

PERFORMANCE SPECIFICATION SHEET

OSCILLATOR, CRYSTAL CONTROLLED, TYPE 1 (CRYSTAL OSCILLATOR (XO)),  
1.0 MHz THROUGH 60.0 MHz, HERMETIC SEAL, SQUARE WAVE, TTL

This specification is approved for use by all Departments  
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein  
shall consist of this specification sheet and [MIL-PRF-55310](#).

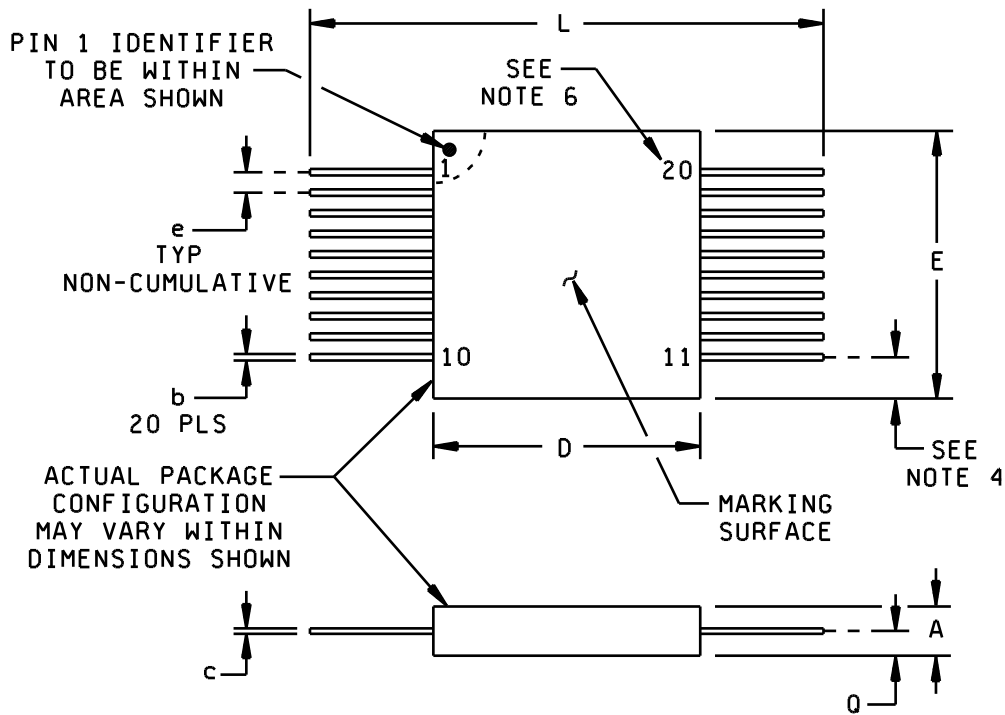


FIGURE 1. Dimensions and configuration.



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Pin number	Function
1-9	NC
10	B- (GND/CASE)
11	OUTPUT
12	NC
13	B+ (see note 5)
14-19	NC
20	B+ (optional) (see note 5)

Ltr	Inches		mm	
	Min	Max	Min	Max
A	---	.120	---	3.05
b	.010	.022	0.25	0.56
c	.005	.015	0.13	0.38
D	---	.650	---	16.51
E	---	.650	---	16.51
e	.045	.055	1.14	1.40
L	1.250	---	31.75	---
Q	---	.060	---	1.52

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are  $\pm 0.005$  (0.13 mm) for three place decimals and  $\pm 0.02$  (0.5 mm) for two place decimals.
4. The leads shall be symmetrical with respect to the package so that the spacing between the first lead and the end of the package shall be equidistant on each side.
5. Unit shall meet all requirements with pin 13 and pin 20 simultaneously tied to supply voltage.
6. Lead numbers are for reference only and need not be marked on unit.
7. All pins with NC function may be connected internally and are not to be used as external tie points or connectors.

FIGURE 1. Dimensions and configuration - Continued.

REQUIREMENTS:

Interface and physical dimensions: See [figure 1](#).

Mounting: See [figure 1](#).

Pads: See [figure 1](#).

Seal: Hermetic in accordance with [MIL-PRF-55310](#), maximum leakage rate  $5 \times 10^{-8}$  atm cc/s.

Weight: 4 grams, maximum.

Oscillator: Class 2 or any class 1 or class 3 oscillator meeting all class 2 requirements and verification tests specified herein and in [MIL-PRF-55310](#).

Calibration: Manufacturer calibrated.

Screening: In accordance with [MIL-PRF-55310](#), product level B or S, as applicable.

Temperature:

Operating: See [table I](#).

Storage: -62°C to +125°C.

Oscillator load: Standard TTL loads (see [table I](#)).

Output waveform: Symmetrical square wave.

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Supply voltage: 5.0 V dc  $\pm$ 10 percent.

Input current: At designated supply voltage (see [table I](#)).

Output frequency: Frequency as designated at time of acquisition (see [table I](#)).

Output voltage: At designated TTL load (see [table I](#)).

Logic 1: 2.4 V dc, minimum.

Logic 0: 0.5 V dc, maximum.

Rise and fall times: See [table I](#).

Duty cycle: See [table I](#).

Initial accuracy at reference temperature (up to 30 days after shipment): See [table I](#).

Initial frequency-temperature accuracy (one-half temperature cycle): Verification applicable. <sup>1/</sup>

Frequency-temperature tolerance (one-half temperature cycle, referenced to frequency measured at  $+23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , immediately prior to starting of the test): See [table I](#). Measurements taken at ten equally spaced increments over the specified operating temperature range. <sup>1/</sup>

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<sup>1/</sup> For the purpose of transitioning this device to [MIL-PRF-55310](#), 'Frequency stability versus temperature' has been renamed 'Frequency-temperature tolerance'. The verification requirements of 'initial frequency-temperature accuracy (one-half temperature cycle)' shall apply except that frequency measurements shall be referenced to the frequency measured at  $+23^{\circ}\text{C} \pm 1^{\circ}\text{C}$  ( $f_{\text{ref}}$ ) instead of to the nominal frequency ( $f_{\text{nom}}$ ).

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TABLE I. Dash numbers and operating characteristics.

Dash number	Output frequency range	Input current max at 5.25 V $\pm 1\%$ 1/	Pulse characteristics			Initial accuracy ppm at +23°C $\pm 1^\circ\text{C}$	Frequency aging ppm/year after 30 days	Frequency-temperature tolerance (ppm)		
			Rise and fall times max	Duty cycle at 1.4 V	Load max 2/			-55°C to +125°C	-55°C to +105°C	-20°C to +70°C
								A	B	C
01	1.0 MHz to 5.0 MHz	<u>mA</u> 70	<u>ns</u> 15	<u>percent</u> 40 to 60	10 TTL	$\pm 15$	$\pm 10$	$\pm 50$	$\pm 40$	$\pm 25$
02	1.0 MHz to 5.0 MHz	70	15	40 to 60	10 TTL	$\pm 25$	$\pm 10$	$\pm 100$	$\pm 75$	$\pm 50$
03	1.0 MHz to 5.0 MHz	70	15	40 to 60	10 TTL	$\pm 25$	$\pm 10$	$\pm 200$	$\pm 150$	$\pm 100$
11	5.0 MHz to 20.0 MHz	30	15	40 to 60	10 TTL	$\pm 15$	$\pm 10$	$\pm 50$	$\pm 40$	$\pm 25$
12	5.0 MHz to 20.0 MHz	30	15	40 to 60	10 TTL	$\pm 25$	$\pm 10$	$\pm 100$	$\pm 75$	$\pm 50$
13	5.0 MHz to 20.0 MHz	30	15	40 to 60	10 TTL	$\pm 25$	$\pm 10$	$\pm 200$	$\pm 150$	$\pm 100$
21	20.0 MHz to 60.0 MHz	65	5	40 to 60	6 TTL	$\pm 15$	$\pm 10$	$\pm 50$	$\pm 40$	$\pm 25$
22	20.0 MHz to 60.0 MHz	65	5	40 to 60	6 TTL	$\pm 25$	$\pm 10$	$\pm 100$	$\pm 75$	$\pm 50$
23	20.0 MHz to 60.0 MHz	65	5	40 to 60	6 TTL	$\pm 25$	$\pm 10$	$\pm 200$	$\pm 150$	$\pm 100$

1/ Maximum input current for no load condition. Actual configuration of TTL loads must be added to determine power supply requirements.

2/ A TTL unit load is defined as: 1.6 mA sink, 0.04 mA source, and 2 pF capacitance.

Frequency-voltage tolerance:  $\pm 4$  ppm maximum for a  $\pm 10$  percent change in supply voltage. Measurements taken at reference temperature and operating temperature range end points.

Frequency aging: Measurements shall be taken at  $+70^\circ\text{C} \pm 0.2^\circ\text{C}$  at intervals of not more than every 72 hours for 30 days minimum (see [table I](#)).

$\pm 10$  ppm per year, maximum  
 $\pm 1.5$  ppm per 30 days.  
 $\pm 3$  ppm per 90 days.

| Terminal strength: [MIL-STD-202-211](#), test condition C.

| Applied force: 2 pounds each terminal for 10 seconds.

| Bends: Five at 45 degrees each.

Frequency-environmental tolerance: Not applicable.

| Vibration, sinusoidal: In accordance with [MIL-PRF-55310](#) and [MIL-STD-202-204](#).

Nonoperating: Test condition G.

Operating: Not required.

Ambient pressure:

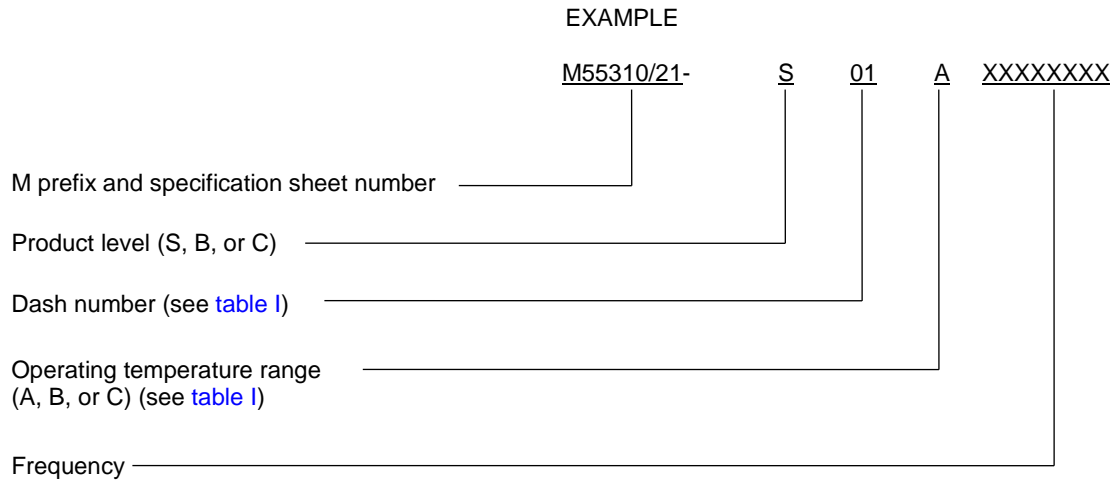
Nonoperating: In accordance with [MIL-PRF-55310](#).

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Operating: MIL-STD-202-105, test condition C.

Reflow soldering: Reflow soldering of the unit at +230°C ±10°C for 15 seconds shall not degrade the performance. Reflow soldering temperatures shall not be applied to the case but to the ribbon leads only.

Part or Identifying Number (PIN): Consists of "M" prefix followed by specification sheet number, a dash and coded alphas, and numeric number. See example:



Reference documents. In addition to MIL-PRF-55310, this document references the following:

- MIL-STD-202-105
- MIL-STD-202-204
- MIL-STD-202-211

The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:  
Air Force - 99  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5955-2018-014)

Review activities:  
Air Force - 19, 84

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