

INCH-POUND

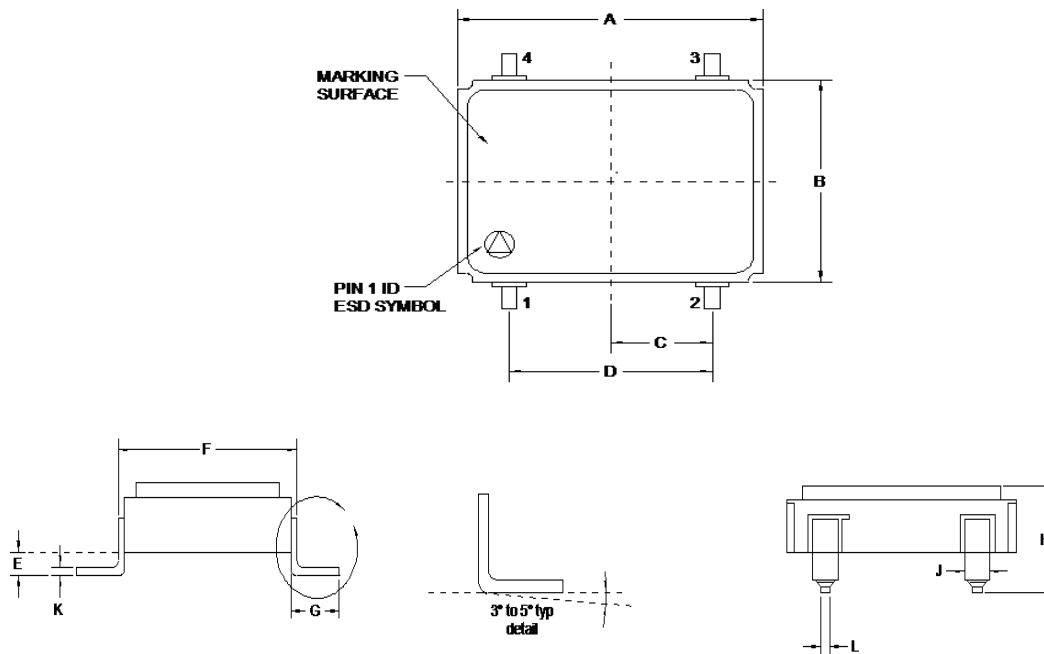
MIL-PRF-55310/41  
30 August 2018

PERFORMANCE SPECIFICATION SHEET

OSCILLATOR, CRYSTAL CONTROLLED, TYPE 1 (CRYSTAL OSCILLATOR (XO)),  
500 KHz THROUGH 125 MHz, HERMETIC SEAL, LOW VOLTAGE CMOS

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](#).



Ltr	Inches		Millimeters	
	Min	Max	Min	Max
A	.270 Typ	.282 Typ	6.85 Typ	7.16 Typ
B	.191 Typ	.203 Typ	4.85 Typ	5.15 Typ
C	.095	.105	2.41	2.67
D	.192	.208	4.87	5.28
E	.057	.064	1.44	1.62
F	-	.216	-	5.49
G	.050	.066	1.42	1.68
H	-	.174	-	4.41
J	.025	.031	.635	.787
K	.007 Typ	.009 Typ	.177 Typ	.229 Typ
L	.015	.021	.381	.534

Pin Number	Function
1	N/C
2	GND
3	Output
4	B+

FIGURE 1. Interface and physical dimensions

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.

FIGURE 1. Interface and physical dimensions - Continued.

REQUIREMENTS:

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

Mounting: See [figure 1](#).

Terminals: See [figure 1](#).

Seal: Hermetic in accordance with [MIL-PRF-55310](#), maximum leakage rate  $5 \times 10^{-8}$  atm cc/s.  
Product level S shall be in accordance with [MIL-STD-883](#) Test Method 1014.

Weight: 0.8 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:  $-62^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

Load test circuit: See [figure 2](#).

Output waveform: Symmetrical square wave, 3.3 volt CMOS logic compatible (see [figure 3](#)).

Output logic voltage levels at designated CMOS (see [figure 3](#)):

Logic 1: 90 percent of  $V_{DD}$ , minimum.

Logic 0: 10 percent of  $V_{DD}$ , maximum.

Rise and fall times: (See [table I](#)) Measurements shall be taken at the 10 percent and 90 percent peak-to-peak output voltage levels, with peak-to-peak output defined as level 1-level 0 or level 0 – level 1 (see [figure 3](#)).

Duty cycle: See [table I](#) and [figure 3](#).

Supply voltage:  $+3.3\text{ V dc} \pm 10$  percent.

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

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

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

TABLE I. Dash numbers and operating characteristics.

Dash Number	Output Frequency Range	Input Current (max) <u>2/</u>	Pulse Characteristics		Initial Accuracy at +23°C ±1°C	Frequency-Temperature Tolerance (ppm) <u>1/</u>		
			Rise and Fall Times (max) <u>3/</u>	Duty Cycle min-max <u>3/</u>		-55°C to +125°C	-55°C to +105°C	-20°C to +70°C
						A	B	C
01	500 kHz to 15.999 MHz	6 mA	4 ns	45% to 55%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
04	500 kHz to 15.999 MHz	6 mA	4 ns	45% to 55%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
11	16.000 MHz to 31.999 MHz	10 mA	4 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
14	16.000 MHz to 31.999 MHz	10 mA	4 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
21	32.000 MHz to 39.999 MHz	15 mA	4 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
24	32.000 MHz to 39.999 MHz	15 mA	4 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
31	40.000 MHz to 64.999 MHz	20 mA	4 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
34	40.000 MHz to 64.999 MHz	20 mA	4 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
41	65.000 MHz to 79.999 MHz	30 mA	4 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
44	65.000 MHz to 79.999 MHz	30 mA	4 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
51	80.00 MHz to 109.999 MHz	40 mA	3 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
54	80.00 MHz to 109.999 MHz	40 mA	3 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm
61	110.00 MHz to 125.00 MHz	45 mA	3 ns	40% to 60%	±20 ppm	±50 ppm	±40 ppm	±25 ppm
64	110.00 MHz to 125.00 MHz	45 mA	3 ns	40% to 60%	±30 ppm	±100 ppm	±80 ppm	±50 ppm

1/ Temperature range A applicable for product level B oscillators only.

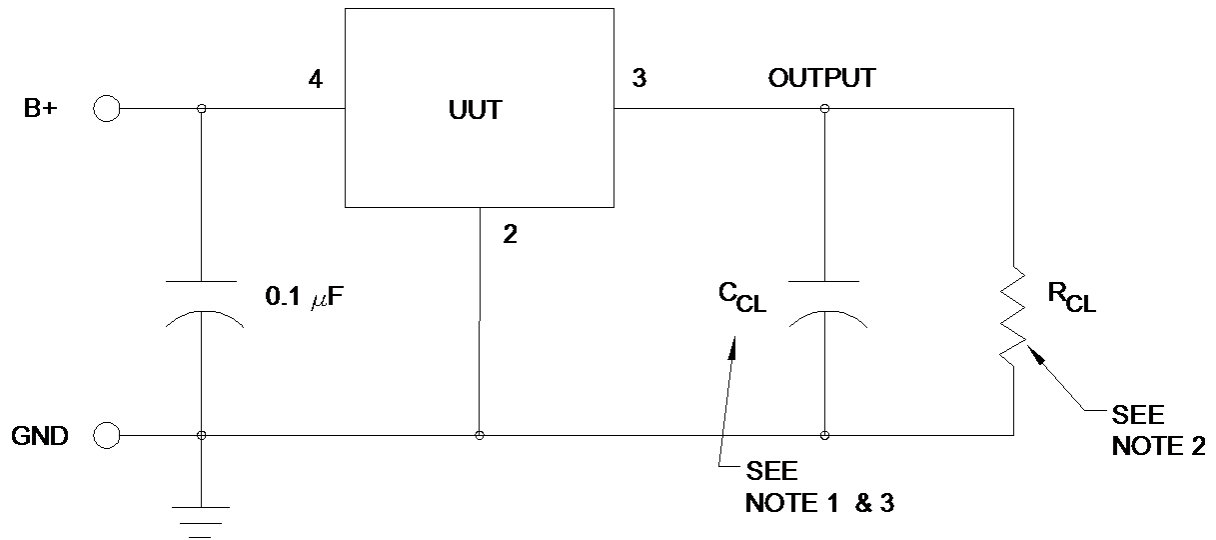
2/ Maximum input current for no load condition.

3/ See [figure 3](#).

Frequency-temperature tolerance (one-half temperature cycle, referenced to frequency measured at +23°C±1°C, immediately prior to starting of the test): See [table I](#). Measurements taken at ten equally spaced increments over the specified operating temperature range. 1/

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

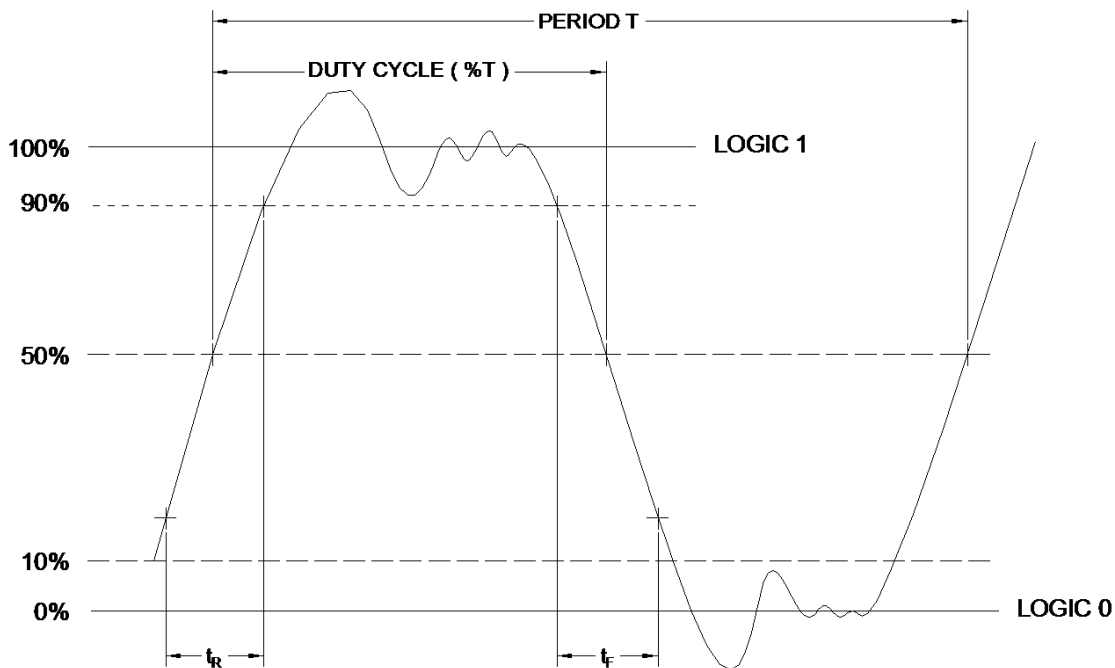
1/ For the purpose of transitioning this device to [MIL-PRF-55310](#), 'Frequency stability versus temperature' has been renamed 'Frequency-temperature tolerance'. The verification requirements of 'initial frequency-temperature accuracy (one-half temperature cycle)' shall apply except that frequency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



NOTES:

1. For C<sub>cl</sub> = 15 pF ± 5 percent.
2. For R<sub>cl</sub> = 10K Ω ± 5 percent.
3. C<sub>cl</sub> includes scope capacitance.

FIGURE 2. Load test circuit.

FIGURE 3. Waveform

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 (Except one maximum interval of 96 hours per 30 days is permitted).

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

Terminal strength: In accordance with [MIL-STD-202-211](#) test condition A.

Applied force: 8 ounces each terminal.

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.

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Ambient pressure:

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

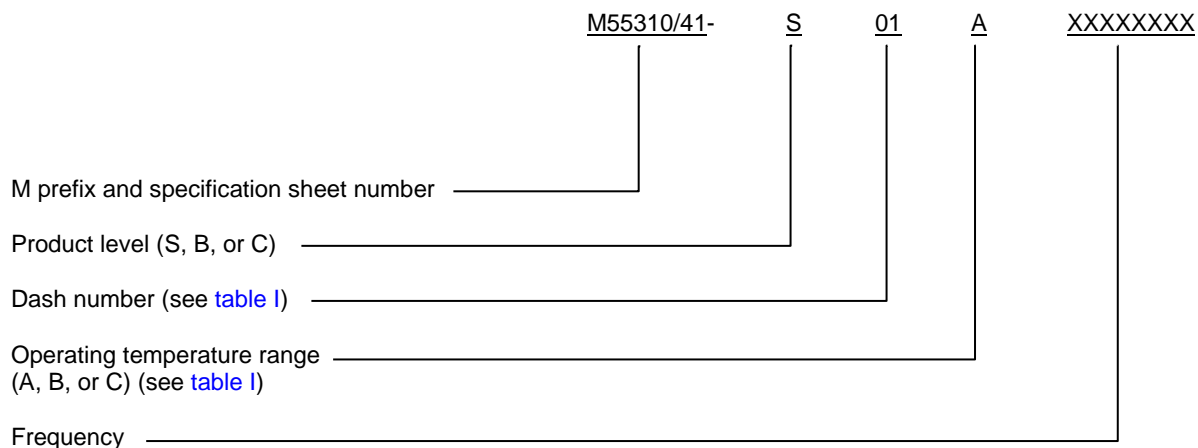
Operating: In accordance with [MIL-STD-202-105](#), test condition C.

Exposure time: 5 minutes.

Reflow soldering: Reflow soldering of the unit at +230°C±10°C for 15 seconds shall not degrade the performance.

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

EXAMPLE



Referenced documents. In addition to [MIL-PRF-55310](#), this document references the followings

[MIL-STD-883](#)  
[MIL-STD-202-105](#)  
[MIL-STD-202-204](#)  
[MIL-STD-202-211](#)

Custodians:

Army - CR  
Navy - EC  
Air Force - 184  
DLA - CC  
NASA- NA

Preparing activity:

DLA - CC  
(Project 5955-2018-017)

Review activities:

Army - AR, MI, SM  
Navy - AS, CG, MC  
Air Force - 19

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.