Title: 50.0 MHz Space Crystal Oscillator

P/N: 501-28039
Rev: -
Date: 04-24-14
Drawn: -
Ref: 15895

Tolerances:
- 0.XX Dec: ±0.030"
- 0.XXX Dec: ±0.010"
- PSCM: 62821

Dimensions are in inches

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Supply Voltage</td>
</tr>
<tr>
<td>P2</td>
<td>Ground</td>
</tr>
<tr>
<td>P3</td>
<td>RF Out</td>
</tr>
</tbody>
</table>

- 3X Ø0.030 LENGTH 0.185 TYP.
- 0.000in
- 0.025in
- 0.060in
- 0.180in
- 0.500in
- 1.000in
- 1.250in
- 2X 0.080 in
- 2X 0.125 in
- 2X 0.185 in
- 2X 0.500 in
- 2X 1.530 in
- Ø0.030 in Vent Hole

Wenzel Associates, Inc.
Austin, Texas
GENERAL REQUIREMENTS

Material, Design and Construction
MIL-PRF-55310

Parts and Materials List
Supplied

Parts, Materials
EEE-INST-002 Level 2 at a minimum, JANS Semiconductors,
Class S Passives and ICs, when available.

Crystal
Premium Q, Z-swept, synthetic quartz

Outgassing
TML<1% and CVCM <0.1% per SP-R-002A

Traceability
Semiconductor and passive lot and date code tracking

De-rating
per EEE-INST-002, (JPL-D-8545, alternative)

Soldering
J-STD-001 class 3

Case
Nickel-plated steel housing

Finish
Electroless nickel per MIL-C-26074

REV  DATE  REVISION RECORD  DWN  AUTH
-  04-24-14  Initial Release  Liz

ELECTRICAL PERFORMANCE

RF Output Frequency
50.0 MHz, sine wave

Frequency Accuracy (initial)
±1 x 10^-6 at +25°C

Frequency Stability
±8 x 10^-6 for -10°C to +50°C (ref +25°C)

Aging Rate (after 90 days operating)

1 year
±2 x 10^-6

RF Output Power
+7 dBm ±2.5dB into 50Ω

RF Output Harmonics
-30 dBc

RF Output Spurious
<-80 dBc

Phase Noise, Static

100 Hz
-115 dBc/Hz

1 kHz
-135 dBc/Hz

10 kHz
-163 dBc/Hz

Supply voltage
+10 ±0.5 VDC, regulated and filtered

Input power
<0.5 watts steady state at ambient pressure <5 x 10^-5 torr

ENVIRONMENTAL CONDITIONS

Operating temperature
-10°C to +50°C

Storage temperature
-40°C to +105°C

Design / Qualification
-10°C to +50°C

Ambient pressure
Atmospheric (760 torr), Vacuum (<5 x 10^-5 torr)

Radiation, design to meet
TID 100 krads Si

MECHANICAL SPECIFICATIONS

Size
1.610” x 1.0” x 0.5”

Weight
<150 grams

Physical
Pressure relief hole

MODEL DEFINITIONS

EM (Engineering Model)
Design and Construction similar in appearance and identical
in form, fit, and function to FM. Developed using best
commercial practice, including commercial parts and
materials. EM shall be subjected only to electrical tests, with
no environmental testing performed.

FM (Flight Model)
Fabricated to meet all design, construction, and test
requirements. FM shall be subjected to the entire compliment
of electrical and environmental acceptance tests.

QM(Qualification Model)
Fabricated and tested as an FM unit with the addition of
Qualification tests.
**QUALIFICATION TESTS** (Non-flight model, only)

- **Group I** (6 samples)  Visual, Electrical Tests*
- **Burn-In** (operational)  240 hours minimum at +60°C
- **Group II** (6 samples)  30 Days
  - **Aging**  30 Days
  - **Group III Subgroup 1** (6 samples)  Random Vibration  11.95 Grms, MIL-STD-202, method 214 I-D, 50 to 2000 Hz, 5 min per axis
  - **Shock**  MIL-STD-202, Method 213, Condition A, 50G, 11msec
  - **Group III Subgroup 2** (3 samples)  Thermal Shock  MIL-STD-202, Method 107, Condition A-1, 25 cycles, -55°C to +85°C
  - **Ambient Pressure**  MIL-STD-202, Method 105, at <5 x 10^-5 torr
  - **Group III Subgroup 3** (1 sample)  Resistance to Soldering Heat  MIL-STD-202, Method 210, Condition A
  - **Group III Subgroup 4** (1 sample)  Terminal Strength  MIL-STD-202, Method 211, Condition C, Not applicable for pins <0.25"
  - **Solderability**  MIL-STD-202, Method 208
  - **Electrical Tests**
  - **Radiographics**  MIL-STD-202, method 209

**ACCEPTANCE TESTS** (Flight Model)

- **Electrical Tests**
- **Thermal Shock**  MIL-STD-202, Method 107, Condition A, 5 Cycles, -55°C to +85°C
- **Random Vibration**  7.56 Grms overall, 50 to 2000 Method 214 I-B, 50 to 2000 Hz, 5 min per axis
- **Electrical Tests**
- **Burn-In** (operational)  240 hours minimum at +60°C
- **Aging Rate**  Projected after 30 days operating
- **Electrical Tests**
- **Radiographics**  MIL-STD-202, method 209

*ELECTRICAL TESTS*

*Tested at standard pressure and at -10, +10, +25, +40, +50°C unless otherwise noted*

- **Input Power**
- **Cold Start** (-10°C)
- **Hot Start** (+50°C)
- **RF Output Power**
- **RF Output Harmonics**
- **RF Output Spurious**
- **Frequency Accuracy** (+25°C only)
- **Frequency Stability**
- **Phase Noise - Static** (+25°C only, 760 torr)

**ANALYSES**

- Thermal Analysis, Component Stress Analysis