

Need Tonic

Certificate of Compliance

Customer	The University of Arizona	Revision:	2.0
Address	1303 E University Blvd, Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00007	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422225 - 1.00
Sierra Tool Number	171618	Date Shipped	10/5/2020
Number of Layers	8		
Surface Finish	HAL		
Quantity of PCB Shipped:	3		

(Plus solder sample if required.)

Compliance to:

Master Drawing	None		
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3	and IPC-1601, IPC-A-600 (latest revision)	
Lead Free	No	NASA Outgassing	No
RoHS / REACH *	Yes, with exception of Lead in surface finish.	Positive Etch Back	No
UL	---	Halogen Free	No
Special ID, marking, comments	None		

Specific paragraphs and inspection items:

IPC-6012

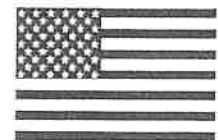
<p>3.2 Material</p> <p>Visual</p> <p>3.3.1 Edges of Printed Board</p> <p>3.3.2 Laminate Imperfections</p> <p>3.3.3 Plating and Coating Voids in the Hole</p> <p>3.3.4 Lifted Lands</p> <p>3.3.5 Marking and Traceability</p> <p>3.3.9 Workmanship</p> <p>Solderability</p> <p>3.3.6 Surface</p> <p>3.3.6 Plated Through Holes</p> <p>Dimensional</p> <p>3.4 Printed Board Dimensional</p> <p>3.4.1 Hole Size</p> <p>3.4.1 Hole Pattern Accuracy</p> <p>3.4.1 Pattern feature accuracy</p> <p>3.4.2 Annular ring (external)</p> <p>3.4.3 Bow and twist</p> <p>3.7 Solder Mask Coverage</p> <p>3.6.2.11 Plating / coating thickness</p> <p>Conductor Width & Spacing</p> <p>3.5.1 Internal and External Width</p> <p>2.5.2 Internal and External Spacing</p>	<p>Conductor Surfaces</p> <p>3.3.8 junction of gold plate to solder finish</p> <p>3.5.4.1 Nick, dents, pinholes</p> <p>3.4.4.5 - 7 Dewetting / nonwetting / final finish coverage</p> <p>3.5.4.4 Edge printed board connector</p> <p>3.5.4.2 Surface mount</p> <p>Physical</p> <p>3.3.7 Plating adhesion</p> <p>3.7.2 Solder mask cure and adhesion</p> <p>Structural Integrity After Thermal Stress</p> <p>3.6.2.1 Plating integrity</p> <p>3.6.2.3 Laminate voids</p> <p>3.6.2.6 & 8 Etchback / negative etchback</p> <p>3.6.2.9 Annular ring and Breakout (internal)</p> <p>3.6.2.10 Lifted Lands</p> <p>3.6.2.11 Hole plating thickness</p> <p>3.6.2.15 Surface plating and conductor thickness</p> <p>3.6.2.14 Copper foil thickness (internal)</p> <p>3.6.2.16 Metal core spacing</p> <p>3.6.2.17 Dielectric thickness</p> <p>3.6.2.18 Material fill of Blind and Buried Vias</p> <p>Cleanliness</p> <p>3.9.1 Cleanliness prior to solder mask application Foreign Object Debris (FOD)</p>
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The above order has been both visually inspected, microsection, tested, and conformed to the customer specification, customer's master drawings, and purchase order.

All material used in the manufacture of the above order meet the material and manufacturing specifications as specified on the customer's drawings and purchase order subject to subsequent communication / agreement. Sierra Circuits hereby certifies that the item was last substantially transformed ("Substantially Transformed") in the United States of America. Sierra hereby certifies that the information is accurate and TAA Compliant, which is defined to mean that the article is wholly the growth, product or manufacture of the U.S.A. or Substantially Transformed in the U.S.A.

"RoHS / REACH" Compliant: Manufactured to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regulated by the European Union dated 18 December 2006. Furthermore, they do not contain any of the 174 materials that are considered substance of very high concern (SVHC), updated on July 7, 2017 (refer to URL <http://ec.europa.eu/environment/>)

MADE IN



U. S. A.

Bhupinder Kaur

Inspector

October 5, 2020

Date

SIERRA CIRCUITS

1108 West Evelyn Ave., Sunnyvale, CA 94086
Cage Code: 0ZHS4
(408) 735-7137
files@protoexpress.com
www.protoexpress.com

Electrical Test Certificate of Compliance

Customer	The University of Arizona	Revision	2.0
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00007	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422225 - 1.00
Sierra Tool Number	171618	Date Tested	10/2/2020
Number of boards Passed	17	Boards shipped might be less then the boards that passed electrical test.	

Compliance to:

Master Drawing	None
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3
Test Level	C
Test Method	Resistive

Test Stamp:

Stamped on PCB

Resistive Test Parameters:

Isolation (Shorts/Leakage) Meg Ohms	10
Continuity (Open)	10
Voltage	40

Adjacency Used	Yes
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Horizontal Distance	0.05
Vertical Distance	0.05

Source Data Used	Net List from Gerber Data
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Additional Comments	None
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High Potential (Hi-Pot):

Voltage	No Requirement
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Comments or addition results:	None
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Sierra Circuits, Inc. certifies that this work order has been electrically tested in accordance with IPC-9252 "Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards". The above order has been electrical tested, and conformed to the order specifications and the customer's drawings & purchase order.

710-Mandeep Kaur

October 2, 2020

Inspector

Date



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Boards that Passed Electrical Test to IPC Specifications

Customer	The University of Arizona	SN Range	17
Address	1303 E University Blvd Box 5 Tucson AZ 85719	from	17
Part #	GUSTO-UA-DWG-00007	to	17
PO #	559272line 3, COIN 24101	Specification / Rev / Amd	Boards shipped per C of C =
Revision	2.0	IPC-6012 Rev D Amd 1, Class 3	Boards shipped per this form =
Date Code	2039		
Tool Number	171618		
Work Order	422225 - 1 00		
Boards per Panel	6		

Delete the board serial numbers that did not pass electrical test.

Panel SN#	Board SN#																				
S/N: 1	1	2	3	4	5																
S/N: 2	1	2	3	4	5	6															
S/N: 3	1	2	3	4	5	6															



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Certificate of Compliance - Dimension

Customer	The University of Arizona	Lot Conformance Inspection (LCI)
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	
Part Number	GUSTO-UA-DWG-00007	Revision 2.0
Purchase Order #	559272/line 3, COIN-24101	Date Code 2039
PCB Type	Type 3	
Sierra Tool Number	171618	Manufactured Work Order 422225 - 1.00
		Number of Pnl in Work Order 3
		Number of Bds Released 18
		Boards per Panel 6
		Sample Size Required 1

Compliance to:

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

Disposition: Accept Reject

Comments:

Bhupinder Kaur

October 5, 2020

Inspector

Date

Item	Nominal (Print Spec)	Tolerance		Measurement from Boards					Measurement Tool Serial Number & Calibration Date
		+	-	Board #1	Board #2	Board #3	Board #4	Board #5	
1	6.299	0.005	0.005	6.299					caliper/dr7305/5-20-21
2	6.299	0.005	0.005	6.299					caliper/dr7305/5-20-21
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									



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Certificate of Compliance - Hole Size

Customer The University of Arizona
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719
 Part Number GUSTO-UA-DWG-00007
 Purchase Order # 559272/line 3, COIN 24101
 PCB Type Type 3
 Sierra Tool Number 171618

Lot Conformance Inspection (LCI)

Revision 2.0
 Date Code 2039
 Manufactured Work Order 422225 - 1.00
 Number of Pnl in Work Order 3
 Number of Bds Released 18
 Boards per Panel 6
Sample Size Required 1

Compliance to:

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

All dimensions in inches.

Comments:

Disposition:

Accept

Reject

Bhupinder Kaur

October 5, 2020

Inspector

Date

Hole Symbol or Type	Nominal (Print Spec)	Tolerance		Measurement from Boards (Holes) & Serial Numbers					Measurement Tool Serial Number
		- +	- -	Board #1	Board #2	Board #3	Board #4	Board #5	
				001-002					
non_plated	0.067	0.003	0.003	0.067					pingageas
via	0.016	0.003	0.003	via					n/a
via	0.020	0.003	0.003	via					n/a
plated	0.021	0.003	0.003	0.021					pingageas
plated	0.024	0.003	0.003	0.024					pingageas
plated	0.028	0.003	0.003	0.028					pingageas
plated	0.035	0.003	0.003	0.035					pingageas
plated	0.039	0.003	0.003	0.039					pingageas
plated	0.051	0.003	0.003	0.051					pingageas
plated	0.093	0.003	0.003	0.093					pingageas
plated	0.098	0.003	0.003	0.098					pingageas



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Certificate of Compliance - Bow & Twist

Customer The University of Arizona
 Address 1303 E University Blvd, Box 5 Tucson AZ 85719
 Part Number GUSTO-UA-DWG-00007
 Purchase Order # 559272/line 3, COIN 24101

Lot Conformance Inspection (LCI)

Revision: 2.0
 Date Code 2039

Board Length 6.30 inches
 Board Width 6.30 inches
 Panels in lot 3
 # of Samples 1

Sierra Tool Number 171618

Work Order 422225 - 1.00

Compliance to:

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

Design Surface mount components

Specification 0.75%

Bow									
Board #	S/N #	Length (L)	Width (W)	Go/No-Go gauge for sample length R_L	Go/No-Go gauge for sample width R_W	Max. height off table along Brd length (inches) R_L	Max. height off table along Brd width (inches) R_W	% Bow _L	% Bow _W
1	001-002	6.300	6.300	0.047	0.047	0.000	0.000	0.00%	0.00%
2									
3									
4									
5									

Calculations for Bow:

$R_L = L (B) / 100$ % Bow_W = $(R_W / W) \times 100$
 $R_W = W (B) / 100$ % Bow_L = $(R_L / L) \times 100$

Where:

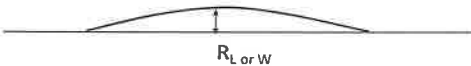
R_L = Go/No-Go feeler / pin gage size for sample length
 R_W = Go/No-Go feeler / pin gage size for sample width
 L = Board Length measurement
 W = Board Width measurement
 B = Maximum allowable Bow %

Calculations for Twist:

% Twist = $(R / (2 * D)) \times 100$

Where:

L = length of board (inches)
 W = width of board (inches)
 R_D = max. height off table along diagonal board length (inches)
 D = diagonal board length (inches)
 R = max. corner height above table (inches)



Note: Any R values of 10 mils or less are considered negligible and are listed as "0"

Twist						Overall Rating	
Board #	S/N #	Diagonal Length (D)	Go/No-Go gauge for sample length R_D	Max. corner height above table (inches) R	% Twist	Bow & Twist Pass / Fail	Remarks / Comments
1	001-002	8.910	0.134	0.000	0.00%	Pass	
2							
3							
4							
5							

Measurement Tool Used	GRANITE	Serial Number	AA0474	Calibration Date:	5/20/2021
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Comments:

Any board rejection requires 100% sort and retest.

Bhupinder Kaur
 Inspector

October 5, 2020
 Date



Sierra Circuits Inc
Certificate of Compliance - XRF

Analysis Report
9/30/2020 7:05:19 PM

Analysis Title
Hard Au-Ni-Cu(12mil)

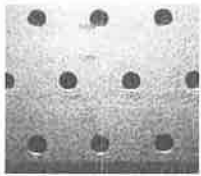
Analysis Device
Bowman XRF
S/N: P1819203

Customer	the university of arizona	Part Number	gusto-ua-dwg-00007
Work Order	422225 1.00	Tool Number	171618
Operator	raul Lemus	Number	5069

Analysis Results

		1	2
		μin	μin
	Result	Au	Ni
	1	53.1	225.8

Sample Images



Sample 1

_____ *gl*

Date: 10/05/20

Micro Section Analysis Report

Customer	The University of Arizona	Revision	2.0
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Part Number	GUSTO-UA-DWG-00007	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422225 - 1.00

Sierra Tool Number	171618	Construction Type	Foil
Surface Finish	HAL	Number of Layers	8
Compliance to:	Master Drawing	None	
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3		

Layer	Specification		Actual Measurement
	Copper Weight (oz)	Nominal	
Layer 1	0.250	0.00035	0.00035
Dielectric		0.00510	0.00500
Layer 2	1.000	0.00140	0.00139
Dielectric		0.01400	0.01456
Layer 3	1.000	0.00140	0.00138
Dielectric		0.00660	0.00676
Layer 4	1.000	0.00140	0.00137
Dielectric		0.01400	0.01396
Layer 5	1.000	0.00140	0.00138
Dielectric		0.00660	0.00698
Layer 6	1.000	0.00140	0.00137
Dielectric		0.01400	0.01391
Layer 7	1.000	0.00140	0.00138
Dielectric		0.00560	0.00565
Layer 8	0.250	0.00035	0.00034
Dielectric			
Layer 9			
Dielectric			
Layer 10			
Dielectric			
Layer 11			
Dielectric			
Layer 12			
Dielectric			
Layer 13			
Dielectric			
Layer 14			
Dielectric			
Layer 15			
Dielectric			
Layer 16			
Dielectric			
Layer 17			
Dielectric			
Layer 18			
Dielectric			
Layer 19			
Dielectric			
Layer 20			
Dielectric			
Layer 21			

Serial Number-Used: 1

Compliance to the following requirements:

Structural Integrity After Thermal Stress

- 3.6.2.1 Plating integrity
- 3.6.2.3 Laminate voids
- 3.6.2.6 & 8 Etchback / negative etchback
- 3.6.2.9 Annular ring and Breakout (internal)
- 3.6.2.10 Lifted Lands
- 3.6.2.11 Hole plating thickness
- 3.6.2.15 Surface plating and conductor thickness
- 3.6.2.14 Copper foil thickness (internal)
- 3.6.2.16 Metal core spacing
- 3.6.2.17 Dielectric thickness
- 3.6.2.18 Material fill of Blind and Buried Vias

Overall Thickness

Nominal	0.079
Minimum	0.071
Maximum	0.087
Measured	0.081
Pass/Fail	PASS

Measurement taken over:
ALL

Measurement Tool:
Optical Microscope

Solderability Test Results

Use "S" Coupons if available

Serial Number	Results
1	PASS
2	PASS
3	PASS
	Not Evaluated

Report Completed by:
Date:

External Total Plated Conductor/Pad Thickness

Spec:	Maximum	Minimum
None		0.0000
Layer 1		0.0026
Layer 8		0.0025

Coupon Hole Wall Thickness

A	Hole Size	Average =
Reading 1	0.00186	0.00176
Reading 2	0.00160	
Reading 3	0.00182	
B	Hole Size	Average =
Reading 1	0.00166	0.00159
Reading 2	0.00147	
Reading 3	0.00163	
B2	Hole Size	Average =
Reading 1	0.00222	0.00204
Reading 2	0.00183	
Reading 3	0.00206	

Comments:

Arthur Torres

October 5, 2020

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Customer Coupon Retention

Customer	The University of Arizona	Revision:	2.0
Address	1303 E University Blvd, Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00007	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422225 - 1.00
Sierra Tool Number	171618		
Number of Layers	8		
Surface Finish	HAL		

Coupon Shipped Number SN: 1

Date Shipped 10/5/2020

This coupon has been given to the customer upon their request. The customer is responsible for the retention of this coupon as required by all specifications and regulations. Sierra Circuits might not have any additional retention coupons.

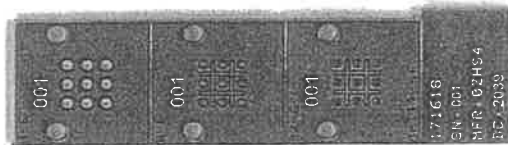
Arthur Torres

October 5, 2020

Inspector

Date

Attach coupon below



Sierra Circuits
1108 West Evelyn Avenue
Sunnyvale, CA 94086
Ionic Contamination Testing Report



Test Description:	Test Oct05,20_110002		
Name:	THE UNIVERSITY OF ARIZONA		
Status:	Passed	Nomenclature:	171618
Result:	8.925 ug/Square	Part Number:	GUSTO-UA-DWG-00007
Start Time:	11:00:02	Comment:	FINAL
Total Run Time:	00:22:00	Length:	6.29
Test Type:	Dynamic Test	Width:	6.29
Test Date:	10/5/2020	Area:	79.1
Baseline Resistivity:	299.87 MΩ-cm	Termination:	Automatic
Final Resistivity:	228.84 MΩ-cm	Duration:	NA
Temperature:	45 Degree C	Sensitivity:	2
Lot / Part No:		%IPA:	76.6
User:	QC	Failpoint:	10.06 ug NaCl/sq

