

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Updated resistance to soldering heat requirement. Updated to latest DSCC drawing format.	7 FEB 02	K. Cottongim
B	Addition of pure tin prohibition requirements. Editorial changes throughout.	30 July 2007	M. Radecki
C	Update to the latest DLA Land and Maritime drawing format.	10 October 2013	M Radecki

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3  
HAS CHANGED NAMES TO:  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-3990

Prepared in accordance with [ASME Y14.100](#)

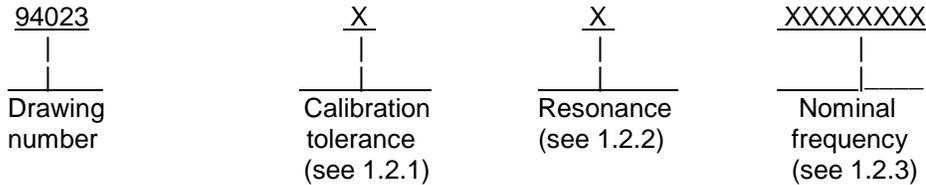
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PMIC N/A	PREPARED BY Fred W. Lester		DESIGN ACTIVITY DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH																
Original date of drawing  October 31, 1996	CHECKED BY Fred W. Lester		TITLE CRYSTAL UNIT, QUARTZ, MINIATURE, SURFACE MOUNT																
	APPROVED BY David E. Moore																		
	SIZE A	CODE IDENT. NO. <b>037Z3</b>	DWG NO. <b>94023</b>																
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a miniature quartz crystal unit, surface mount, with a frequency range of 10 to 2,100 kilohertz, supplied to the requirements of this drawing specified herein.

1.2 Part or Identifying Number (PIN). The PIN for the drawing will be as shown in the following example:



1.2.1 Calibration tolerance. The calibration tolerance will be denoted by the use of one of three letters (see table I).

TABLE I. Calibration tolerance.

Frequency mode of vibration at +25°C	A	B	C
10 - 74.9 kHz tuning fork flexure	± 0.003%	± 0.01%	± 0.10%
75 - 169 kHz tuning fork flexure	± 0.005%	± 0.01%	± 0.10%
170 - 249 kHz tuning fork flexure	± 0.010%	± 0.02%	± 0.20%
250 - 600 kHz tuning fork flexure	± 0.020%	± 0.05%	± 0.50%
530 - 2.10 MHz extensional mode	± 0.050%	± 0.10%	± 1.0%

1.2.2 Resonance. The resonance of the crystal unit can be denoted with either an H or V letter.

H: Denotes parts that are designed for series oscillator circuits.

V: Denotes parts that are designed for Pierce oscillator circuits.

1.2.3 Nominal frequency. The nominal frequency expressed in hertz is identified by a field of eight characters consisting of digits and a letter (M or K) representing, simultaneously, the decimal point and the kilohertz or megahertz multiplier.

All digits preceding and following the letter (M or K) of the group represent significant figures.

The following are examples of using the eight characters in constructing the frequency.

<u>Compressed notation</u>	<u>Used for frequencies In the noted range</u>
DDKDDDDD	10.00000 to 41.00000 kilohertz
DMDDDDDD	5.000000 to 9.999999 megahertz
DDMDDDDD	10.00000 to 41.00000 megahertz

Where D signifies a single digit from 0 to 9.

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2. APPLICABLE DOCUMENT

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-3098 - Crystal Units, Quartz, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202 - Electronic and Electrical Component Parts.

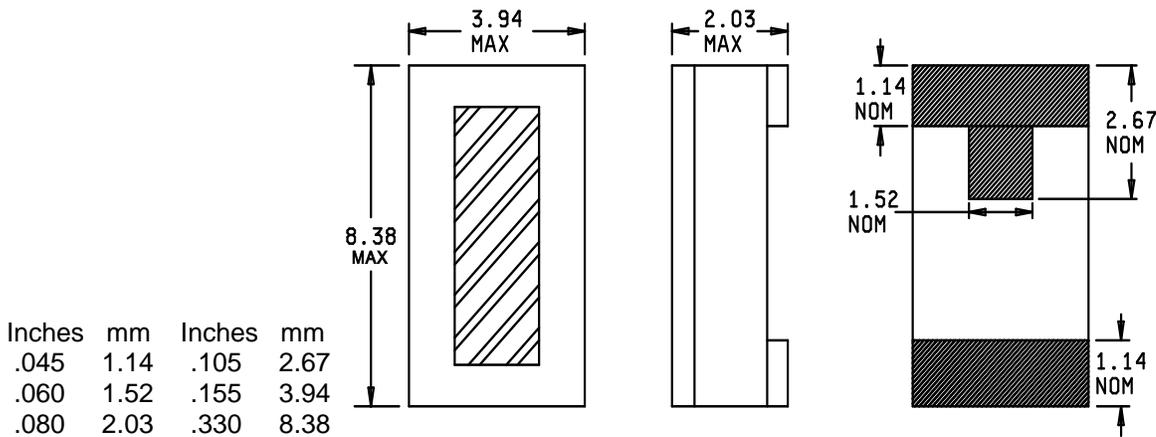
MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or <https://assist.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interface and physical dimensions. The individual item requirements shall be as specified herein and [table II](#).



NOTES:

1. Dimensions are in metrics.
2. Inch equivalents are given for general information only.
3. Unless otherwise specified, tolerances are  $\pm 0.25$  mm (.010 inch) for two place decimals.

FIGURE 1. Design and dimensions.

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TABLE II. Requirements.

Requirements	Specified value or condition
Dimensions and configurations	See <a href="#">figure 1</a> .
Temperature range	-55°C to +125°C.
Frequency range	10 to 2,100 kHz.
Drive level	For V resonance:
	10 - 25 kHz tuning fork flexure - 0.5 μW maximum. 25 - 600 kHz tuning fork flexure - 1.0 μW maximum. 530 - 2.10 MHz extensional mode - 3.0 μW maximum.
	For H resonance:
	10 - 25 kHz tuning fork flexure - 1.5 μW maximum. 25 - 600 kHz tuning fork flexure - 3.0 μW maximum. 530 - 2.10 MHz extensional mode - 5.0 μW maximum.
Calibration tolerance	In accordance with table I.
Capacitance, shunt	1.5 pF for 10-600 kHz tuning fork flexure. 1.2 pF for 530-2,000 kHz extensional mode.
Aging, during first year	5 ppm maximum for 10-499 kHz. 10 ppm maximum for 500-2,000 kHz.
Shock <u>1/</u>	10 kHz - 600 kHz tuning fork flexure, <a href="#">method 213 of MIL-STD-202</a> , test condition E.
	530 kHz - 2.10 MHz extensional mode, <a href="#">method 213 of MIL-STD-202</a> , using peak value of 750 g's, 1 ms duration and 1/2 sine wave.
Thermal shock	<a href="#">Method 107 of MIL-STD-202</a> , test condition B.
Vibration <u>1/</u>	10 kHz - 600 kHz tuning fork flexure, <a href="#">method 204 of MIL-STD-202</a> , test condition D.
	530 kHz - 2.10 MHz extensional mode, <a href="#">method 204 of MIL-STD-202</a> , test condition C.
Moisture resistance	<a href="#">Method 106 of MIL-STD-202</a> .
Resistance to soldering heat	<a href="#">Method 210 of MIL-STD-202</a> , test condition B.
Solderability of leads	<a href="#">Method 208 of MIL-STD-202</a> .

1/ Frequency change permitted: ±.0005 percent. Equivalent resistance change permitted: ±10 percent.

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3.2 Marking. Marking of the miniature crystal unit is not required; however, each unit package shall be marked in accordance with [MIL-STD-1285](#) and include the PIN as specified herein (see 1.2), the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot codes.

3.3 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of circuit breaker components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.3).

3.4 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.5 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.

3.6 Workmanship. The miniature crystal units shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

#### 4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not applicable to this document.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of the group A inspections in accordance with [MIL-PRF-3098](#), provided they are listed in this drawing.

#### 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

#### 6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. Crystal units conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing will become inactive for new design. The qualified product will be the preferred item for all applications.

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6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN number (see 1.2).
- b. Requirements for notification of change in product to acquiring activity, if applicable.
- c. Requirements for packaging, and packing.

6.3 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Environmentally preferable materials. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see [Section 3](#)).

6.5 Users of record. Coordination of this document for future revisions is coordinated only with the approved sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at [CircuitProtect@dla.mil](mailto:CircuitProtect@dla.mil) or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0548 or DSN 850-0548.

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6.6 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at [CircuitProtect@dla.mil](mailto:CircuitProtect@dla.mil), or by contacting DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0548 or DSN 850-0548.

DLA Land and Maritime drawing PIN <u>1/</u>	Vendor commercial PIN	Vendor CAGE number	Vendor name and address
94023AH(XXXXXXXX)	CX-1HS-SM2*****A	51791	Statek Corporation 512 North Main Street Orange, CA 92868-1102 Phone number (714) 639-7810 Facsimile number (714) 997-1256 E-mail: <a href="mailto:sales@statek.com">sales@statek.com</a> Uniform Resource Locator (URL): <a href="http://www.statek.com/">http://www.statek.com/</a>
94023AV(XXXXXXXX)	CX-1VS-SM2*****A	51791	
94023BH(XXXXXXXX)	CX-1HS-SM2*****B	51791	
94023BV(XXXXXXXX)	CX-1VS-SM2*****B	51791	
94023CH(XXXXXXXX)	CX-1HS-SM2*****C	51791	
94023CV(XXXXXXXX)	CX-1VS-SM2*****C	51791	

1/ Parts must be purchased to this DLA Land and Maritime PIN to assure that all performance requirements and tests are met.

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