REV	DESCRIPTION	DATE	PREP	APPD
E	EC17156	4/8/22	DF	DF

MOUNT HOLLY SPRINGS, PA 17065

Oscillator Specification, Hybrid VCSO

For

Hi-Rel Standard, LVPECL Output

THE RECORD OF APPROVAL FOR THIS DOCUMENT IS MAINTAINED ELECTRONICALLY WITHIN THE ERP SYSTEM

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UNSPECIFIED TOLERANCES: N/A

1. SCOPE

1.1 General. This specification defines the design, assembly and functional evaluation of high reliability, hybrid voltage controlled SAW oscillators produced by Vectron. Devices delivered to this specification represent the standardized Parts, Materials and Processes (PMP) Program developed, implemented and certified for advanced applications and extended environments.

1.2 Applications Overview. The designs represented by these products were primarily developed for the MIL-Aerospace community. The lesser Design Pedigrees and Screening Options imbedded within DOC206906 bridge the gap between Space and COTS hardware by providing custom hardware with measures of mechanical, assembly and reliability assurance needed for Military or Ruggedized COTS environments.

2. APPLICABLE DOCUMENTS

2.1 Specifications and Standards. The following specifications and standards form a part of this document to the extent specified herein. The issue currently in effect on the date of quotation will be the product baseline, unless otherwise specified. In the event of conflict between the texts of any references cited herein, the text of this document shall take precedence.

Military

MIL-PRF-55310	Oscillators, Crystal Controlled, General Specification For
MIL-PRF-38534	Hybrid Microcircuits, General Specification For

Standards

MIL-STD-202	Test Method Standard, Electronic and Electrical Component Parts
MIL-STD-750	Test Method Standard, Test Methods for Semiconductor Devices
MIL-STD-883	Test Methods and Procedures for Microelectronics

Vectron

QSP-90100	Quality Systems Manual, Vectron International
DOC011627	Identification Common Documents, Materials and Processes, Hi-Rel XO
DOC203982	DPA Specification
QSP-91502	Procedure for Electrostatic Discharge Precautions
DOC208191	Enhanced Element Evaluation for Space Level Hybrid Oscillators

3. GENERAL REQUIREMENTS

3.1 Classification. All devices delivered to this specification are of hybrid technology conforming to Class 2 of MIL-PRF-55310. Primarily developed as a Class S equivalent specification, options are imbedded within it to also produce Class B, Engineering Model and Ruggedized COTS devices. Devices carry a Class 1B ESDS classification per MIL-PRF-38534.

3.2 Item Identification. Unique model number series are utilized to identify device package configurations as listed in Table 1.

3.3 Absolute Maximum Ratings.

a. Supply Voltage Range (V_{CC}):	0Vdc to + 6.0Vdc
b. Control Voltage Range (Vc):	-0.5Vdc to +8.0Vdc
c. Storage Temperature Range (T_{STG}):	-65°C to +125°C
d. Junction Temperature (T_J):	+150°C
e. Lead Temperature (soldering, 10 seconds):	+300°C

3.4 Design, Parts, Materials and Processes, Assembly, Inspection and Test.

3.4.1 Design. The ruggedized designs implemented for these devices are proven in military and space applications under extreme environments. Section 4.0 details the component requirements for the various oscillator design pedigrees. For radiation characteristics, see paragraph 4.1.4.

3.4.1.1 Design and Configuration Stability. Barring changes to improve performance by reselecting passive chip component values to offset component tolerances, there will not be fundamental changes to the design or assembly or parts, materials and processes after first product delivery of that item without written approval from the procuring activity.

3.4.1.2 Environmental Integrity. Designs have passed the environmental qualification levels of MIL-PRF-55310. These designs have also passed extended dynamic levels of at least:

a. Sine Vibration: MIL-STD-202, Method 204, Condition G (30g pk.)
b. Random Vibration: MIL-STD-202, Method 214, Condition II-J (43.92g rms, three-minute duration in each of three mutually perpendicular directions)
c. Mechanical Shock: MIL-STD-202, Method 213, Condition F (1500g, 0.5ms)

3.4.2 Prohibited Parts, Materials and Processes. The items listed are prohibited for use in high reliability devices produced to this specification.

a. Gold metallization of package elements without a barrier metal.
b. Zinc chromate as a finish.
c. Cadmium, zinc, or pure tin external or internal to the device.
d. Plastic encapsulated semiconductor devices.
e. Ultrasonically cleaned electronic parts.
f. Heterojunction Bipolar Transistor (HBT) technology.

3.4.3 Assembly. Manufacturing utilizes standardized procedures, processes and verification methods to produce MIL-PRF-55310 Class S / MIL-PRF-38534 Class K equivalent devices. MIL-PRF-38534 Group B Option 1 in-line inspection is included on design pedigrees E and F per paragraph 7.1part numbers to further verify lot pedigree. Devices are handled in accordance with Vectron document QSP-91502 (Procedure for Electrostatic Discharge Precautions). Element replacement will be as specified in MIL-PRF-38534, Rev L.

3.4.4 Inspection. The inspection requirements of MIL-PRF-55310 apply to all devices delivered to this document. Inspection conditions and standards are documented in accordance with the Quality Assurance, ISO-9001 and AS9100 derived, System of QSP-90100.

3.4.5 Test. The Screening test matrix of Table 4 is tailored for selectable-combination testing to eliminate costs associated with the development/maintenance of device-specific documentation packages while maintaining performance integrity.

3.4.6 Marking. Device marking shall be in accordance with the requirements of MIL-PRF-55310. In addition, when devices are identified with laser marking, the Resistance to Solvents test specified in MIL-PRF-55310 Group C, Mil-PRF-55310 Qualification or MIL-PRF-38534 Group B Inspection will not be performed.

3.4.7 Ruggedized COTS Design Implementation. Design Pedigree "D" devices (see ¶ 5.2) use the same robust designs found in the other device pedigrees. They do not include the provisions of traceability or the Class-qualified components noted in paragraphs 3.4.3 and 4.1.

4. DETAIL REQUIREMENTS

4.1 Components

4.1.1 Resonators. VCSO designs utilize a Surface Acoustic Wave (SAW) resonator as the frequency determining device. The SAW is manufactured and sealed in its own package prior to mounting in the hybrid. Resonators used in flight models will come from lots that have passed MIL-PRF-38534 Lot Acceptance Test for SAW devices plus 100% screening and electrical test prior to installation into the VCSO.

4.1.2 Passive Components.

4.1.2.1 For Design Pedigree E, where available, resistors shall be Established Reliability, Failure Rate R (as a minimum) and capacitors shall be Failure Rate S. Where resistors and capacitors are not available as ER parts, and for all other passive components, the parts shall be from homogeneous manufacturing lots that have successfully completed the Enhanced Element Evaluation of DOC208191 which meets the requirements of Mil-PRF-38534 Revision L for Class K.

4.1.2.2 For Design Pedigree R, where available, resistors shall be Established Reliability, Failure Rate 'R' & capacitors shall be Failure Rate S. Where resistors and capacitors are not available as ER parts and for all other passive components, the parts shall be from homogeneous manufacturing lots that have successfully completed the Class K Element Evaluation of Mil-PRF-38534 Revision K.

4.1.2.3 For Design Pedigree B, all passive elements shall comply with the Element Evaluation requirements of Mil-PRF-55310 Class B as a minimum.

4.1.2.4 For Design Pedigree D, the passive elements will be COTs level or higher.

4.1.3 Microcircuits

4.1.3.1 For Design Pedigree E, the microcircuits shall be from homogeneous wafer lots that meet the Enhanced Element Evaluation requirements in DOC208191 and meet the requirements of Mil-PRF-38534 Revision L for Class K.

4.1.3.2 For Design Pedigree R, microcircuits shall be from homogeneous wafer lots that have successfully completed the MIL-PRF-38534, Revision K Lot Acceptance Tests for Class K.

4.1.3.3 For Design Pedigrees B, microcircuits are procured from wafer lots that have successfully completed the MIL-PRF-55310 Lot Acceptance Tests for Class B as a minimum.

4.1.3.4 For Design Pedigree D, microcircuits can be COTs level or higher.

4.1.4 Semiconductors (transistors, diodes, etc)

4.1.4.1 For Design Pedigree E, the semiconductors shall be from homogeneous wafer lots that meet the Enhanced Element Evaluation requirements in DOC208191.

4.1.4.2 For Design Pedigree R, semiconductors shall be from homogeneous wafer lots that have successfully completed the MIL-PRF-38534, Revision K Lot Acceptance Tests for Class K devices as a minimum.

4.1.4.3 For Design Pedigree B, semiconductors are procured from wafer lots that have successfully completed the MIL-PRF-55310 Lot Acceptance Tests for Class B devices as a minimum.

4.1.4.4 For Design Pedigree D, semiconductors can be COTs level or higher.

4.1.5 Radiation. When optionally specified, further testing is performed on the bipolar transistor for radiation hardness assurance up to 100krad (Si) total ionizing dose (TID) and for Enhanced Element Evaluation as specified in DOC208191. The LVPECL output buffer, identified by a unique part number, has undergone RLAT to 100krad(Si) ELDRS. Varactor diodes are considered insensitive to total ionizing dose effects.

4.1.6 Traceability and Homogeneity. All design pedigrees except option D have active device lots that are traceable to the manufacturer's individual wafer; all other elements and materials are traceable to their manufacturer and incoming inspection lots. Design pedigrees E and F have homogenous material. A production lot, as defined by Vectron, is all oscillators that have been kitted and assembled as a single group. After the initial kitting and assembly, this production lot may be divided into multiple sublots to facilitate alignment and test capacity.

4.1.7 Packages. Packages are procured that meet the construction, lead materials and finishes as specified in MIL-PRF-55310. All leads are Kovar with gold plating over a nickel underplate. Package lots are evaluated in accordance with the requirements of MIL-PRF-38534 as applicable. Vectron will not perform Salt Spray testing as part of MIL-PRF-55310 Group C/Qualification. In accordance with MIL-PRF-55310, package evaluation results for salt atmosphere will be substituted for Salt Spray testing during MIL-PRF-55310 Group C/Qualification.

4.2 Mechanical.

4.2.1 Package Outline. See Table.

4.2.2 Thermal Characteristics. Because these VCSO's are multichip hybrid designs, the actual θ_{jc} to any one given semiconductor die will vary, but the junction temperature of any one die will not exceed +105°C when computed with a nominal supply voltage, nominal component values and operating at the maximum case temperature of +85°C.

4.2.3 Weight. 3.5 grams typical

4.2.4 Lead Forming. When lead forming option is specified, the applicable leak test specified in screening will be performed after forming.

4.3 Electrical.

4.3.1 Supply Voltage. Devices are designed for standard +3.3V ±5%.

4.3.2 Temperature Range. Operating range is -40°C to +85°C.

4.3.3 Absolute Pull Range. Absolute pull range is defined as the minimum guaranteed amount the VCXO can be varied, about the center frequency (fo). It accounts for degradations including initial frequency tolerance, temperature stability (-40 to 85°C), aging (15 years), radiation effects, power supply variations (±5%) and load variations (±10%).

4.3.4 Frequency Aging. When tested in accordance with MIL-PRF-55310 Group B inspection, the 15-year aging projection shall not cause the minimum APR limit to be exceeded.

4.3.5 All devices include an External Frequency Control (EFC) pin for the purpose of externally pulling each VCSO back to its nominal frequency.

4.3.6 Output Load. Complementary LVPECL

5. QUALITY ASSURANCE PROVISIONS AND VERIFICATION

5.1 Verification and Test. Device lots shall be tested prior to delivery in accordance with the applicable Screening Option letter as stated by the 15th character of the part number. Table 4 tests are conducted in the order shown and annotated on the appropriate process travelers and data sheets of the governing test procedure. For devices that require Screening Options that include MIL-PRF-55310 Group A testing, the Post-Burn-In Electrical Test and the Group A Electrical Test are combined into one operation.

5.1.1 Screening Options. The Screening Options, by letter, are summarized as:

- A Modified MIL-PRF-38534 Class K Screening
- B Modified MIL-PRF-55310 Class B Screening & Group A QCI
- C Modified MIL-PRF-55310 (Rev E) Class S Screening & Group A QCI
- D Modified MIL-PRF-38534 Class K Screening & 30-day Aging
- E Modified MIL-PRF-55310 Class B Screening & Groups A & B QCI
- F Modified MIL-PRF-55310 (Rev E) Class S Screening & Groups A & B QCI
- G Modified MIL-PRF-55310 Class B Screening & Post BI Nominal Electricals
- S MIL-PRF-55310 (Rev F) Class S Screening & Groups A & B QCI
- X Engineering Model (EM)

5.2 Optional Design, Test and Data Parameters. The following is a list of design, assembly, inspection and test options that can be selected or added by explicit purchase order request.

a. Design Pedigree (choose one as the 5th character in the part number):
   - (E) Enhanced Element Evaluation (MIL-PRF-38534 Rev L for Class K components as specified in DOC208191)
   - (R) M38534 Rev K, Class K die & passive components
   - (B) Class B die & passive components
   - (D) COTs components

b. Input Voltage, (A) for +3.3V as the 14th character

c. Not used

d. Radiographic Inspection

e. Group C Inspection: MIL-PRF-55310 Rev E (requires 8 destruct specimens)

f. Group C Inspection: MIL-PRF-55310, Rev F (requires 8 destruct specimens, includes Random Vibration, MIL-STD-883, Method 1014 Leak Test and Life Test)

g. Group C Inspection: MIL-PRF-38534, Table C-Xc, Condition PI [requires 8 destruct specimens – Life (5), RGA (3)]. Subgroup 1 fine leak test to be performed per MIL-STD-202, Method 112, Condition C.

h. Internal Water-Vapor Content (RGA) samples and test performance

i. MTBF Reliability Calculations

j. Worst Case Circuit Analysis (unless otherwise specified, MIL-HDBK-1547)

k. Derating and Thermal Analysis (unless otherwise specified, MIL-HDBK-1547 with Tj Max = +105°C; Case Temperature = +85°C)

l. Process Identification Documentation (PID)

m. Customer Source Inspection (pre-cap / final)

n. Destruct Physical Analysis (DPA): MIL-STD-1580 with exceptions as specified in Vectron DOC203982.

o. Qualification: In accordance with MIL-PRF-55310 Rev F, Table IV (requires 16 destruct specimens).
p. Qualification: In accordance with EEE-INST-002, Section C4, Table 3, Level 1 or 2 (requires 11 destruct specimens)
q. High Resolution Digital Pre-Cap Photographs (20 Megapixels minimum)
r. Hot solder dip of leads with Sn63/Pb37 solder prior to shipping.
s. As Designed Parts, Materials and Processes List

5.2.1 NASA EEE-INST-002. A combination of Design Pedigree R, Option S Screening, and Qualification per EEE-INST-002, Section C4, Table 3 meet the requirements of Level 1 device reliability.

5.3 Test Conditions. Unless otherwise stated herein, inspections are performed in accordance with those specified in MIL-PRF-55310 and MIL-PRF-38534, in that order. Process travelers identify the applicable methods, conditions and procedures to be used. Examples of electrical test procedures that correspond to MIL-PRF-55310 requirements are shown in Table 3.

5.4 Deliverable Data. The manufacturer supplies the following data, as a minimum, with each lot of devices (except devices with Screening Option X):
a. Completed assembly and Screening lot travelers & Screening data, including radiographic images, rework history and Certificate of Conformance.
b. Electrical test variables data, identified by unique serial number.
c. Special items when required by purchase order such as Group C data and RGA data.
d. Traceability, component LAT & enclosure LAT and RLAT (if specifically requested on the purchase order).

5.5 Discrepant Material. All MRB authority resides with the procuring activity.

5.5.1 Failure Analysis. Any failure during Qualification or Group C Inspection will be evaluated for root cause. The customer will be notified after occurrence and upon completion of the evaluation.

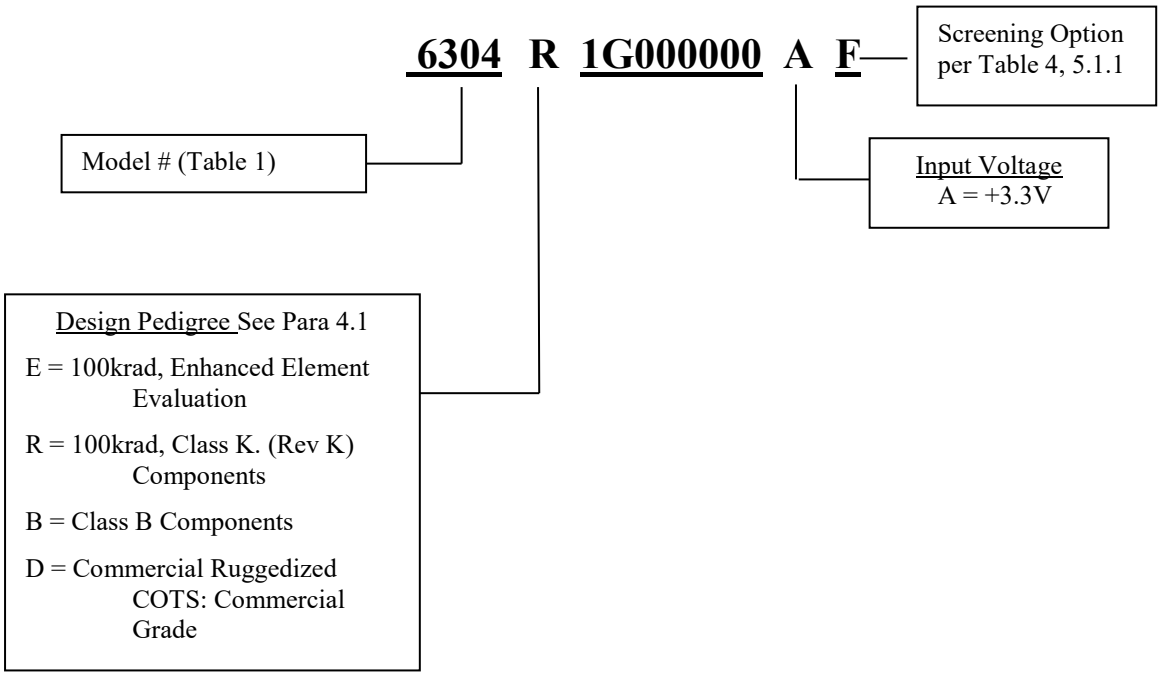
6. PREPARATION FOR DELIVERY

6.1 Packaging. Devices will be packaged in a manner that prevents handling, ESD and transit damage during shipping.

7. ORDERING INFORMATION

7.1 Ordering Part Number. The ordering part number is made up of an alphanumeric series of 15 characters. Design-affected product options, identified by the parenthetic letter on the Optional Parameters list (¶ 5.2a and b), are included within the device part number.

The Part Number breakdown is described as:



7.1.1 Model Number. The device model number is the four (4) digit number assigned to a corresponding package and output combination per Table 1.

7.1.2 Design Pedigree. Class S variants correspond to either letter "E" or "R" and are described in paragraph 5.2a. The Class B variant corresponds to letter "B" and is described in paragraph 5.2a. Ruggedized COTS, using commercial grade components, corresponds to letter "D".

7.1.3 Output Frequency. The nominal output frequency is expressed in the format as specified in MIL-PRF-55310 utilizing eight (8) characters.

7.1.4 Input Voltage. Voltage is the 14th character, letter "A" = represents +3.3V.

7.1.5 Screening Options. The 15th character is the Screening Option (letter A thru G or X) selected from Table 4.

7.2 Optional Design, Test and Data Parameters. Test and documentation requirements above that of the standard high reliability model shall be specified by separate purchase order line items (as listed in ¶ 5.2c thru s).

HI-REL STANDARD MODEL #	PACKAGE	MECHANICAL OUTLINE and PIN CONNECTIONS
6304	20 Lead Flatpack	FIGURE 2
6320	20 Lead Flatpack With formed leads	FIGURE 3

TABLE 1 - Item Identification and Package Outline

Frequency Range: 300 MHz to 1.000 GHz
Temperature Range: -40°C to +85°C
Initial Tolerance: -50 ppm to +150 ppm typical
Frequency-Voltage Tolerance: ±5 ppm typical (Vcc ±5%)
Frequency Aging: ±30 ppm typical (projected over 15 years)
Supply Voltage: +3.3V ±5%
Absolute Pull Range: ±20 ppm min. (See paragraph 4.3.3)
Control Voltage (Vc) Range: 0 V to +3.3V
Input Impedance: 100kΩ min.
Modulation Bandwidth: 100kHz min.(Fo ≥ 500MHz), 50kHz min.(Fo < 500MHz)
Slope: Positive
Linearity: ±10% max.
F vs. V Gain: 90 ppm/V typical
Output Voltage: V_{OH}= Vcc-1.085 to Vcc-0.880, V_{OL}=Vcc-1.830 to Vcc-1.555
Sub-Harmonics: None
Phase Noise: See Figure 1
Supply Current, No load: 65mA max
Rise / Fall Time: 900 ps max.)
Duty Cycle: 40/60%

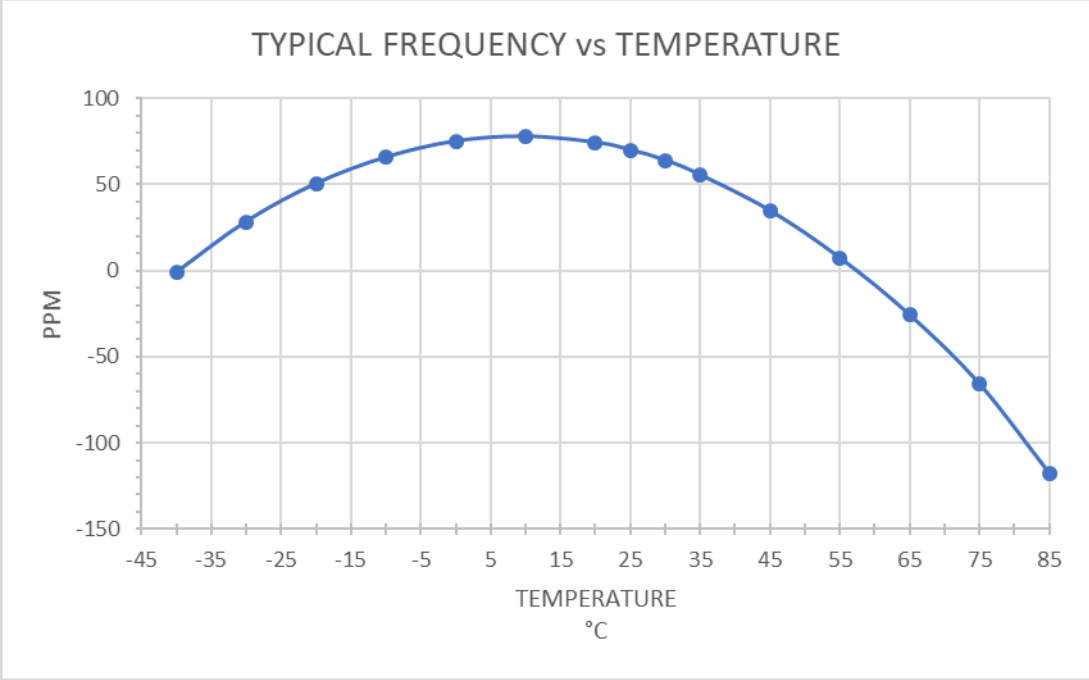
TABLE 2 - Electrical Performance Characteristics

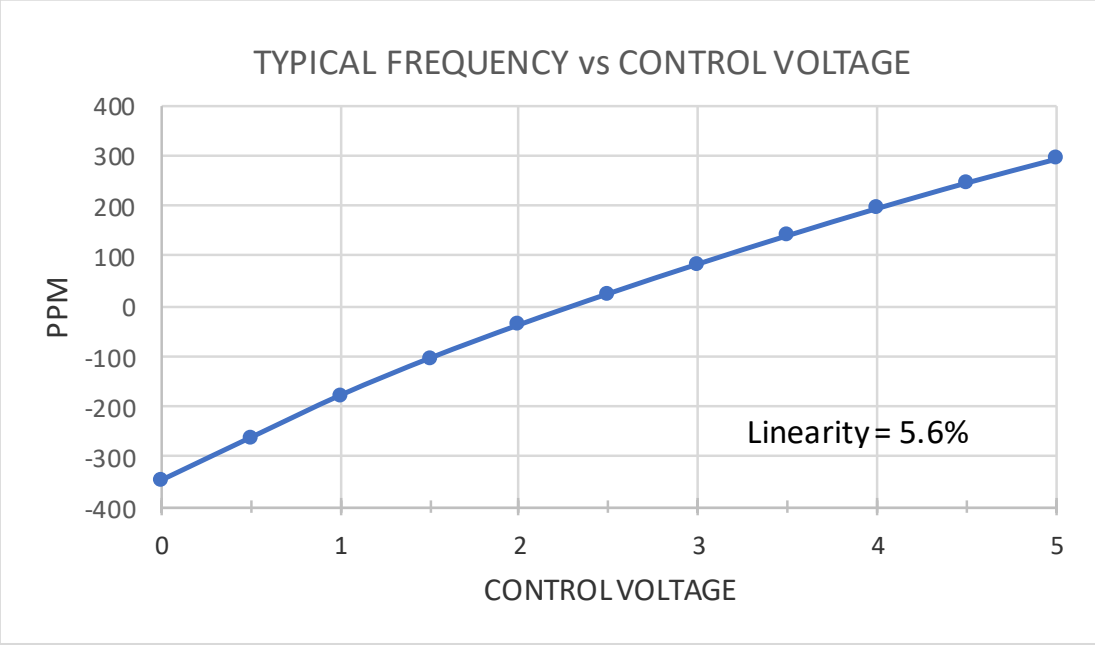
Nominal Frequency (MHz)	Typical Period Jitter 1 sigma (ps)	Typical Period Jitter peak-to-peak (ps)	Phase Jitter 12kHz to 20MHz (ps)
300	6	50	0.10
1000	2	16	0.05

TABLE 2A - Typical Jitter

OPERATION LISTING	REQUIREMENTS AND CONDITIONS 1/
@ all Electrical tests	
Input Current (no load)	MIL-PRF-55310, Para 4.8.5.1
Initial Accuracy @ Ref. Temp.	MIL-PRF-55310, Para 4.8.6
Output Logic Voltage Levels	MIL-PRF-55310, Para 4.8.21.3
Rise and Fall Times	MIL-PRF-55310, Para 4.8.22
Duty Cycle	MIL-PRF-55310, Para 4.8.23
@ Post Burn-In Electrical only	
Overvoltage Survivability	MIL-PRF-55310, Para 4.8.4
Freq. – Voltage Tolerance	MIL-PRF-55310, Para 4.8.14

TABLE 3 - Electrical Test Parameter


TYPICAL FREQUENCY vs TEMPERATURE
100
50
0
-50
-100
-150
PPM
-45
-35
-25
-15
-5
5
15
25
35
45
55
65
75
85
TEMPERATURE
°C


TYPICAL FREQUENCY vs CONTROL VOLTAGE
400
300
200
100
0
-100
-200
-300
-400
PPM
Linearity = 5.6%
0
1
2
3
4
5
CONTROL VOLTAGE

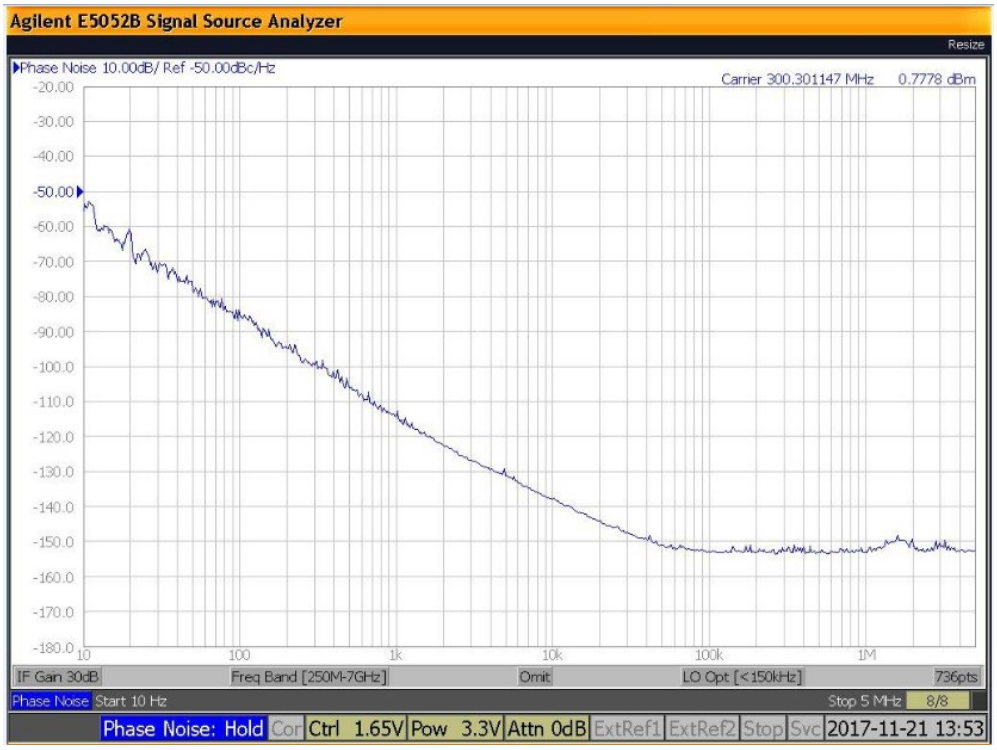


Figure 1A – Typical Phase Noise @ 300.000MHz

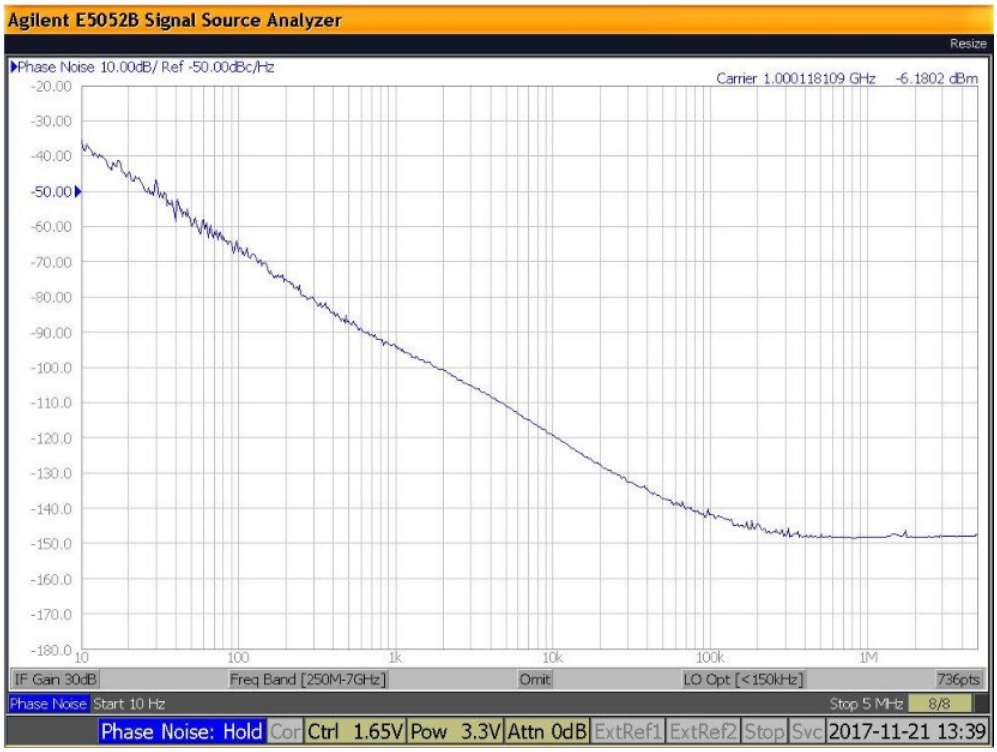


Figure 1B – Typical Phase Noise @ 1.000GHz

OPN. NO.	OPERATION LISTING	REQUIREMENTS AND CONDITIONS	Option A	Option B	Option C	Option D	Option E	Option F	Option G	Option S	Option X
	SCREENING	MIL Class Similarity (MIL-PRF-55310, Class S/B or MIL-PRF-38534, Class K)	K 100%	B- 100%	S- 100%	K+ 100%	B 100%	S (Rev E) 100%	100%	S (Rev F) 100%	EM 100%
1	Non-Destruct Bond Pull	MIL-STD-883, Meth 2023	X	NR	X	X	NR	X	NR	X	NR
2	Internal Visual	MIL-STD-883, Meth 2017 Class K, Meth 2032 Class K	X	X	X	X	X	X	X	X	X
3	Stabilization (Vacuum) Bake	MIL-STD-883, Meth 1008, Cond C, 150°C	X 48 hrs.	X 24 hrs.	X 48 hrs.	X 48 hrs.	X 24 hrs.	X 48 hrs.	X 24 hrs.	X 48 hrs.	X 24 hrs.
4	Random Vibration	Mil-STD-883, Meth 2026, TC, I-B, 15 mins in each axis	NR	NR	NR	NR	NR	X	NR	NR	NR
5	Thermal Shock	MIL-STD-883, Meth 1011, Cond A	NR	NR	X	NR	NR	X	NR	X	NR
6	Temperature Cycle	MIL-STD-883, Meth 1010, Cond. B (except Option S), 10 cycles min.	X	X	X	X	X	X	X	X Cond. C	NR
7	Constant Acceleration	MIL-STD-883, Meth 2001, Cond A, Y1 plane only, 5000 g's	X	X	X	X	X	X	X	X	NR
8	Particle Impact Noise Detection	MIL-STD-883, Meth 2020, Cond B (except Option S)	X	X	X	X	X	X	NR	X Cond. A	X
9	Electrical Testing, Pre Burn-In	Perform tests in Table 3. Nominal Vcc, nominal temperature	X	X	X	X	X	X	X	X	X
10	1st Burn-In	MIL-STD-883, Meth 1015, Condition B	X 160 hrs.	X 160 hrs.	X 240 hrs.	X 160 hrs.	X 160 hrs.	X 240 hrs.	X 160 hrs.	X 240 hrs.	NR
11	Electrical Testing, Intermediate	Perform tests in Table 3. Nominal Vcc, nominal temperature	X	NR	NR	X	NR	NR	NR	NR	NR
12	2nd Burn-In	MIL-STD-883, Meth 1015, Condition B	X 160 hrs.	NR	NR	X 160 hrs.	NR	NR	NR	NR	NR
13	Electrical Testing, Post Burn-In (Group A)	Perform tests in Table 3. Nominal Vcc & extremes, nominal temperature & extremes	X	X	X	X	X	X	X nom. Vcc	X	NR
14	Seal: Fine Leak Seal: Gross Leak	MIL-STD-202, Meth 112, Cond C (5×10^{-8} atm cc/sec max) MIL-STD-202, Meth 112, Cond D	X	X	X	X	X	X	X	NR	X
15	Seal: Fine Leak Seal: Gross Leak	MIL-STD-883, Meth 1014, Cond A2 or B1 MIL-STD-883, Meth 1014, Cond B2 or B3	NR	NR	NR	NR	NR	NR	NR	X	NR
16	Radiographic Inspection	MIL-STD-883, Meth 2012	X	AR	AR	X	AR	X	NR	X	NR
17	Solderability	MIL-STD-883, Meth 2003	1/	1/	1/	1/	1/	1/	1/	1/	NR
18	External Visual & Mechanical	MIL-STD-883, Meth 2009	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/
19	Aging, 30 Day 3/ (M55310 Group B)	MIL-PRF-55310, para. 4.8.35.1	NR	NR	NR	X	13 pcs.	X	NR	X	NR
20	Group C Inspection (optional)	See Para 5.2 herein for details of supplier recommended Group C Inspection options	5.2(g)	5.2(e)	5.2(e)	5.2(g)	5.2(e)	5.2(e)	5.2(e)	5.2(f)	NR

LEGEND: X = Required, NR = Not Required, AR = As Required

TABLE 4 - Test Matrix

1/ Performed at package LAT. Include LAT data sheet

2/ When specified, RGA samples will be removed from the lot after completion of this operation. Use of Screening failures require customer concurrence.

3/ By customer request, the Aging test may be terminated after 15 days if the measured aging rate is less than one-half the specified aging rate, as described in paragraph 4.3.4.1 herein. See the customer PO.

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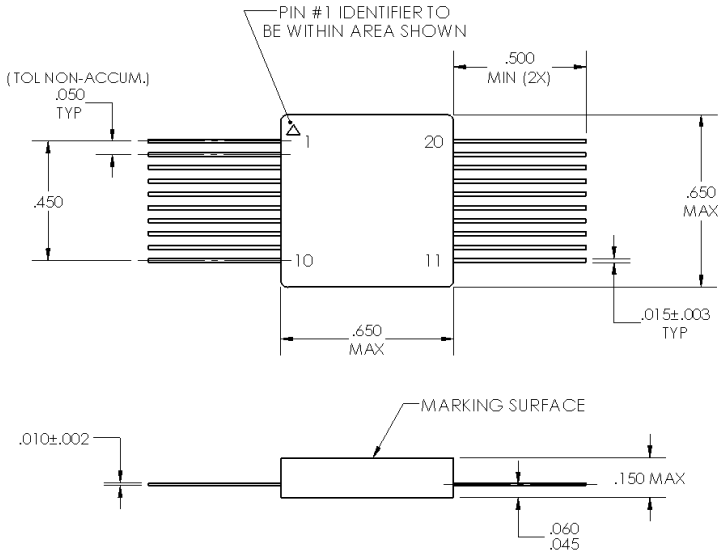

FIGURE 2
Model 6304 Package Outline

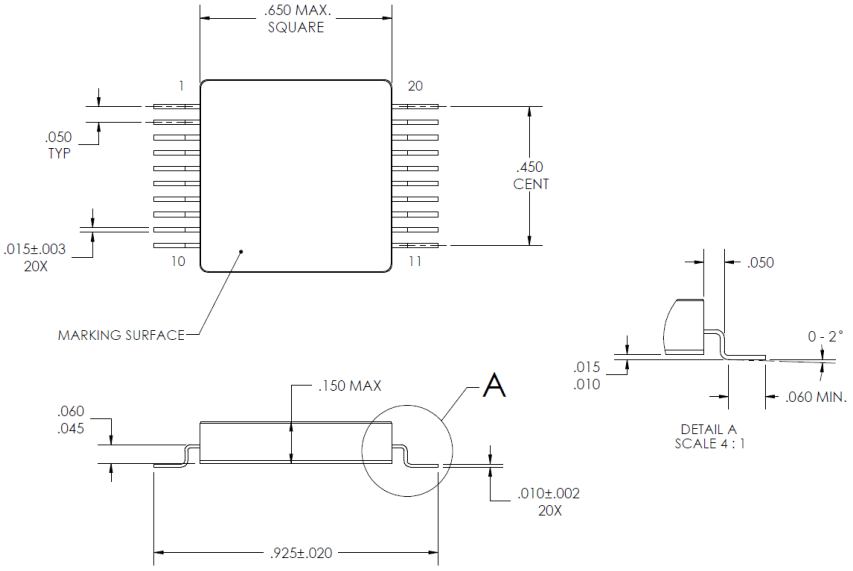

FIGURE 3
Model 6320 Package Outline

PIN CONNECTIONS FOR FIGURES 2 & 3				
Vcc	Vc	Q	Qnot	Gnd/Case
20	1	7	9	2, 8, 10

1/. All unassigned pins have no internal connections or ties.
2/. 6320 is a lead formed version of 6304.

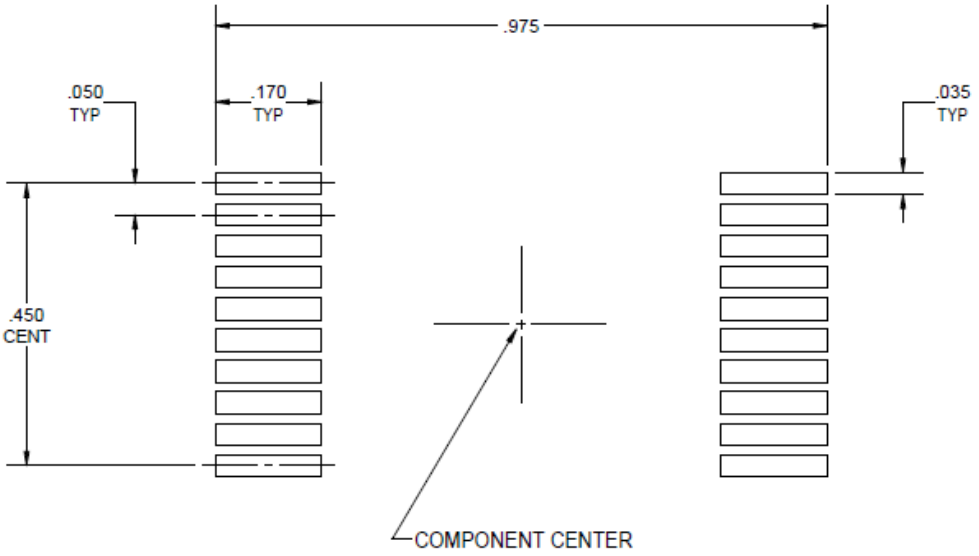

Figure 4
Recommended Land Pattern for Lead Formed version Model 6320