Title: 100.0 MHz-SC Space Crystal Oscillator

P/N: 501-27273

Wenzel Associates, Inc.

Tolerances: (except as noted) Dimensions are in inches
0.XX Dec: ±0.030"
0.XXX Dec: ±0.010"
FSCM: 62821

Page 1 of 3
### General Requirements
- Material, Design and Construction: MIL-PRF-55310
- Parts and Materials List: Supplied
- 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-INSTR-002, (JPL-D-8545, alternative)
- Soldering: J-STD-001 class 3
- Case: Nickel-plated aluminum housing
- Finish: Electroless nickel per MIL-C-26074

### Electrical Performance
- RF Output Frequency: 100 MHz (fixed, please specify), sine wave
- Frequency Accuracy (initial): ±2 x 10^-8 at +25°C
- Frequency Stability: ±1 x 10^-7 for -10°C to +50°C (ref +25°C)
- Aging Rate (after 90 days operating):
  - 1 day: ±2 x 10^-8
  - 1 month: ±5 x 10^-8
- RF Output Power: +13 dBm ±1.5 dB into 50Ω
- RF Output 2nd Harmonic: -30 dBc
- RF Output Sub-harmonics: ≤-40 dBc
- Phase Noise (Static):
  - 100 MHz: -100 dBc/Hz
  - 1 KHz: -130 dBc/Hz
  - 10 KHz: -160 dBc/Hz
- Supply voltage: +15 VDC ±5%
- Warm-up power: ≤5 watts
- Warm-up time: ≤20 minutes at ambient pressure ≤5 x 10^-5 torr
- Input power: ≤2 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
- Ambient pressure: Atmospheric (760 torr), Vacuum (≤5 x 10^-5 torr)

### Mechanical Specifications
- Size: 3” x 2” x 1.44”
- Weight: ≤300 grams
- Physical: Pressure relief holes, vented

### 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 some commercial parts and materials. EM shall be subjected only to electrical tests, with some environmental testing performed.
- FM (Flight Model): Fabricated to meet all design, construction, and test requirements reference MIL-PRF-55310, Class 1, Product level S. FM shall be subjected to the entire compliment of electrical and environmental acceptance tests listed.

**Flight Model Space Level, Parts EEE-INSTR-002, Level 1,2,3 MIL-PRF-3098 Level 2 Crystals, Tested to Table 2, Qual Table 3 by similarity MIL-PRF-19500 / MIL-STD-750 Semiconductors, JANTX with PIN D, JANTX with PIN D and DPA (5 ea)**

**Qualification Model**: EM unit, when specified, using EEE-INSTR-002, Level 1,2,3 parts where available. Testing for (1) unit.

- 501-27273-01: EM Engineering Model
- 501-27273-02: Qualification Model
- 501-27273-03: FM Flight Model
QUALIFICATION TESTS (Non-flight model, only)

Group I (1 samples)  Visual, Electrical Tests*
Burn-in (operational)  240 hours minimum at +75°C
Group II (1 samples)
Aging  30 Days

Group III Subgroup 1 (1 sample)
Random Vibration  11.95 Grms, MIL-STD-202, method 214 I-D,
50 to 2000 Hz, 5 min per axis

Group III Subgroup 2 (1 sample)
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
Resistance to Solvents  MIL-STD-202, Method 215
Not applicable when marking is electro-etched

Electrical Tests*
Radiographics  MIL-STD-202, method 209

ACCEPTANCE TESTS (Flight Model)

Electrical Tests*
Random Vibration (non-operational)  7.56 Grms overall, MIL-STD-202 Method 214 Test Cond I-B,
50 to 2000 Hz, 5 min per axis
Thermal Shock  MIL-STD-202, Method 107, Condition A,
5 Cycles, -55°C to +85°C
Electrical Tests*
Burn-In (operational)  240 hours minimum at +75°C
Aging Rate  Projected to 30 days operating
Electrical Tests*
Radiographics  MIL-STD-202, method 209

*ELECTRICAL TESTS
Tested at ambient pressure ≤5 x 10^-5 torr and at -40, +25, and 75°C unless otherwise noted

Warm-Up Power (-40°C only)
Warm-Up Time (-40°C only)
Input Power
Cold Start (-40°C)
Hot Start (+75°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