	Scratches (or insertion marks) on the inside and/or outside faces of the leads	X				None was observed
3.5.10	Gross oxidation	X				None was observed
3.5.11	Corrosion	X				None was observed

Images For External Visual inspection - Detailed .

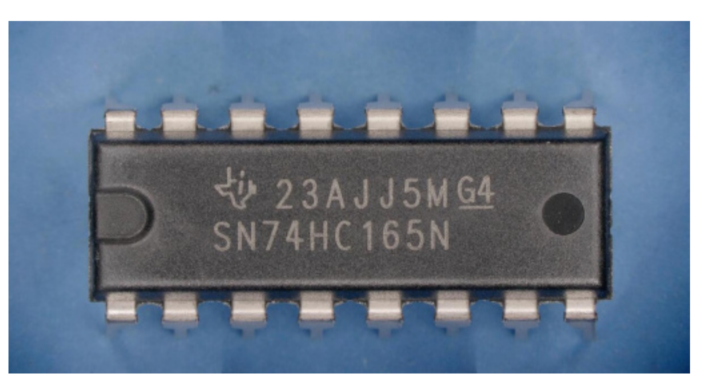


Figure 7. TOP

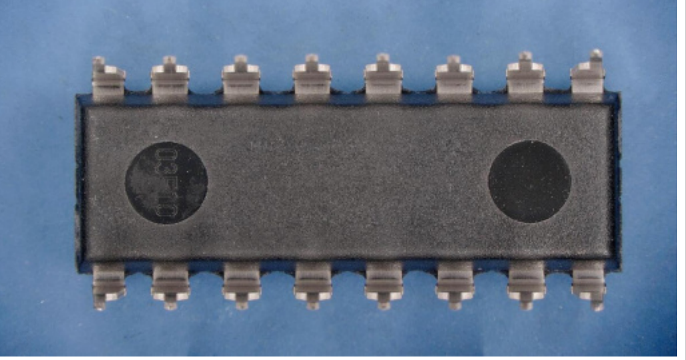


Figure 8. BOTTOM

Images For External Visual inspection - Detailed . **(Continued From Previous Page)**

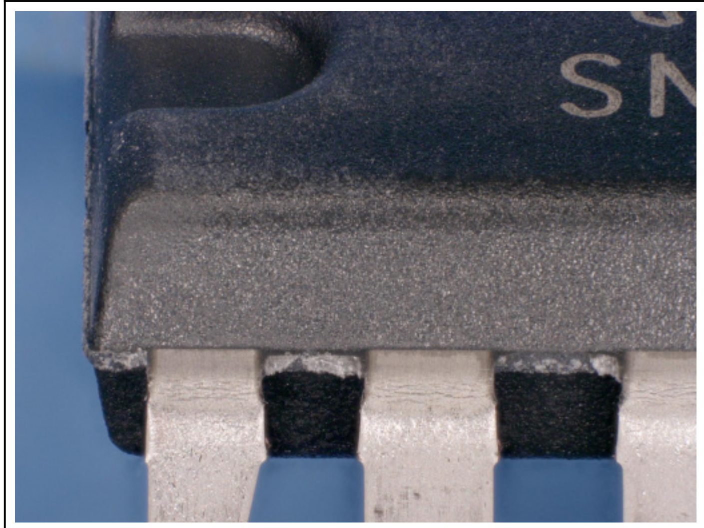


Figure 9. SIDE

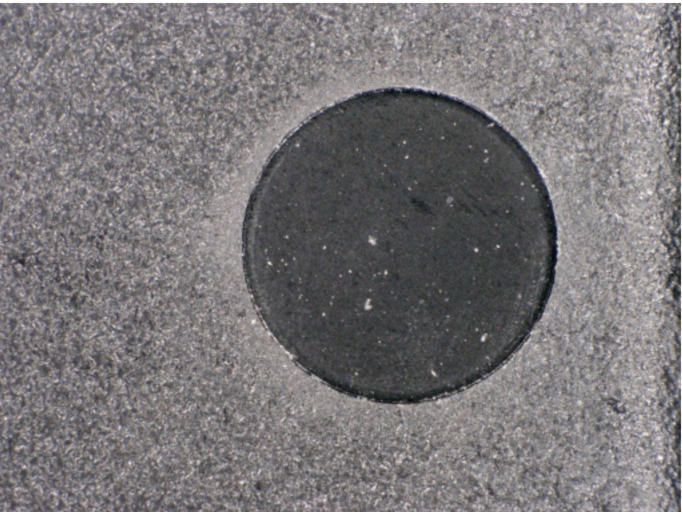


Figure 10. TOP PIN

Figure 11. BOTTOM PIN

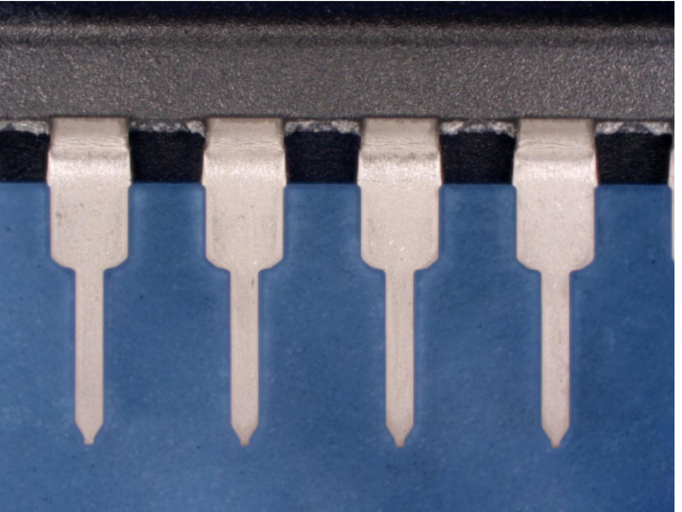


Figure 12. LEADS VIEW 1

Images For External Visual inspection - Detailed . (Continued From Previous Page)

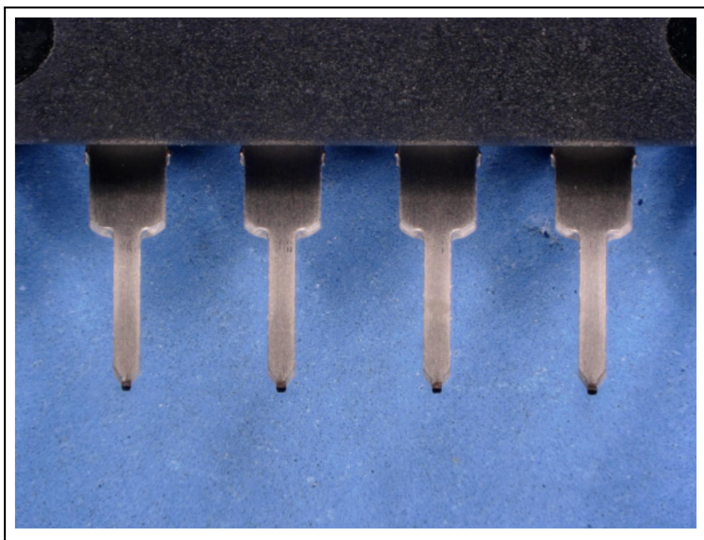


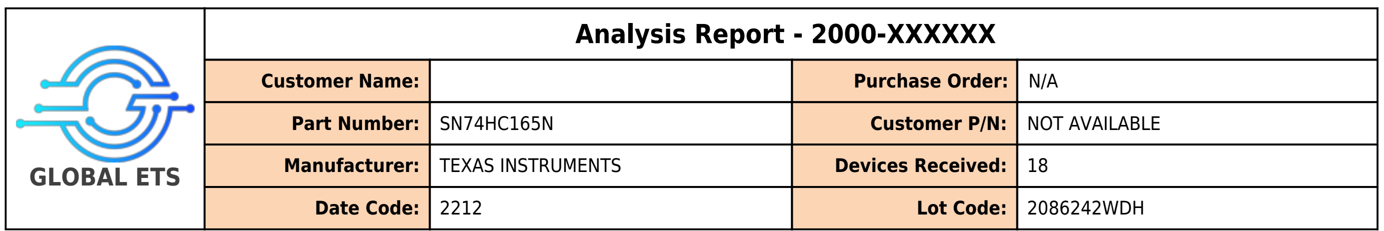
Figure 13. LEADS VIEW 2

Figure 14. LEAD ENDS

Images For External Visual inspection - Detailed . (Continued From Previous Page)

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)
84095012A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	84095012A SNJ54HC 165FK
8409501EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8409501EA SNJ54HC165J
8409501FA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8409501FA SNJ54HC165W
SN54HC165J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54HC165J
SN74HC165DBR	ACTIVE	SSOP	DB	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HC165
SN74HC165DR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU | SN	Level-1-260C-UNLIM	-40 to 125	HC165
SN74HC165DRE4	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HC165
SN74HC165DRG3	ACTIVE	SOIC	D	16	2500	RoHS & Green	SN	Level-1-260C-UNLIM	-40 to 125	HC165
SN74HC165DRG4	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HC165
SN74HC165N	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 125	SN74HC165N

Figure 15. MARKING INFORMATION



Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

4.0.0	Mechanical Inspection - Dimensions (AS6171/2A) (Non-Destructive)

Results Summary
Dimensions match datasheet specification.
16-Pin PDIP

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
4.1.0	Part Dimensions (Non-Destructive)					
4.1.1	Part Dimensions	X				LENGTH = 19.56 MM, WIDTH = 6.36 MM, THICKNESS = 3.82 MM Nominal Dimensions: MM LENGTH - 18.92-19.69 WIDTH - 6.10-6.60 THICKNESS - 5.08 MAX
	Equipment Used	**CALIPER-25** Asset Tag: **220** Calibration Due Date: **2024-05-09** Cert: **A5041916**				

Images For Mechanical Inspection - Dimensions.

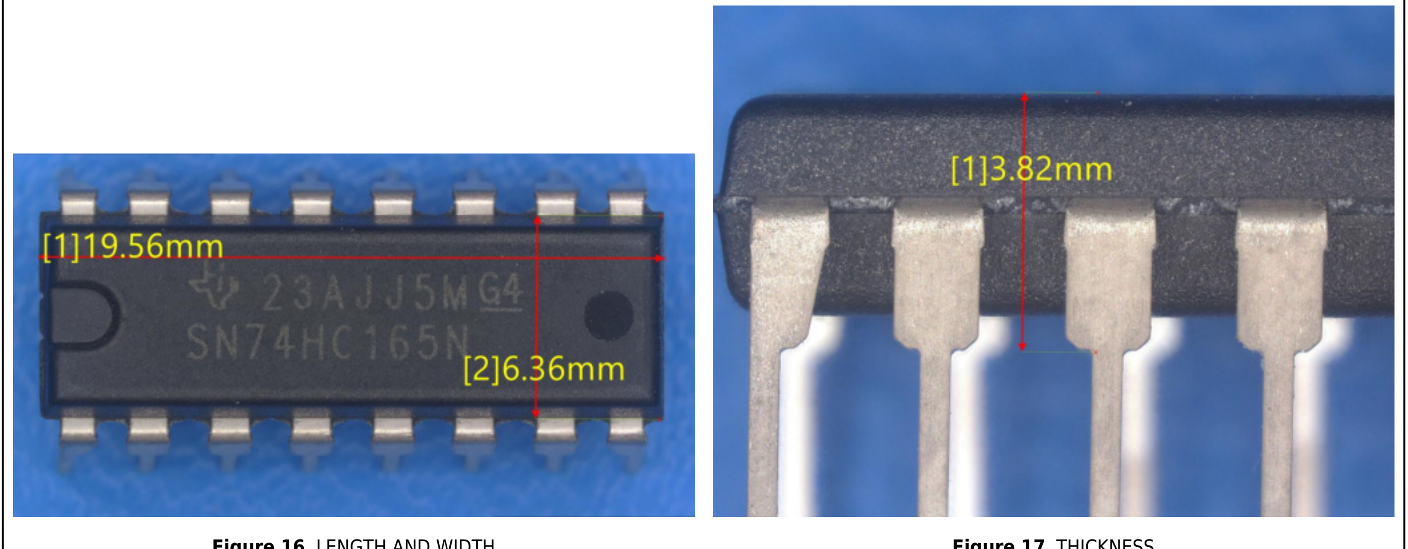


Figure 16. LENGTH AND WIDTH

Figure 17. THICKNESS

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Images For Mechanical Inspection - Dimensions. **(Continued From Previous Page)**

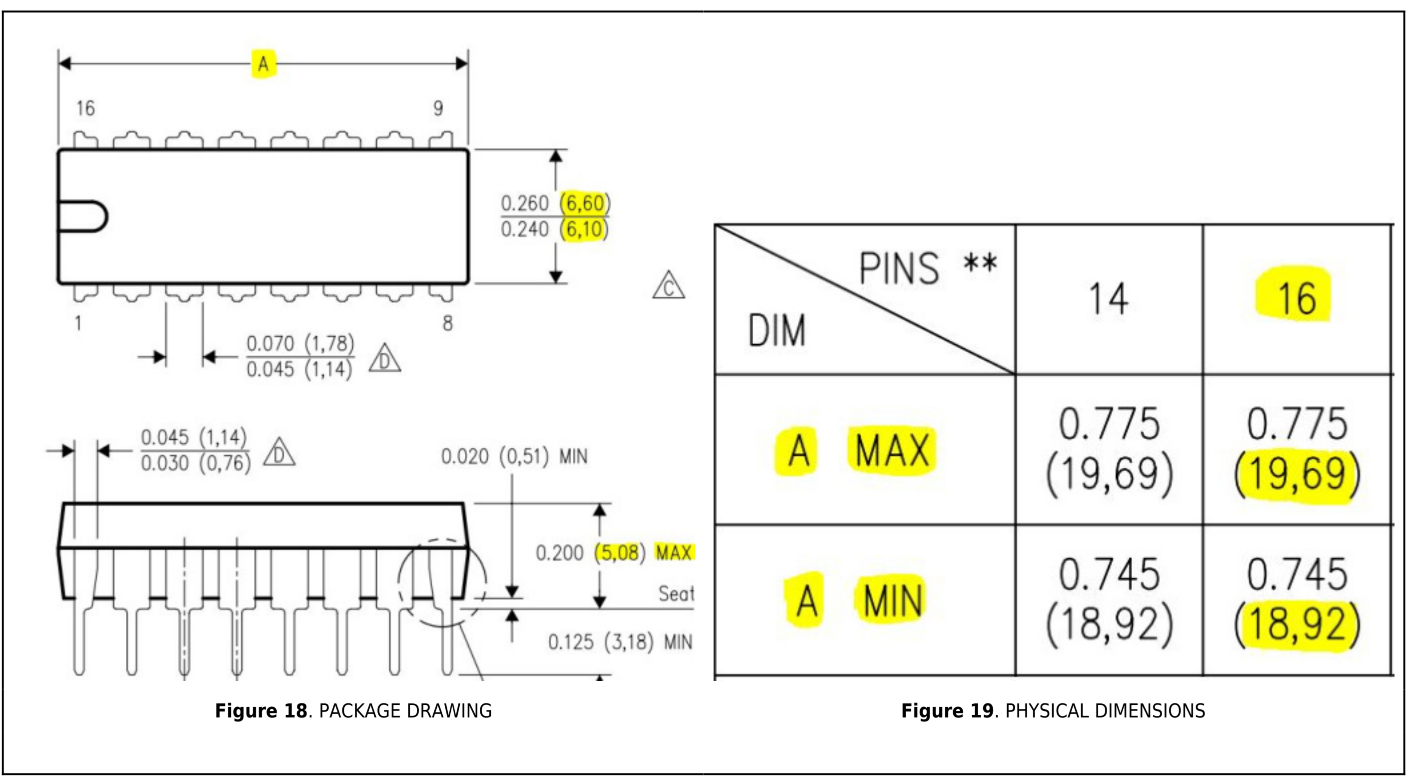

Figure 18. PACKAGE DRAWING

DIM \ PINS **	14	16
A MAX	0.775 (19,69)	0.775 (19,69)
A MIN	0.745 (18,92)	0.745 (18,92)

Figure 19. PHYSICAL DIMENSIONS

5.0.0 Mechanical inspection - Parts weight measurement (AS6171/2A) (Non-Destructive)

Results Summary
18 randomly selected devices were weighed and recorded. The weight deviation of each individual device is within 20% of the mean value.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
5.1.0	Part Weight (Non-Destructive)					
5.1.1	Part Weight	X				
	Equipment Used	**INTELLIGENT WEIGHT SCALE** Asset Tag: **304** Calibration Due Date: **Validated Daily** Cert: **DAILY**				

Images For Mechanical inspection - Parts weight measurement .

GLOBAL ETS
NEXT GENERATION COMPONENT TESTING & AUTHENTICATION

Device: COM3

Operator: LR SO: 120636 Upload

Tolerance(%): 20 Read: 0 g Add Evaulate: Ready

	Reading	Date/Time	Operator	Pass/Fail
1	1.001 g	12/12/2023 8:1	LR	Pass
2	1.005 g	12/12/2023 8:1	LR	Pass
3	1.004 g	12/12/2023 8:1	LR	Pass
4	1.001 g	12/12/2023 8:1	LR	Pass
5	1.002 g	12/12/2023 8:1	LR	Pass
6	1.002 g	12/12/2023 8:1	LR	Pass
7	1.002 g	12/12/2023 8:1	LR	Pass
8	1.001 g	12/12/2023 8:1	LR	Pass
9	1.002 g	12/12/2023 8:1	LR	Pass
10	1.003 g	12/12/2023 8:2	LR	Pass
11	1.003 g	12/12/2023 8:2	LR	Pass
12	1.001 g	12/12/2023 8:2	LR	Pass
13	0.999 g	12/12/2023 8:2	LR	Pass
14	1.004 g	12/12/2023 8:2	LR	Pass
15	1.004 g	12/12/2023 8:2	LR	Pass
16	1 g	12/12/2023 8:2	LR	Pass
17	1.005 g	12/12/2023 8:2	LR	Pass
18	1.005 g	12/12/2023 8:2	LR	Pass
MIN	0.999000g			

Graph
Weight (g): 1.005, 1.004, 1.003, 1.002, 1.001, 1, 0.999
Index: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18

Min	Average	Max
0.801955	1.00244	1.20293

Figure 20. 120636_SCALE (1)

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GLOBAL ETS

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

6.0.0 X-Ray - Standard 2D (AS6081 (4.2.6.4.4), (AS6171/5) (Non-Destructive)

Results Summary
10 devices were X-rayed. Construction and size are the same. No anomalies were found.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
6.1.0	X-Ray Analysis (Non-Destructive)					
6.1.1	Die Construction	X				
6.1.2	Wire Bond Layout/Quality	X				
6.1.3	Lead Frame	X				
6.1.4	Missing Bond Wires				X	
6.1.5	Open Internal Interconnect				X	
6.1.6	Missing Die				X	

Images For X-Ray - Standard 2D.

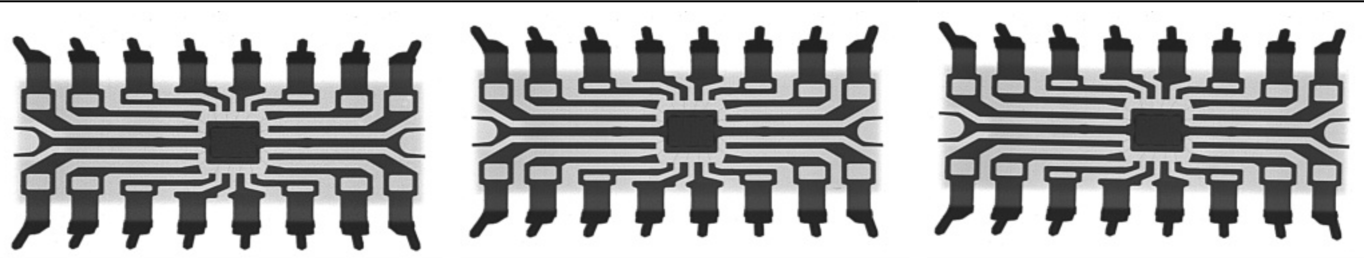

Figure 21. SO-120283_000001_XRAY

Figure 22. SO-120283_000002_XRAY

Figure 23. SO-120283_000003_XRAY

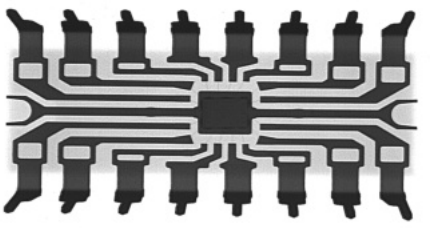

Figure 24. SO-120283_000004_XRAY

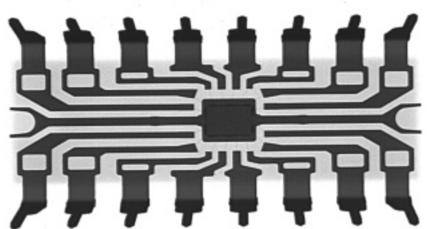

Figure 25. SO-120283_000005_XRAY

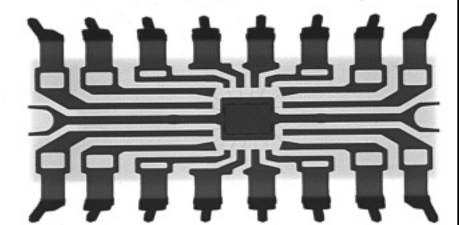

Figure 26. SO-120283_000006_XRAY

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Images For X-Ray - Standard 2D. **(Continued From Previous Page)**

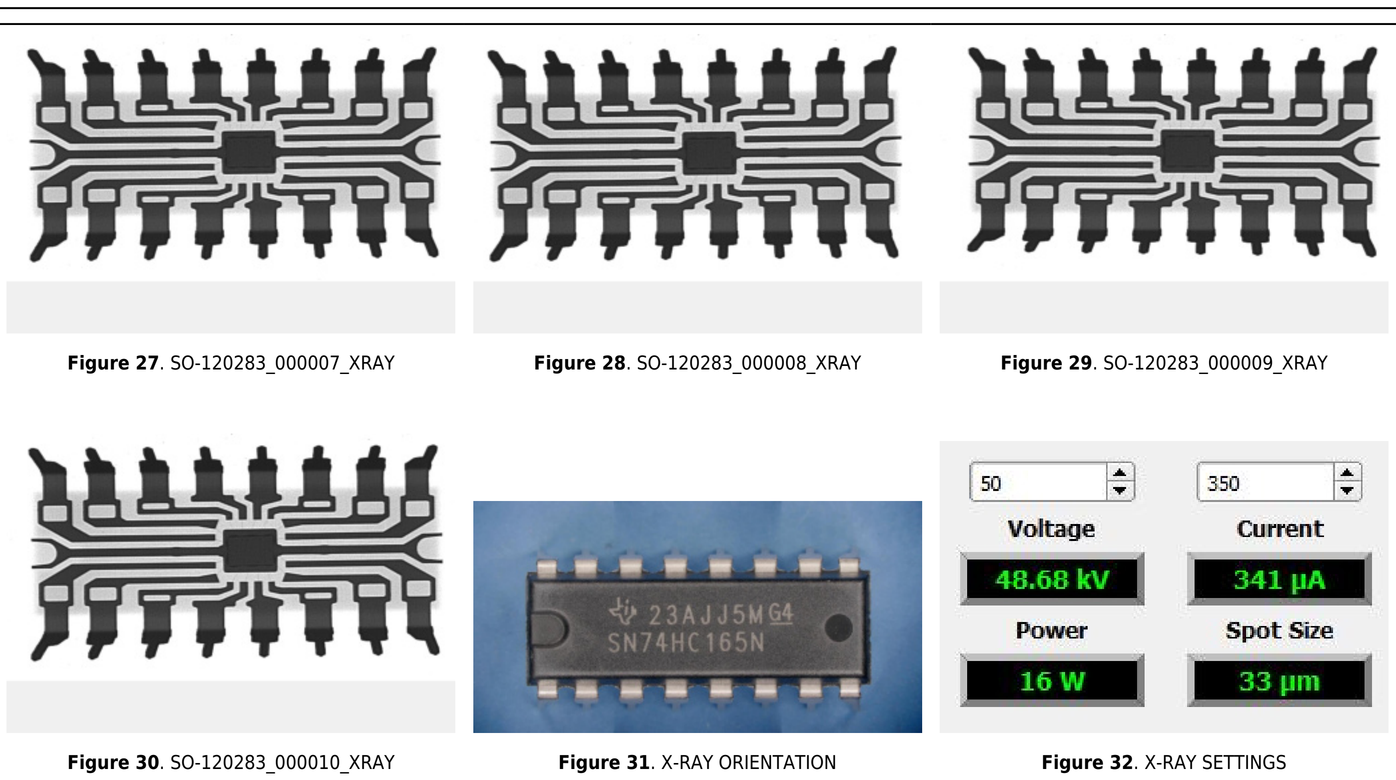

Figure 27. SO-120283_000007_XRAY

Figure 28. SO-120283_000008_XRAY

Figure 29. SO-120283_000009_XRAY

Figure 30. SO-120283_000010_XRAY

Figure 31. X-RAY ORIENTATION

Figure 32. X-RAY SETTINGS

	Analysis Report - 2000-XXXXXX		
Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

7.0.0 XRF - RoHS 1.0 / 6 Elements (AS6171/3) (Non-Destructive)

Results Summary
3 samples were XRF tested. These 3 devices are RoHs compliant with minimal restricted elements observed. Devices are RoHs compliant per EU RoHS Directive (2011/65/EU) restriction.

XRF Equipment: Ux-220

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
7.1.0	XRF, Lead Finish Analysis (Non-Destructive)					
7.1.1	RoHS 1 Compliance	X				

Images For XRF - RoHS 1.0 / 6 Elements.

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SplitSerial **010-000-000-000**

Sample ID **0**

Vendor: 1

Testing Date 2023-12-06 07:45:36

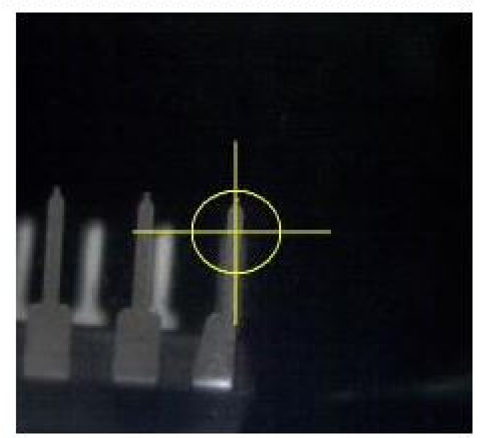
Assemble:

Part:

Split:

Matrix: Metal

Batch:



Item	Testing Result(ppm)	MDL	Limitation	Result(%)
Lead(Pb)	80.045	5	1000	**0.008**
Cadmium(Cd)	N.D.	5	100	**N.D.**
Mercury(Hg)	N.D.	5	1000	**N.D.**
Chromium(Cr)	N.D.	5	1000	**N.D.**
Polybrominated biphenyls (PBB)	N.D.	5	1000	**0%**
Polybrominated diphenyl ethers (PBDE)	N.D.	5	1000	**0%**

Note: N.D. means Non-Detected, MDL. means Method Detection Limitation, B.C. mean Beyond Calibration, ppm means mg/kg-each of sample, "--" means not Analyzed.

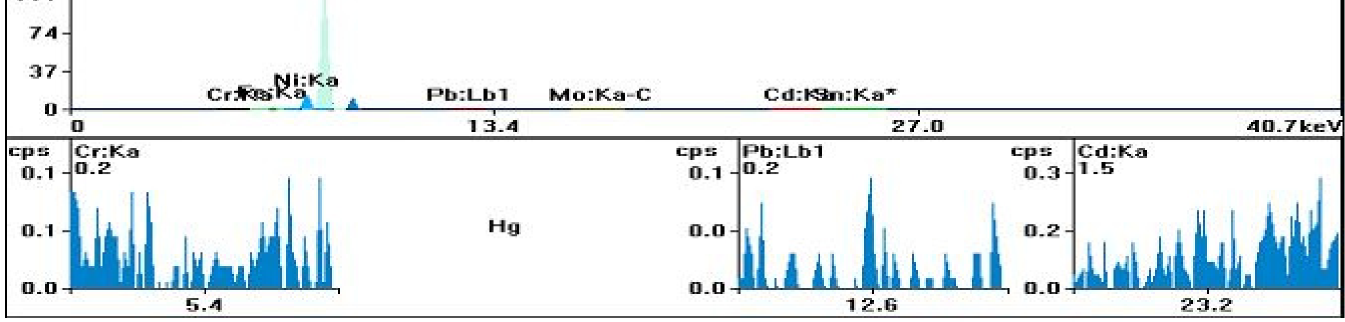


Figure 33. SAMPLE-01-XRF

SplitSerial 010-000-000-000

Sample ID 0

Vendor: 1

Testing Date 2023-12-06 07:47:33

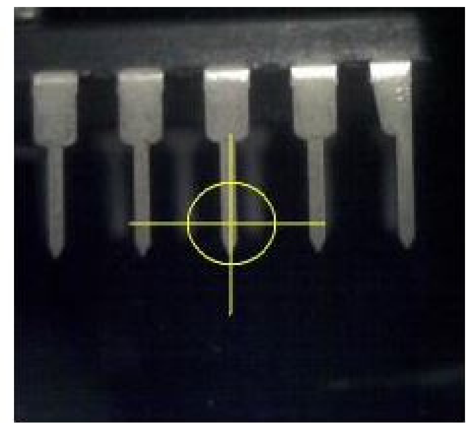
Assemble:

Part:

Split:

Matrix: Metal

Batch:



Item	Testing Result(ppm)	MDL	Limitation	Result(%)
Lead(Pb)	N.D.	5	1000	**N.D.**
Cadmium(Cd)	N.D.	5	100	**N.D.**
Mercury(Hg)	N.D.	5	1000	**N.D.**
Chromium(Cr)	N.D.	5	1000	**N.D.**
Polybrominated biphenyls (PBB)	N.D.	5	1000	**0%**
Polybrominated diphenyl ethers (PBDE)	N.D.	5	1000	**0%**
Note:	N.D. means Non-Detected, MDL. means Method Detection Limitation, B.C. mean Beyond Calibration, ppm means mg/kg-each of sample, "--" means not Analyzed.			

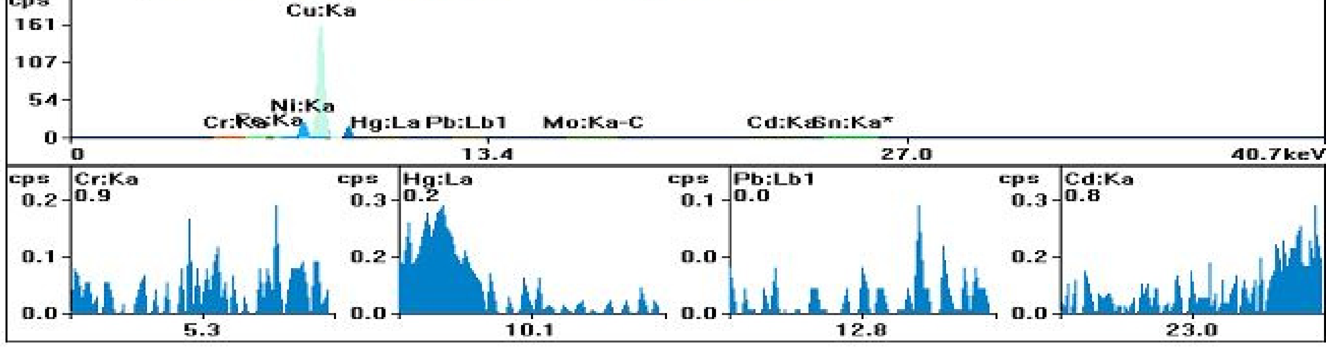


Figure 34. SAMPLE-02-XRF

SplitSerial 010-000-000-000

Sample ID 0

Vendor: 1

Testing Date 2023-12-06 07:49:39

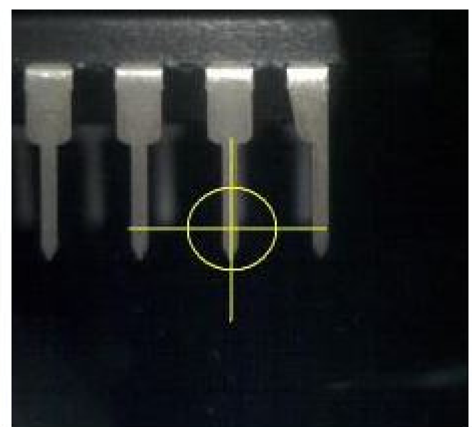
Assemble:

Part:

Split:

Matrix: Metal

Batch:



Item	Testing Result(ppm)	MDL	Limitation	Result(%)
Lead(Pb)	N.D.	5	1000	**N.D.**
Cadmium(Cd)	N.D.	5	100	**N.D.**
Mercury(Hg)	N.D.	5	1000	**N.D.**
Chromium(Cr)	N.D.	5	1000	**N.D.**
Polybrominated biphenyls (PBB)	N.D.	5	1000	**0%**
Polybrominated diphenyl ethers (PBDE)	N.D.	5	1000	**0%**

Note: N.D. means Non-Detected, MDL. means Method Detection Limitation, B.C. mean Beyond Calibration, ppm means mg/kg-each of sample, "--" means not Analyzed.

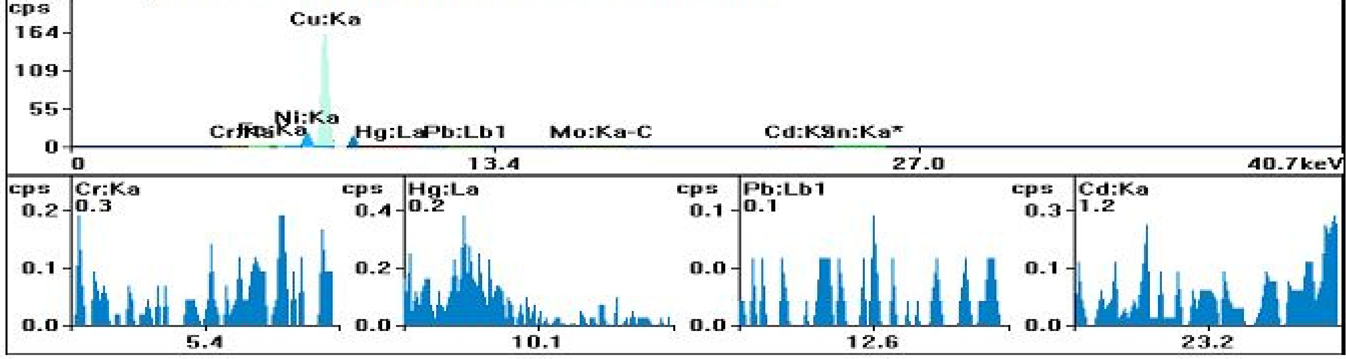


Figure 35. SAMPLE-03-XRF

8.0.0 XRF - Lead Finish Analysis (AS6171/3) (Non-Destructive)

Results Summary
XRF were performed on 3 samples. Devices material composition percentages are
Sample 1
Cu 81.04%
Ni 17.05%
Fe 1.64%

Sample 2
Cu 78.59%
Ni 19.65%
Fe 1.43%

Sample 3
Cu 78.05%
Ni 20.20%
Fe 1.42%

XRF Equipment: XF-A5

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
8.1.0	XRF, Lead Finish Analysis (Non-Destructive)					
8.1.1	Lead Finish(Plating)	X				Au Pd Over Ni Cu Alloy|N/A

Images For XRF - Lead Finish Analysis.

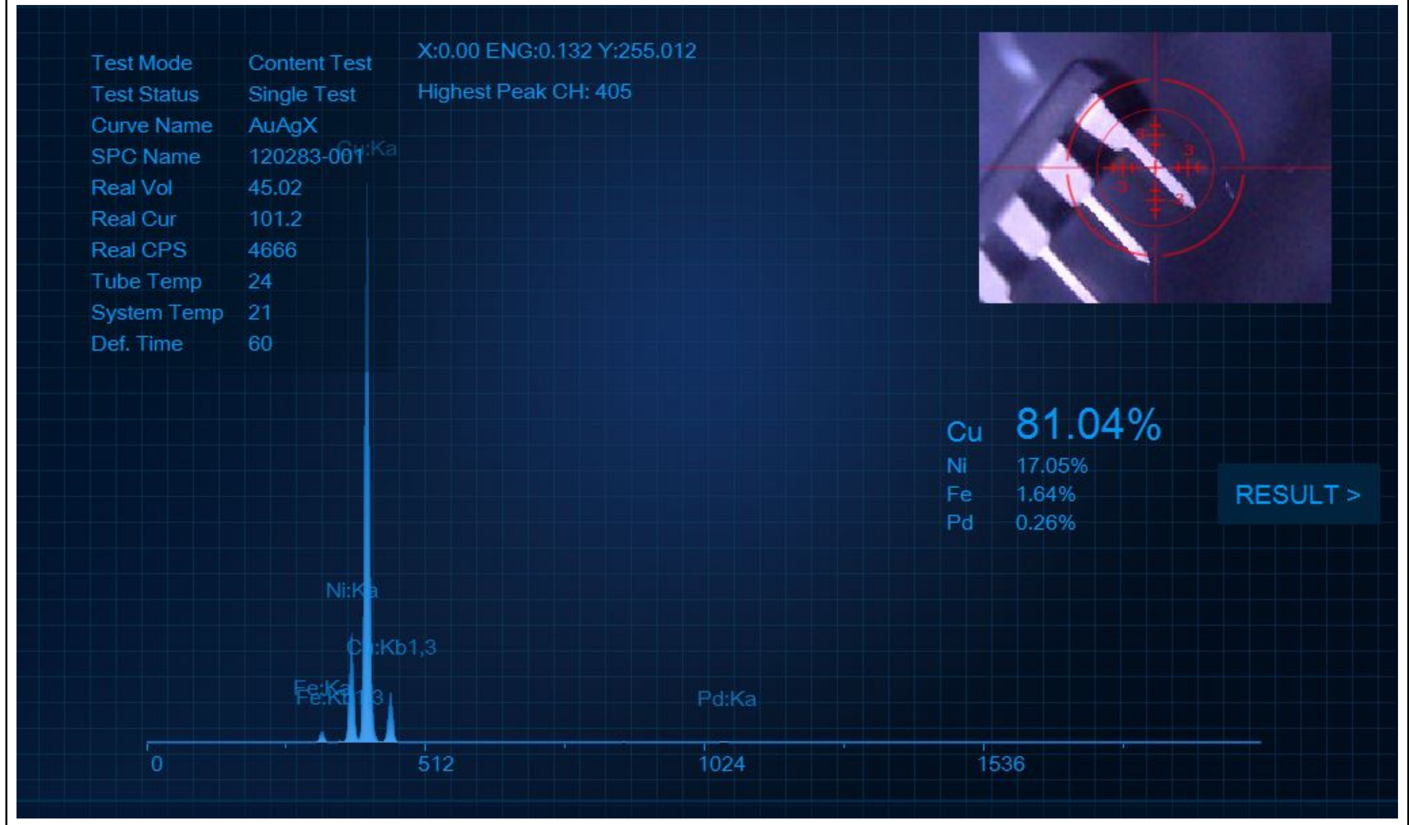


Figure 36. SAMPLE-001-XRF

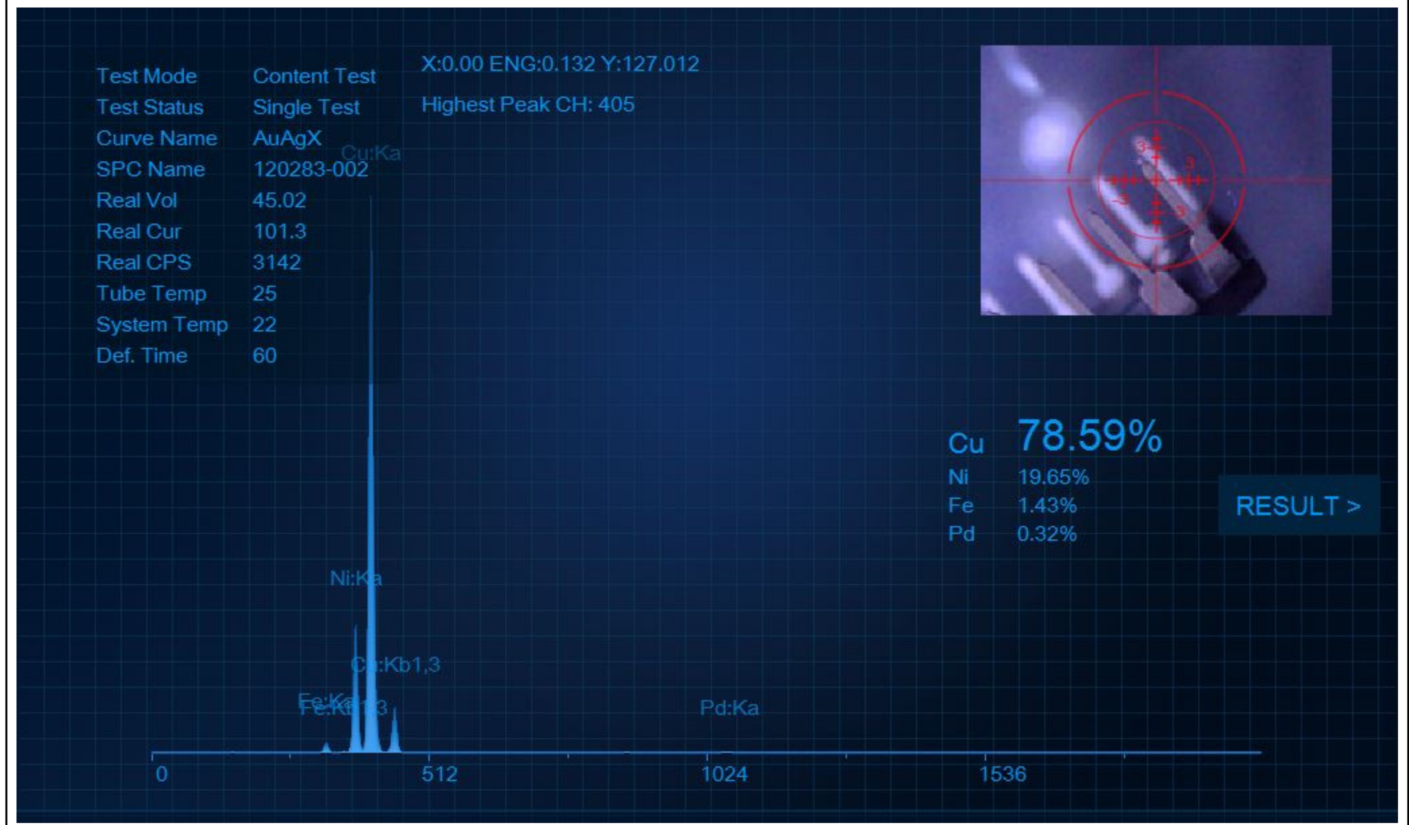


Figure 37. SAMPLE-002-XRF

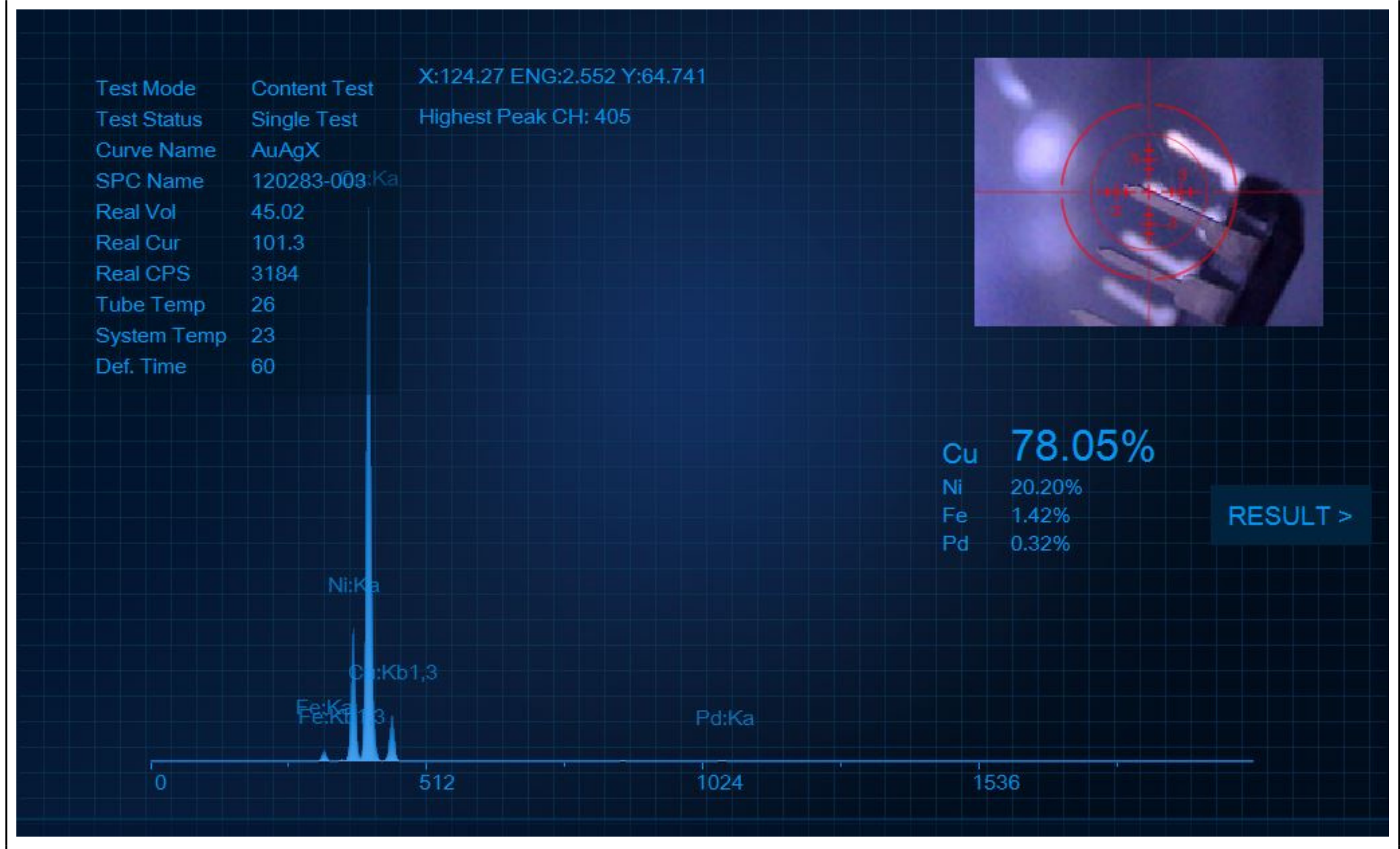


Figure 38. SAMPLE-003-XRF

9.0.0 Electrical - QTST- FSC 5962 (Semiconductors) Test

10 devices max, c=0 (Non-destructive) AS6171/7 Test Temperature 68 °F (20 °C) - 76 °F (24.4 °C), Humidity 30%-60%
Groups A1, A4, A7, and A9 electrical tests for QML-38535/38534.
non-QML-19500 / non-QML-38535/38534 all parametric at 25°C with Exceptions per QTSL-5961/5962 Rev B section 3.1.3.1

Results Summary
Tested 10 functionally at 25C via verify DUT's AC/DC characteristic, switching and function.
Passed: 10.

*Please reference appendix for detail data.

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
9.1.0	Electrical Test (MIL-STD-883 METHOD 2022.3) (Non-Destructive)					
9.1.1	Static test(DC) at +25°C	10	10	0		
	Equipment Used	**PROGRAMMER 6100** Asset Tag: **68** Calibration Due Date: **Not Required** Cert: **CAL NOT REQUIRED** **NI VIRTUAL** Asset Tag: **161** Calibration Due Date: **2025-01-04** Cert: **A5360612**				
9.1.2	Dynamic tests at +25°C	10	10	0		
	Equipment Used	**PROGRAMMER 6100** Asset Tag: **68** Calibration Due Date: **Not Required** Cert: **CAL NOT REQUIRED** **NI VIRTUAL** Asset Tag: **161** Calibration Due Date: **2025-01-04** Cert: **A5360612**				
9.1.3	Electrical Test TA = 25˚C	10	10	0		
	Equipment Used	**PROGRAMMER 6100** Asset Tag: **68** Calibration Due Date: **Not Required** Cert: **CAL NOT REQUIRED** **NI VIRTUAL** Asset Tag: **161** Calibration Due Date: **2025-01-04** Cert: **A5360612**				
9.1.4	Acoustic image of circuit side with phase inversion,	10	10	0		
	Equipment Used	**PROGRAMMER 6100** Asset Tag: **68** Calibration Due Date: **Not Required** Cert: **CAL NOT REQUIRED** **NI VIRTUAL** Asset Tag: **161** Calibration Due Date: **2025-01-04** Cert: **A5360612**				

Images For Electrical - QTST- FSC 5962 (Semiconductors) Test.

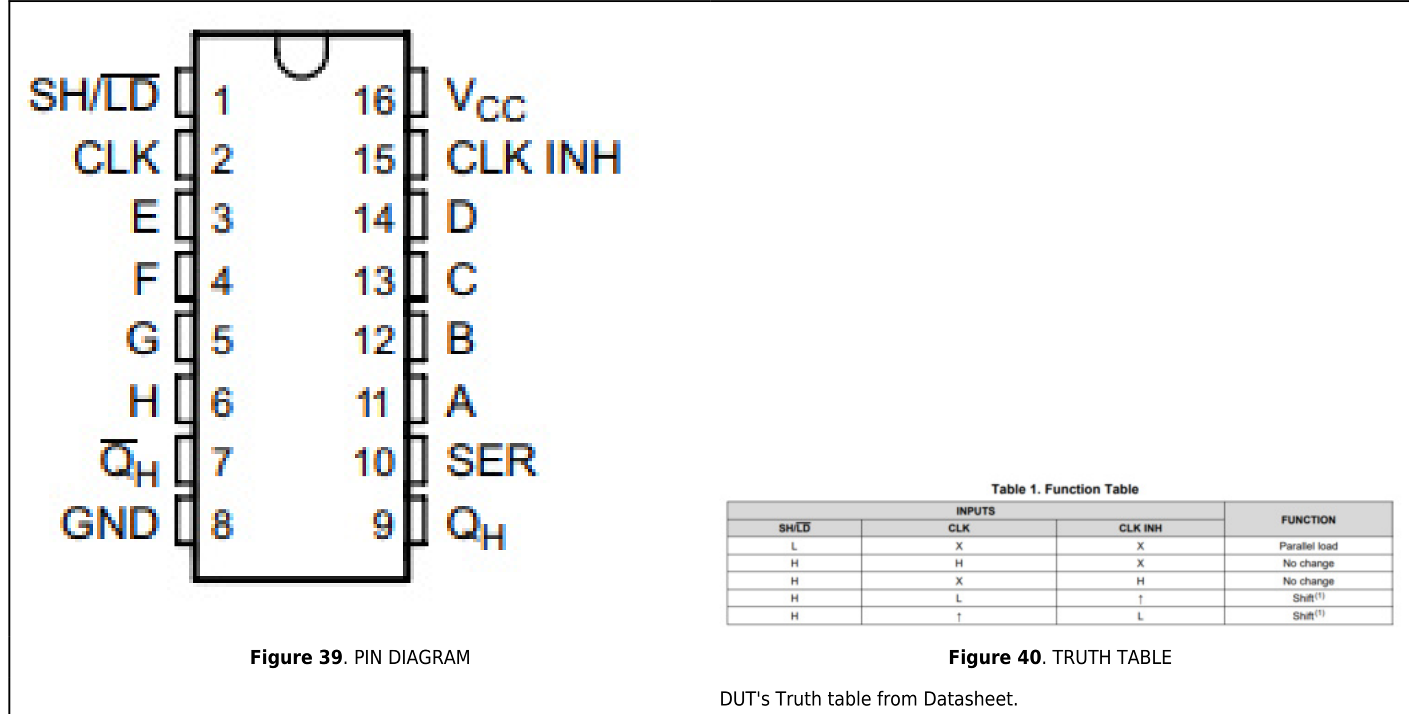


Figure 39. PIN DIAGRAM

Table 1. Function Table

INPUTS			FUNCTION
SH/LD	CLK	CLK INH	
L	X	X	Parallel load
H	H	X	No change
H	X	H	No change
H	L	↑	Shift(1)
H	↑	L	Shift(1)

Figure 40. TRUTH TABLE

DUT's Truth table from Datasheet.

Images For Electrical - QTST- FSC 5962 (Semiconductors) Test. **(Continued From Previous Page)**

Logic Test

Search: 74165

TTL/CMOS Chips: 74165

Vector Table:

Line	1234567890123456
0001	0C0000HGL00000V
0002	0C0001LGH00000V
0003	100100LGH00000V
0004	1C0010HGL10000V
0005	1C0001HGL10000V
0006	1C0000HGL10000V
0007	....
0008	....
0009	....
0010	....
0011	....
0012	....
0013	....
0014	....

Test the chip 74165 ...
Device Passed Vector Test !
Test the chip 74165 end.

DownLoad Library(Test) | DownLoad Library(Auto Find)

New | Delete | Edit | Test | Auto Find | OK

Figure 41. LOGIC TEST

Page 3 of 12

Statistics

Test Parameters

Parameters	Test Conditions	Minimum	Typical	Maximum	Unit
VOH		3.98	4.3	-	V
VOL		-	0.17	0.26	V
II		-	0.1	100	nA
ICC		-	-	8	uA
tpd		-	15	30	ns
tt		-	8	15	ns

Figure 42. CONDITION

Verified The Truth Table .
PASS!

Page 2 of 12

Analysis Summary

Test Parameters	Passed	Failed	Total	Pass Percentage
VOH	18	0	18	100%
VOL	18	0	18	100%
II	18	0	18	100%
ICC	18	0	18	100%
tpd	18	0	18	100%
tt	18	0	18	100%
Cumulative	18	0	18	100%

Figure 43. SUMMARY

10.0.0 Materials Analysis - SEM _Scanning Electron Microscope (AS6171/2 (SEM) Method F) (Destructive)

GLOBAL ETS

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

Results Summary
Tested 3 devices at 25˚C via verified DUT surface quantitative with Scanning Electron Microscopy (SEM) Analysis:

DUT was compared at three different areas on the top surface with the following conditions:
1)15.0 kV, x200 (magnification)
2)15.0 kV, x400 (magnification)
3)15.0 kV, x3000 (magnification)

A detailed surface analysis of DUT were successfully compared. There is a clear surface structure consistency between samples. No micro blasting, resurfacing, remarking, or other anomalies found.

*DUT= Device Under Test

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
10.1.0	Material Composition Analysis (Destructive)					
10.1.1	SEM Analysis	3	3	0		
	Equipment Used	**SEM&EDS ELECTRON MICROSCOPE** Asset Tag: **303** Calibration Due Date: **Validated Daily** Cert: **CALIBRATION NOT REQUIRE**				

Images For Materials Analysis - SEM _Scanning Electron Microscope.

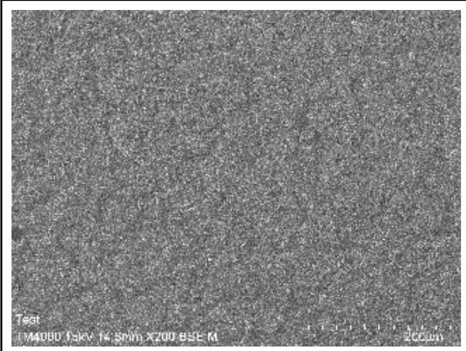


Figure 44. TOP 200X

DUT Top surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x200 (magnification).

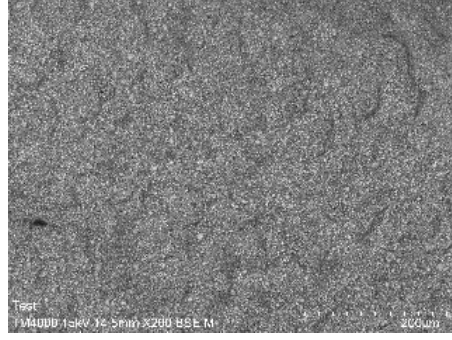


Figure 45. BOTTOM 200X

DUT Bottom surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x200 (magnification).

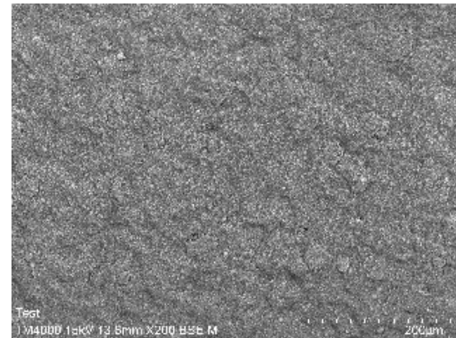


Figure 46. SIDE 200X

DUT Side surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x200 (magnification).

Prepared by:
(MANDY ANDERSON)

Approved by:
(JASON HOUSTON)

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GLOBAL ETS

Analysis Report - 2000-XXXXXX

Customer Name:		Purchase Order:	N/A
Part Number:	SN74HC165N	Customer P/N:	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	Devices Received:	18
Date Code:	2212	Lot Code:	2086242WDH

Images For Materials Analysis - SEM _Scanning Electron Microscope. **(Continued From Previous Page)**

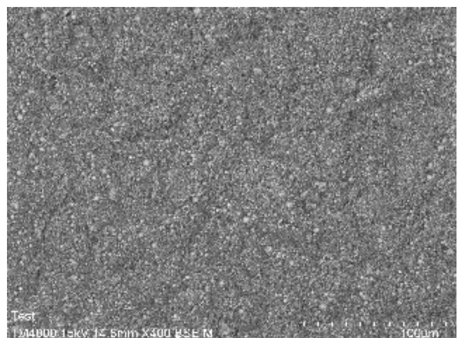

Figure 47. TOP 400X

DUT Top surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x400 (magnification).

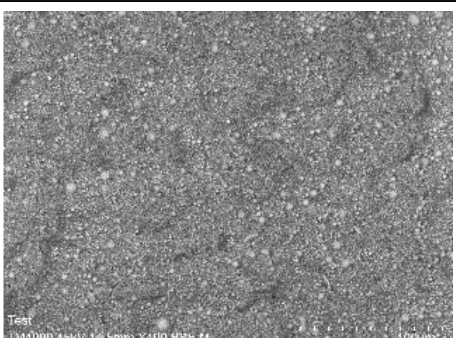

Figure 48. BOTTOM 400X

DUT Bottom surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x400 (magnification).

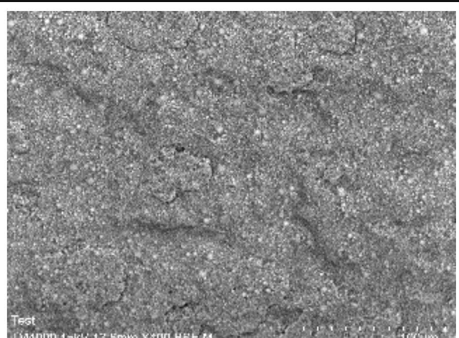

Figure 49. SIDE 400X

DUT Side surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x400 (magnification).

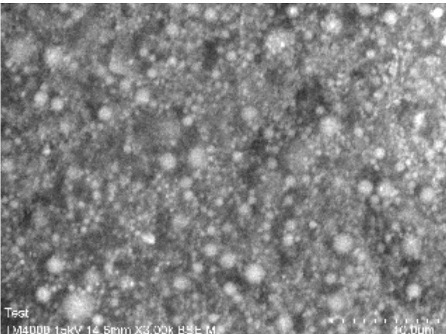

Figure 50. TOP 3KX

DUT Top surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x3000 (magnification).

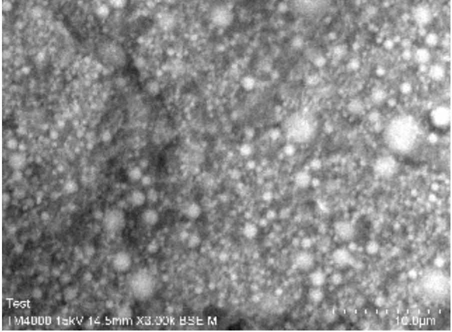

Figure 51. BOTTOM 3KX

DUT Bottom surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x3000 (magnification).

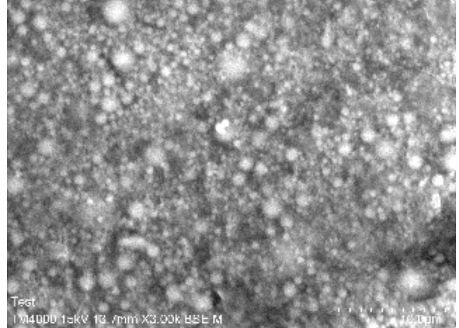

Figure 52. SIDE 3KX

DUT Side surface quantitative with Scanning Electron Microscope
(SEM) Analysis:
1)15.0 kV x3000 (magnification).

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

11.0.0 Materials Analysis - EDS/EDX_Energy Dispersive Spectroscopy (AS6171/3) (Destructive)

Results Summary
Tested 3 devices at 25˚C via verified DUT Substance with Energy Dispersive X-Ray Spectroscopy (EDS) Analysis:
(20kV)
The main composition of DUT 1 Lead:
Nickel: 83.4 wt.% Copper: 6.8 wt.% Palladium: 6.5 wt.% Gold: 3.3 wt.%

The main composition of DUT 2 Lead:
Nickel: 84.7 wt.% Palladium: 7.7 wt.% Copper: 4.4 wt.% Gold: 3.2 wt.%

The main composition of DUT 3 Lead:
Nickel: 83.9 wt.% Palladium: 7.1 wt.% Copper: 5.7 wt.% Gold: 3.3 wt.%

*DUT= Device Under Test

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
11.1.0	Material Composition Analysis (Destructive)					
11.1.1	EDS/EDX Analysis	3	3	0		
	Equipment Used	**SEM&EDS ELECTRON MICROSCOPE** Asset Tag: **303** Calibration Due Date: **Validated Daily** Cert: **CALIBRATION NOT REQUIRE**				

Images For Materials Analysis - EDS/EDX_Energy Dispersive Spectroscopy.

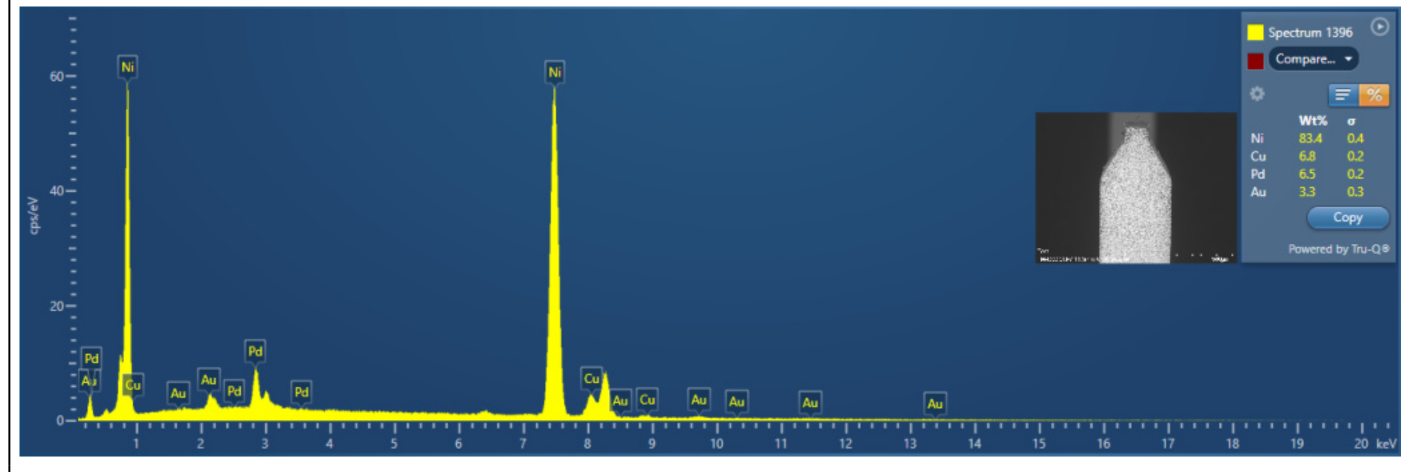

Figure 53. DUT 1 LEAD EDS

A 20kV, Tilt 30° Accelerated Electron Beam was focused on the marked area

The main composition of DUT 1 Lead:
Nickel: 83.4 wt.% Copper: 6.8 wt.% Palladium: 6.5 wt.% Gold: 3.3 wt.%

Prepared by:	Disclaimer	Generated On:
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Approved by:		**Page:**
(JASON HOUSTON)	**Global Electronics Testing Services, LLC | 2631 Success Dr., Odessa, FL, 33556, USA | 1-727-807-7991**	

Images For Materials Analysis - EDS/EDX_Energy Dispersive Spectroscopy. **(Continued From Previous Page)**

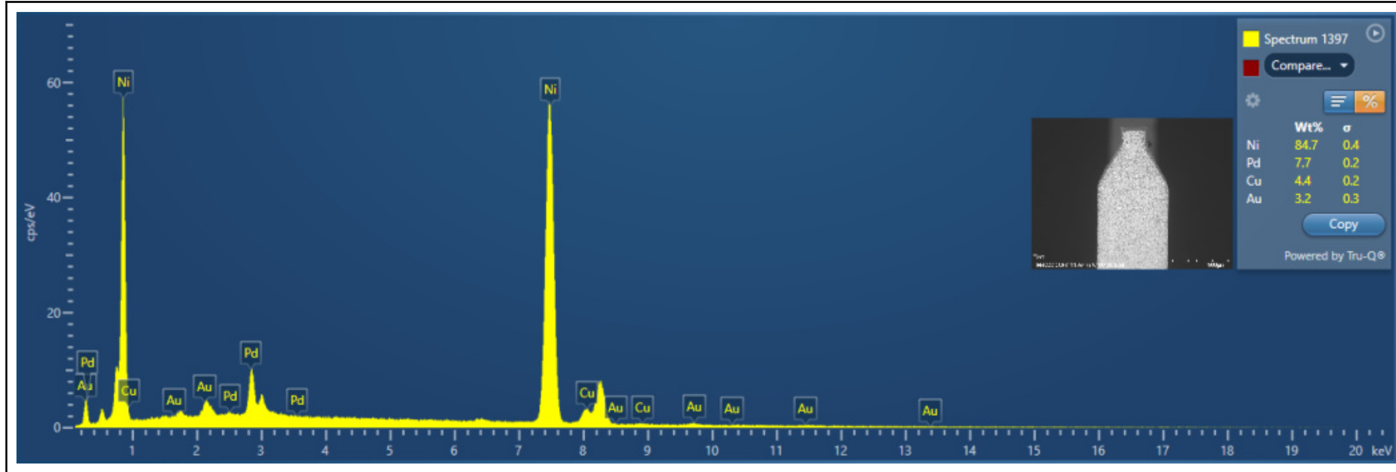

Figure 54. DUT 2 LEAD EDS

A 20kV, Tilt 30° Accelerated Electron Beam was focused on the marked area

The main composition of DUT 2 Lead:
Nickel: 84.7 wt.% Palladium: 7.7 wt.% Copper: 4.4 wt.% Gold: 3.2 wt.%

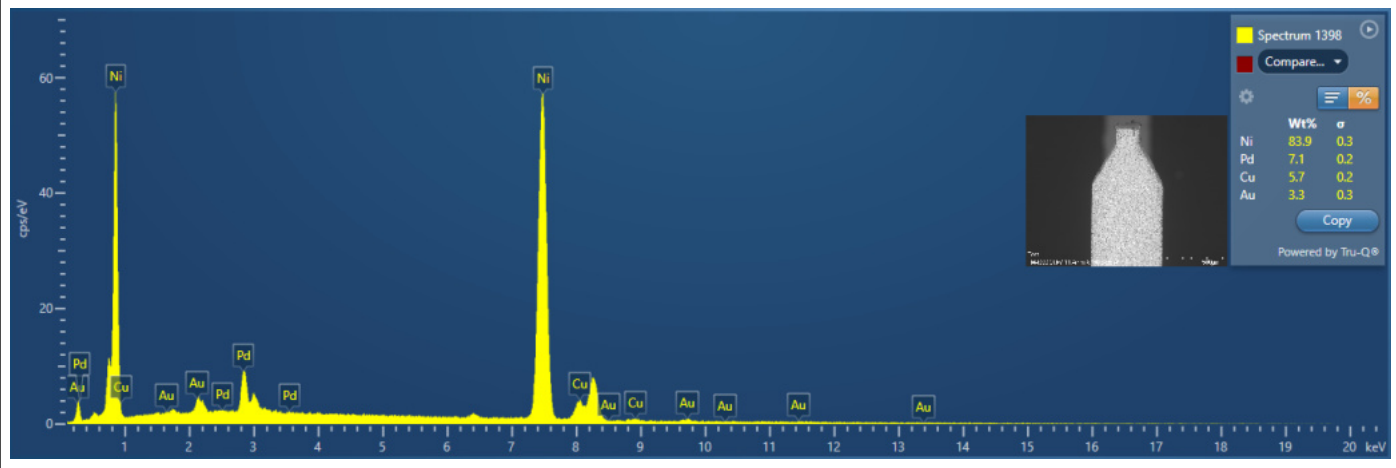

Figure 55. DUT 3 LEAD EDS

A 20kV, Tilt 30° Accelerated Electron Beam was focused on the marked area

The main composition of DUT 3 Lead:
Nickel: 83.9 wt.% Palladium: 7.1 wt.% Copper: 5.7 wt.% Gold: 3.3 wt.%

Manufacturing Info

VIEW MANUFACTURING DEFINITIONS

MSL	N/R	Wave Solder Time (Sec)	N/A
Maximum Reflow Temperature (°C)	N/R	Lead Finish(Plating)	Au
Reflow Solder Time (Sec)	N/R	Under Plating Material	Pd over Ni
Reflow Temp. Source	Download XLS	Terminal Base Material	Cu Alloy|N/A
Maximum Wave Temperature (°C)	N/A		

Figure 56. PART DATA

Analysis Report - 2000-XXXXXX

Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

12.0.0 Materials Analysis - C-SAM_Scanning Acoustic Microscopy (AS6171/6) (Non-Destructive)

Results Summary
3 samples were subjected to C-Mode Scanning Acoustic Microscopy using a 25 MHz transducer at the circuit side with a scanning resolution of 20µm. The devices were inspected at the die surface to epoxy interface and at the die paddle/substrate to epoxy interface. No anomalies were detected.

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
12.1.0	Acoustic Microscopy (Non-Destructive)					
12.1.1	Acoustic image of circuit side	3	3	0		
12.1.2	Acoustic image of circuit side with phase inversion,	3	3	0		
12.1.3	Acoustic image of non-circuit side	3	3	0		
12.1.4	Acoustic Microscopy	3	3	0		
12.1.5	Acoustic image of non-circuit side with phase inversion,	3	3	0		

Images For Materials Analysis - C-SAM_Scanning Acoustic Microscopy.

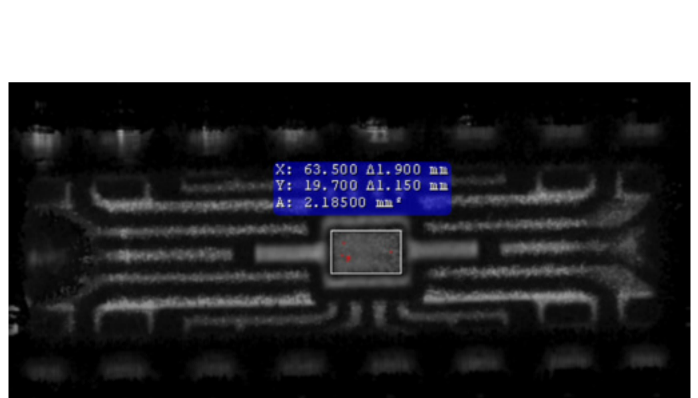

Figure 57. DUT SCAN DIE/PAD INTERFACE

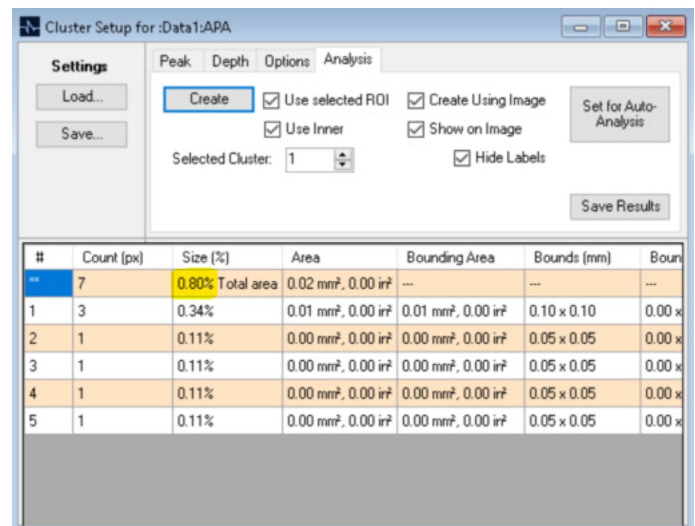

Figure 58. DUT ANALYSIS

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Images For Materials Analysis - C-SAM_Scanning Acoustic Microscopy. **(Continued From Previous Page)**

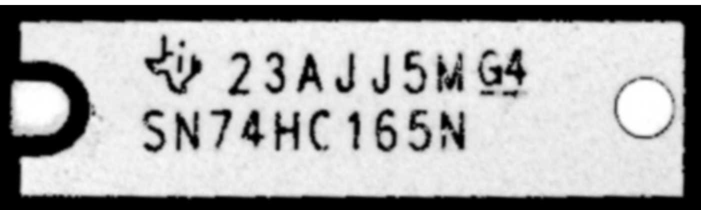


Figure 59. DUT SURFACE SCAN

Images For Materials Analysis - C-SAM_Scanning Acoustic Microscopy. **(Continued From Previous Page)**

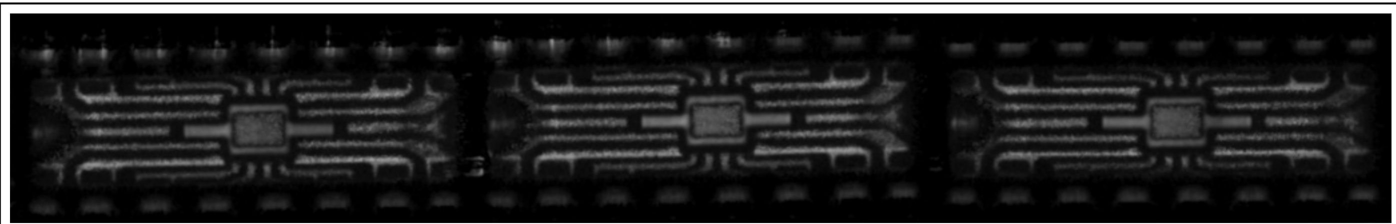
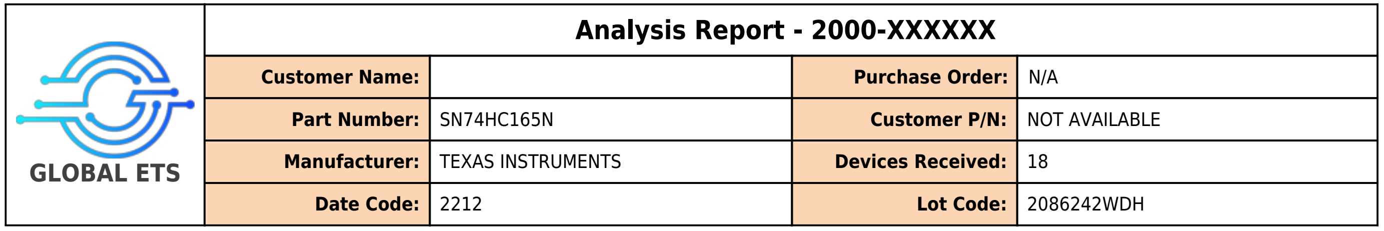


Figure 60. CSAM



Analysis Report - 2000-XXXXXX			
Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

13.0.0 Materials Analysis - FTIR Spectroscopy_Material Analysis (AS6171/9) (Non-Destructive)

Results Summary
Tested 3 devices at 25˚C via verified DUT Encapsulant Material via Fourier Transform Infrared (FTIR) Spectroscopy Analysis with a mounted Single-Reflection ATR with diamond prism and stainless steel presser head at a resolution of 4.0cm-1 and 16 scans.

No sample preparation process was required previous to the measurements. No impregnated blasting materials present and DUT hasn't been exposed to foreign materials such as cleaners.

DUT Encapsulant Composition: The 3 DUTs were compared against each other, and their outer shells were found to be made of the same material.

*DUT= Device Under Test

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
13.1.0	Material Composition Analysis (Non-Destructive)					
13.1.1	Fourier Transform Infrared Spectroscopy (FTIR) Analysis	3	3	0		
	Equipment Used	**FT/ IR** Asset Tag: **312** Calibration Due Date: **Not Required** Cert: **CALIBRATION NOT REQUIRE**				

Images For Materials Analysis - FTIR Spectroscopy_Material Analysis.

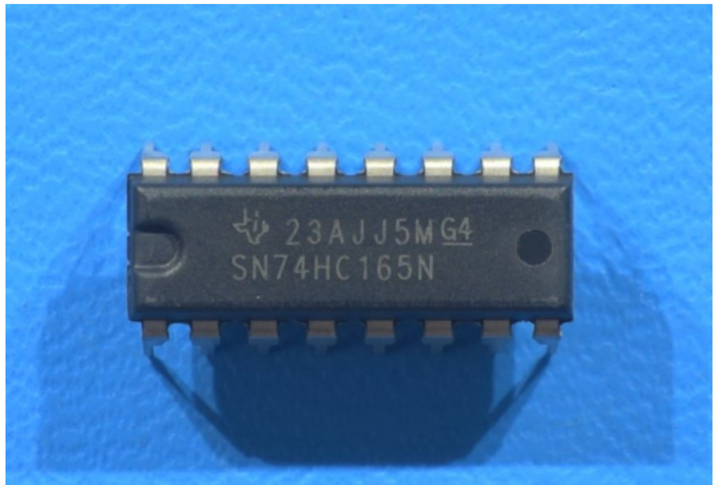


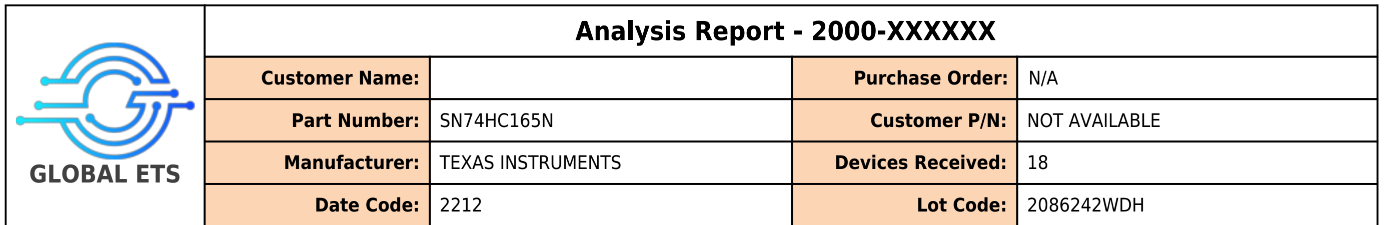
Figure 61. DEVICE UNDER TEST

Images For Materials Analysis - FTIR Spectroscopy_Material Analysis. **(Continued From Previous Page)**

Figure 62. FTIR

Verified DUT Encapsulant Composition via FTIR:

The 3 DUTs were compared, and their outer shells were found to be made of the same material.



Analysis Report - 2000-XXXXXX

Customer Name:		Purchase Order:	N/A
Part Number:	SN74HC165N	Customer P/N:	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	Devices Received:	18
Date Code:	2212	Lot Code:	2086242WDH

14.0.0 Materials Analysis - Raman Spectroscopy_Material Analysis (AS6171/8) (Non-Destructive)

Results Summary
Tested 1 device at 25˚C via verified DUT Encapsulant Material via Dispersive Microscopic Raman Spectroscopy Analysis:

The DUT was exposed for 2 accumulations, each of 100 seconds, and they were tested using a laser wavelength of 785nm with power of 1.5mW. The spectra measurement was made with a slit of 50x8000µm and a spectral resolution was 6.69cm-1.

No sample preparation process was required previous to the measurements. No impregnated blasting materials present and DUT hasn't been exposed to foreign materials such as cleaners.

DUT Encapsulant Composition: The device was compared with library spectra from KnowItAll database and the device was found to have the highest Hit Quality Index (HQI) with Carboxyl terminated polyester with a polyepoxy, coating formulation.

*DUT= Device Under Test

	Test-Process Operation	Quantity Inspected	Pass	Fail	N/A	Comments / Observations
14.1.0	Material Composition Analysis (Non-Destructive)					
14.1.1	Raman Spectroscopy Analysis	1	1	0		
	Equipment Used	**RAMAN**	Asset Tag: **313**	Calibration Due Date: **Validated Daily**		Cert: **CALIBRATION NOT REQUIRE**

Images For Materials Analysis - Raman Spectroscopy_Material Analysis.

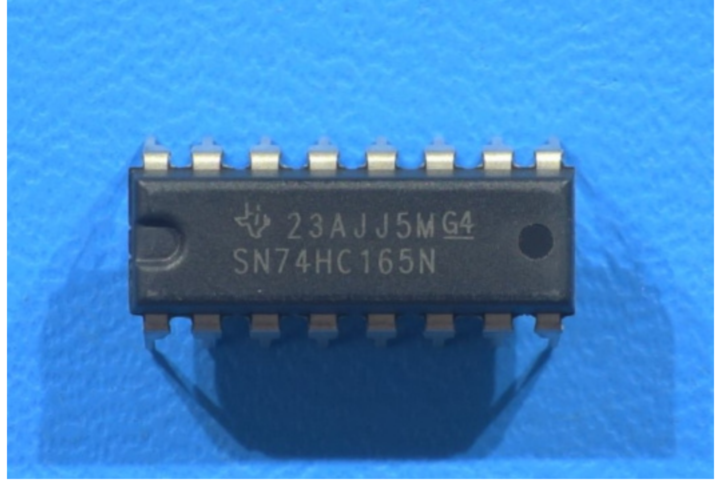


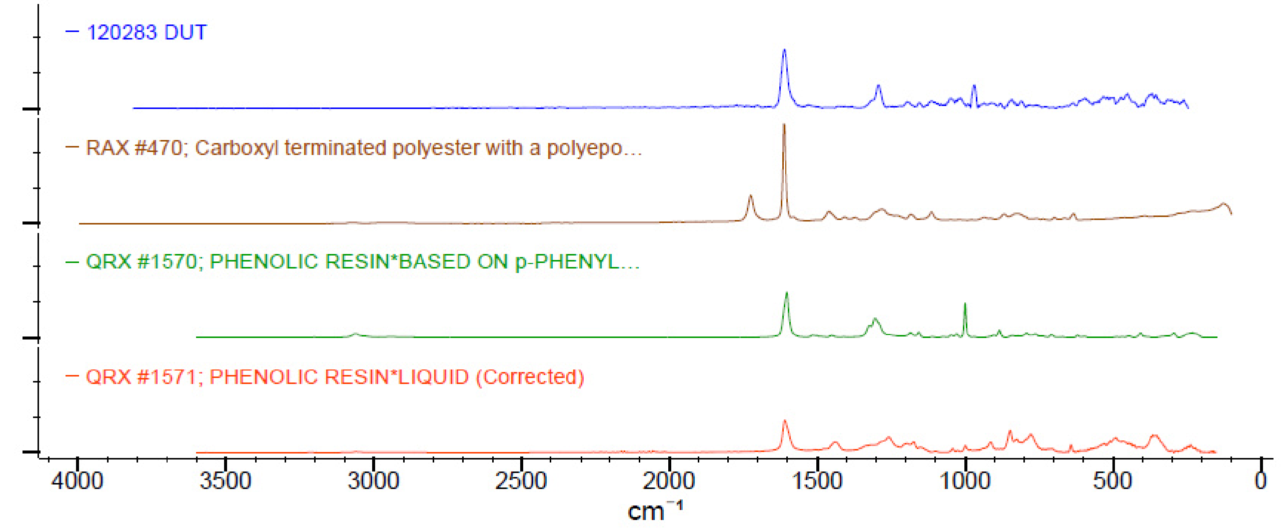
Figure 63. DEVICE UNDER TEST

Images For Materials Analysis - Raman Spectroscopy_Material Analysis. **(Continued From Previous Page)**

1700
1500
1000
Int.
500
0
-100
3500
3000
2000
1000
250
Raman Shift [cm-1]

120283 TEXAS INSTRUMENTS SN74HC165N DUT.jws

Figure 64. DUT RAMAN SPECTRUM



HQI	Tag	rrectic	DB	ID	Name	Spectrum
59.42			RAX	470	Carboxyl terminated polyester with a polyepoxy, coating formulation	
58.03			QRX	1570	PHENOLIC RESIN*BASED ON p-PHENYLPHENOL	
53.06			QRX	1571	PHENOLIC RESIN*LIQUID	

Figure 65. DUT RAMAN IDENTIFICATION

Verified DUT Encapsulant Composition via Raman:

The DUT was compared with library spectra from KnowItAll database and the device was found to have the highest Hit Quality Index (HQI) with Carboxyl terminated polyester with a polyepoxy, coating formulation.

15.0.0 Solderability Test - Dip & Look Method (J-STD-002, (MIL-STD-883L METHOD 2003.14) (Destructive)

Results Summary
1 device was tested using dip and look method. Device was inspected under magnification. All leads have over 95% solder coverage. No pinholes or voids are found.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
15.1.0	Solderability Test (Destructive)					
15.1.1	Hot Solder Dip (Destructive)	X				
	Equipment Used	**SOLDER POT9** Asset Tag: **193** Calibration Due Date: **2024-11-13** Cert: **A5302605**				

Images For Solderability Test - Dip & Look Method.

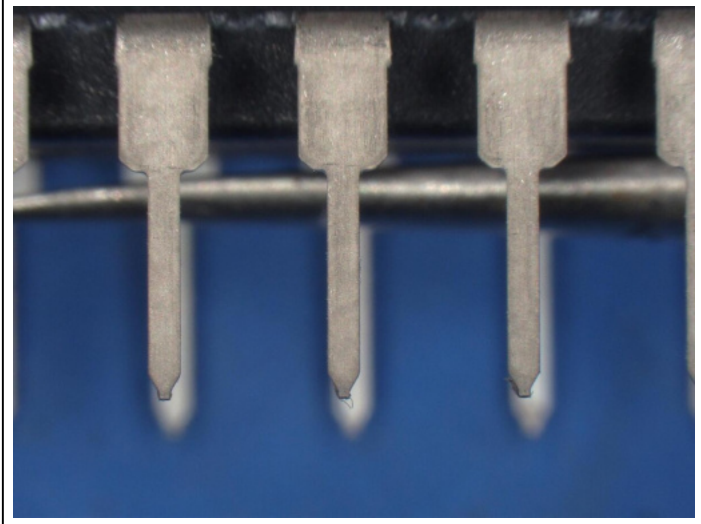


Figure 66. PRE SOLDER LEADS VIEW 1

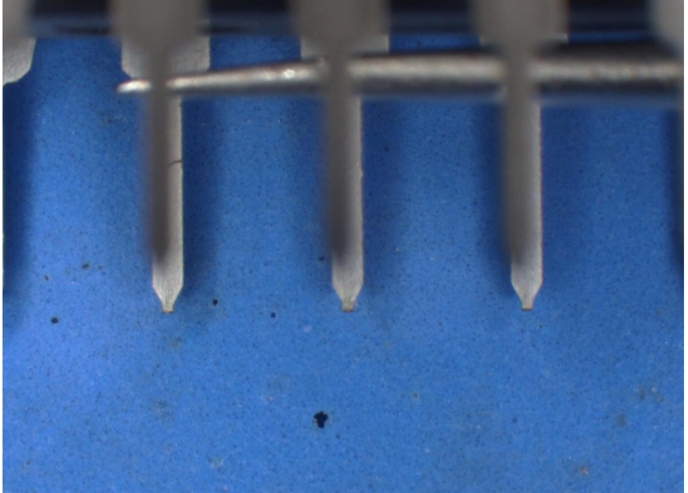


Figure 67. PRE SOLDER LEADS VIEW 2

Images For Solderability Test - Dip & Look Method. **(Continued From Previous Page)**

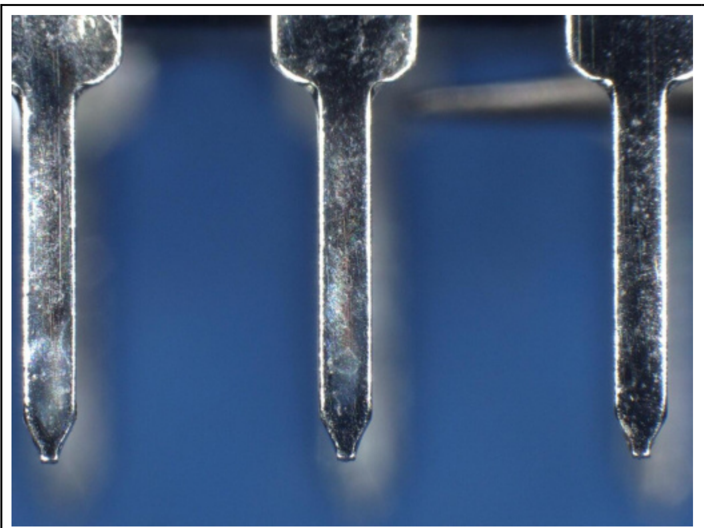


Figure 68. POST SOLDER LEADS VIEW 1

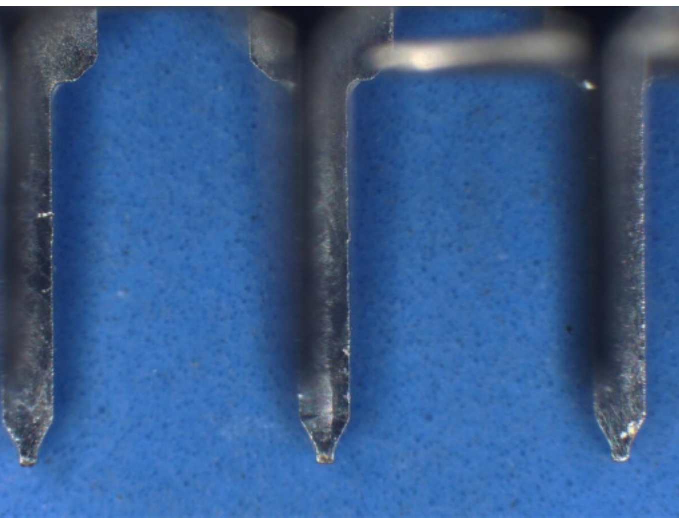


Figure 69. POST SOLDER LEADS VIEW 2

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16.0.0 Solvent Test - Re-Marking_Marking Permanency Test (AS6171/2A) (Destructive)

Results Summary
Permanency test was performed on 3 devices using 3 parts Mineral Spirits, 1 part Isopropyl Alcohol mixture. Devices were cotton swabbed, no marking was removed during this process. Devices passed marking permanency testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
16.1.0	Testing for Remarking (Destructive)					
16.1.1	Solvent Test for Re-marking - Permanency (Destructive)	X				

Images For Solvent Test - Re-Marking_Marking Permanency Test .

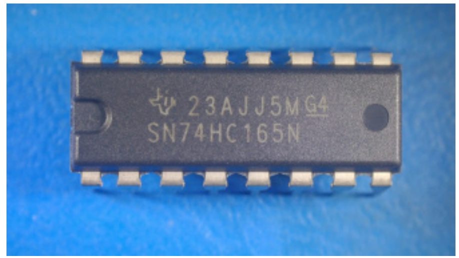

Figure 70. SAMPLE 1 PRE PERMANENCY

Figure 71. SAMPLE 2 PRE PERMANENCY

Figure 72. SAMPLE 3 PRE PERMANENCY

Figure 73. SAMPLE 1 POST PERMANENCY

Figure 74. SAMPLE 2 POST PERMANENCY

Figure 75. SAMPLE 3 POST PERMANENCY

Analysis Report - 2000-XXXXXX			
Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

17.0.0 Solvent Test - Re-Surfacing _Non Aggressive_Acetone Test AS6171/2A (Destructive)

Results Summary
Non-Aggressive Acetone test was performed on 3 devices using 100% pure acetone. Devices were cotton swabbed several times with pressure, no secondary coating or marking was removed during this process. Devices passed aggressive acetone testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
17.1.0	Re-Surfacing Test (Destructive)					
17.1.1	Solvent Test for Re-Surfacing - Non Aggressive Acetone	X				
	Test Specifications	(AS6171/2A)				

Images For Solvent Test - Re-Surfacing _Non Aggressive_Acetone Test.

Figure 76. SAMPLE 1 PRE NON AGGRESSIVE ACETONE

Figure 77. SAMPLE 2 PRE NON AGGRESSIVE ACETONE

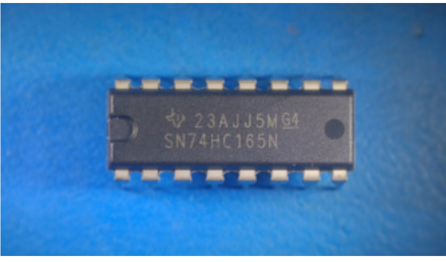

Figure 78. SAMPLE 3 PRE NON AGGRESSIVE ACETONE

Figure 79. SAMPLE 1 POST NON AGGRESSIVE ACETONE

Figure 80. SAMPLE 2 POST NON AGGRESSIVE ACETONE

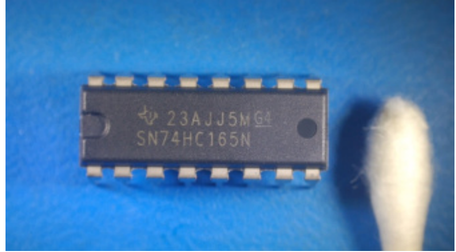

Figure 81. SAMPLE 3 POST NON AGGRESSIVE ACETONE

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18.0.0 Solvent Test - Re-Surfacing _Aggressive_Acetone Test AS6171/2A (Destructive)

Results Summary
Aggressive Acetone test was performed on 3 devices using 100% pure acetone. Devices were cotton swabbed several times with pressure, no secondary coating or marking was removed during this process. Devices passed aggressive acetone testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
18.1.0	Re-Surfacing Test (Destructive)					
18.1.1	Solvent Test for Re-Surfacing - Aggressive Acetone	X				
	Test Specifications	(AS6171/2A)				

Images For Solvent Test - Re-Surfacing _Aggressive_Acetone Test.

Figure 82. SAMPLE 1 PRE AGGRESSIVE ACETONE

Figure 83. SAMPLE 2 PRE AGGRESSIVE ACETONE

Figure 84. SAMPLE 3 PRE AGGRESSIVE ACETONE

Figure 85. SAMPLE 1 POST AGGRESSIVE ACETONE

Figure 86. SAMPLE 2 POST AGGRESSIVE ACETONE

Figure 87. SAMPLE 3 POST AGGRESSIVE ACETONE

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19.0.0 Solvent Test - Re-surfacing test - Scrape Test (AS6171/2A) (Destructive)

Results Summary
Scrape Test was performed on 3 devices using IDEA 1010.3.2.3 method. No coating was removed during this process. Devices passed scrape testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
19.1.0	Re-Surfacing (Destructive) (AS6171/2A) (Destructive)					
19.1.1	Scrape Testing (Destructive)	X				
	Test Specifications					

Images For Solvent Test - Re-surfacing test - Scrape Test.

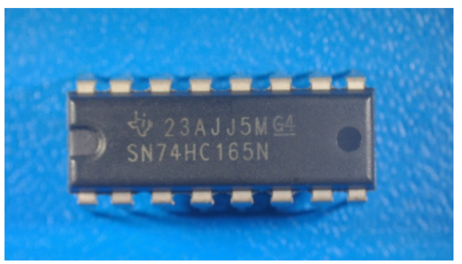

Figure 88. SAMPLE 1 PRE SCRAPE

Figure 89. SAMPLE 2 PRE SCRAPE

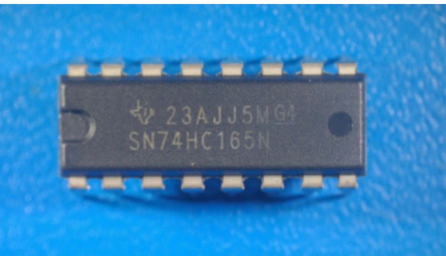

Figure 90. SAMPLE 3 PRE SCRAPE

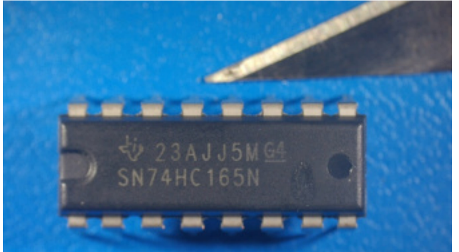

Figure 91. SAMPLE 1 POST SCRAPE

Figure 92. SAMPLE 2 POST SCRAPE

Figure 93. SAMPLE 3 POST SCRAPE

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	Analysis Report - 2000-XXXXXX		
Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

20.0.0 Solvent Test - Re-surfacing_1-Methyl 2-Pyrrolidinone (AS6171/2A) (Destructive)

Results Summary
1-Methyl 2-Pyrrolidinone was performed on 3 devices. Devices were submerged in solution and heated to 115 - 120 °C for 2 to 5 min. No secondary coating was removed during this process. Devices passed 1-Methyl 2-Pyrrolidinone testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
20.1.0	Re-Surfacing / Re-Marking Testing (AS6171/2A)					
20.1.1	Solvent Test for Re-Surfacing - 1-Methyl 2-Pyrrolidinone (Destructive)	X				
	Equipment Used	**HOT PLATE** Asset Tag: **314** Calibration Due Date: **2024-11-13** Cert: **A5302610**				

Images For Solvent Test - Re-surfacing_1-Methyl 2-Pyrrolidinone.

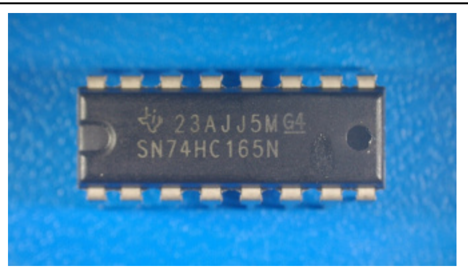

Figure 94. SAMPLE 1 PRE 1M2P

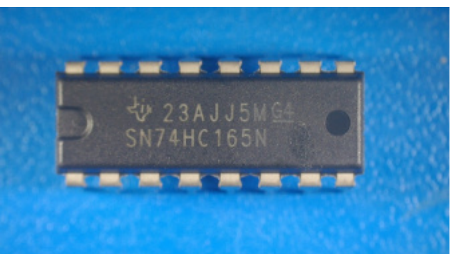

Figure 95. SAMPLE 2 PRE 1M2P

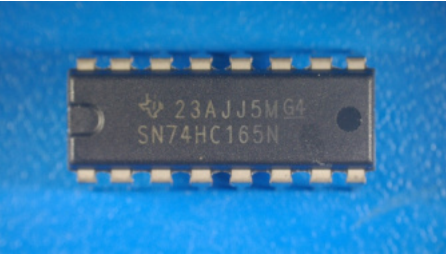

Figure 96. SAMPLE 3 PRE 1M2P

Figure 97. SAMPLE 1 POST 1M2P

Figure 98. SAMPLE 2 POST 1M2P

Figure 99. SAMPLE 3 POST 1M2P

21.0.0 Solvent Test - Re-surfacing_Dynasolve (AS6171/2A) (Destructive)

Results Summary
HST (Heated Solvent Test) was performed on 3 devices using Dynasolve 750 solution. Dynasolve 750 was preheated to 105 °C. Devices were submerged in solution for 45 min. No secondary coating was removed during this process. Devices passed Dynasolve testing.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
21.1.0	Re-Surfacing (Destructive) (AS6171/2A)					
21.1.1	Solvent Test for Re-Surfacing - Dynasolve 750 (Destructive)	X				
	Equipment Used	**HOT PLATE** Asset Tag: **261** Calibration Due Date: **2024-11-13** Cert: **A4823484**				

Images For Solvent Test - Re-surfacing_Dynasolve.

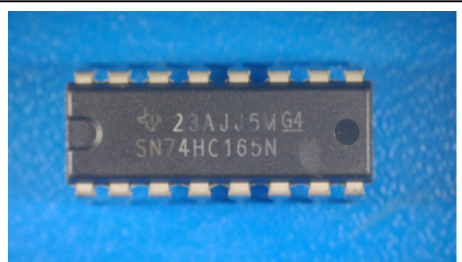

Figure 100. SAMPLE 1 PRE DYNASOLVE

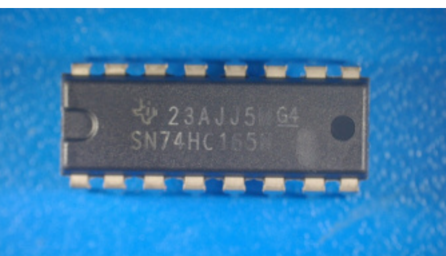

Figure 101. SAMPLE 2 PRE DYNASOLVE

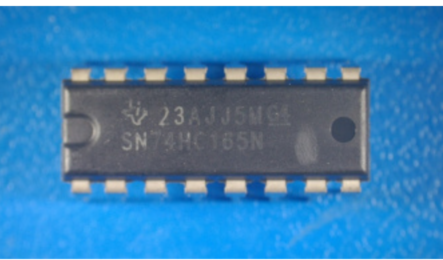

Figure 102. SAMPLE 3 PRE DYNASOLVE

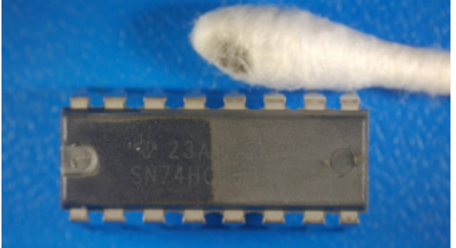

Figure 103. SAMPLE 1 POST DYNASOLVE

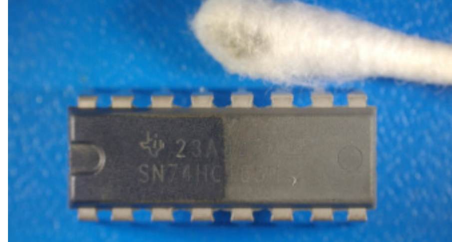

Figure 104. SAMPLE 2 POST DYNASOLVE

Figure 105. SAMPLE 3 POST DYNASOLVE

Analysis Report - 2000-XXXXXX			
Customer Name:		**Purchase Order:**	N/A
Part Number:	SN74HC165N	**Customer P/N:**	NOT AVAILABLE
Manufacturer:	TEXAS INSTRUMENTS	**Devices Received:**	18
Date Code:	2212	**Lot Code:**	2086242WDH

22.0.0 Delid/Decapsulation - Thermomechanical (AS6171/4) (Destructive)

Results Summary
Internal inspection was performed on 3 devices. Each one of the 3 devices have the same die structure and markings. Devices revealed Texas Instruments logo with 1984 copyright. Die marking HC165E was also found. Die marking correlates with devices family marking.

	Criteria	Acceptable	Suspect	Not Acceptable	Not Available	Comments / Observations
22.1.0	Physical (INTERNAL) (Destructive)					
22.1.1	Die Topography	X				
22.1.2	Die Marking Verification	X				
22.1.3	Wrong Die				X	

Images For Delid/Decapsulation - Thermomechanical.

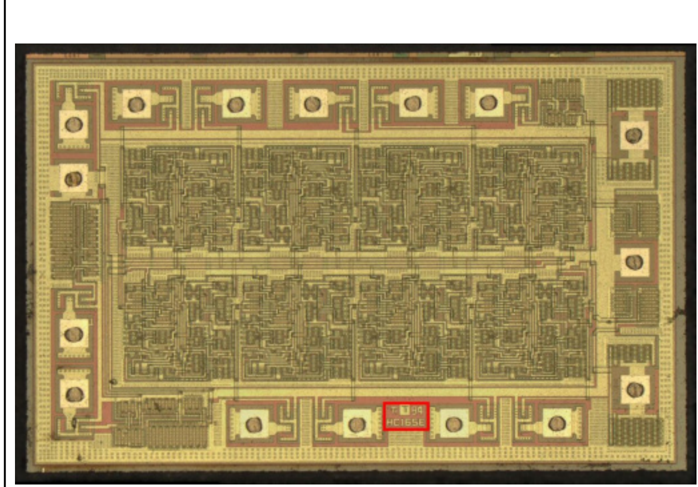

Figure 106. SAMPLE 1 DIE TOPOGRAPHY

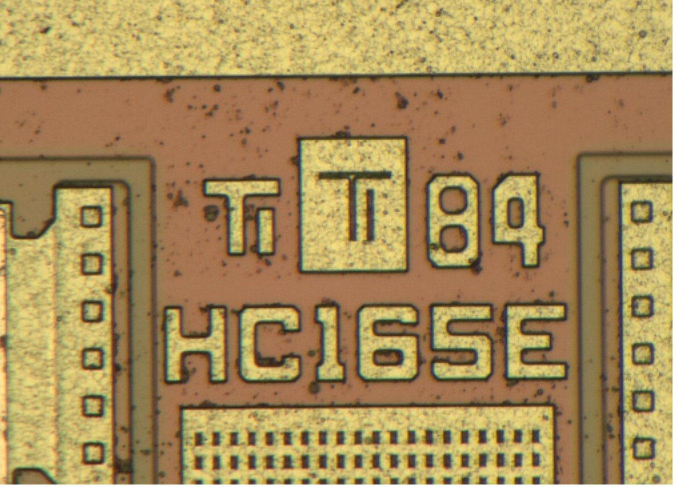

Figure 107. SAMPLE 1 DIE MARKING

Images For Delid/Decapsulation - Thermomechanical. **(Continued From Previous Page)**

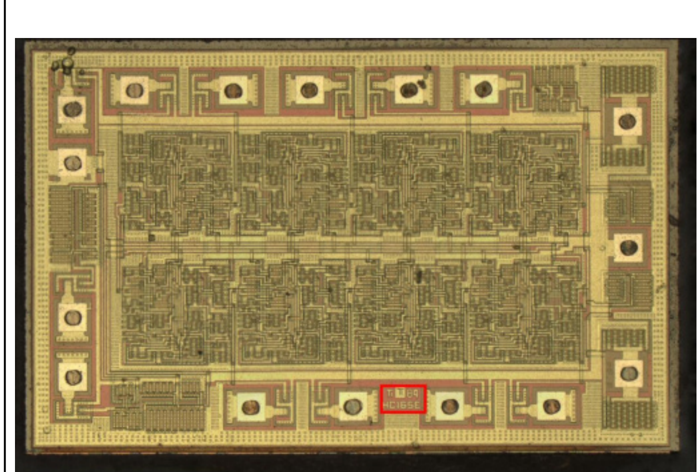

Figure 108. SAMPLE 2 DIE TOPOGRAPHY

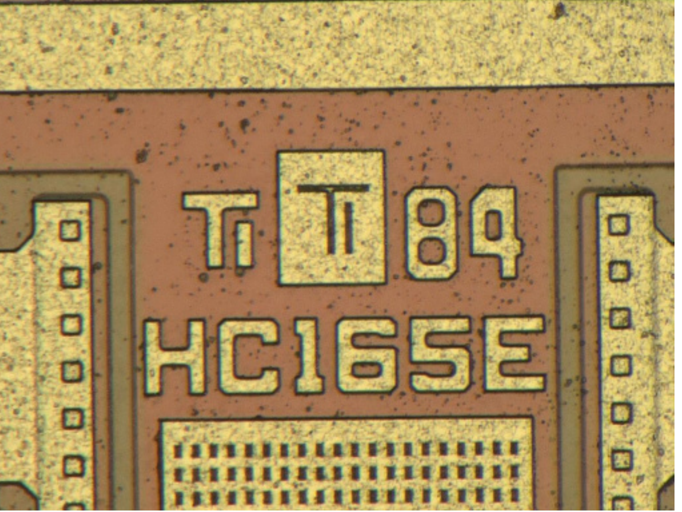

Figure 109. SAMPLE 2 DIE MARKING

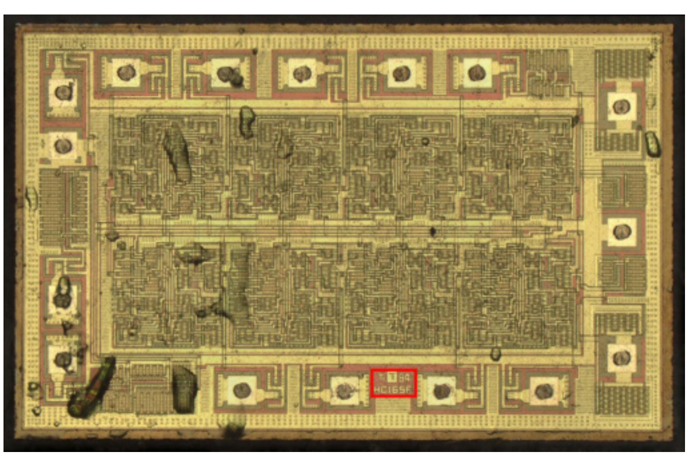

Figure 110. SAMPLE 3 DIE TOPOGRAPHY

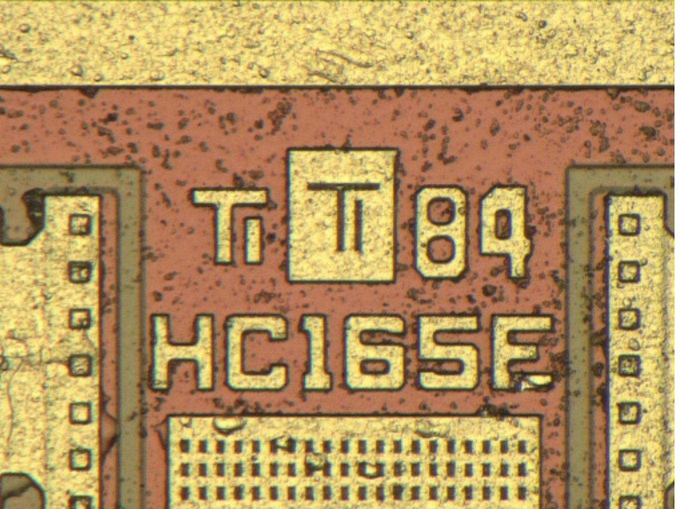

Figure 111. SAMPLE 3 DIE MARKING