

Ultra-High-Performance Crystal Oscillator

1000C



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Summary

Our 1000C ultra-high-performance crystal oscillator with a dewar-insulated oven provides superior temperature stability over the full temperature range. The maximum frequency change over the operating temperature range is $<5.0E^{-9}$. An oven temperature indicator (10 mV/°C) is provided at the power connector. The product is offered in two versions—high performance and ultra-high performance. The ultra-high-performance version provides signals with ultra-low phase noise of -130/-160 dBc/Hz at 1 Hz/100 kHz offsets and is stable to $2E^{-13}$ from 0.1s to 100s. The high-performance version provides signals with very-low phase noise of -120/-160 dBc/Hz at 1 Hz/100 kHz offsets and is stable to $3E^{-13}$ from 0.1s to 100 seconds.

Low-noise, high-isolation buffer amplifiers provide two independent, 5 MHz outputs. The buffer amplifiers isolate outputs from load variations. An internal voltage regulator minimizes fluctuations due to power supply ripple.

Linearized electronic frequency control allows the use of servo loop techniques for fine frequency tuning. Linearity is better than 5% over the specified tuning range. The 1000C ultra-high-performance crystal oscillator meets the demands of a wide range of applications for military and industrial environments. The oscillator is found in precision frequency counters and synthesizers, GPS receivers, microwave multiplier chains, phase noise calibration test equipment, stratum II telecommunications applications, radar and tactical communications systems, secure communications systems, satellite ground terminals and space flight systems.

Key Features

- Outputs: Two independently buffered and transformer-isolated outputs at 5 MHz
- Phase noise at 1 Hz offset: -130 dBc/Hz (Ultra high performance)
- Phase noise at 100 kHz offset: -160 dBc/Hz
- Short-term stability: 0.1s to 100s $<2E^{-13}$ (Ultra high performance)
- Electronic tuning input: -5 to 5V
- Tuning range: $6E^{-7}$ typical
- Warm-up: 15 minutes to $2E^{-8}$

Phase noise Frequency	High Performance	Ultra-High Performance
1 Hz	-120 dBc	-130 dBc
10 Hz	-145 dBc	-150 dBc
100 Hz	-156 dBc	-157 dBc
1 kHz	-160 dBc	-160 dBc
10 kHz	-160 dBc	-160 dBc
100 kHz	-160 dBc	-160 dBc

Specifications

Electrical Specifications

Frequency	(2) 5 MHz
Amplitude of outputs	(2) 13 dBm into 50Ω load
Harmonic distortion	<-40 dBc
Spurious signals	<-80 dBc
Short-term stability 0.1s to 100s	High-performance: <3E ⁻¹³ Ultra-high-performance: <2E ⁻¹³
Aging per Day (after 30 days operation)	< 1E ⁻¹⁰

Aging typically improves to a level of parts in 1.0E⁻¹¹ per day (1.0E⁻⁸/year). After years of unperturbed operation, some users of the same oscillator family have observed aging rates as low as 1.0E⁻¹².

- Temperature coefficient: <5.0E⁻⁹ over operating range
- Frequency adjustment range
 - Tuning slope: negative
 - Control range: -5 to 5 V
- Load change (50Ω ± 10%) <5.0E⁻¹¹
- Input voltage
 - Oven supply: 18 to 30 Vdc
 - Electronics supply: 18 to 30 Vdc

Environment & Physical Specifications

Supply sensitivity 1% change in input	<1.0E ⁻¹¹
EMI susceptibility (side bands) 0.1VRMS on power supply inputs 10 Hz to 104 Hz	<-100 dBc
Temperature Operating	0°C to 55°C
Non-operating	-40° to +85°C
Warm-up power	<13W
Operating power at 25°C	<3.5W
Warm-up to 2.0E-8 of final frequency	<15 minutes
Oven temperature monitors	10 mV/°C
Dimensions	3.0" W × 6.54" D × 3.0" H
Weight	<1.5 lbs (0.67 kg)
Connectors RF (J1 - J2) Power (J5)	SMA 9-pin D-subminiature

Ordering Information

Description	Part No.
1000C High-performance version	05818-523
1000C Ultra-high-performance version	05818-527

