

Certificate of Compliance

Customer	The University of Arizona	Revision:	1.0
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00474 Band1	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422353 - 1.00
Sierra Tool Number	171689	Date Shipped	10/5/2020
Number of Layers	8		
Surface Finish	HAL		
Quantity of PCB Shipped:	3		
	<i>(Plus solder sample if required.)</i>		

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	solder sample s/n: 4-002		

Specific paragraphs and inspection items:

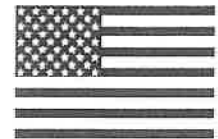
	IPC-6012	
3.2 Material		Conductor Surfaces
Visual		3.3.8 junction of gold plate to solder finish
3.3.1 Edges of Printed Board		3.5.4.1 Nick, dents, pinholes
3.3.2 Laminate Imperfections		3.4.4.5 - 7 Dewetting / nonwetting / final finish coverage
3.3.3 Plating and Coating Voids in the Hole		3.5.4.4 Edge printed board connector
3.3.4 Lifted Lands		3.5.4.2 Surface mount
3.3.5 Marking and Traceability		Physical
3.3.9 Workmanship		-- 3.3.7 Plating adhesion
Solderability		3.7.2 Solder mask cure and adhesion
3.3.6 Surface		Structural Integrity After Thermal Stress
3.3.6 Plated Through Holes		3.6.2.1 Plating integrity
Dimensional		3.6.2.3 Laminate voids
3.4 Printed Board Dimensional		3.6.2.6 & 8 Etchback / negative etchback
3.4.1 Hole Size		3.6.2.9 Annular ring and Breakout (internal)
3.4.1 Hole Pattern Accuracy		3.6.2.10 Lifted Lands
3.4.1 Pattern feature accuracy		3.6.2.11 Hole plating thickness
3.4.2 Annular ring (external)		3.6.2.15 Surface plating and conductor thickness
3.4.3 Bow and twist		3.6.2.14 Copper foil thickness (internal)
3.7 Solder Mask Coverage		3.6.2.16 Metal core spacing
3.6.2.11 Plating / coating thickness		3.6.2.17 Dielectric thickness
Conductor Width & Spacing		3.6.2.18 Material fill of Blind and Buried Vias
3.5.1 Internal and External Width		Cleanliness
3.5.2 Internal and External Spacing		3.9.1 Cleanliness prior to solder mask application
		Foreign Object Debris (FOD)

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.

Daisy Demetria

Inspector

October 5, 2020

Date



1108 West Evelyn Ave., Sunnyvale, CA 94086

Cage Code: OZHS4

(408) 735-7137

sales@pilotexpress.com

www.pilotexpress.com

Boards Shipped to IPC Specifications

Customer: The University of Arizona	Revision: 1.0	SN Range:	Boards shipped per C of C =
Address: 1203 E University Blvd, Box 5, Tucson AZ 85719	Date Code: 2039	from 1	Boards shipped per this form =
Part #: GUSTO-UA-DWG-00474 Board1	Work Order: 422553 - 1,00	to 5	3
PO #: 59272line 3, COIN 24101	Boards per Panel: 4	IPC-6012 Rev D Amd 1, Class 3	
Delete the board serial numbers that did not ship.			
Panel SN#	Board SN#		
S/N 1	002 003		
S/N 2	003		
S/N 3			
S/N 4			
S/N 5			

SIERRA CIRCUITS

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

Electrical Test Certificate of Compliance

Customer	The University of Arizona	Revision	1.0
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00474 Band1	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422353 - 1.00
Sierra Tool Number	171689	Date Tested	10/5/2020

Number of boards Passed 19
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

Horizontal Distance 0.05
Vertical Distance 0.05

Source Data Used Net List from Gerber Data
Additional Comments None

High Potential (Hi-Pot):

Voltage No Requirement

Comments or addition results: None

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.

78-Sukhpal Kaur

October 5, 2020

Inspector

Date



1108 West Evelyn Ave., Sunnyvale, CA 94086
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 (408) 735-7137
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Boards that Passed Electrical Test to IPC Specifications

Customer: The University of Arizona	Tool Number: 171689	SN Range: from 1 to 5	Boards shipped per C of C = 19
Address: 1303 E University Blvd Box 5 Tucson AZ 85719	Work Order: 422353 - 1,00	Specification / Rev / Amd: IPC-6012 Rev D Amd 1, Class 3	Boards shipped per this form = 19
Part #: GUSTO-UA-DWG-00474 Band1	Revision: 1.0		
PO #: 559272line 3, COIN 24101	Date Code: 2039		

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

Panel SN#	Board SN#								
S/N: 1	001 002 003 004								
S/N: 2	001 002 003 004								
S/N: 3	001 002 003 004								
S/N: 4	001 002 003 004								
S/N: 5	001 002 003 004								



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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-00474 Band1	Revision 1.0
Purchase Order #	559272/line 3, COIN 24101	Date Code 2039
PCB Type	Type 3	
Sierra Tool Number	171689	

Compliance to:

Master Drawing None

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

Manufactured Work Order 422353 - 1.00
 Number of Pnl in Work Order 5
 Number of Bds Released 20
 Boards per Panel 4
 Sample Size Required 3

Disposition: Accept Reject

Comments:

Daisy Demetria

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	
				1-002	1-003	2-003			
1	7.874	0.005	0.005	7.874	7.874	7.874			Caliper/DR7305/5-20-21
2	4.875	0.005	0.005	4.875	4.875	4.875			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	Lot Conformance Inspection (LCI)
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	
Part Number	GUSTO-UA-DWG-00474 Band1	Revision 1.0
Purchase Order #	559272/line 3, COIN 24101	Date Code 2039
PCB Type	Type 3	
Sierra Tool Number	171689	Manufactured Work Order 422353 - 1.00

Compliance to:

Master Drawing None

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

Number of Pnl in Work Order 5
 Number of Bds Released 20
 Boards per Panel 4
 Sample Size Required 3

All dimensions in inches.

Comments:

Disposition:

Accept

Reject

Daisy Demetria

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 1-002	Board #2 1-003	Board #3 2-003	Board #4	Board #5	
non_plated	0.045	0.003	0.003	0.045	0.045	0.045			PIN GAGE/1006063
non_plated	0.125	0.003	0.003	0.125	0.125	0.125			PIN GAGE/1005958
plated	0.016	0.003	0.003	0.016	0.016	0.016			PIN GAGE/1006063
plated	0.024	0.003	0.003	0.024	0.024	0.024			PIN GAGE/1006063
plated	0.026	0.003	0.003	0.025	0.025	0.025			PIN GAGE/1006063
plated	0.028	0.003	0.003	0.027	0.027	0.027			PIN GAGE/1006063
plated	0.045	0.003	0.003	0.044	0.044	0.044			PIN GAGE/1006063
plated	0.045	0.003	0.003	0.045	0.045	0.045			PIN GAGE/1006063
plated	0.055	0.003	0.003	0.054	0.054	0.054			PIN GAGE/1006063
plated	0.134	0.003	0.003	0.133	0.133	0.133			PIN GAGE/1005958

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-00474 Band1
 Purchase Order # 559272/line 3, COIN 24101

Lot Conformance Inspection (LCI)

Revision: 1.0
 Date Code 2039
 Work Order 422353 - 1.00

Board Length 4.88 inches
 Board Width 7.87 inches
 Panels in lot 5
 # of Samples 3

Sierra Tool Number 171689

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	1-002	4.880	7.870	0.037	0.059	0.000	0.000	0.00%	0.00%
2	1-003	4.880	7.870	0.037	0.059	0.000	0.000	0.00%	0.00%
3	2-003	4.880	7.870	0.037	0.059	0.000	0.000	0.00%	0.00%
4									
5									

Calculations for Bow:

$$R_L = L(B) / 100 \quad \% \text{Bow}_W = (R_W / W) \times 100$$

$$R_W = W(B) / 100 \quad \% \text{Bow}_L = (R_L / L) \times 100$$

Where:

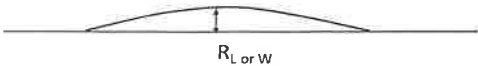
R_L = Go/No-Go feeler / pin gage size for sample length
 R_W = Go/No-Go feeler / pin gage size for sample width
 L = Board Length measurement
 W = Board Width measurement
 B = Maximum allowable Bow %

Calculations for Twist:

$$\% \text{Twist} = (R / (Z \cdot D)) \times 100$$

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	1-002	9.260	0.139	0.000	0.00%	Pass	
2	1-003	9.260	0.139	0.000	0.00%	Pass	
3	2-003	9.260	0.139	0.000	0.00%	Pass	
4							
5							

Measurement Tool Used	GRANITE SURFACE	Serial Number	CR5268	Calibration Date:	1/20/2021
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Comments:

Any board rejection requires 100% sort and retest.

Daisy Demetria
 Inspector

October 5, 2020
 Date

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro
 20362 Window Drive
 Lake Forest CA 92630

Quality Certificate

Date
 08/07/2020
 Purchase order item/date
 100243776 12 / 07/23/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82667103 014 / 08/07/2020
 Order item/date
 1384076 012 / 07/23/2020
 Customer number/materialnumber
 1003432 / 3H100YY180240



Purchase order item: 100243776 12



Material number: 3H100YY180240



Delivery date: 08/07/2020



Delivery item: 82667103 014



Order item: 1384076 012

Made In USA

Material: 10.087.107 PCL370HR C0100 S1 S1 222 18.00X24.00
 Construction: 02X1652 Grain: 24.000 " Surface: C
 IPC-4101E/98 L 98 0100 S1 /S1 C C
 UL Name: PCL-FR-370HR
 UL-File: E41625 Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B
 Copper: IPC-4562A-WAM1

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16387751 310



Quantity: 211 PC



Production date: 08/04/2020

Characteristic	Method	Unit	Value	LSL	USL
Laminate base thickness	IPC-TM-650 2.2.18	"	0.00970	0.00910	0.01090
Peel Strength	IPC TM 650	-	Pass	-	-
Substrate Visual Inspection	-	-	Pass	-	-
Thermal Stress Etched	-	-	Pass	-	-
Thermal Stress Unetched	-	-	Pass	-	-

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site



Certificate of Compliance

6920 Pacific Circle,
 Mississauga, ON L5T 1N8
 Phone (905) 362-8404
 Fax (905) 362-0312
 www.advancedcopperfoil.com

Waybill #:
 Shipment: 2079179
 Shipment Date: Sep 23, 2020
 Customer: 16588-ACF
 P.O. #: 150119PN
 Order #: 755867
 Ship Via: MATRIX TRUCK
 Page: 1

BILL TO

SIERRA PROTO EXPRESS
 1108 WEST EVELYN AVENUE
 SUNNYVALE, CA 94086
 USA

SHIP TO

SIERRA PROTO EXPRESS
 1108 WEST EVELYN AVENUE
 SUNNYVALE, CA 94086
 USA

ITEM # / MANUFACTURER	QTY	PRODUCT / DESCRIPTION	LOT # / EXPIRY DATE
1 ADVANCED COPPER FOIL INC.	100	73064F4.A401 ACF2 BF-TZA 1/4oz AL010 13X19 TOOLED (ML4 12x18) ACF2 BF-TZA 1/4oz AL010 13X19 TOOLED (ML4 12x18) IPC 4562A/3	00229747
1 ADVANCED COPPER FOIL INC.	100	73011F4.A401 ACF2 BF-TZA 1/4oz AL010 19X25 TOOLED (18x24 ML4) ACF2 BF-TZA 1/4oz AL010 19X25 TOOLED (18x24 ML4) IPC 4562A/3	91029975
1 ADVANCED COPPER FOIL INC.	120	73037F4.A601 ACF3 BF-TZA 1/4oz AL015 19X25 TOOLED (18x24 ML4) ACF3 BF-TZA 1/4oz AL015 19X25 TOOLED (18x24 ML4) IPC 4562A/3	00131850 ✓
1 ADVANCED COPPER FOIL INC.	60	73041F1.A401 ACF2 TW-YE 1oz AL010 13X19 TOOLED ACF2 TW-YE 1oz AL010 13X19 TOOLED IPC 4562A/3	91041252
1 ADVANCED COPPER FOIL INC.	60	73041F1.A401 ACF2 TW-YE 1oz AL010 13X19 TOOLED ACF2 TW-YE 1oz AL010 13X19 TOOLED IPC 4562A/3	91141512

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro
 20362 Window Drive
 Lake Forest CA 92630

Quality Certificate

Date
 07/16/2020
 Purchase order item/date
 100241739 4 / 06/30/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82659477 031 / 07/16/2020
 Order item/date
 1379815 004 / 06/30/2020
 Customer number/material number
 1003432 / 3HH8380



Purchase order item: 100241739 4



Material number: 3HH8380



Delivery date: 07/16/2020



Delivery item: 82659477 031



Order item: 1379815 004

Made In USA

Material: 10.162.981 PCL370HR 1080 U71 38.00

IPC-4101E/98 P 98 E1080

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16348207 310



Quantity: 500.000 YD



Expiry date: 02/10/2021



Production date: 07/15/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	71.1	69.5	72.5
Minimum viscosity AVE	IPC TM 650	Pa.s	31.21	20.00	45.00
Flow Window AVE	Isola Internal Test Metho	s	391	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:
 Insulectro
 20362 Window Drive
 Lake Forest CA 92630

Quality Certificate

Date
 07/21/2020
 Purchase order item/date
 100242942 4 / 07/14/2020
 Shipping plant
 Isola Ridgeway, USA
 Delivery item/date
 82661125 016 / 07/21/2020
 Order item/date
 1382262 004 / 07/14/2020
 Customer number/materialnumber
 1003432 / 3H80380



Purchase order item: 100242942 4



Material number: 3H80380



Delivery date: 07/21/2020



Delivery item: 82661125 016



Order item: 1382262 004

Made in USA

Material: 10.077.036 PCL370HR 1080 U66 38.00

IPC-4101E/98 P 98 E1080

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16355951 310



Quantity: 631.000 YD



Expiry date: 02/14/2021



Production date: 07/19/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	65.1	64.5	67.5
Minimum viscosity AVE	IPC TM 650	Pas	33.48	20.00	45.00
Flow Window AVE	Isola Internal Test Metho	s	330	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse
 Quality Manager, Isola Ridgeway Site

DATE : 2020.08.04

INSPECTION CERTIFICATE

PRODUCT

LJR-4000 FW100

LOT NO.

20200804211

This is to certify that the above mentioned product(s) has duly complied with the requirements of our Quality Conformance Tests, conducted prior to Ex-factory;

This Product meets the requirements of IPC-4781 and the performance requirements of A-A-56032D, Type II, as it applies to printed circuit board applications.

ITEMS	TEST METHOD	SPECIFICATIONS	RESULT
Viscosity	Cone-Plate Type 5rpm / 50°C	10.5 ±1.0cPs	9.5
Pencil Hardness	≥ 3H /on Solder resist	The solder resist must not be seen	4H
Solder Heat Resistance	10sec.×3times/260°C(K-920)	No ink peeling	Pass
Adhesion	Cross Cut 10×10	100/100 No peeling	Pass

Expiration date : 2021-01-01

Please avoid from direct sunlight and keep the optimum temperature(10~20°C).

We secure above data.

TAIYO INK MFG. CO., (KOREA) LTD.
166, Manhae-ro, Danwon-gu, Ansan-si,
Gyeonggi-do, Korea.
POST CODE: 425-839

MANAGER : KWANG SEOK, HAN 

TAIYO AMERICA, INC.
 2675 Antler Drive, Carson City, NV 89701
 Phone: (775) 885-9959 Fax: (775) 885-9972


CERTIFICATE OF ANALYSIS and CONFORMANCE

This is to certify that the following product has been inspected prior to sale and shipment, and complies with Taiyo America's manufacturing specifications for this product.
 This product meets all the requirements of IPC-SM-840E Classes H and T and Bellcore (Telecordia) GR-78-CORE and is UL recognized 94V-0 (File #E166421, UL Name: PSR-4000JA).

PSR-4000 LDI (US) Lot # 0071317 Mfg. Date: 7-13-20
 Warranty Ends: 1-13-21

<u>PROPERTY</u>	<u>TEST METHOD</u>	<u>MANUFACTURING SPECIFICATION</u>	<u>RESULT</u>
<u>VISCOSITY</u>	Toki Sangyo RE100U Viscometer 5 rpms @ 25°C	Before mixing: -Report Only After mixing: 220 - 270 ps	416 ps 246 ps
<u>THIXOTROPIC INDEX</u>	Toki Sangyo RE100U Viscometer Viscosity ratio: 5 rpm / 50 rpm	After mixing: Report Only	1.4
<u>FINENESS OF GRIND</u>	TAI-0-0002	5 microns maximum	5 microns
<u>VISUAL EXAMINATION</u>	Microscopic examination:		
	1. 1-mil drawdown of wet film	No bubbles, pits, voids, particles, color differences.	Passed <input checked="" type="checkbox"/>
	2. Wet film drawdown on grind gauge	No bubbles, pits, voids, particles, color differences.	Passed <input checked="" type="checkbox"/>
<u>SCREENABILITY</u>	Visual inspection of screen printed panel	No surface defects, such as bubbles, pinholes, etc.	Passed <input checked="" type="checkbox"/>
<u>TACK-DRY</u>	Hot air convection oven 80°C / 30 minutes	Tack-free to the touch	Passed <input checked="" type="checkbox"/>
<u>IMAGING</u>	ORC HMW 680GW - 7 kW 100 mJ / cm ² Horizontal Developer - 1% Na ₂ CO ₃ 30°C (86°F) / 60 secs., 28 psi	Stouffer 21 step: 12 - 16 (clear on copper)	13
<u>RESISTANCE TO SOLDERING (*)</u>	260°C (500°F) / 30 sec x 1 cycle Rosin-based flux	No discoloration, peeling, or blistering	Passed <input checked="" type="checkbox"/>
<u>SOLVENT RESISTANCE (*)</u>	Immersion in PM Acetate 20°C / 20 mins.	No swelling, softening, or blistering	Passed <input checked="" type="checkbox"/>
<u>PENCIL HARDNESS (*)</u>	TAI-0-0020	6H or greater	8H
<u>ADHESION (*)</u>	TAI-0-0021	100/100 on copper	Passed <input checked="" type="checkbox"/>

(*) - Final cure for these tests was 60 minutes @ 150°C (302°F) in a convection oven

Verified By: _____
 P.C. SUPERVISOR 7/20/20
 Name, Title, Date



Sierra Circuits Inc
Certificate of Compliance - XRF

Analysis Report

10/5/2020 10:04:59 PM

Analysis Title

Tin Lead(12mil)

Analysis Device

Bowman XRF

S/N: P1819203

Customer	THE UNIVERSITY OF ARIZONA	Part Number	GUSTO-UA-DWG-00474
Work Order	422353 1.00	Tool Number	BAND1 1.0
Operator	dd	Number	171689
			R345

Analysis Results

		1		
		μin	%	
	Result	SnPb	Sn	Pb
	1	134.4	61.9	38.1

Sample Images



Sample 1

DDe m...tr...

Date: 10-5-2020



Sierra Circuits Inc
Certificate of Compliance - XRF

Analysis Report

10/1/2020 2:14:19 PM

Analysis Title

Hard Au-Ni-Cu(12mil)

Analysis Device

Bowman XRF

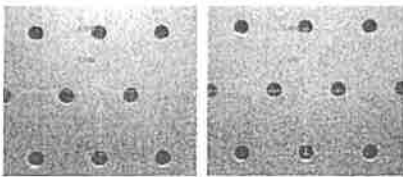
S/N: P1819203

Customer	the university of arizona	Part Number	gusto-ua-dwg-00474 band1 1.0
Work Order	422353 1.00	Tool Number	171689
Operator	VICC	Number	5074

Analysis Results

		1	2
		μ in	μ in
	Result	Au	Ni
	1	51.2	255.2
	2	58.5	287.2
Mean		54.9	271.2
Min		51.2	255.2
Max		58.5	287.2
Range		7.3	32.0
StdDev		5.15	22.64
% StdDev		9.39	8.35
Cp		----	----
Cpk		----	----
Cg		0.0	0.0
Cgk		----	----

Sample Images



Sample 1

Sample 2

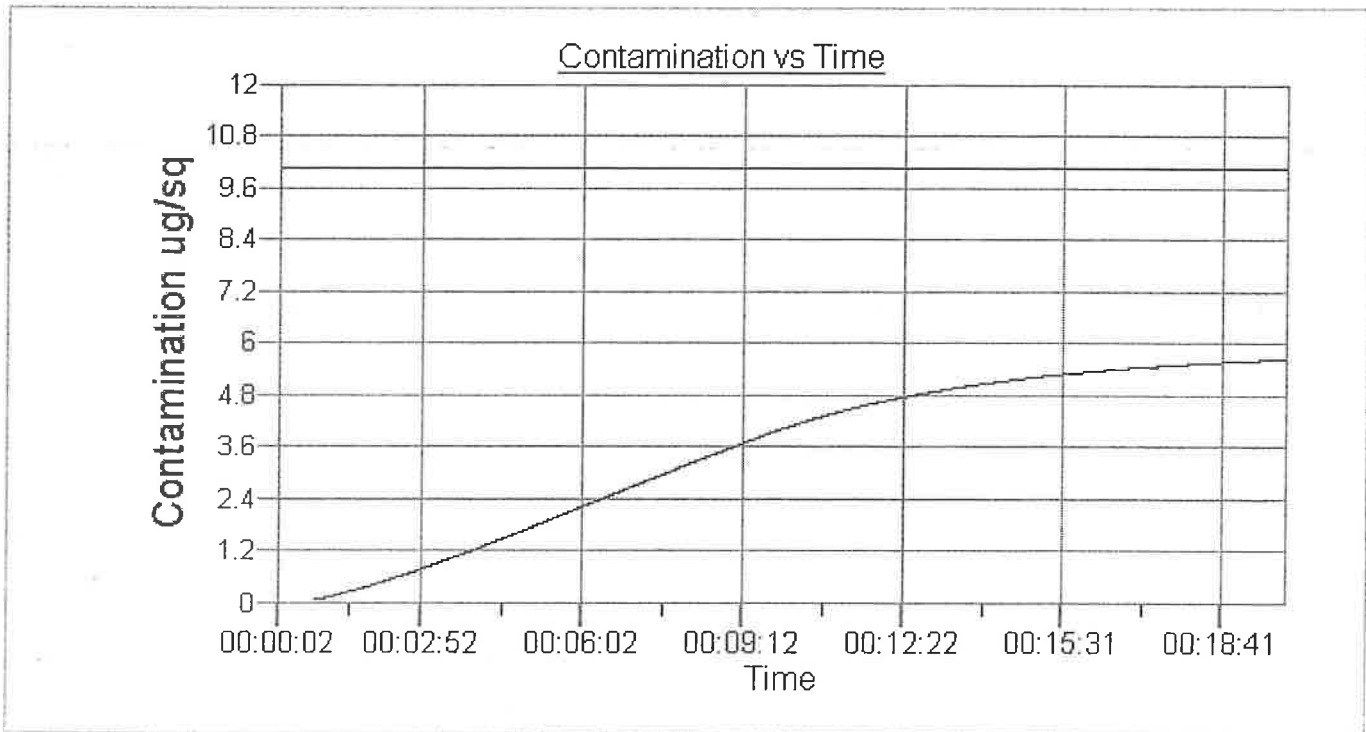
Bob Miller

Date: 10-1-2020

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



Test Description:	Test Oct05,20 220736		
Name:	THE UNIVERSITY OF ARIZONA		
Status:	Passed	Nomenclature:	171689
Result:	5.6526 ug/Square	Part Number:	GUSTO-UA-DWG-00474 BAND1
Start Time:	22:07:36	Comment:	FINAL
Total Run Time:	00:20:00	Length:	7.87
Test Type:	Dynamic Test	Width:	4.87
Test Date:	10/5/2020	Area:	76.7
Baseline Resistivity:	324.10 MΩ-cm	Termination:	Automatic
Final Resistivity:	302.32 MΩ-cm	Duration:	NA
Temperature:	44.9 Degree C	Sensitivity:	2
Lot / Part No:		%IPA:	76.6
User:	QC	Failpoint:	10.06 ug NaCl/sq





1108 West Evelyn Ave., Sunnyvale, CA 94086
 Cage Code: OZHS4
 (408) 735-7137
 files@protoexpress.com
 www.protoexpress.com

Micro Section Analysis Report

Customer	The University of Arizona	Revision	1.0
Address	1303 E University Blvd, Box 5 Tucson AZ 85719	Date Code	2039
Part Number	GUSTO-UA-DWG-00474 Band1	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422353 - 1.00

Sierra Tool Number 171689

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

Construction		Serial Number Used: 1	
Layer	Specification		Actual Measurement
	Copper Weight (oz)	Nominal	
Layer 1	0.250	0.00035	0.00036
Dielectric		0.00970	0.01054
Layer 2	1.000	0.00140	0.00131
Dielectric		0.01000	0.00978
Layer 3	1.000	0.00140	0.00130
Dielectric		0.00750	0.00812
Layer 4	1.000	0.00140	0.00129
Dielectric		0.01000	0.00986
Layer 5	1.000	0.00140	0.00130
Dielectric		0.00820	0.00956
Layer 6	1.000	0.00140	0.00131
Dielectric		0.01000	0.00992
Layer 7	1.000	0.00140	0.00132
Dielectric		0.01010	0.01106
Layer 8	0.250	0.00035	0.00035
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			

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	0.084
Pass/Fail	PASS

Measurement taken over: ALL

Measurement Tool: Optical Microscope

Solderability Test Results

Use "S" Coupons if available

Serial Number	Results
001	PASS
002	PASS
003	PASS
	Not Evaluated

Report Completed by: Arnel Fillon

Date: October 5, 2020

External Total Plated Conductor/Pad Thickness

Spec:	Maximum	Minimum
	None	0.0000
Layer 1		0.0020
Layer 8		0.0022

Coupon Hole Wall Thickness

A	Hole Size	0.04920
Reading 1	0.00120	Average =
Reading 2	0.00136	0.00133
Reading 3	0.00144	
B	Hole Size	0.01970
Reading 1	0.00136	Average =
Reading 2	0.00148	0.00147
Reading 3	0.00158	
B2	Hole Size	0.01180
Reading 1	0.00136	Average =
Reading 2	0.00120	0.00130
Reading 3	0.00134	

Comments:

Arnel Fillon

October 5, 2020

SIERRA CIRCUITS

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

Customer Coupon Retention

Customer The University of Arizona
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719
 Part Number GUSTO-UA-DWG-00474 Band1
 Purchase Order # 559272/line 3, COIN 24101

Sierra Tool Number 171689
 Number of Layers 8
 Surface Finish HAL

Revision: 1.0
 Date Code 2039
 Base Material Isola 370 HR
 Work Order 422353 - 1.00

Coupon Shipped Number 001, 002, 003, 004, 005

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.

Arnel Fillon

October 5, 2020

Inspector

Date

Attach coupon below

