



# SR W150

Ultra Low Noise 500 MHz SAW Oscillators  
*Preliminary specification (Rev -)*

▣ Features .....	P01
▣ Environmental conditions.....	P01
▣ Mechanical Characteristics .....	P02
▣ Technical Characteristics.....	P03
▣ Typical Application 1 .....	P05
▣ Typical Application 2.....	P06

# SR W150

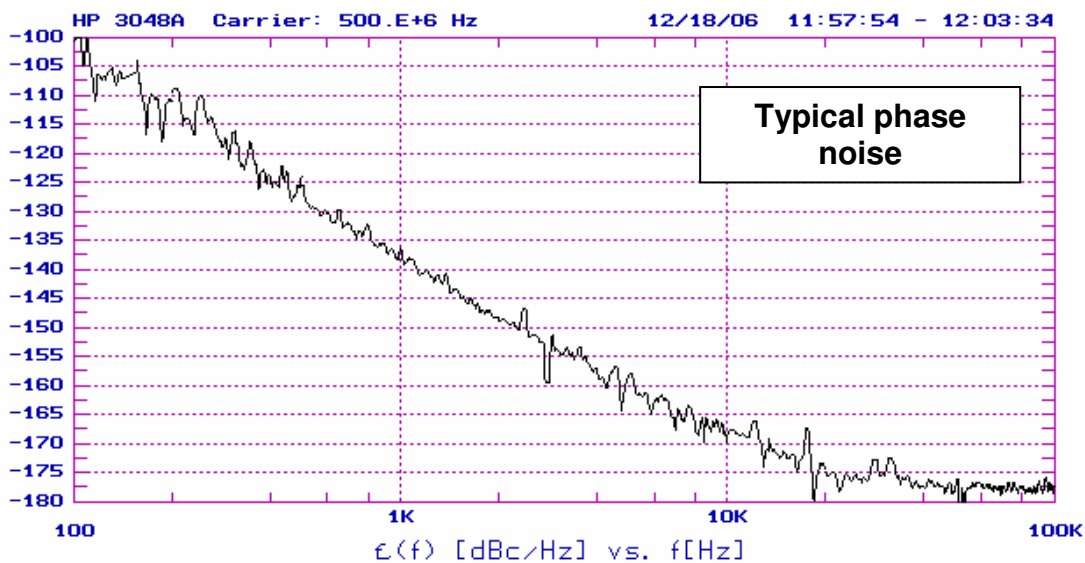
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Preliminary specification (Rev -)

January 8<sup>th</sup>, 2007

### Features

- ❑ Ultra Low Noise (ULN), Oven Controlled, Voltage Controlled, SAW Oscillator (OCVCSO)
- ❑ Nominal Frequency: 500 MHz
- ❑ Ultra low phase noise: - 167 dBc/Hz @ 10 kHz offset (Typical)  
- 178 dBc/Hz noise floor (Typical)
- ❑ Frequency fine tuning by temperature control of the oven
- ❑ Operating temperature range : [0 – 50 °C]
- ❑ Laboratory environment (stabilized platforms)
- ❑ Applications :
  - Instrumentation: phase noise analyzer, synthesizer
  - Ground based military equipment & test bench
  - Radar & Telecom simulator
- ❑ 9-pin Plug-in package + SMA connector for the frequency output



### Environmental conditions

Parameters	Unit	Minimum	Typical	Maximum
Operating temperature range	°C	0		+ 50
Storage temperature range	°C	- 40		+ 75

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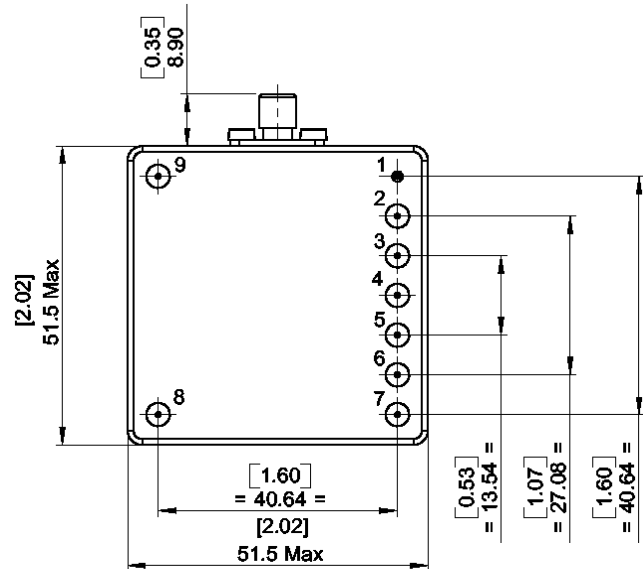
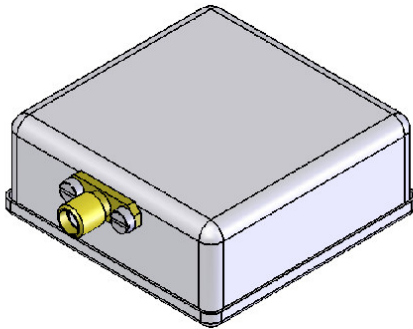
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January 8<sup>th</sup>, 2007

### Mechanical characteristics

#### Package:

- 9-pin plug-in module
- SMA connector on a side.

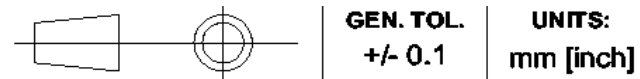
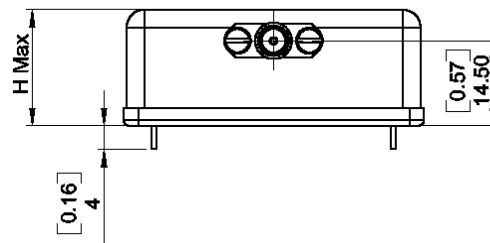


#### Foot-print (without SMA connector):

- 51.5 x 51.5 mm max.

#### Height (H Max):

- 20.5 mm max.



#### Pin description

Pin number	Name	Function
1	Ground, case	Electrical & mechanical ground
2	Supply voltage	Oscillator power supply
3	NC	Factory frequency setting (C1)
4	NC	Factory frequency setting (C2)
5	NC	-
6	Voltage control	Voltage control for electrical tuning
7	return	Return / Voltage control
8	Heating supply voltage	Oven power supply
9	return	Return / Heating supply voltage

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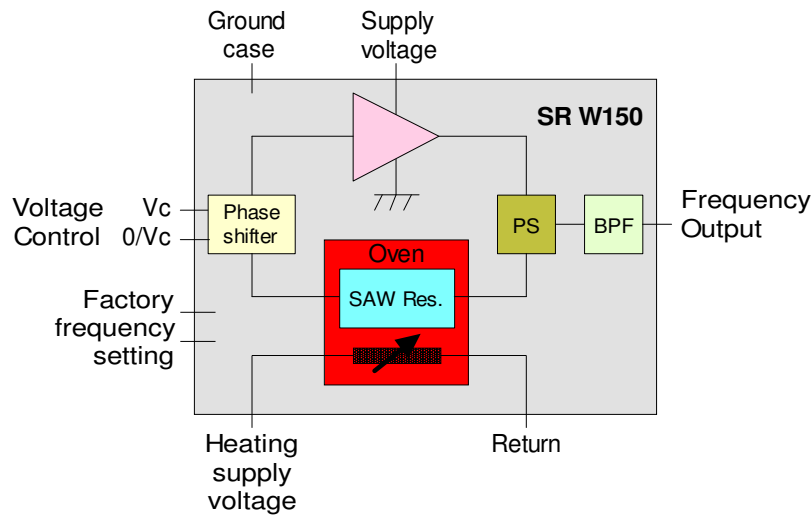
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### Technical Characteristics

#### Block diagram



#### Electrical specifications

Electrical Parameters	Unit	Minimum	Typical	Maximum
<b>Frequency output (SMA Connector)</b>				
Nominal frequency	MHz		500	
Output level (50 Ω load)	dBm	10	11	12
Harmonics suppression	dBc	30		
Phase noise @ 1 kHz offset	dBc/Hz		- 141	- 136
Phase noise @ 10 kHz offset	dBc/Hz		- 167	- 164
Phase noise @ 100 kHz offset	dBc/Hz		- 178	- 175
Phase noise floor	dBc/Hz		- 178	- 175
VSWR	-			2:1
<b>Free running mode (Voltage Control pin NC)</b>				
Factory set accuracy @ 25 °C	ppm		± 0.1	± 1
Temperature stability	ppm			± 1
Aging per year	ppm			± 1
<b>Electrical tuning (Voltage Control pin)</b>				
Relative tuning range	ppm	± 2		
Voltage range	V <sub>DC</sub>	3	4.7	6
Slope @ V control = 4.7 V	Hz / V	750	1000	1500
<b>Supply voltage pin</b>				
Voltage range	V <sub>DC</sub>	11.8	12	12.2
Supply current	mA		70	100
<b>Heating supply voltage pin</b>				
Voltage range	V <sub>DC</sub>	11		12
Supply current	mA			500
Warm up time	mn			5

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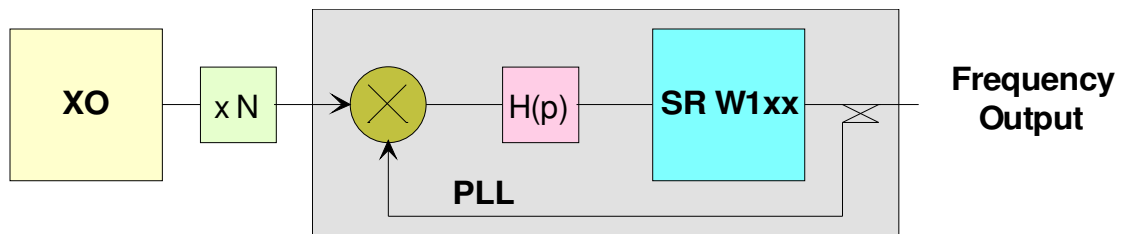
### Typical application 1: SR W150 phase locked on low frequency ULN XO

Crystal oscillators (XOs) are the state-of-the-art of ultra low noise frequency sources below 150 MHz.

For higher frequency applications, frequency multiplication of XOs remains the best solution for close to the carrier noise. On the other hand, this is not true for the noise floor which has been degraded by the multiplication factor. High frequency fundamental mode oscillators may achieve a better noise floor. This is the case for ULN SAW oscillators.

In frequency range 300 to 700 MHz, the best phase noise is obtained by “filtering” the noise floor of a multiplied XO by a PLL build around an ULN VCISO with a loop bandwidth of about one kHz, as shown hereafter on two typical examples.

#### Block diagram



#### Benefits

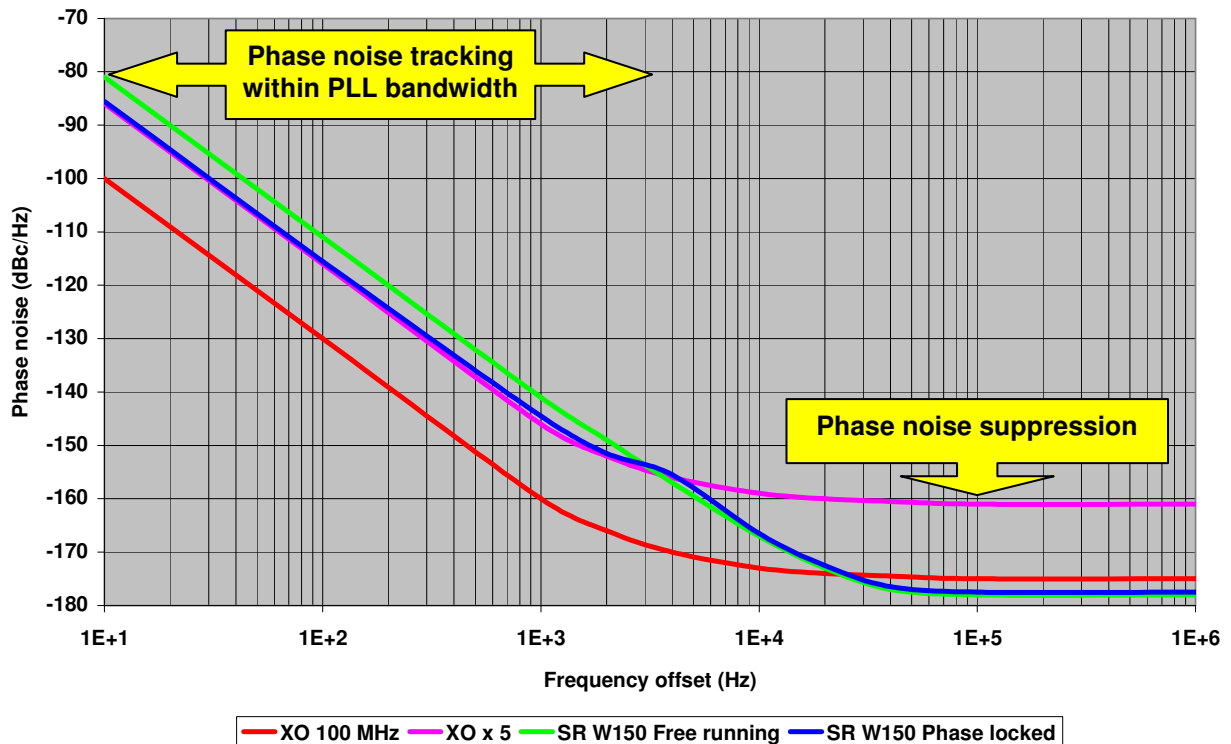
##### 1. Frequency stability :

- the output frequency is the frequency of the XO multiplied by N
- the long term relative performances are those of the XO

##### 2. Phase noise improvement :

- Within the PLL bandwidth, the phase noise is the phase noise of the XO + 20 logN
- Out of the PLL bandwidth, the phase noise is the phase noise of the ULN VCISO

#### Typical example: SR W150 phase locked on a XO @ 100 MHz multiplied by 5



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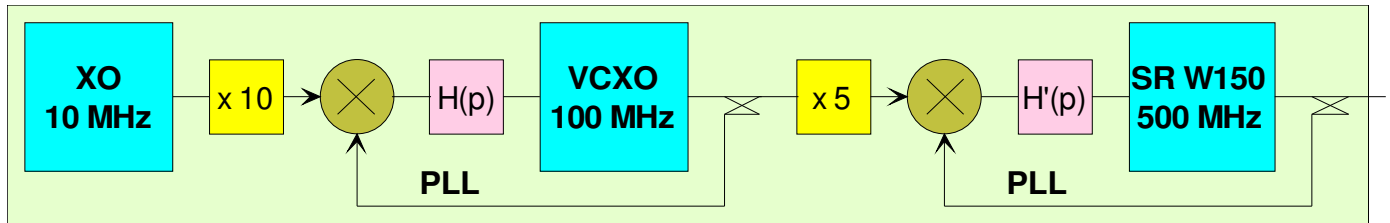
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Typical application 2: SR W150 phase locked on 100 MHz ULN VCXO itself phase locked on 10 MHz ULN XO

### Block diagram



### Simulated phase noise:

