

### 3.3V CMOS Ultra Low Jitter, High Frequency Voltage Controlled Crystal Oscillator (VCXO)



Actual Size = 9 x 14mm



#### Product Features

- Frequencies available between 38.88 and 125 MHz
- High frequency fundamental-mode crystal
- No internal PLL or frequency multiplication
- Less than 0.5 ps RMS jitter
- LVCMOS compatible output
- Commercial and industrial operation
- ±20 ppm stability (or as specified)
- ±50 ppm absolute (net) pull range
- 9x14mm true SMT design

#### Product Description

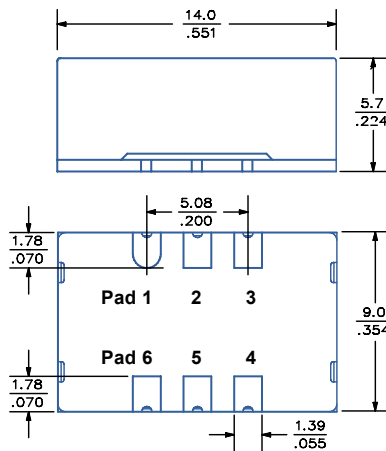
The ST1308 is a voltage controlled crystal oscillator that achieves superb jitter and temperature stability over a broad range of operating conditions and frequencies. The device is constructed with a hermetically sealed, fundamental-mode quartz crystal resonator exhibiting a high-Q for exceptional phase noise performance. The device, available on tape and reel, is contained in a 9x14mm leadless FR4 package.

#### Applications

The ST1308 Series VCXO is an ideal component in phase locked loop circuits that perform clock smoothing, clock/data recovery, or frequency translation and card synchronization functions, supporting jitter-sensitive applications such as:

- SMPTE-compliant Video networking
- SONET/SDH timing control and line cards
- Gigabit Ethernet and FibreChannel
- Satellite and microwave communications
- Server & Storage platforms

#### Package Outline



#### Pin Functions

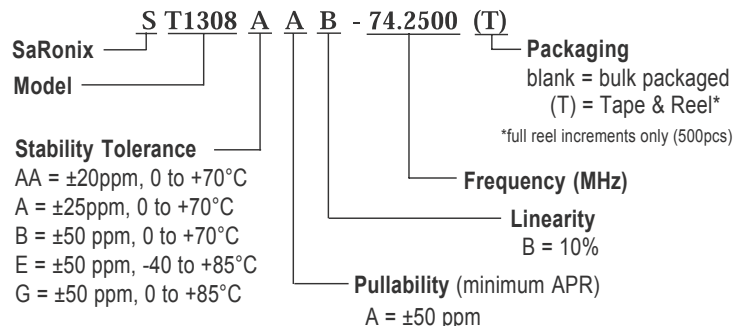
Pad	Function
1	Control voltage
2	Output Enable/Disable
3	Ground
4	Output
5	No Connect
6	Supply voltage

Full Mechanical Drawings page 6. Dimensions are in mm/inches.

#### Common Frequencies

38.8800	51.8400	54.0000
62.5000	65.5360	74.1758
74.2500	75.0000	77.7600
100.0000	106.2500	108.0000
125.0000		

#### Ordering Information



**Electrical Performance**

Parameter	Min.	Typ.	Max.	Units	Notes
Output frequency (F <sub>N</sub> )	38.88		125	MHz	As specified
Supply voltage	3.135	3.3	3.465	V	
Supply current			30	mA	
Frequency stability	±20		±50	ppM	See #1 below
Operating temperature	-40		+85	°C	As specified
Output logic 0, V <sub>OL</sub>			0.4	V	I <sub>OL</sub> = 2mA max
Output logic 1, V <sub>OH</sub>	2.4			V	I <sub>OH</sub> = -2mA max
Output load			20	pF	
Duty cycle	45		55	%	measured 1.4V
Rise and fall time			3	ns	measured 10/90%
Jitter, phase			0.5	ps RMS (1-σ)	12kHz to 40MHz frequency band
Jitter, accumulated			3.5	ps RMS (1-σ)	20,000 adjacent periods
Jitter, total			25	ps pk-pk	100,000 random periods
Phase Noise		-60		dBc/Hz	10 Hz offset
Phase Noise		-85		dBc/Hz	100 Hz offset
Phase Noise		-115		dBc/Hz	1 kHz offset
Phase Noise		-140		dBc/Hz	10 kHz offset
Phase Noise		-150		dBc/Hz	100 kHz offset

**Notes:**

- As specified. Stability includes all combinations of operating temperature, load changes, rated input (supply) voltage changes, aging (5 years at 40°C average ambient temperature), shock and vibration.

**Frequency Modulation Function**

Parameter	Min.	Typ.	Max.	Units	Notes
Absolute pull range (APR)	±50			ppM	See #1 below
Control voltage range	0.3		3.0	V <sub>DC</sub>	As rated
Center control voltage	1.32	1.65	1.98	V	For RMT center frequency
Monotonic linearity			10	%	Positive transfer slope
Input impedance	50			kΩ	Control voltage pin
Modulation bandwidth	10			kHz	-3dB

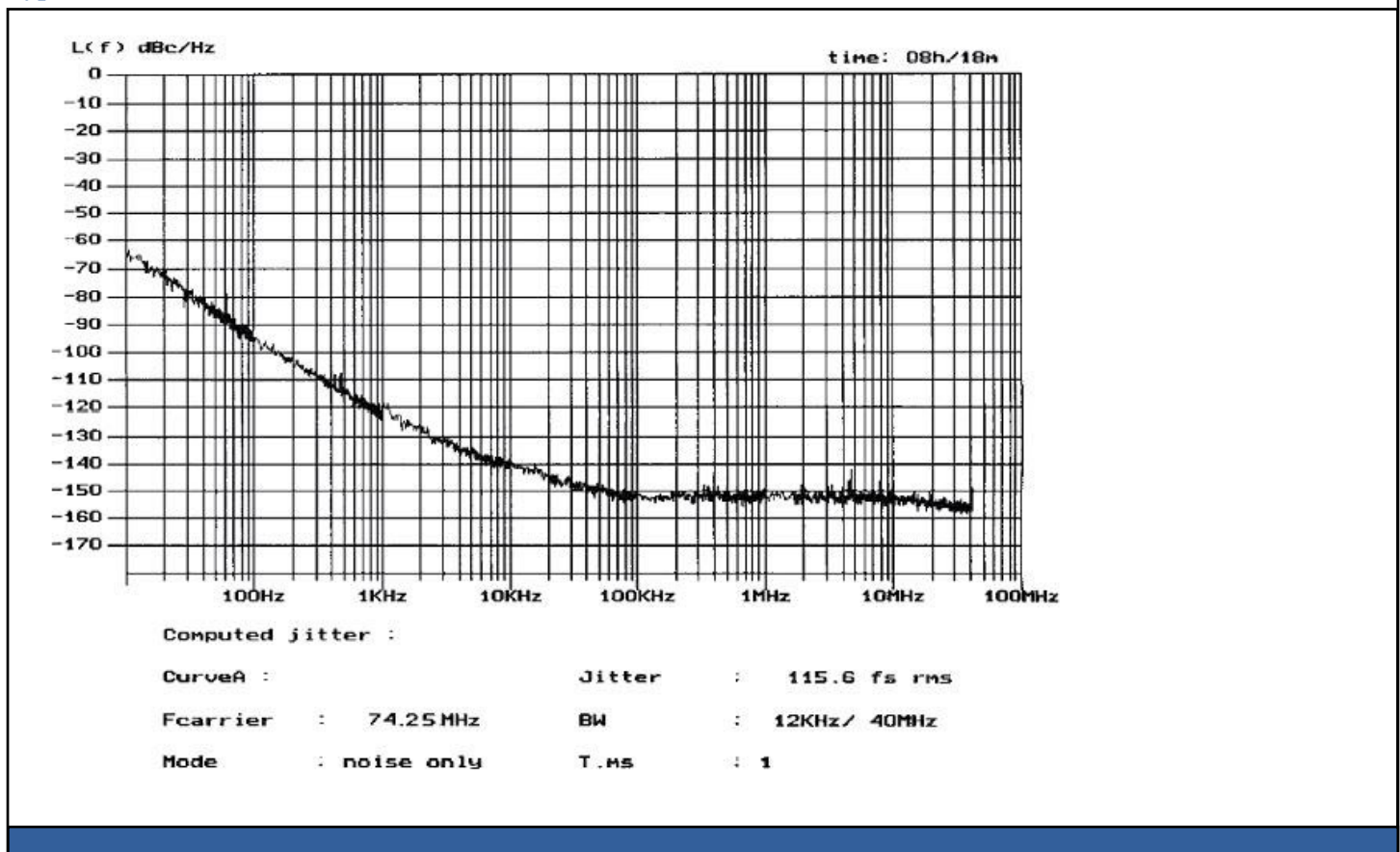
**Notes:**

- APR is relative to the nominal output frequency F<sub>N</sub> (as specified); APR is inclusive (net) of frequency deviation due to stability.

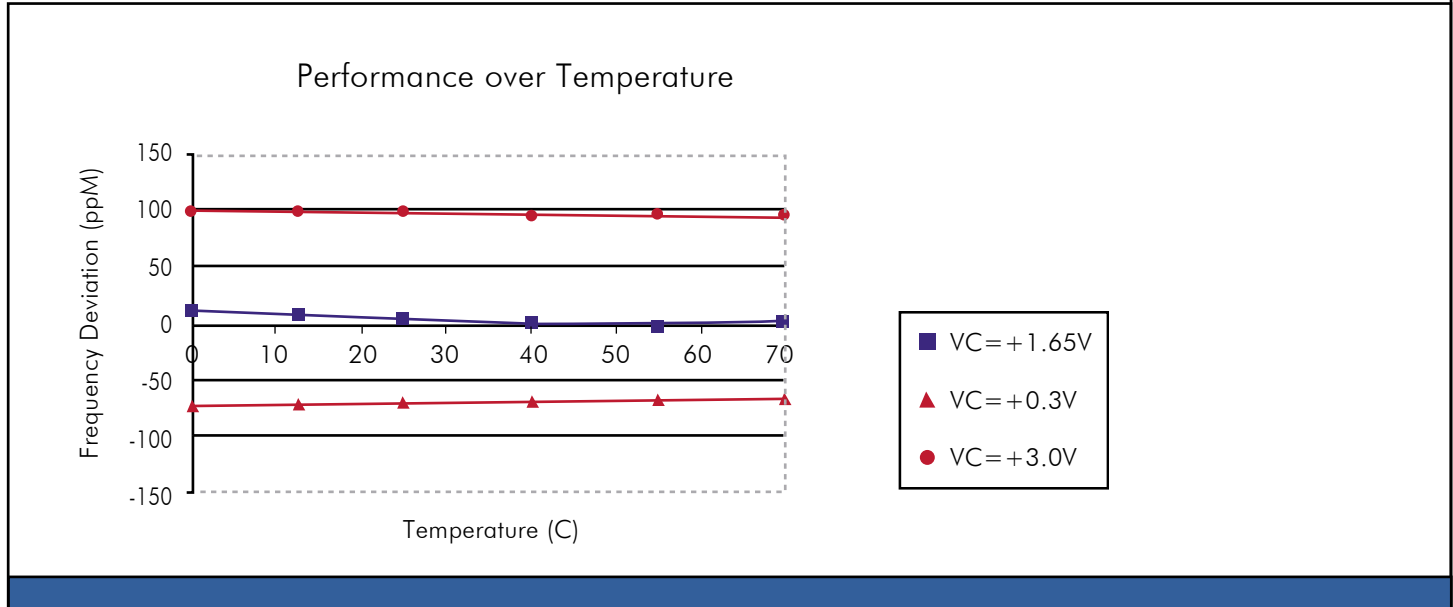
**Output Enable / Disable Function**

Parameter	Min.	Typ.	Max.	Units	Notes
Input voltage, output enable	2.2			V	
Input voltage, output high impedance			0.8	V	
Output disable delay			100	ns	
Internal pullup resistance	50			k $\Omega$	

**Typical Phase Noise**



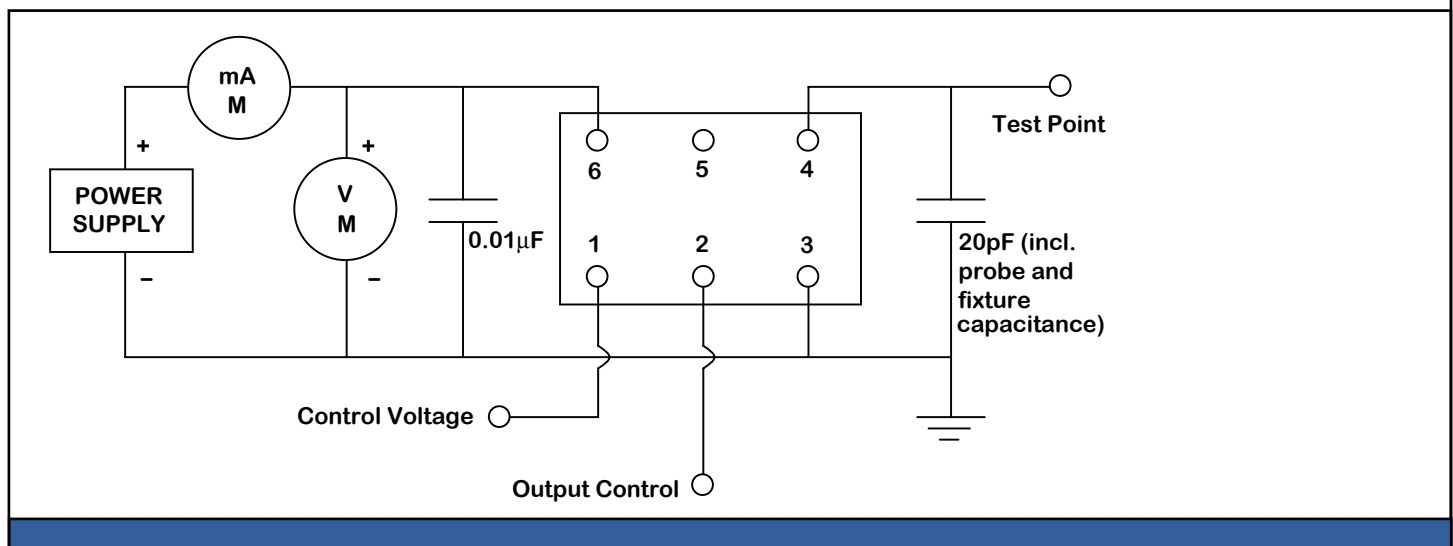
**Typical Temperature and Pull Characteristics**



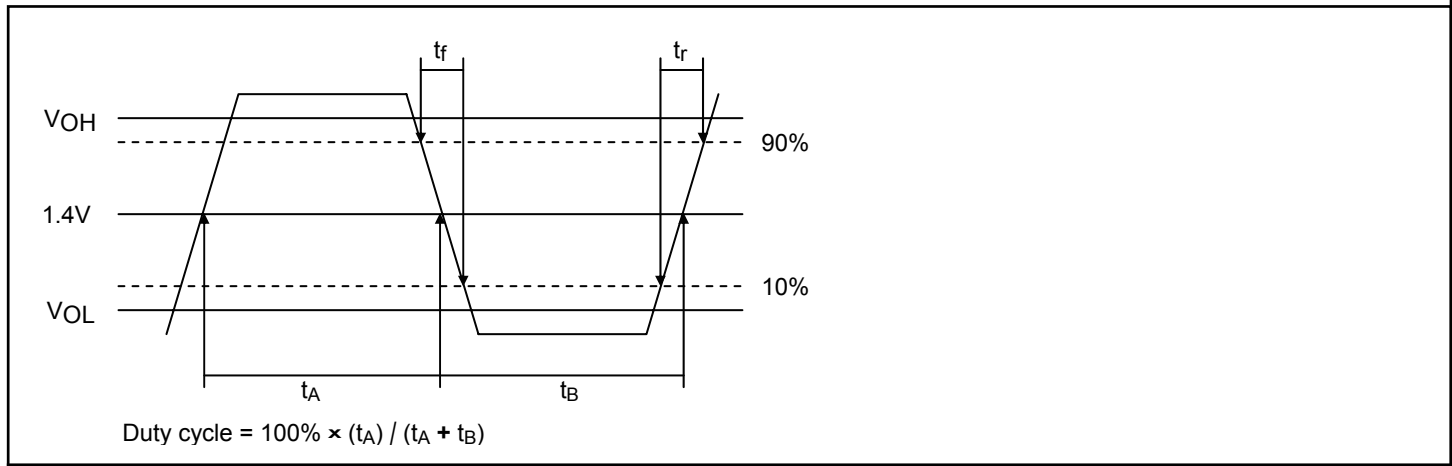
**Absolute Maximum Ratings**

Parameter	Min.	Typ.	Max.	Units	Notes
Storage temperature	-55		+125	°C	
Control voltage range	0		V <sub>CC</sub>	V	

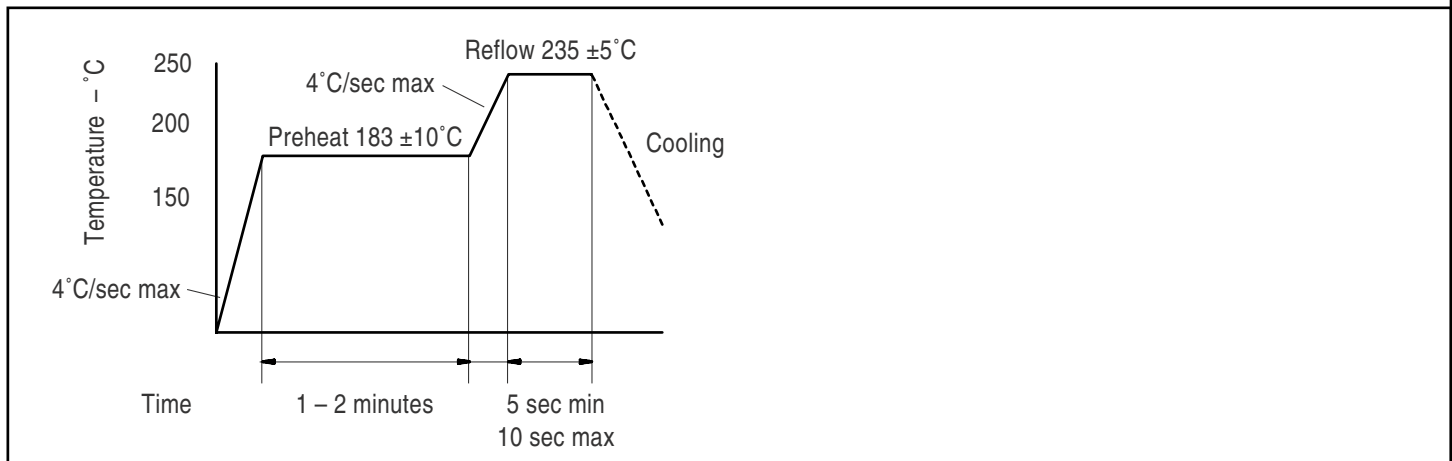
**Test Circuit**



**Output Waveform**



**Solder Reflow Guide**

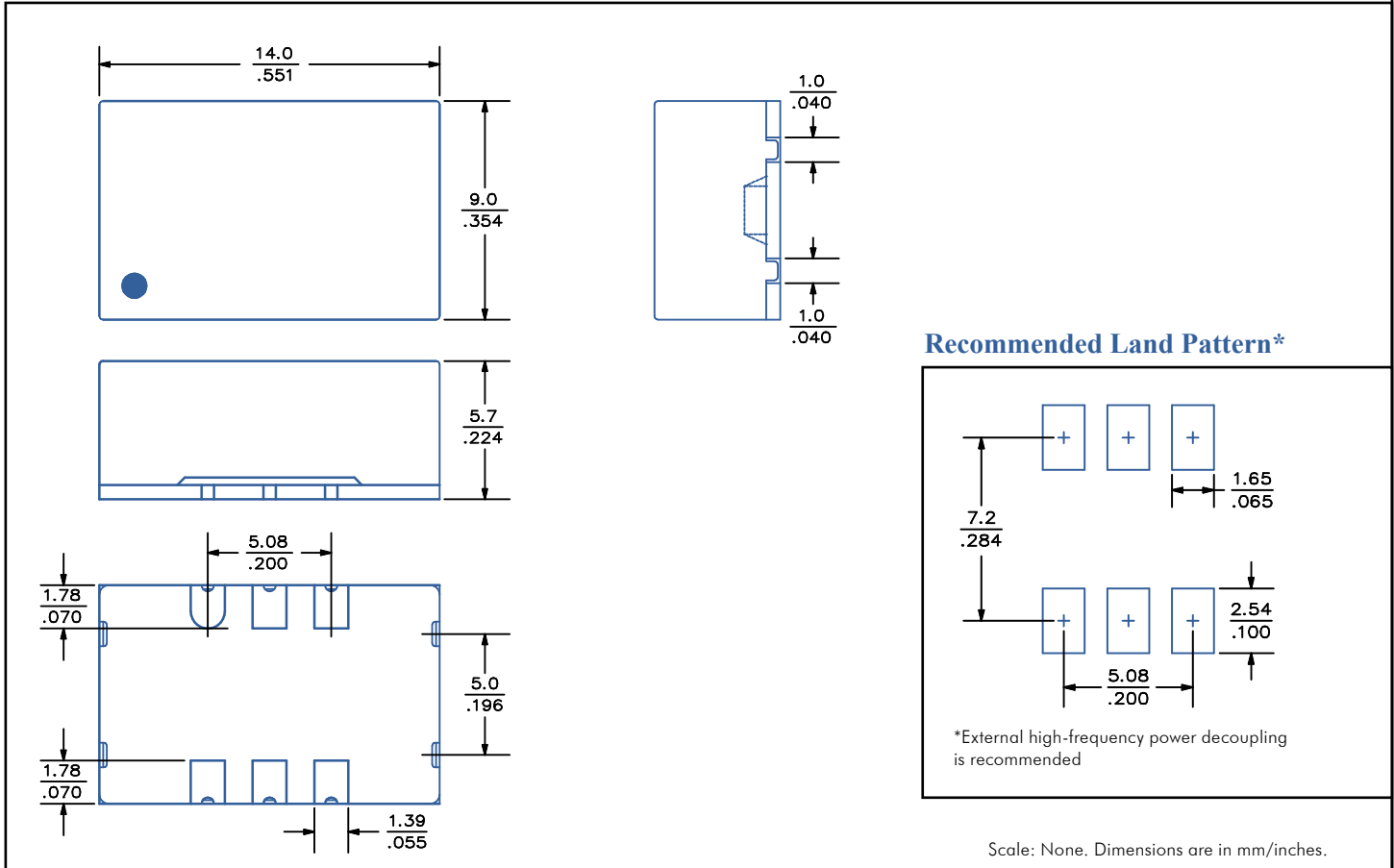


**Reliability Test Ratings**

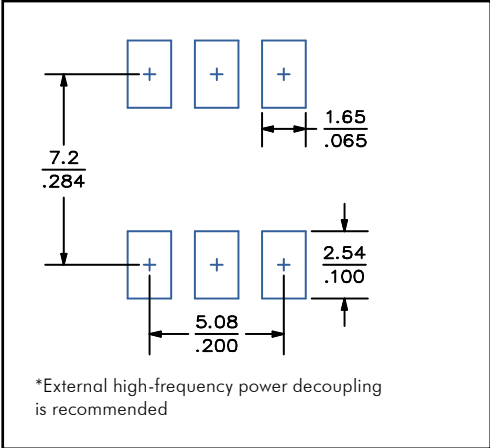
This product is rated under the following test conditions:

Type	Parameter	Test Condition
Mechanical	Shock	MIL-STD-883, Method 2002, Condition B
Mechanical	Solderability	MIL-STD-883, Method 2003
Mechanical	Terminal strength	MIL-STD-883, Method 2004, Condition D
Mechanical	Solvent resistance	MIL-STD-202, Method 215
Environmental	Thermal shock	MIL-STD-883, Method 1011, Condition A
Environmental	Moisture resistance	MIL-STD-883, Method 1004
Environmental	Vibration	MIL-STD-883, Method 2007, Condition A
Environmental	Resistance to soldering heat	MIL-STD-202, Method 210, Condition I or J

**Mechanical Drawings**



**Recommended Land Pattern\***



Scale: None. Dimensions are in mm/inches.

Marking LINE 1: SARONIX YY WW X (Year, Week, Origin)  
 Marking LINE 2: 12M3456 (Frequency)  
 Marking LINE 3: • ST1308xxx (Pin 1, Part Number)

**\*\* Exact location of items may vary**

**Ordering Information**

