SaRonix

Voltage Controlled Crystal Oscillator   5V, HCMOS
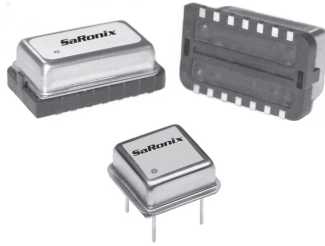
## Technical Data   S150x / ST150x Series

ACTUAL SIZE

Description

A voltage controlled crystal oscillator designed with excellent Jitter characteristics - ideal for telecom applications. The HCMOS output can drive high speed CMOS & TTL loads. Devices are in standard 14-pin DIP metal packages. Pin 7(4 on 1/2 size) is grounded to reduce EMI. SMD DIL 14 version is available utilizing adaptor technology (see separate data sheet for dimensions).

Applications & Features

- Phase Locked Loop (PLL) Clock & Data Recovery, Frequency Translation, Frequency Synthesis in Video, Video Compression, Telephony, and LAN/ WAN Data Communication and other Telecommunication applications.
- HCMOS / TTL compatible
- 3.5ps max RMS period jitter
- ± 50, 100 or 200 ppm APR*
- ± 20, 25 or 50 ppm Stability
- Tri-State option available
- SMD versions for IR reflow available

Output Waveform

| | Frequency Range: | 1.5 MHz to 100 MHz (Full Size)
1.5 MHz to 28.6363 MHz (Half Size) |
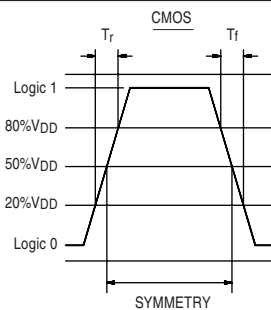
Frequency Range: 1.5 MHz to 100 MHz (Full Size)
1.5 MHz to 28.6363 MHz (Half Size)

Frequency Stability: ±20, ±25 or ±50 ppm over all conditions: operating temperature, voltage change, load change, calibration tolerance, shock and vibration, with V_C = 2.5V

Aging @ 25°C: ± 3ppm max per year, ±10ppm max for 10 years

Temperature Range:

	Operating:	0 to +70°C or -40 to +85°C
	Storage:	-55 to +125°C

Supply Voltage:

Recommended Operating: 5V ±10%

Supply Current:

Full Size Package:	1.5 to 11.9MHz:	20mA max with 30pF load
	12 to 70MHz:	65mA max with 30pF load
	70+ to 100MHz:	60mA max with 15pF load
Half Size Package:	1.5 to 28.6363MHz:	25mA max with 30pF load

Output Drive:

Symmetry:	45/55% max @ 50% V_{DD} 1.5 to 70 MHz
	40/60% max @ 50% V_{DD} 70+ to 100 MHz
Rise & Fall Times:	20% to 80% V_{DD}
1.5 to 25 MHz:	8ns max rise, 6ns max fall, full size package
25+ to 70 MHz:	5ns max rise & fall, full size package
70+ to 100 MHz:	3ns max rise & fall, full size package
1.5 to 28.6363 MHz:	6ns max rise & fall, half size package
Logic 0:	10% V_{DD} max
Logic 1:	90% V_{DD} min
Load:	30pF to 70 MHz, 15pF from 70+ to 100 MHz
Period Jitter RMS:	3.5ps max

Pull Characteristics:

Input Impedance (pin 1):	50KΩ min
Frequency Response (-3dB):	10 kHz min
Pullability:	±50, ±100, ±200ppm APR* min, See Part Numbering Guide
Control Voltage:	0.5 to 4.5V
Transfer Function:	Frequency increases when Control Voltage increases
Linearity:	5 or 10% max
Center Control Voltage:	2.5V

Mechanical:

Shock:	MIL-STD-883, Method 2002, Condition B
Solderability:	MIL-STD-883, Method 2003
Terminal Strength:	MIL-STD-883, Method 2004, Conditions B2
Vibration:	MIL-STD-883, Method 2007, Condition A
Solvent Resistance:	MIL-STD-202, Method 215
Resistance to Soldering Heat:	MIL-STD-202, Method 210, Conditions A, B or C
	(I or J for Gull Wing or SMD)

Environmental:

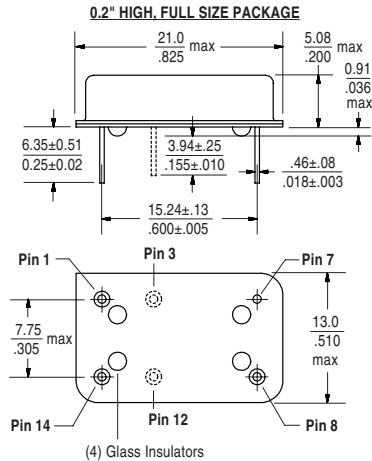|	
Gross Leak Test:	MIL-STD-883C, Method 1014, Condition C
Fine Leak Test:	MIL-STD-883C, Method 1014, Condition A2
Thermal Shock:	MIL-STD-883C, Method 1011, Condition A
Moisture Resistance:	MIL-STD-883C, Method 1004

* APR = (VCXO Pull relative to specified Output Frequency) – (VCXO Frequency Stability) – (Aging)
10 years aging is inclusive on 1/2 size version

DS-197   REV E

Voltage Controlled Crystal Oscillator   5V, HCMOS

Technical Data   S150x / ST150x Series

Package Details

0.2" HIGH, FULL SIZE PACKAGE

21.0 / .825 max   5.08 / .200 max
0.91 / .036 max
6.35±.51 / 0.25±.02
3.94±.25 / .155±.010
.46±.08 / .018±.003
15.24±.13 / .600±.005

Pin 1   Pin 3   Pin 7
7.75 / .305 max   13.0 / .510 max
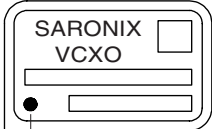Pin 14   Pin 12   Pin 8

(4) Glass Insulators

Pin Function:

Pin 1: Control Voltage
Pin 3: Tri-State Control (optional)
Pin 7: GND/Case (V$_{SS}$)
Pin 8: OUTPUT
Pin 12: N/C (optional)
Pin 14: VDC (V$_{DD}$)
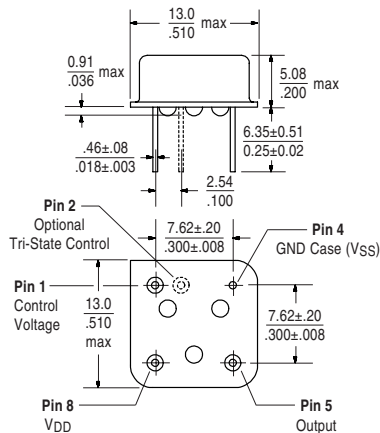
Marking Format**
Includes Date Code, Frequency, Part Number

SARONIX
VCXO

Denotes Pin 1

HALF SIZE PACKAGE

13.0 / .510 max
0.91 / .036 max   5.08 / .200 max
.46±.08 / .018±.003
6.35±.51 / 0.25±.02
2.54 / .100

Pin 2
Optional Tri-State Control
7.62±.20 / .300±.008
Pin 4
GND Case (V$_{SS}$)
Pin 1
Control Voltage   13.0 / .510 max
7.62±.20 / .300±.008
Pin 8
V$_{DD}$
Pin 5
Output

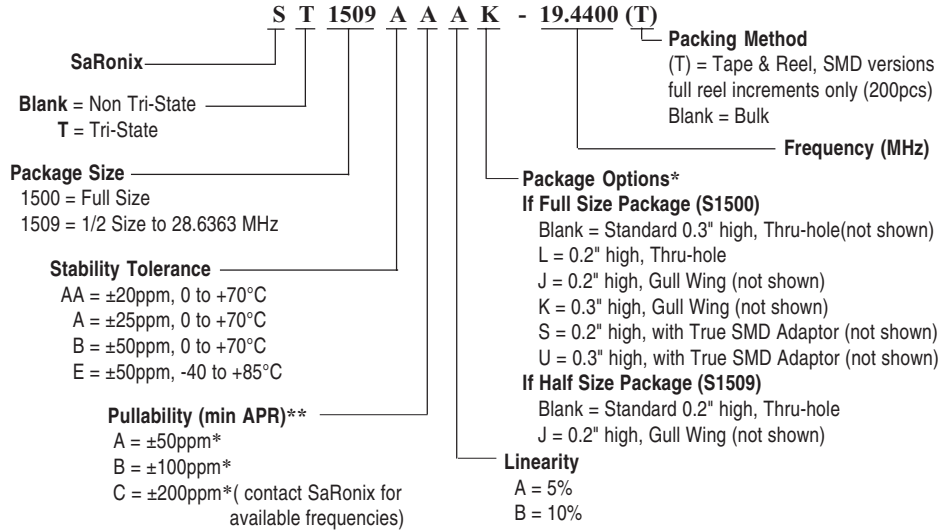**Marking Format****
Includes Date Code, Frequency, Part Number

SARONIX

Denotes Pin 1

**Exact location of items may vary

Scale: None (Dimensions in $\frac{mm}{inches}$)

Part Numbering Guide

S T 1509 A A A K - 19.4400 (T)

SaRonix

Blank = Non Tri-State
T = Tri-State

Package Size
1500 = Full Size
1509 = 1/2 Size to 28.6363 MHz

Stability Tolerance
AA = ±20ppm, 0 to +70°C
A = ±25ppm, 0 to +70°C
B = ±50ppm, 0 to +70°C
E = ±50ppm, -40 to +85°C

Pullability (min APR)**
A = ±50ppm*
B = ±100ppm*
C = ±200ppm*(contact SaRonix for available frequencies)

Packing Method
(T) = Tape & Reel, SMD versions full reel increments only (200pcs)
Blank = Bulk

Frequency (MHz)

Package Options*
If Full Size Package (S1500)
Blank = Standard 0.3" high, Thru-hole(not shown)
L = 0.2" high, Thru-hole
J = 0.2" high, Gull Wing (not shown)
K = 0.3" high, Gull Wing (not shown)
S = 0.2" high, with True SMD Adaptor (not shown)
U = 0.3" high, with True SMD Adaptor (not shown)
If Half Size Package (S1509)
Blank = Standard 0.2" high, Thru-hole
J = 0.2" high, Gull Wing (not shown)

Linearity
A = 5%
B = 10%

*Products are available with the following combination of Frequency, Pull and Package

Frequency	Pullability	Full Size (S1500)	Half Size (S1509)
1.5 to 28.6363MHz	A, B	L, J, S	Standard, J
	C	Standard, K, U	
28.6363+ to 100MHz	A, B, C	Standard, K, U	

** APR = (VCXO Pull relative to specified Output Frequency) **–** (VCXO Frequency Stability) – (Aging)
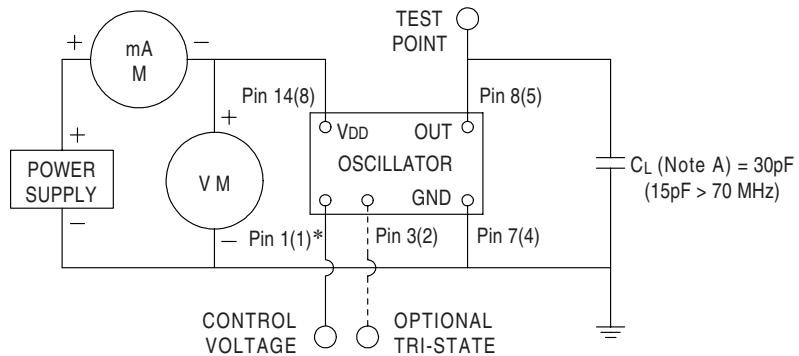**10 years aging is inclusive on 1/2 size version**

Tri-State Logic Table

Pin 3(2) Input	Pin 8(5) Output
Logic 1 or NC	Oscillation
Logic 0 or GND	High Impedance

Required Input Levels on Pin 3(2):
Logic 1 = 3.0V min
Logic 0 = 0.5V max

Test Circuit

mA / M
TEST POINT
Pin 14(8)   Pin 8(5)
POWER SUPPLY
V M
V$_{DD}$ OUT
OSCILLATOR
GND
C$_L$ (Note A) = 30pF
(15pF > 70 MHz)
Pin 1(1)*   Pin 3(2)   Pin 7(4)
CONTROL VOLTAGE   OPTIONAL TRI-STATE

NOTE A: C$_L$ includes probe and fixture capacitance.   *Items in brackets( ) represent Half Size model

All specifications are subject to change without notice.

DS-197   REV E

SaRonix

True SMD Adaptor - 7.57mm High

Technical Data

22.0 / .866
20.32 / .800
15.24 / .600
12.70 / .500
10.82 / .426
13.4 / .527
5.08 / .200
18.44 / .726
7.57 / .298
4.15 / .163
14 1.4 / .055
14 1.0 / .040
17.84 / .702
14 1.0 / .040
14 1.5 / .060
3.3 / .130
9.6 / .378
3.0 / .118
13.0 / .511
1.0 / .040

RECOMMENDED LAND PATTERN

15.24 / .600
2.54 / .100
2.03 / .080
11.86 / .467
1.52 / .060

REV A

True SMD Adaptor - 9.85mm High

Technical Data

22.0
.866

20.32
.800

12.70
.500

10.82
.426

13.4
.527

15.24
.600

7.36
.290

18.44
.726

9.85
.388

4.15
.163

14 1.4
.055

14 1.0
.040

17.84
.702

14 1.0
.040

14 1.5
.060

3.3
.130

9.6
.378

3.0
.118

13.0
.511

1.0
.040

RECOMMENDED LAND PATTERN

15.24
.600

2.54
.100

2.03
.080

11.86
.467

1.52
.060

REV A