
**PRODUCT QUALIFICATION
TEST REPORT**

**GL_49SNC Series Construction Change QUAL
49S SMD - Minature Quartz Crystal**

For a listing of Standard/Legacy part numbers and Custom part numbers at the time of Qualification - Refer to Appendix A

Approvals: On File

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Date: Oct-2010

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1.0 Abstract

The purpose of this report is to present the Qualification test results of the Pericom/SaRonix-eCera GL_49SNC Minature Quartz Crystals.

The Pericom/SaRonix-eCera GL_49SNC Quartz Crystals are minature AT-strip lead-free crystal resonators housed in a 49S package. The crystals are housed in a low profile package with SMD adapter for surface mounting. The parts utilize a proven, low cost, metal package technology with a precision molded based and universal contact configuration.

The product features a rugged AT-strip crystal construction and a SMD package. The product series is ideally suited for Set-Top Box, Multimedia, Network Adapter Cards, Modems, Remote Control devices and other hand held products.

The information contained herein represents proof of product Reliability and Performance for the Pericom/SaRonix-eCera GL_49SNC Quartz Crystals in accordance with the generic specification after exposure to a variety of environmental and mechanical events that occur during the installation and operational lifetime of the product.

Upon conclusion of the testing the product continued to operate within specification limits, demonstrating its capability of reliable operation throughout its lifetime.

2.0 Purpose

The purpose of the qualification is to verify the epoxy material 3301F construction integrity of connecting the crystal lead to the SMD adapter for the Pericom/PSE 49SNC products

3.0 Scope and Contents

The report describes the qualification test program, procedures utilized, criteria enforced (at the time of product validation), and specific result data obtained during the testing of three lots of Quartz Crystals. The three lots consisted of an equal number of units from different part numbers and date codes to ensure manufacturing repeatability. Where possible the different options from the design series such as operating frequency, frequency stability were selected to demonstrate compliance across the full design range.

4.0 Reference Documents

Pericom/SaRonix-eCera Data Sheet(s)	Data Sheet DS-153 for the 49S SMD products
QAP81	SaRonix Frequency Control Products Qualification Assurance Procedure
JESD22	Reliability Test Methods for Packaged Devices
MIL-STD-883	Test Methods and Procedures for Electronic Devices
J-STD-020C	Moisture/Reflow Sensitivity Classification for Non-Hermetic Solid State Surface Mount Devices (Table 4.2 and 5.2)

5.0 Equipment

Saunders & Associates Model 2200A or W2200 Crystal Temperature Test System.

Consisting of:

- S&A PI Network, or equivalent
- PTS Model 620 Frequency Synthesizer
- Agilent Model 8508A Vector Voltmeter
- S&A Model 4220 Temperature Test Chamber or equivalent

Saunders & Associates Model 250B and/or 250C Crystal Test System

- Digital Thermometer, Fluke Model 51 or equivalent
- Convection Oven, Blue M Mechanical or equivalent
- Digital Calipers, Mityoto or equivalent

Note: All test equipment has been optimized for radio frequency signal transmission and recording; however, certain physical limitations in the equipment and associated fixturing will contribute to variations in results.

The electrical test data contained herein consists of summaries of room temperature operating Frequency and ESR before and after each stress test. Detailed electrical performance, including Frequency, resistance, C1, C0, L1, DLD, and Q at various operating frequencies are available on request.

All electrical testing was performed using a test system comprised from the calibrated equipment listed above.

6.0 Outside Facilities

None

7.0 ESD Precautions

Crystals are not considered static sensitive devices as designated by Category A of MIL-STD-883, Method 3015.

8.0 Justification for Qualification by similarity

This report draws on the commonly utilized method of 'qualification by similarity' to justify the qualification of the Pericom/SaRonix-eCera GL_49SNC and all related custom (SRX) part number derivatives Quartz Crystals.

It is the policy of Pericom/SaRonix-eCera that in some specific cases, qualification may be presumed by similarity, e.g. When a group of devices is in the same functional category, manufactured with the same crystal fabrication processes, crystal processing line/location and design rules, the same packaged with the same packaging technology, and on the same packaging line/location, they can be qualified by similarity.

Stress / Test:	TEST SUMMARY MATRIX	Reference: Pericom/SaRonix QAP 81 Documentation
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Part Number:	GL Series	Quantity:	# of Lots: 3
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz	Sample Size:	See below
Test Date:	Various - 2010	Result:	Pass
Test Condition:	Refer to Table below		

Summary:

#	Stress / Test	Abbv	Reference	Number of Lots	Sample Size per Lot	Accept on # Failures	Test Conditions / Additional Requirements	Result
Initial								
1	Physical Dim	PD	JESD22-B100 Mil Std 883 M2016	3	5	0	Internal Master Specification	PASS
2	Gross/Fine Leak	GFL	JESD22-A109 Mil Std 883 M1014	3	30	0	Fine Method 1014 Cond A1 Gross Method 1014 Cond C1	PASS
3	Electrical Characterization	ED	SaRonix Data Sheet	3	20	0	Full parameter ATE test Aging projection	PASS
4	Electrical Test	TST	SaRonix Data Sheet	All parts in Qual			To be performed pre and post each stress/test	PASS
Mechanical								
5	Mechanical Shock	MS	JESD22-B104	3	20	0	1500g peak 0.5ms pulse, 5 pulses in each of 6 directions	PASS
6	Vibration Variable Frequency	VVF	JESD22-B103	3	20	0	20g peak 20-2000Hz, in each of 3 directions	PASS
7	Solderability	SD	J-STD-002 (SMD)* JESD22-B102 (TH)	3	5	0	Lead Free criteria if applicable	PASS
8	Marking Permanency	MP	JESD22-B107	NA			Not required for laser marked devices	N. A.
Environmental								
9	Preconditioning of non-hermetic devices / Moisture resistance	PC	JESD22-A113	All samples to be submitted through THB (or HAST), TC and AC tests			Perform before THB (or HAST), TC and AC tests, post test SAM required	N. A.
10	Steady State Temp Humidity Bias Life	THB	JESD22-A101	NA			85°C / 85% RH 1008Hrs	N. A.
11	Highly Accelerated Stress Testing	HAST	JESD22-A110 / A118	NA			130°C/85%RH, 96Hrs or 110°C/85%RH, 264Hrs	N. A.
12	Accelerated Moisture Resistance - Autoclave / Pressure Cooker Test	AC	JESD22-A102	NA			121°C 100%RH 15psig 96Hrs	N. A.
13	Temp Cycle	TC	JESD22-A104 Mil Std 883 M1010	3	30	0	-55C/125C, 1000 cycles Post test SAM required	PASS
16	Resistance to Solder Heat (SMD parts)	RSH	JESD22-B106 (TH) J-STD-020C (SMD)	3	20	0	High Temp/Lead Free criteria if applicable	PASS
18	Low Temp Storage	LTS	JESD22-A119	NA			100 Hrs -55°C	N. A.
19	High Temp Storage Life / Bake	HTB	JESD22-A103 JIS C 6701-1999	NA			720 Hours @ 125°C, 2Hrs @25 before testing	N. A.
27	Aging	Ag	Xtal-MIL-PRF-3098	NA			M4.7.14 30 days (720 hrs) @ 85°C, Interrupt test for electrical measurement at 24hrs and each 48hrs - 96hrs there after.	N. A.
Package Tests								
29	Destructive Physical Analysis	DPA	Mil Std 883 5009	3	5	0	De-lid for DPA inspections / tests	PASS
32	Internal Visual	IV	WMS-00	3	5	0	Plastic packages to be X-Rayed	PASS
33	External Visual	EV	WMS-00	3	5	0		PASS
34	Lead Integrity (If applicable)	LI	JESD22-B105 Mil Std 883 M2004	3	5	0	2 pounds through hole 8 ounces plastic package	N. A.
28	Internal Moisture Analysis	RGa		3	2	0	< 5000 ppm	N. A.

Note: - Qualification test matrix above was generated as qual specific extract from SaRonix Quality Assurance Procedure QAP81 (Frequency Control Products Qualification).

- The stress test conditions as detailed in this qualification are representative of the most frequently encountered and accepted reliability stress tests, and are equivalent to the referenced environmental/mechanical conditions referenced on the product data sheets. The test summary matrix referenced and program undertaken is based on the JESD47B 'Stress-Test-Driven Qualification of Integrated Circuits'

Stress / Test:	PHYSICAL DIMENSIONS	Reference:	MIL-STD-883 Method 2016
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Part Number:	GL Series	Quantity:	# of Lots: 3
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz	Sample Size:	5
Test Date:	1-Oct-10	Result:	Pass
Test Condition:	Digital calipers		

Results Summary:

Mechanical Inspection Report

Lot #1 49SNC03.6864-20HJE-E 1039E

Part #	A	B	C	D	E	F	G
1	13.0000	4.6500	4.8500				
2	12.9900	4.6400	4.8500				
3	13.0000	4.6500	4.8500				
4	12.9900	4.6500	4.8500				
5	13.0000	4.6400	4.8400				
Min	-	-	-				
Max	13.300	5.200	5.500				
Typ	-	-	-				

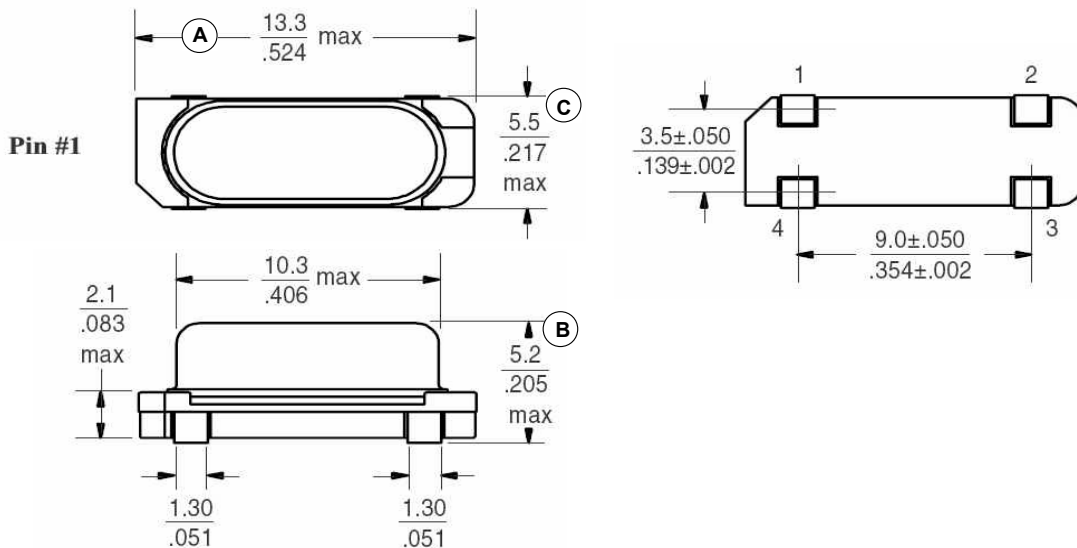
Lot #2 SRX5920-E 1039E

Part #	A	B	C	D	E	F	G
1	12.9800	4.6400	4.8500				
2	12.9900	4.6500	4.8600				
3	13.0000	4.6500	4.8500				
4	12.9800	4.6400	4.8500				
5	13.0000	4.6500	4.8600				
Min	-	-	-				
Max	13.300	5.200	5.500				
Typ	-	-	-				

Lot #3 49SNC25.0000-20GGC-E 1039E

Part #	A	B	C	D	E	F	G
1	12.9800	4.6500	4.8400				
2	12.9900	4.6500	4.8500				
3	13.0000	4.6400	4.8500				
4	13.0000	4.6400	4.8500				
5	12.9800	4.6400	4.8400				
Min	-	-	-				
Max	13.300	5.200	5.500				
Typ	-	-	-				

GL_49SNC OUTLINE DIAGRAM



Stress / Test: MECHANICAL SHOCK

Reference: JESD22-B104

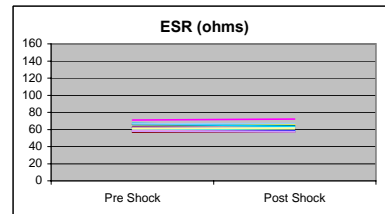
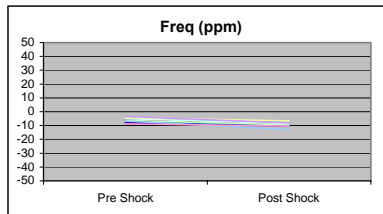
Part Number: GL Series
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
Test Date: 6-Oct-2010
Test Condition: 1500g peak, 0.5ms pulse 5 pulses in each directions

Quantity: of 6
of Lots: 3
Sample Size: 20

Pass
Results Summary:
Lot #1 49SNC03.6864-20HJE-E 1039E

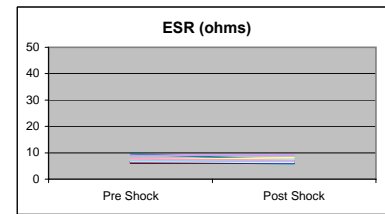
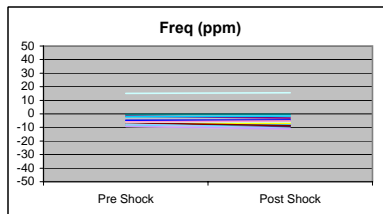
	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-6.29	-9.37	3.08	62.52	61.87	0.65
Min	-8.77	-13.05	1.43	56.87	57.02	-1.48
Max	-3.37	-6.71	6.23	70.86	71.98	4.21

Failures | 0


Lot #2 SRX5920-E 1039E

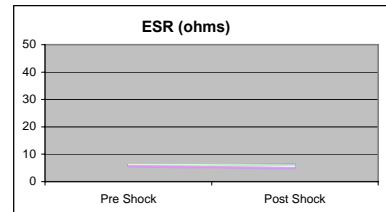
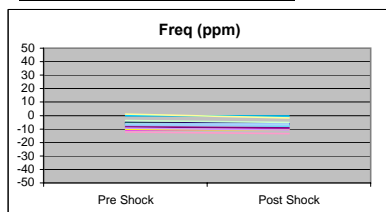
	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-4.67	-5.26	0.59	7.14	6.95	0.20
Min	-9.15	-11.12	-0.71	6.03	5.90	-0.74
Max	15.08	15.56	3.16	9.65	9.14	2.38

Failures | 0


Lot #3 49SNC25.0000-20GGC-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-6.41	-7.23	0.82	5.74	5.32	0.41
Min	-12.23	-13.45	-0.83	5.32	4.69	-0.08
Max	1.00	-0.42	2.81	6.16	6.16	0.76

Failures | 0



Stress / Test: VIBRATION

Reference: JESD22-B103

Part Number: GL Series
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
Test Date: 12-Oct-2010
Test Condition: 20g peak, 20-2000Hz X, Y & Z

Quantity: # of Lots: 3
Sample Size: 20

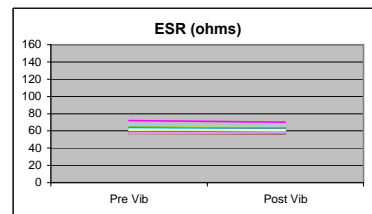
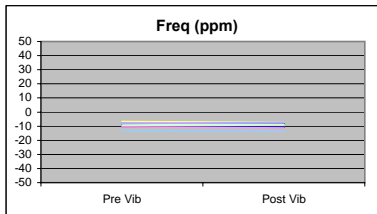
Result: Pass

Results Summary:

Lot #1 49SNC03.6864-20HJE-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-9.37	-9.69	0.32	61.87	61.75	0.12
Min	-13.05	-13.82	-0.77	57.02	56.94	-1.15
Max	-6.71	-7.44	0.94	71.98	70.19	1.79

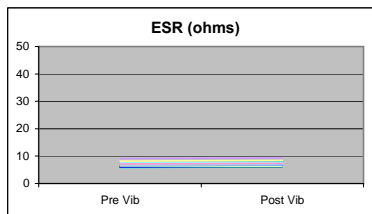
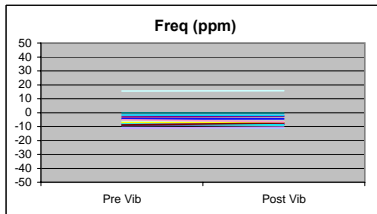
Failures: 0



Lot #2 SRX5920-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-5.26	-5.25	-0.01	6.95	7.05	-0.11
Min	-11.12	-11.25	-1.30	5.90	6.12	-0.28
Max	15.56	15.69	1.37	9.14	9.32	0.11

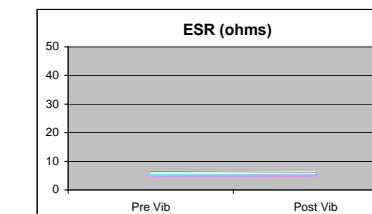
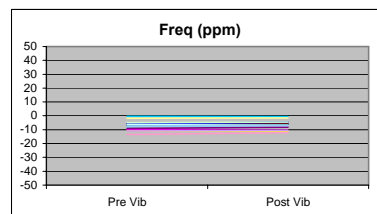
Failures: 0



Lot #3 49SNC25.0000-20GGC-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	Fl Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-7.23	-6.80	-0.43	5.32	5.48	-0.16
Min	-13.45	-12.16	-1.54	4.69	4.94	-0.29
Max	-0.42	-0.52	0.63	6.16	6.34	-0.01

Failures: 0



Stress / Test: ELECTRICAL CHARACTERIZATION

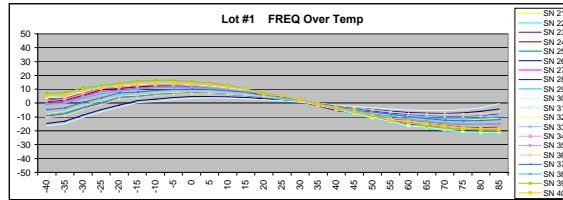
Reference: SaRonix-eCera Datasheet

Part Number: GL Series
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
Test Date: 30-Sep-10
Test Condition: S&A 2200 temp test

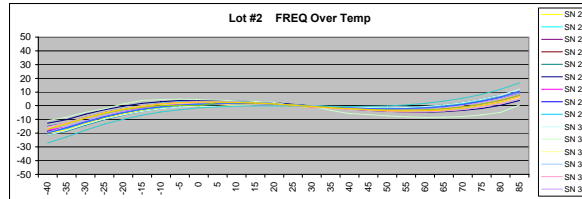
Quantity: # of Lots: 3
Sample Size: 20
Result: Pass

Initial Characterization Summary:

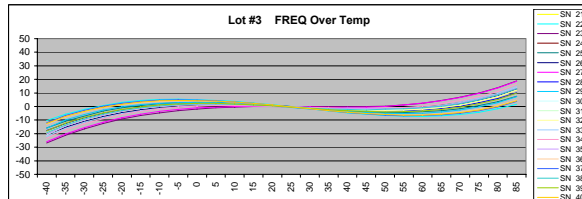
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Initial Characterization at 25°C							
SN#	Freq (MHz)	FL (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DLD2 ohms	RLD2 ohms
21	3686367.19	-8.9	63.3	2.3	4.0	9.6	67.2
22	3686384.74	-4.1	64.1	2.2	4.0	8.9	66.6
23	3686377.28	-6.2	74.0	2.3	3.8	7.0	75.0
24	3686366.00	-9.2	60.6	2.2	4.1	7.9	61.5
25	3686371.29	-7.8	53.5	2.3	4.1	8.9	56.6
26	3686367.34	-8.9	61.6	2.2	4.1	8.7	63.8
27	3686377.55	-6.1	49.1	2.3	4.1	9.0	52.1
28	3686388.67	-3.1	60.2	2.2	4.2	8.6	62.9
29	3686375.12	-6.7	60.2	2.3	3.9	10.7	62.4
30	3686369.49	-8.3	69.9	2.3	4.0	6.9	71.8
Avg		-6.9	61.6	2.3	4.04	8.62	63.9
Min		-9.2	49.1	2.2	3.77	6.86	52.1
Max		-3.1	74.0	2.3	4.21	10.67	75.0
Spec Min		-50.0	-	-	-	-	-
Spec Max		50.0	180.0	-	7	10	150



Lot #2 SRX6920-E 1039E							
Initial Characterization at 25°C							
SN#	Freq (MHz)	FL (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DLD2 ohms	RLD2 ohms
21	16670030.44	1.8	7.7	13.2	3.8	0.9	0.4
22	16669845.39	-9.3	6.4	13.8	3.8	0.3	0.2
23	16669903.29	-5.8	6.6	13.8	3.8	0.1	0.3
24	16669973.67	-1.6	6.6	13.9	3.8	1.0	0.9
25	16669868.18	-7.9	6.5	13.9	3.8	0.6	0.6
26	16669888.67	-6.7	6.8	13.7	3.8	0.2	0.4
27	16669820.76	-10.8	6.2	13.9	3.8	0.3	0.3
28	16669930.65	-4.2	6.1	13.8	3.8	0.2	0.3
29	16670011.18	0.7	6.3	13.7	3.7	0.1	0.3
30	16669912.41	-5.3	11.9	13.7	3.8	0.6	0.5
Avg		-4.9	7.1	13.7	3.79	0.42	0.4
Min		-10.8	6.1	13.2	3.75	0.06	0.2
Max		1.8	11.9	13.9	3.83	1.02	0.9
Spec Min		-50.0	-	-	-	-	-
Spec Max		50.0	50.0	-	7	10	40



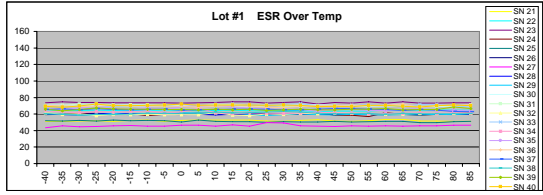
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Initial Characterization at 25°C							
SN#	Freq (MHz)	FR (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DLD2 ohms	RLD2 ohms
21	24999946.20	-2.2	5.8	15.3	4.1	0.2	0.4
22	25000045.75	1.8	6.4	14.6	4.1	0.2	0.5
23	24999931.81	-2.7	5.8	15.3	4.1	1.3	0.5
24	24999948.68	-2.1	6.2	15.2	4.1	0.2	0.4
25	24999917.32	-3.3	5.9	15.1	4.1	0.3	0.5
26	24999820.95	-7.2	5.7	15.5	4.1	0.8	0.6
27	24999912.86	-3.5	5.6	15.5	4.1	0.3	0.4
28	24999829.64	-6.8	5.3	15.7	4.1	0.2	0.4
29	24999931.80	-2.7	5.9	15.1	4.1	0.3	0.4
30	24999766.20	-9.4	6.0	15.1	4.1	0.3	0.5
Avg		-3.8	5.9	15.3	4.11	0.41	0.5
Min		-9.4	5.3	14.6	4.07	0.19	0.4
Max		1.8	6.4	15.7	4.15	1.34	0.6
Spec Min		-30.0	-	-	-	-	-
Spec Max		30.0	30.0	-	7	10	30



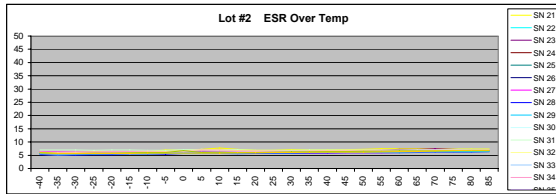
Stress / Test: ELECTRICAL CHARACTERIZATION	Reference: SaRonix-eCera Datasheet
Part Number: GL Series	Quantity: # of Lots: 3
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz	Sample Size: 20
Test Date: 30-Sep-10	
Test Condition: S&A 2200 temp test	Result: Pass

Initial Characterization Summary:

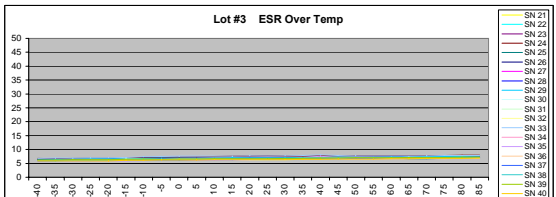
Lot #1 49SNC03.6864-20HJE-E 1039E							
Initial Characterization at 25°C							
SN#	Freq (MHz)	FL (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DL22 ohms	RLD2 ohms
21	3686367.19	-8.9	63.3	2.3	4.0	9.6	67.2
22	3686384.74	-4.1	64.1	2.2	4.0	8.9	66.6
23	3686377.28	-6.2	74.0	2.3	3.8	7.0	75.0
24	3686366.00	-9.2	60.6	2.2	4.1	7.9	61.5
25	3686371.29	-7.8	53.5	2.3	4.1	8.9	55.8
26	3686367.34	-8.9	61.6	2.2	4.1	8.7	63.8
27	3686377.55	-6.1	49.1	2.3	4.1	9.0	52.1
28	3686388.67	-3.1	60.2	2.2	4.2	8.6	62.9
29	3686375.12	-6.7	60.2	2.3	3.9	10.7	62.4
30	3686369.49	-8.3	69.9	2.3	4.0	6.9	71.8
Avg	-6.9	61.6	2.3	4.04	8.62	63.9	
Min	-9.2	49.1	2.2	3.77	6.86	52.1	
Max	-3.1	74.0	2.3	4.21	10.67	75.0	
Spec Min	-50.0	-	-	-	-	-	-
Spec Max	50.0	180.0	-	7	10	150	-



Lot #2 SRX6920-E 1039E							
Initial Characterization at 25°C							
SN#	Freq (MHz)	FL (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DL22 ohms	RLD2 ohms
21	16670030.44	1.8	7.7	13.2	3.8	0.9	0.4
22	16669845.39	-9.3	6.4	13.8	3.8	0.3	0.2
23	16669903.29	-5.8	6.6	13.8	3.8	0.1	0.3
24	16669973.67	-1.6	6.6	13.9	3.8	1.0	0.9
25	16669868.18	-7.9	6.5	13.9	3.8	0.6	0.6
26	16669888.67	-6.7	6.8	13.7	3.8	0.2	0.4
27	16669820.76	-10.8	6.2	13.9	3.8	0.3	0.3
28	16669930.65	-4.2	6.1	13.8	3.8	0.2	0.3
29	16670011.18	0.7	6.3	13.7	3.7	0.1	0.3
30	16669912.41	-5.3	11.9	13.7	3.8	0.6	0.5
Avg	-4.9	7.1	13.7	3.79	0.42	0.4	
Min	-10.8	6.1	13.2	3.75	0.06	0.2	
Max	1.8	11.9	13.9	3.83	1.02	0.9	
Spec Min	-50.0	-	-	-	-	-	-
Spec Max	50.0	50.0	-	7	10	40	-



Lot #3 49SNC25.0000-20GGC-E 1039E							
Initial Characterization at 25°C							
SN#	Freq (MHz)	FR (ppm)	ESR (ohms)	C1 (fF)	C0 (pF)	DL22 ohms	RLD2 ohms
21	24999946.20	-2.2	5.8	15.3	4.1	0.2	0.4
22	25000045.75	1.8	6.4	14.6	4.1	0.2	0.5
23	24999931.81	-2.7	5.8	15.3	4.1	1.3	0.5
24	24999949.68	-2.1	6.2	15.2	4.1	0.2	0.4
25	24999917.32	-3.3	5.9	15.1	4.1	0.3	0.5
26	24999820.95	-7.2	5.7	15.5	4.1	0.8	0.6
27	24999912.86	-3.5	5.6	15.5	4.1	0.3	0.4
28	24999829.64	-6.8	5.3	15.7	4.1	0.2	0.4
29	24999931.80	-2.7	5.9	15.1	4.1	0.3	0.4
30	24999766.20	-9.4	6.0	15.1	4.1	0.3	0.5
Avg	-3.8	5.9	15.3	4.11	0.41	0.5	
Min	-9.4	5.3	14.6	4.07	0.19	0.4	
Max	1.8	6.4	15.7	4.15	1.34	0.6	
Spec Min	-30.0	-	-	-	-	-	-
Spec Max	30.0	30.0	-	7	10	30	-



Stress / Test:	RESISTANCE TO SOLDER HEAT	Reference:	J-STD-020C
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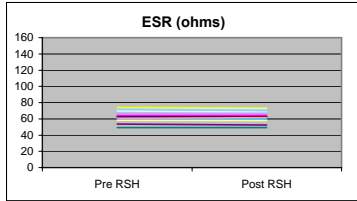
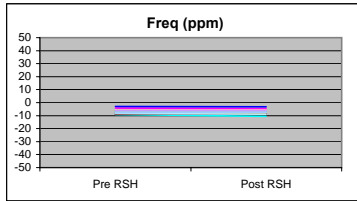
Part Number:	GL Series	Quantity:	# of Lots: 3
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz	Sample Size:	20
Test Date:	6-Oct-10	Pass	
Test Condition:	IPC / J-STD-020C Pb-free profile (260°C for 10 sec)		

Results Summary:

Lot #1 49SNC03.6864-20HJE-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-6.82	-7.03	0.21	63.01	62.79	0.21
Min	-9.22	-10.66	-0.80	49.12	49.45	-1.02
Max	-3.07	-3.31	1.44	73.96	73.33	1.68

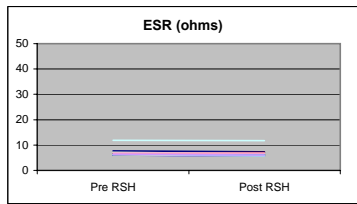
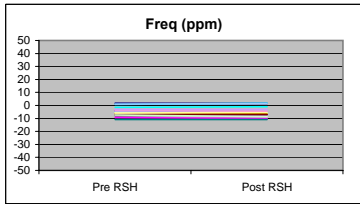
Failures 0



Lot #2 SRX5920-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-5.83	-5.80	-0.03	7.24	6.97	0.27
Min	-21.86	-21.24	-1.43	6.11	5.62	-0.30
Max	1.83	1.82	1.34	11.89	11.70	1.57

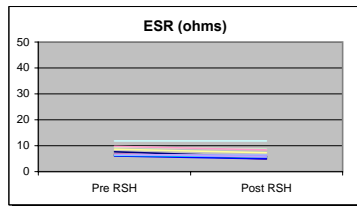
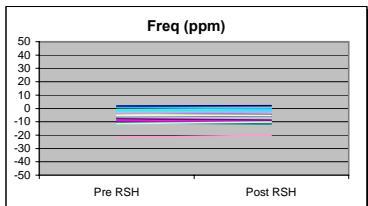
Failures 0



Lot #3 49SNC25.0000-20GGC-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-6.47	-6.44	-0.04	7.47	6.56	0.91
Min	-21.86	-20.04	-1.81	6.11	4.96	-0.04
Max	1.83	1.99	0.85	11.89	11.86	2.00

Failures 0



Stress / Test:	EXTERNAL VISUAL	Reference:	MIL-STD-883 Method 2009
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Part Number:	GL Series	Quantity:	# of Lots:	3
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz		Sample Size:	5
Test Date:	12-Oct-10			
Test Condition:	10x Magnification	Result:	Pass	

Results Summary:

External Visual Inspection Report

Lot #1 49SNC03.6864-20HJE-E 1039E

Part #	A	B	C	D	E	F	G	H	I	J	K
16	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
17	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
18	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
19	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
20	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A

Lot #2 SRX5920-E 1039E

Part #	A	B	C	D	E	F	G	H	I	J	K
16	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
17	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
18	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
19	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
20	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A

Lot #3 49SNC25.0000-20GGC-E 1039E

Part #	A	B	C	D	E	F	G	H	I	J	K
16	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
17	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
18	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
19	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A
20	Pass	Pass	Pass	Pass	Pass	Pass	N/A	Pass	N/A	N/A	N/A

Failure Code & Desc

- A** Marking -
- B** Hermetic interface -
- C** Non-conformance
- D** Foreign/displaced material -
- E** Construction defects -
- F** Package Body/Lid Finish -
- G** Leads -
- H** Pads -
- I** Solder Balls -
- J** Package body/lid -
- K** Special requirement -

Failure Criteria:

- Illegible marking, or marking content or placement not in accordance with the applicable specification.
- Presence of any secondary coating material that visually obscures a seal area
- Evidence of any nonconformance with the detail drawing / procurement document, or absence of any required feature
- Leads or terminals that are not free of foreign material such as paint or other adherent deposits.
- Protrusions, metallization not intended by design between solder pads etc
- Defective finish (peeling, flaking, pitting, blistering, or corrosion)
- Broken, twisted, burrs, misalignment, metallization (including solder lead finish) etc
- Bridging, Burrs, etc.
- Bridging, Solder ball Size and/or shape, etc.
- Evidence of cracks, delamination, separation, or voiding on any multilayer ceramic package.

Lot #1 49SNC03.6864-20HJE-E 1039E



Lot #2 SRX5920-E 1039E



Lot #3 49SNC25.0000-20GGC-E 1039E



Stress / Test:	FINE/GROSS LEAK TEST	Reference:	JESD22-A109
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Part Number:	GL Series	Quantity:	# of Lots:	3
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz		Sample Size:	10
Test Date:	Refer to Test Dates below			
Test Condition:	Fine - 5Kgf/cm2 He 1 Hour, Pass @<math>1 \times 10^{-9}</math>, Gross - Fluoride Bomb 60psig 2 hours, Trio tech G-203 Bubble test 125°C	Result:	Pass	

Results Summary: Pass / Fail Criteria **Fine Leak** - Leak of $> 1 \times 10^{-9}$ atm-cc/s (air) = FAIL
Gross Leak - Constant stream of bubbles within 30 secs = FAIL

Lot #1 49SNC03.6864-20HJE-E 1039E						
Leak test-1		Leak test-2		Leak test-3a		Leak test-3b
Part #	12-Oct-10	Part #	30-Sep-10	Part #	30-Sep-10	14-Oct-10
1	PASS	21	PASS	41	PASS	PASS
2	PASS	22	PASS	42	PASS	PASS
3	PASS	23	PASS	43	PASS	PASS
4	PASS	24	PASS	44	PASS	PASS
5	PASS	25	PASS	45	PASS	PASS
6	PASS	26	PASS	46	PASS	PASS
7	PASS	27	PASS	47	PASS	PASS
8	PASS	28	PASS	48	PASS	PASS
9	PASS	29	PASS	49	PASS	PASS
10	PASS	30	PASS	50	PASS	PASS

Lot #2 SRX5920-E 1039E						
Leak test-1		Leak test-2		Leak test-3a		Leak test-3b
Part #	12-Oct-10	Part #	30-Sep-10	Part #	30-Sep-10	14-Oct-10
1	PASS	21	PASS	41	PASS	PASS
2	PASS	22	PASS	42	PASS	PASS
3	PASS	23	PASS	43	PASS	PASS
4	PASS	24	PASS	44	PASS	PASS
5	PASS	25	PASS	45	PASS	PASS
6	PASS	26	PASS	46	PASS	PASS
7	PASS	27	PASS	47	PASS	PASS
8	PASS	28	PASS	48	PASS	PASS
9	PASS	29	PASS	49	PASS	PASS
10	PASS	30	PASS	50	PASS	PASS

Lot #3 49SNC25.0000-20GGC-E 1039E						
Leak test-1		Leak test-2		Leak test-3a		Leak test-3b
Part #	12-Oct-10	Part #	30-Sep-10	Part #	30-Sep-10	14-Oct-10
1	PASS	21	PASS	41	PASS	PASS
2	PASS	22	PASS	42	PASS	PASS
3	PASS	23	PASS	43	PASS	PASS
4	PASS	24	PASS	44	PASS	PASS
5	PASS	25	PASS	45	PASS	PASS
6	PASS	26	PASS	46	PASS	PASS
7	PASS	27	PASS	47	PASS	PASS
8	PASS	28	PASS	48	PASS	PASS
9	PASS	29	PASS	49	PASS	PASS
10	PASS	30	PASS	50	PASS	PASS

- Leak Test-1 = After Mechanical Shock and Vibration
- Leak Test-2 = After Electrical Characterization and Resistance to Solder Heat
- Leak Test-3a = Before Temperature Cycle
- Leak Test-3b = After Temperature Cycle

Stress / Test: TEMP CYCLE

Reference:

JESD22-A104

Part Number: GL Series
 Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
 Test Date: 14-Oct-2010
 Test Condition: 100 Cycles -55°C to 125°C

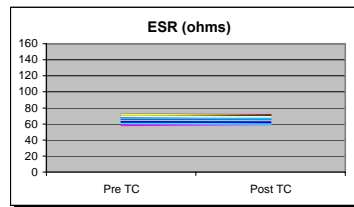
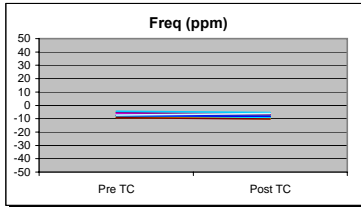
Quantity: # of Lots: 3
 Sample Size: 30
 Result: **Pass**

Results Summary:

Lot #1 49SNC03.6864-20HJE-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-7.20	-7.96	0.76	65.92	65.76	0.16
Min	-9.27	-10.20	-1.21	58.44	59.31	-2.09
Max	-4.48	-5.41	1.48	71.82	71.36	1.15

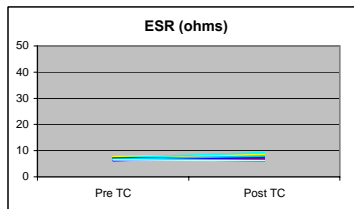
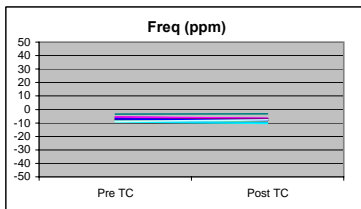
Failures: 0



Lot #2 SRX5920-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-7.16	-7.62	0.46	6.77	7.32	-0.55
Min	-9.09	-10.33	-1.08	6.18	5.96	-2.15
Max	-3.56	-3.20	1.24	7.73	9.31	1.18

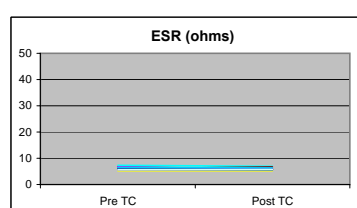
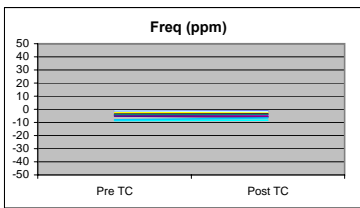
Failures: 0



Lot #3 49SNC25.0000-20GGC-E 1039E

	Freq Dev (ppm)			ESR Dev (ohm)		
	Pre	Post	FI Δ (ppm)	Pre	Post	ESR Δ (ohm)
Average	-4.35	-4.39	0.04	6.15	5.97	0.18
Min	-8.45	-8.28	-1.30	5.30	5.29	-0.67
Max	-1.27	-1.53	0.73	7.29	6.91	1.04

Failures: 0



Note: Frequency drift outside of product tolerance is not to be considered a failure if product operating temperature is exceeded. Only catastrophic failures resulting from component assembly are to be considered failures in this test.

Stress / Test: DESTRUCTIVE PHYSICAL ANALYSIS
INTERNAL VISUAL INSPECTION

Reference:

Part Number: GL Series
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
Test Date: 15-Oct-2010
Test Condition: 10x Magnification

Quantity: # of Lots: 3
Sample Size: 5

Result: Pass

Results Summary:

External Visual Inspection Report

Lot #1 49SNC03.6864-20HJE-E 1039E

Part #	A	B	C	D	E	F	G	H
31	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
32	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
33	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
34	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
35	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass

Lot #2 SRX5920-E 1039E

Part #	A	B	C	D	E	F	G	H
31	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
32	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
33	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
34	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
35	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass

Lot #3 49SNC25.0000-20GGC-E 1039E

Part #	A	B	C	D	E	F	G	H
31	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
32	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
33	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
34	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass
35	N/A	N/A	N/A	N/A	N/A	Pass	Pass	Pass

Failure Code & Desc

- A Wire bonding
- B Wire bond status
- C Wire loop
- D Wire Material
- E Die mount
- F Damage
- G Contamination
- H Crystal Mount
- I Special requirement -

Failure Criteria:

- Improper substrate or bonding.
- Lifted or broken wires.
- Excessive lead wire loop or sag
- Bond wire material or size.
- Improper die mounting or nonconformance with the detail assembly drawing.
- Lifted, cracked, or broken die/substrate/crystal.
- Metallic contamination or foreign material, particles other than those introduced during opening.
- Improper crystal mounting or nonconformance with the detail assembly drawing.

After De-Lidding for Internal Visual Inspection

Lot #1 49SNC03.6864-20HJE-E 1039E



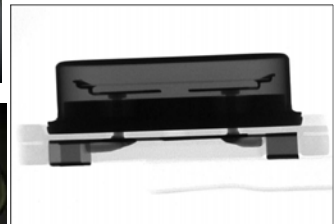
Lot #2 SRX5920-E 1039E



Lot #3 49SNC25.0000-20GGC-E 1039E



X-Ray showing bent lead construction, Epoxy amount and location.



Stress / Test: SOLDERABILITY

Reference: JESD22-B102-D

Part Number: GL Series
Freq: 3.6864 MHz; 16.6700 MHz; 25.0000 MHz
Test Date: 16-Oct-2007
Test Condition: 260°C ±5°C for 5 secs, 95+% coverage

Quantity: # of Lots: 2
 Sample Size: 5

Result: Pass

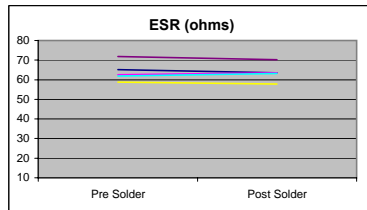
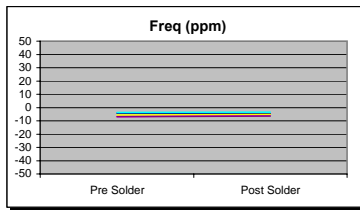
Results Summary:

Lot #1 49SNC03.6864-20HJE-E 1039E

	Freq Dev (ppm)		
	Pre	Post	FI Δ (ppm)
Average	-5.49	-5.08	-0.40
Min	-6.91	-6.40	-1.28
Max	-3.71	-3.54	0.46

	ESR Dev (ohm)		
	Pre	Post	ESR Δ (ohm)
Average	64.06	63.68	0.38
Min	58.80	57.88	-1.33
Max	71.83	70.16	1.69

Failures: 0

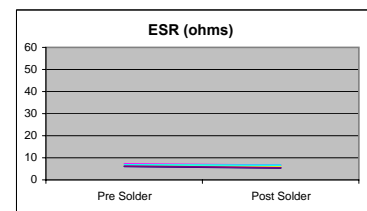
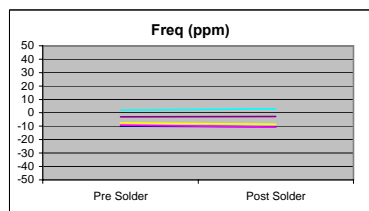


Lot #2 SRX5920-E 1039E

	Freq Dev (ppm)		
	Pre	Post	FI Δ (ppm)
Average	-5.51	-5.86	0.35
Min	-9.91	-10.54	-0.88
Max	2.10	2.99	1.25

	ESR Dev (ohm)		
	Pre	Post	ESR Δ (ohm)
Average	6.66	6.11	0.56
Min	6.03	5.43	0.24
Max	7.29	6.65	0.78

Failures: 0

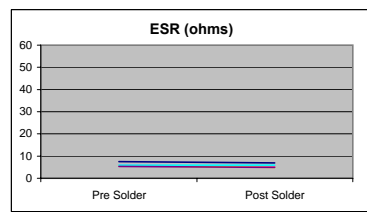
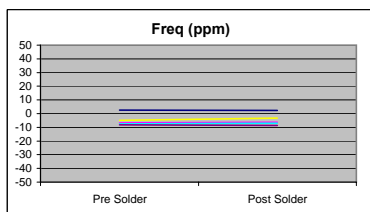


Lot #3 49SNC25.0000-20GGC-E 1039E

	Freq Dev (ppm)		
	Pre	Post	FI Δ (ppm)
Average	-4.92	-4.57	-0.35
Min	-8.15	-8.62	-1.67
Max	2.56	2.25	0.47

	ESR Dev (ohm)		
	Pre	Post	ESR Δ (ohm)
Average	6.03	5.64	0.39
Min	5.35	4.87	0.04
Max	7.54	6.99	0.71

Failures: 0



Stress / Test:	MARKING PERMANENCY	Reference:	JESD22-B107
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Part Number:	GL Series	Quantity:	# of Lots:	N/A
Freq:	3.6864 MHz; 16.6700 MHz; 25.0000 MHz		Sample Size:	N/A
Test Date:	N/A			
Test Condition:	N/A	Result:	Pass	

Results Summary: Not Applicable -- this device is Laser marked

11.0 Conclusion

The successful results of this qualification test activity have demonstrated that the Pericom/SaRonix-eCera GL_49SNC series 49S SMD Quartz Crystals will continue reliable operation throughout exposure to various mechanical, environmental and operating life stress conditions that are extreme to both industrial and commercial service situations.

Based on these qualification results, The following products would also be Qualified by extension for the epoxy construction:

- GL_49SAB series 49S SMD Quartz Crystal
- GL_49SUB series 49S SMD Quartz Crystal

12.0 Appendices

12.1 Pericom/SaRonix-eCera Product Data Sheet - 49S SMD

**GL_49SNC Series
Construction Change QUAL**

Construction Change:
Adapter Attachment from Solder to 3301F Epoxy

	Lot #1	Lot #2	Lot #3
device type	49SNC03.6864-20HJE-E	SRX5920-E	49SNC25.0000-20GGC-E
SaRonix-eCera PN	GL0360009	GL1660001	GL2500006
assembly lot #	1039E	1039E	1039E
package type	49S SMD	49S SMD	49S SMD
assembly hse	E	E	E

Cisco Requirements

Section	Test Name	Accept/ Samp Size	Test Cond/ criteria	Expect date	Supplier results	Report File Name	Expect date	Supplier results	Report File Name	Expect date			
2	General Requirements	NA	NA	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
5	Characterization	0/20	Datasheet	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
8	Thermal specifications	NA	Max. Osc. Output	NA -- GL_49SNC Series are Crystals			N/A						
9.1	AGING (HTOL)	NA	50 FIT @+125C, 1008 Hours	Not Applicable for construction change.			N/A						
9.2	Pre/post AGING Characterization	NA	+25C, 0 Hours, 168, 500, 1008	Not Applicable for construction change.			N/A						
10	Temperature Cycle	0/30	-55C to +125C, 1000 Cycles	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
11	High Temperature Storage	NA	125C, 720 Hours	Not Applicable for construction change.			N/A						
12	Moisture Sensitivity Level	NA	Level 4 minimum	NA -- GL_49SNC Series is a Hermetically Sealed Part			N/A						
16	Marking Permanency	NA	Legible after exposure to solvents	NA -- GL_49SNC Series is a Laser Marked Part			N/A						
17	Mechanical Vibration	0/20	20g peak, 20-2000 Hz	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
18	Mechanical Shock	0/20	200g peak, 0.5ms	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
19	Physical Dimensions	0/5		Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
20	External Visual	0/5		Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
21	Solderability	0/5		Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
22	Low Temperature Storage	NA	-55' C for 100 hrs	Not Applicable for construction change.			N/A						
23	Leak Test	0/24		Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete
24	Lead Integrity	NA		Not Applicable this part is a SMD device.			N/A						
27	Resistance to Soldering Heat	0/20		Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete	PASS	Pericom GL_49SNC Series Construction Change Qual.pdf	Complete



Actual Size



Product Description

The crystals are miniature AT or BT cut strip resonators housed in low profile packages for surface mounting. The parts utilize a proven, low-cost, metal package technology with a precision molded base and universal contact configuration.

Product Features

- 49SNC is interchangeable with common plastic-molded crystal configurations.
- Pb-free and RoHS/Green compliant available.

Typical Applications

- Set-Top Box/Multimedia
- Clock/VCXO Multiplier
- Network Adapter Cards
- Modems
- Microcontrollers and Processors
- Remote control devices

Frequency Range:

- 3.2 to 29.999 MHz, AT Fundamental
- 30.0 to 54.000 MHz, AT 3rd OT
- 26.8 to 54.000 MHz, BT Fundamental

Characteristics at 25°C ±2°C:

- Frequency Calibration Tolerance (as specified): ±30ppm, ±50ppm
- Load Capacitance (as specified): 12 to 32pF or Series Resonance
- Effective Series Resistance:
 - 200Ω max (3.2 to 3.499MHz)
 - 180Ω max (3.5 to 3.999MHz)
 - 150Ω max (4 to 4.999MHz)
 - 120Ω max (5 to 5.999MHz)
 - 100Ω max (6 to 6.999MHz)
 - 80Ω max (7 to 8.999MHz)
 - 60Ω max (9 to 12.999MHz)
 - 40Ω max (13 to 19.999MHz)
 - 30Ω max (20 to 29.999MHz, AT Fund)
 - 80Ω max (30 to 54MHz, AT (3rd overtone))
 - 30Ω max (26.8 to 54MHz, BT Fund)

- Drive Level: 100μW correlation, (500μW Max)
- Shunt Capacitance: 7pF Max.

Temperature Range:

- Operating: -20 to +70°C ; -40 to +85°C (as specified)
- Storage: -55 to +125°C

Temperature Stability (as specified):

- ±30ppm (-20 to +70°C) AT Cut
- ±50 or ±100ppm (-40 to +85°C) AT Cut
- 0 to -100ppm (-20 to +70°C) BT Cut

Aging @ 25°C, first year:

- ±3ppm (typ), ±5ppm (max)

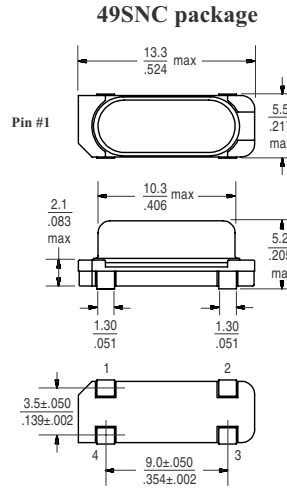
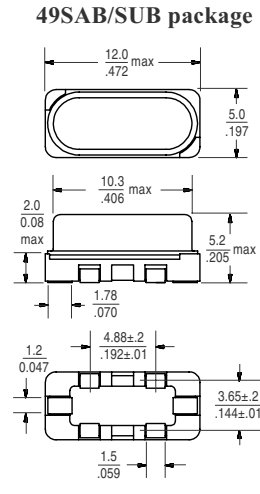
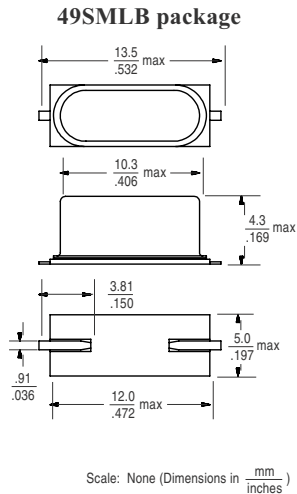
Reflow Temperature:

- 240°C Max (non-RoHS package)
- 260°C Max, 10 sec max (RoHS package)

49SNC:

245°C Max, 10 sec max (RoHS package)

Packaging Information: HC-49

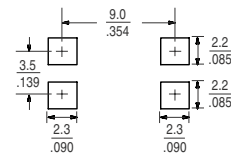
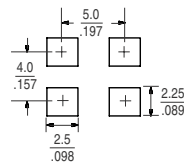
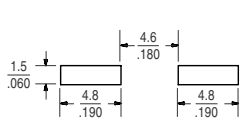


Package Marking Information

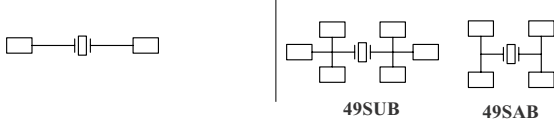
Line 1: S = SaRonix
xxx = Calib/Stability/Temp Code
YYWWX = Date Code
Line 2: Frequency (up to 7 digits, including decimal point)
Z = - (dash) for AT-cut parallel resonant
= blank for AT-cut series resonant
= B for BT-cut
xx = Load Capacitance (leave Blank if Series)

SxxxYYWWX
24.5760zxx

Land Pattern



Pad Connection Configurations



Ordering Information

49SMLB 03.6864 = 18 GGC -E (X)

Type / Package _____
49SMLB = 2 contact, 4mm high
49SAB = 4 contact, 5 mm high
49SNC = 4 contact, 5mm high
49SUB = 6 contact, 5mm high

Frequency _____
Frequency (in MHz) = 0x.xxxx, xx.xxxx
(a zero is used in front of frequencies under 10 MHz)

Cut Type _____
- (dash) = AT-cut Parallel Resonance
Blank = AT-cut Series Resonance
B = BT-Cut

Load Capacitance _____
xx = Parallel Resonance (specify load)
Blank = Series Resonance

Options
(T) = Tape and Reel (full increments only) 1000 pieces
(Q) = Manufactured in a TS16949 or QS9000 registered facility
Blank = Bulk

-E (dash E) = Lead (Pb)-free RoHS Compliant Version
Blank = non-RoHS (not available for new designs)

Calibration / Stability / Temp Range
GGC = $\pm 30\text{ppm} / \pm 30\text{ppm} / -20 \text{ to } +70^\circ\text{C}$ (ATCut)
GHE = $\pm 30\text{ppm} / \pm 50\text{ppm} / -40 \text{ to } +85^\circ\text{C}$ (ATCut)
HJE = $\pm 50\text{ppm} / \pm 100\text{ppm} / -40 \text{ to } +85^\circ\text{C}$ (ATCut)
Blank = $\pm 50\text{ppm}/0 \text{ to } -100\text{ppm}/-20 \text{ to } +70^\circ\text{C}$ (BTCut)
*others available

Part Number Examples: Freq 5.1234MHz, $\pm 30\text{ppm}$ calib, $\pm 30\text{ppm}$ stability, $-20 \text{ to } +70^\circ\text{C}$, 16pF
= 49SMLB05.1234-16GGC
= 49SMLB05.1234-16GGC-E (for Pb-Free/RoHS Compliant)

Mechanical:

- Shock: JESD22-B104 Condition B
- Solderability: MIL-STD-883, Method 2003 (non-RoHS package)
- Solderability: J-STD-002(RoHS package)
- Terminal Strength: MIL-STD-883 Method 2004
- Vibration: JESD22-B103
- Solvent Resistance: JESD22-B107
- Resistance to Soldering Heat: MIL-STD-202, Method 210, Condition I or J (Non-RoHS package)
- Resistance to Soldering Heat: J-STD-020C Table 5-2 Pb-free devices (3 cycles max) (RoHS package)

Environmental:

- Gross Test Leak: JESD22-A109, Condition C
- Fine Test Leak: JESD22-A109, Condition A1
- Moisture Resistance: JESD22-A113
- Insulation Resistance: 500 MΩ min (100 VDC)