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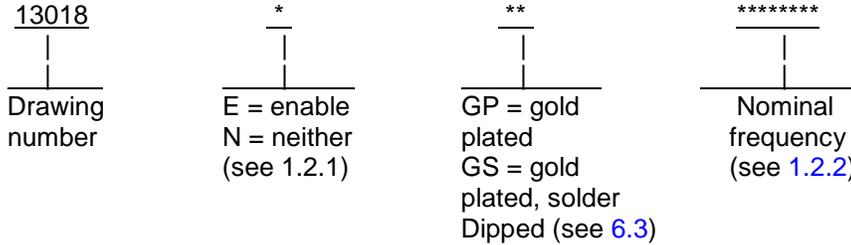
Prepared in accordance with [ASME Y14.100](#)

| REV STATUS OF PAGES | REV | | | | | | | | | | | | | | | | | |
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| PMIC N/A | PREPARED BY Fred W. Lester | | | | | | | DESIGN ACTIVITY DLA LAND AND MARITIME COLUMBUS, OH | | | | | | | | | | |
| Original date of drawing 11 April 2013 | CHECKED BY Kurt L. Anderson | | | | | | | TITLE OSCILLATOR, CRYSTAL CONTROLLED, 3.3 VOLT, ENABLE/TRI-STATE, 32.768 KHZ TO 160 MHZ, TTL AND CMOS COMPATIBLE, SURFACE MOUNT | | | | | | | | | | |
| | APPROVED BY Michael A. Radecki | | | | | | | | | | | | | | | | | |
| | SIZE A | CODE IDENT. NO. 037Z3 | | | | | | | DWG NO. 13018 | | | | | | | | | |
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1. SCOPE

1.1 Scope. This drawing describes the requirements of a enable/tri-state, miniature, surface mount crystal controlled oscillator with a frequency range of 32.768 kilohertz (kHz) to 160 megahertz (MHz), TTL and CMOS compatible, rated at 3.3 volts, meeting the requirements of MIL-PRF-55310 product level B, type 1, class 2 supplied to the requirements of this drawing specified herein.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as follows:



1.2.1 Enable/disable. This device has two enable/disable options: E and N. The E option has a tri-state output and stops oscillating internally when the output is put into the high Z state. The N output does not have PIN 1 connected internally and so has no enable/disable capability. Table I describes the Enable/Disable option E.

Table I. Enable/disable option E function.

| | Enable (PIN 1 High) ^{1/} | Disable (PIN 1 Low) |
|----------------|-----------------------------------|---------------------|
| Output (PIN 3) | Frequency Output | High Z state |
| Oscillator | Oscillates | Stops |
| Current | Normal | Very low |

^{1/} When PIN 1 is allowed to float, it is held high by an internal pull-up resistor.

1.2.2 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 digits.

The following are examples of using the eight characters in constructing the frequency, where D signifies a single digit from 0 to 9.

| | |
|----------------------------|--|
| <u>Compressed notation</u> | <u>Used for frequencies in the noted range</u> |
| DDDKDDDD | 312.0000 to 999.9999 kilohertz |
| DMDDDDDD | 1.000000 to 9.999999 megahertz |
| DDMDDDDDD | 10.000000 to 99.999999 megahertz |
| DDDMDDDDDD | 100.000000 to 170.000000 megahertz |

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2. APPLICABLE DOCUMENTS

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

[MIL-PRF-55310](#) - Oscillator, Crystal Controlled, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

- [MIL-STD-202](#) - Test Methods for Electronic and Electrical Component Parts.
- [MIL-STD-790](#) - Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specifications.
- [MIL-STD-1285](#) - Marking of Electrical and Electronic parts.
- [MIL-STD-1686](#) - Electrostatic Discharge Control Handbook for the Protection of Electrical and Electronic Parts, Assemblies, and Equipment (excluding electrically initiated explosive devices).

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

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.5).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

[ASTM B454](#) - Tin, Electrodeposited Coatings of

(Copies of this document is available online at <http://www.astm.org/> or from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

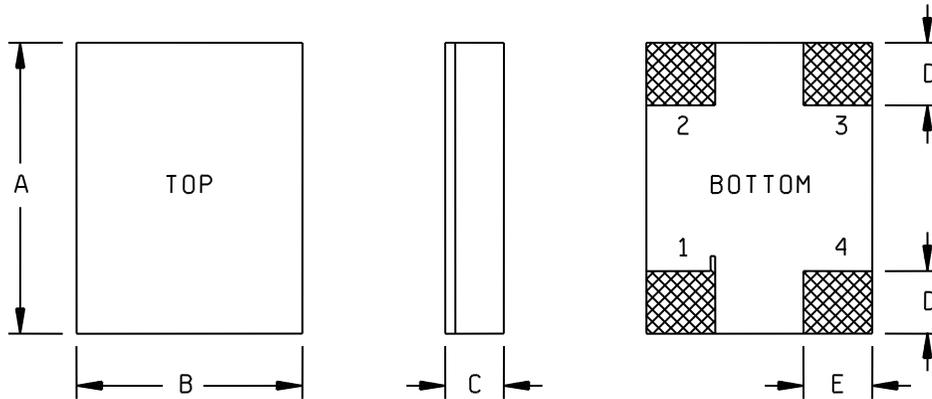
2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Electrical characteristics and other requirements. Electrical characteristics and other requirements shall be as specified in [table II](#).

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| Dimensions | Typical | | Maximum | |
|------------------|---------|------|---------|------|
| | Inches | mm | Inches | mm |
| A | 0.126 | 3.20 | 0.136 | 3.40 |
| B | 0.099 | 2.50 | 0.107 | 2.70 |
| C (GP) (see 1.2) | 0.039 | 1.00 | 0.043 | 1.06 |
| C (GS) (see 1.2) | 0.044 | 1.12 | 0.048 | 1.21 |
| D | 0.040 | 1.00 | 0.041 | 1.10 |
| E | 0.030 | 0.75 | 0.031 | 0.85 |

| Pin No. | Function |
|---------|--|
| 1 | Output Enable/Disable (E) or no connection (N) |
| 2 | Ground |
| 3 | Output |
| 4 | VDD |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ± 0.005 (0.13 mm) for three place decimals and ± 0.02 (0.5 mm) for two place decimals.
4. Lead numbers are for reference only and are not marked on unit.

FIGURE 1. Design and dimensions.

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TABLE II. Requirements

| | |
|--------------------------------------|---|
| Requirements | Specified value or condition. |
| Dimensions and configurations | See figure 1 . |
| Supply voltage | 3.3 volts \pm 10 percent |
| Minimum output voltage – high level | The minimum output voltage - high level, V_{OH} , shall not be less than $0.9 \cdot V_{DD}$. |
| Maximum output voltage – low level | The maximum output voltage - low level, V_{OL} , shall not be more than $0.1 \cdot V_{DD}$. |
| Calibration tolerance | \pm 100 parts per million (ppm) |
| Frequency stability over temperature | \pm 100 ppm |
| Frequency-voltage tolerance | Initial frequency-voltage tolerance over the operating voltage range shall be \pm 4 ppm maximum at acquisition. Measurements shall be taken at -55° C, +23° C to +125° C. |
| Supply current @ 3.3 volts | 23.0 mA for 130 MHz 6.0 mA for 50 MHz 5.0 mA for 32 MHz 3.0 mA for 24 MHz |
| CMOS load | 15 picofarads (pF) |
| Start-up time | 5 milliseconds (ms) maximum |
| Rise/Fall time | 6 nanoseconds (ns) maximum. |
| Duty cycle | 45 percent minimum, 55 percent maximum. |
| Aging, first year | 5 ppm maximum. |
| Shock, survival | 30,000 g peak 0.3 ms, ½ sine |
| Vibration, survival | 20 g RMS 10-2000 Hz swept sine |
| Seal | Hermetic, in accordance with MIL-PRF-55310. Maximum leakage rate shall be 5×10^{-8} atm-cc/s. |
| AC Characteristics | The output shall be connected to a load of 15 picofarads to ground. |
| DC Characteristics | Negative current values indicate current flowing out of the device. |
| Operating temperature range | -55°C to +125°C |
| Storage temperature range | -55°C to +125°C |

3.3 Marking. Marking of the miniature crystal oscillator 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.

3.4 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of crystal oscillator 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](#)).

3.5 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.

3.6 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply (see [4.7](#) and [6.7](#)).

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

4. VERIFICATION

4.1 QPL system. The QPL system specified in MIL-PRF-55310 and maintained in accordance with MIL-STD-790 is not applicable to this document.

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

4.3 Screening. Miniature crystal oscillator units to be delivered shall have been subjected to and passed all the screening tests in accordance with paragraph 4.4 of MIL-PRF-55310, product level B, class 2, type 1.

4.4 Conformance inspection.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and B inspections of MIL-PRF-55310 for product level B, class 2, type 1 crystal oscillators.

4.4.1.1 Group A inspection. Group A inspection shall be in accordance with paragraph 4.7.1.4 of MIL-PRF-55310.

4.4.1.2 Group B inspection. Group B inspection shall be in accordance with paragraph 4.7.1.5 of MIL-PRF-55310.

4.4.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group B requirements in lieu of performing group B tests (see 6.5d).

4.5 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection, examination, and test requirements specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections, examinations, or tests set forth in this description where such inspections, examinations, and tests are deemed necessary to assure supplies and services conform to prescribed requirements.

4.6 Contractor certification statement. The contractor shall certify and maintain objective quality evidence that the product offered meets the requirements of this drawing, and that the product conforms to the producer's own drawings, specifications, standards, quality assurance practices, and is the same as the product provided as a bid sample. The Government reserves the right to require proof of such conformance prior to the first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

4.7 Certificate of compliance. A certificate of compliance shall accompany all miniature crystal oscillator units supplied to this drawing.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.5). 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 activities 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.

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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 oscillators 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.

6.2 ESD Sensitive Units. ESD sensitive devices shall be packaged in accordance with MIL-STD-1686 in a manner that shields the items from extraneous radiation and/or static electricity, or discharge. All packaging shall be marked ESD sensitive as specified in MIL-STD-1686.

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

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging, and packing.
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements.

6.6 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 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.

6.7 Submission of certificate of compliance. The certificate of compliance submitted to DLA Land and Maritime/VAT, prior to listing as an approved source, will state the manufacturer's product meets the requirements herein.

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6.8 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 <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> , <u>2/</u> | Vendor commercial PIN | Vendor CAGE number | Vendor name and address |
|---|------------------------|--------------------|--|
| 13018EGP***** | CXOXHG4ESM1-*****,A4BB | 51791 | Statek Corporation 512 North Main Street Orange, CA 92868-1102 |
| 13018EGS***** | CXOXHG4ESM3-*****,A4BB | 51791 | |
| 13018NGP***** | CXOXHG4NSM1-*****,A4BB | 51791 | |
| 13018NGS***** | CXOXHG4NSM3-*****,A4BB | 51791 | |

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

2/ Asterisks are used for the nominal frequency value, it's the contractors responsibility to insert this necessary value allowed by the DLA Land and Maritime drawing.

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