Rev Y

O-CDFXYZXX-X-X-X-10MHz/100MHz Precision Ultra Low Phase Noise Dual Frequency OCXO Reference Module (DFRM)

The DFRM consists of 2 Ultra Low Phase Noise OCXO at 10 MHz and 100 MHz. Both are packaged in hermetically sealed metal cans. The unit at 100 MHz is phase/frequency locked to the 10 MHz one. Lower frequency OCXO provides for excellent frequency stability over temperature, time (aging), supply and load variations, as well as exceptionally low phase noise close to the carrier, and short-term stability (Allan Deviation). 100 MHz OCXO provides for ultra-low phase noise on the noise floor and high output power.

Features:

- Two frequency outputs 10.000 MHz and 100.000 MHz
- Ultra-Low Phase Noise
  - -123 dBc/Hz at 1 Hz offset, -151 dBc/Hz at 10 Hz offset for 10 MHz
  - -125 dBc/Hz at 10 Hz offset, to -185 dBc/Hz at 100KHz for 100 MHz
- Excellent temperature stability from 2 ppb peak to peak
- Low aging from 0.25 ppb/day
- Excellent short-term stability ADEV < 2E-13 at 1 s

Applications:

- Instrumentation
- High Performance Synthesizers
- Radar
- Telecommunication Equipment

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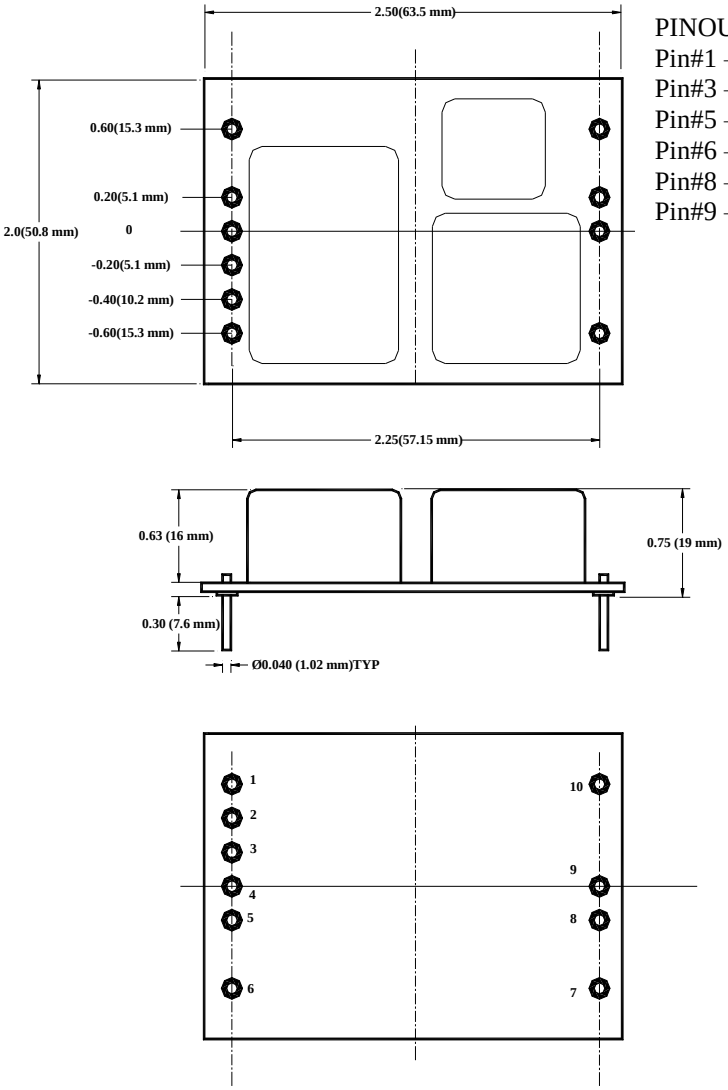
OVEN-CONTROLLED DUAL FREQUENCY REFERENCE

Data Sheet 1205A



PINOUT:
Pin#1 – Vcc10; Pin#2 – Vc;
Pin#3 – Vref; Pin#4 – GND;
Pin#5 – RF OUT 10 MHz
Pin#6 – GND; Pin#7 – GND;
Pin#8 – RF OUT 100 MHz
Pin#9 – GND; Pin#10 – Vcc 100

Specifications:

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
Absolute Maximum Ratings							
Input Break Down Voltage	Vcc	5 V supply	-0.5		5.5	V	
Storage temper.	Ts		-50		90	°C	
Control Voltage	Vc		-1 -5 -1		5.5 5 11	V	Slope option “P” Slope option “N” Slope option “L”

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Electrical

Frequency	F10			10.000		MHz	Pin5
	F100			100.000			Pin8
Frequency stability	ΔF/F	vs. Temp. 4*		±20		ppb	See chart below
		vs. Supply		0.2	0.3	ppb/10%Vcc	
Aging		per day per year, first year second year		5E-10 1E-7 3E-8			after 30 days
		per day per year, first year second year		2E-10 3E-8 1E-8			after 30 days Grade "S"
Allan Deviation		0.1s 1s 10s		5E-13 2E-12 5E-12			
		0.1s 1s 10s		15E-14 2E-13 8E-13			Grade "S"
SSB Phase Noise (achieved after 10 minutes warm-up)	£(Δf)	1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-118 -147 -158 -162 -170 -170	dBc/Hz	10 MHz output
		0.1 Hz 1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-91 -123 -151 -162 -170 -172 -172	-89 -121 -150 -160 -168 -170 -170		10 MHz output, Grade "S", slope Options "P" or "L" only. Package height may be 0.75"
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-125	-90 -123 -130 -160 -172 -180	dBc/Hz	100 MHz output, Grade "U"
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-125	-90 -123 -130 -160 -180 -185	dBc/Hz	100 MHz output, Grade "E" .Optimized for best phase noise at 10 Hz offset
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-122 -135 -165	-90 -120 -133 -163 -180 -185	dBc/Hz	100 MHz output, Grade "M", available with supply option 0. This is modified "E" grade to optimize phase noise in midrange
		0.1 Hz 1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-65 -95 -125 -135 -165	-93 -122 -133 -163 -180 -185		100 MHz output, Grade "S"
Retrace		After 30 minutes			±10	ppb	24 Hours off 3*
G-sensitivity		worst direction			±1.0	ppb/G	
Input Voltage	Vcc		4.7	5.0	5.25	V	See chart below to specify

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Power consumption, Still air	P	steady state, 25°C steady state, -30°C start-up @ -30°C		2.2 4.5 5.0	2.5 6.0	W	Standard Operating Temperature*. Roughly split in half between 10 and 100 MHz
Spectral Purity		Subharmonics Spurious Harmonics		-90 -35	-80 -80 -30	dBc	At 100 MHz output Either output
Load	Internally AC-coupled 50 Ohm						
Warm-up time	τ	to 0.1ppm accuracy		3	5	minutes	
Output Waveform		Sinewave					
Output Power			+10	+13		dBm	Both Outputs
Control voltage	Vc		0 -4.0 0		Vref 4.0 10.0	V	Slope option "P" Slope option "N" Slope option "L"
Input impedance	Zin	At Vc pin	10			KOhm	
Modulation bandwidth	Fm		DC		1	KHz	
Reference Voltage	Vref			4.5		V	Phase Noise Grade "U", "E", and "M" Pin#3 is not connected with slope options "N" and "L"
	Vref			4.096		V	Phase Noise Grade "S" Pin#3 is not connected with slope options "N" and "L"
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	±0.4	±0.6		ppm	Phase Noise Grade "U', "E", and "M"
			±0.3	±0.4		ppm	Phase Noise Grade "S"
Deviation slope		Monotonic, positive Monotonic, negative Monotonic, positive		1.0/Vref -0.13 0.12		ppm/V	Slope option "P" Slope option "N" Slope option "L"
Setability	Vc0	@25°C, Fnom. No internal bias for slope option "L"	Vref/2 ± 0.5 0 ± 0.5 5 ±0.5			V	Slope option "P" 3* Slope option "N" Slope option "L"

Notes:

2*. It's assumed that phase noise test is performed under static conditions (no vibration), in still air, and care is taken for minimizing EMI.

3*. Longer storage time, especially at low temperatures, may affect both retrace and setability parameters. It may require few days on power for re-stabilization.

4*. Temperature stability is specified as ± vs. frequency at 25°C. For Stabilities better than ±10ppb, the height of the module may increase by 0.15" (3.8mm).

5*. Pin 3 is connected to Vref only for Slope Option "P".

6. All parameters, unless otherwise specified, are at nominal conditions, i.e.: T=25°C, Nominal Vcc & Nominal Load.

Environmental and Mechanical

Operating temp. range	-30°C to 70°C Standard, Other options – see chart below
Mechanical Shock	Per MIL-STD-202, 30G, 11ms
Vibration	Per MIL-STD-202, 5G to 2000 Hz
Soldering Conditions	260°C for 10s Max leads only

Electrical Connections

Pin Out	Pin #1-Vcc for 10 MHz ; Pin#2 – Vc; Pin #3 – Vref or N/C (5*); Pin #4- GND ; Pin #5- RF OUT 10 MHz; Pins## 6,7,9 – GND, Pin#8 – RF OUT 100 MHz; Pin#10 – Vcc 100 MHz

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Data Sheet 1205A

Creating a Part Number

O - C DF X YZ XX - X - X X - 10MHz/100MHz

OCXO
Conventional Power

DFRM

Supply Voltage

Code	Specification
0	5V ± 5%

Temperature Stability 4*

Code	Specification
17	$\pm 1x10^{-7}$
58	$\pm 5x10^{-8}$
28	$\pm 2x10^{-8}$
18	$\pm 1x10^{-8}$
YZ	$\pm Yx10^{-Z}$

Temperature Range

Code	In 5ºC steps 7*
First letter	Lowest temperature from A = -40ºC
Second letter	Highest temperature to X = 75ºC
Examples	
IS	0°C to 50°C
GU	-10°C to 60°C
EW	-20°C to 70°C

Environmental

Code	Specification
L	Contains a level of lead that is in excess of RoHS directive and is not designed for reflow
R	RoHS compliant, not designed for reflow

Phase Noise Grade

Code	Specification
U	Ultimate
E	Extraordinary
M	Modified-E
S	Superior-E

Deviation slope

Code	Specification
P	Positive, 0 to Vref
N	Negative, -4 to 4V
L	Positive, 0 to 10 V

Not all combinations available, consult factory

7*Temperature Code Table

Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	**F**	-15	**K**	10	**P**	35	**U**	60	**Z**	85
B	-35	**G**	-10	**L**	15	**Q**	40	**V**	65		
C	-30	**H**	-5	**M**	20	**R**	45	**W**	70		
D	-25	**I**	0	**N**	25	**S**	50	**X**	75		
E	-20	**J**	5	**O**	30	**T**	55	**Y**	80		

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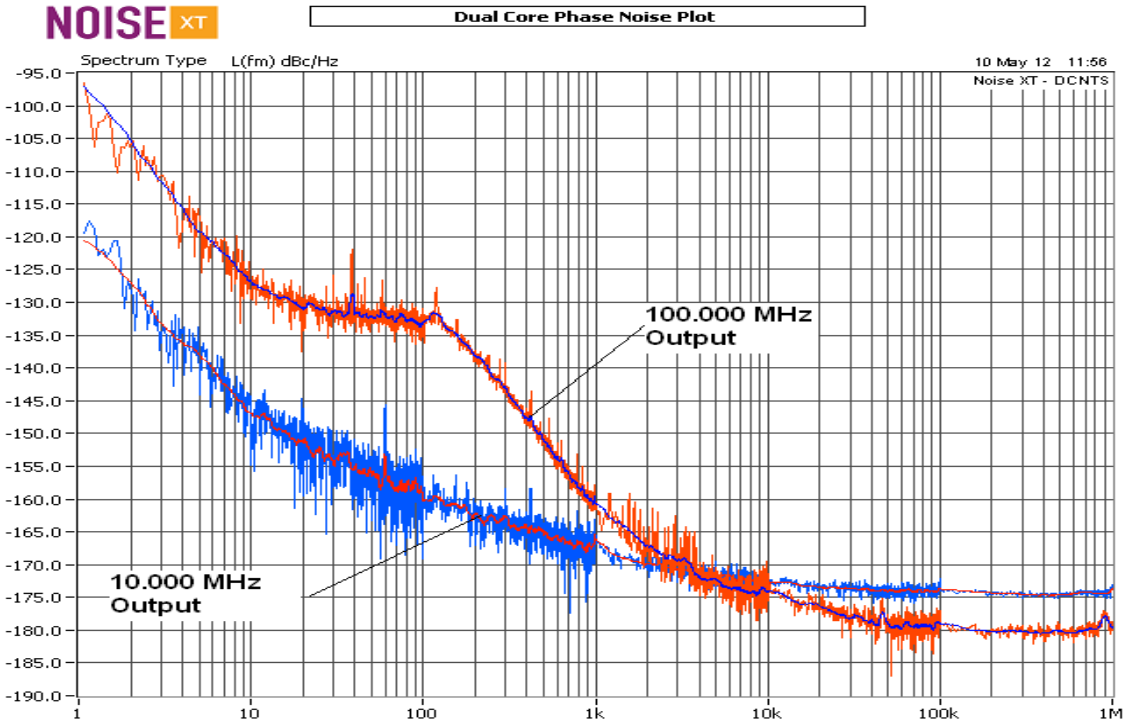
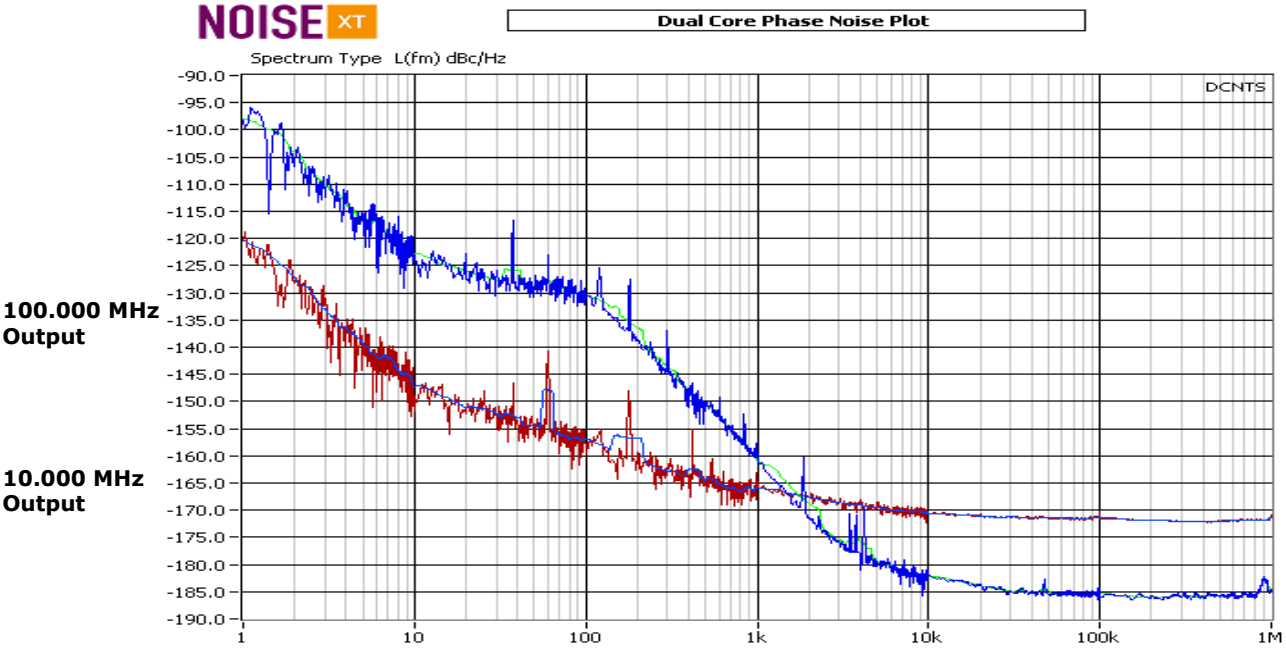
Grade "U" Phase Noise



Grade "E" Phase Noise



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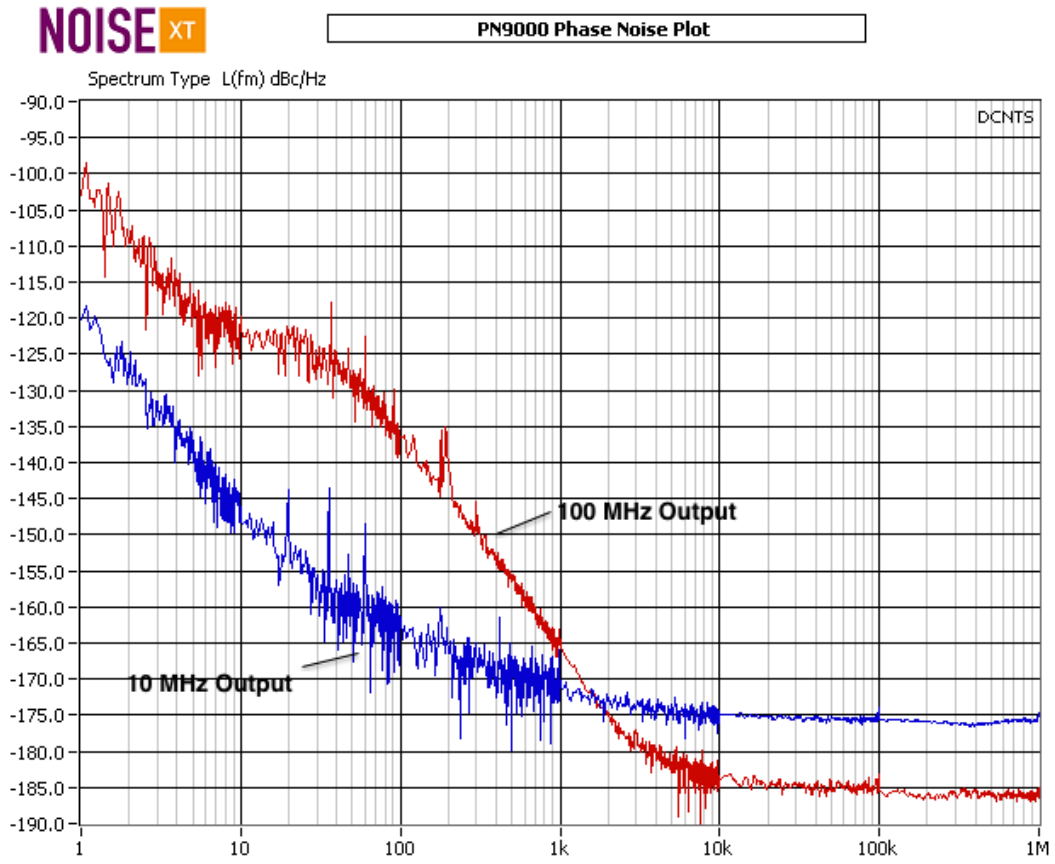
Grade "M" Phase Noise



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