

### 3.3V PECL High-Frequency Voltage-Controlled Crystal Oscillator (VCXO)



Actual Size = 7 x 5mm



#### Product Features

- Frequencies available up to 670 MHz
- Less than 3ps RMS jitter
- LVPECL compatible output
- Commercial and industrial operation
- $\pm 20$  ppm stability (or as specified)
- $\pm 50$  ppm absolute (net) pull range
- Pin compatible with standard 7 x 5mm packages
- Designed for standard reflow and washing techniques
- Pb-free & RoHS/Green compliant

#### Product Description

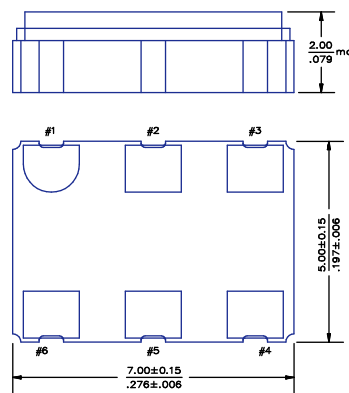
The S1577 is a voltage controlled crystal oscillator that achieves superb temperature stability over a broad range of operating conditions and frequencies. The device is constructed with a hermetically sealed quartz crystal resonator exhibiting a high-Q for exceptional performance. The device, available on tape and reel, is contained in a 7 x 5mm surface mount ceramic package.

#### Applications

The S1577 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, such as:

- SONET/SDH/DWDM/E4 timing control & line cards
- 1 & 10 Gigabit Ethernet and FibreChannel
- Satellite, microwave and cellular base stations
- Server & Storage platforms

#### Package Outline



#### Pin Functions

Pad	Function
1	Control voltage
2	Output Enable/Disable
3	Ground
4	Q Output
5	$\bar{Q}$ Output
6	Supply voltage

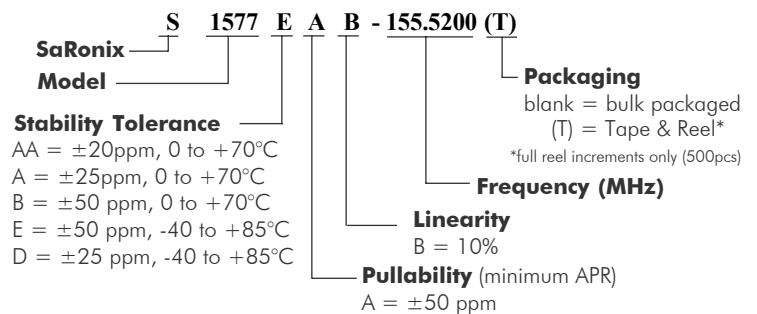
Full Mechanical Drawings page 7. Dimensions are in mm/inches.

#### Common Frequencies

Contact SaRonix for additional frequencies (see SEL383 for 38 to 212 MHz)

19.4400	54.0000	77.7600
106.2500	108.0000	125.0000
139.2640	155.5200	156.2500
161.1328	167.3316	250.0000
312.5000	622.0800	625.0000
644.5312	666.5143	669.3266

#### Ordering Information



**Electrical Performance**

Parameter	Min.	Typ.	Max.	Units	Notes
Output frequency ( $F_N$ )	19.44		670	MHz	As specified
Supply voltage	3.14	3.3	3.46	V	
Supply current		85	110	mA	
Frequency stability			$\pm 20$ to $\pm 50$	ppM	See Note 1 below
Operating temperature	-40		+85	°C	As specified
Output logic 0, $V_{OL}$			$V_{CC} - 1.620$	V	0 to +85°C
Output logic 0, $V_{OL}$			$V_{CC} - 1.555$	V	-40 to +0°C
Output logic 1, $V_{OH}$	$V_{CC} - 1.025$			V	0 to +85°C
Output logic 1, $V_{OH}$	$V_{CC} - 1.085$			V	-40 to +0°C
Output load	50Ω to $V_{CC} - 2V$				output requires termination
Duty cycle	45		55	%	measured 50% of waveform
Rise and fall time			850	ps	measured 20/80% of waveform
Jitter, phase			3	ps RMS (1-σ)	12kHz to 40MHz frequency band
Jitter, accumulated			10	ps RMS (1-σ)	20,000 adjacent periods
Spurious or Subharmonics			-50	dBc	$F_N \leq 350$ MHz
			-40	dBc	$F_N > 350$ MHz

**Notes:**

- As specified. Stability includes all combinations of operating temperature, load changes, rated input (supply) voltage changes, shock and vibration. Stability is inclusive of 5 years aging at 40°C average effective ambient temperature for ordering options A, B, D, E.

**Frequency Modulation (Control Voltage) Function**

Parameter	Min.	Typ.	Max.	Units	Notes
Absolute pull range (APR)	$\pm 50$			ppM	See #1 below
Control voltage range	0.3		3.0	$V_{DC}$	As rated
Center control voltage	1.32	1.65	1.98	V	For RMT nominal frequency $F_N$
Monotonic linearity			10	%	Positive transfer slope
Input impedance	50			kΩ	Control voltage pin
Modulation bandwidth	10			kHz	-3dB

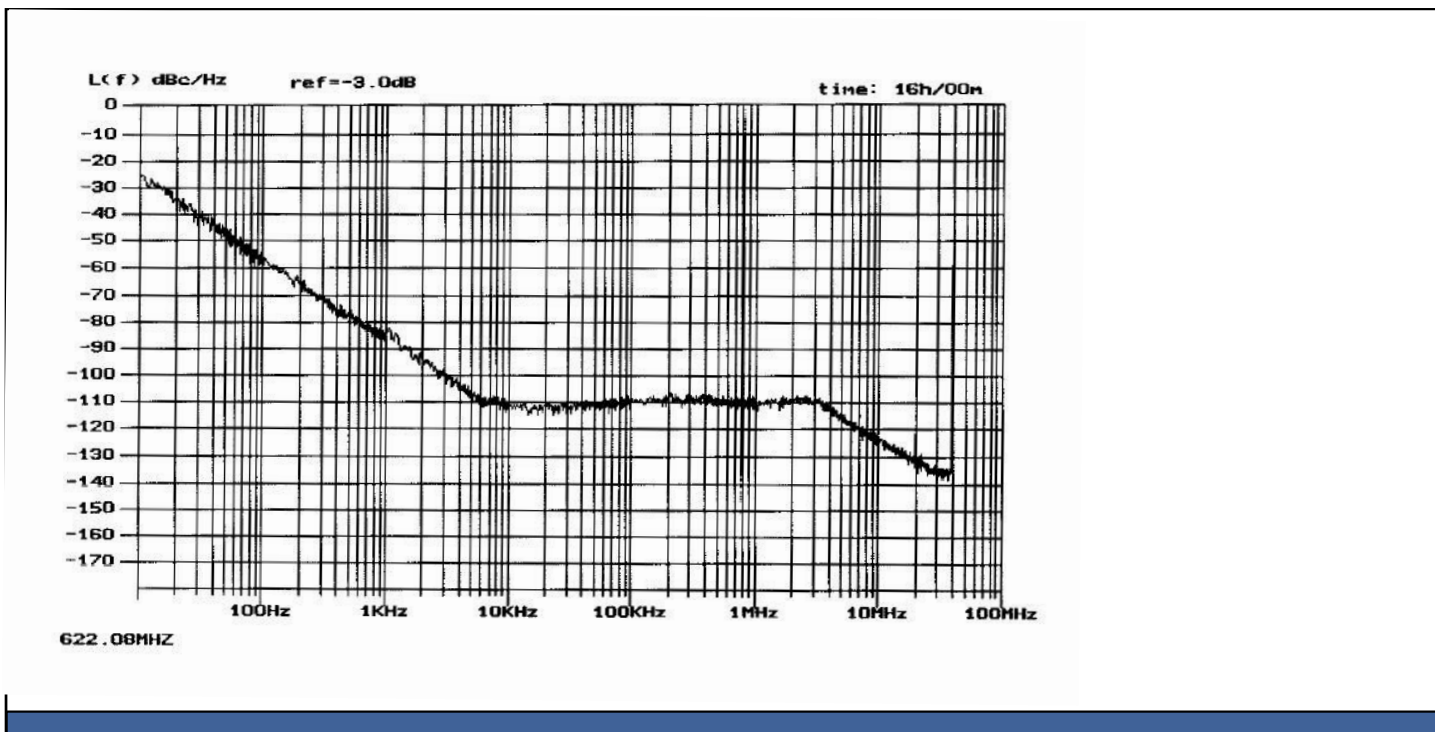
**Notes:**

- APR is relative to the nominal output frequency  $F_N$  (as specified); APR is inclusive (net) of frequency deviation due to stability.

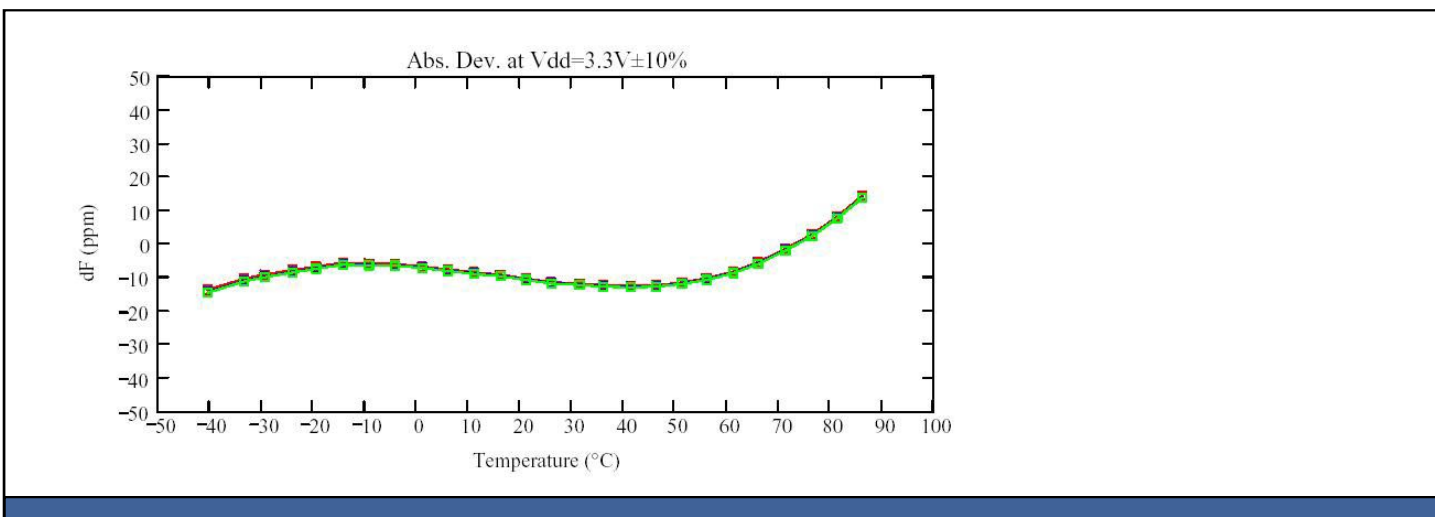
**Output Enable / Disable Function**

Parameter	Min.	Typ.	Max.	Units	Notes
Input voltage, Output Enable (pin 2)			V <sub>OL</sub>	V	or Open
Input voltage, Output Disable (pin2)	V <sub>OH</sub>			V	Q and $\bar{Q}$ outputs disable to High Impedance

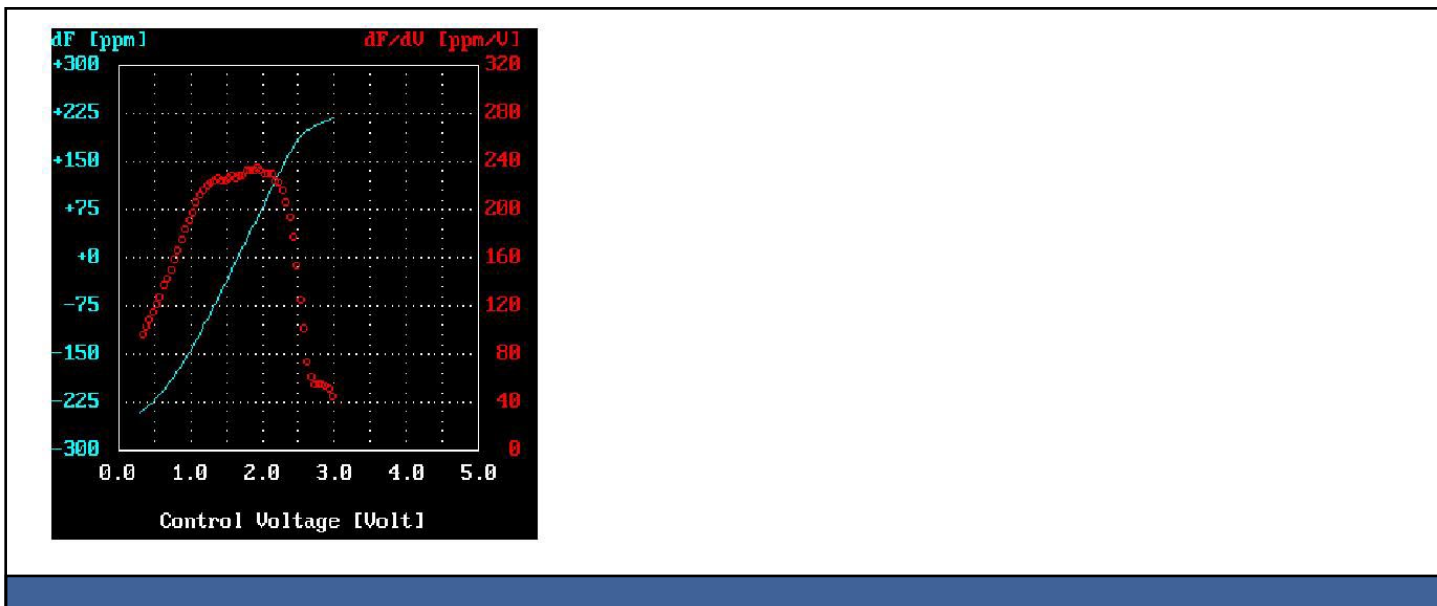
**Typical Phase Noise**



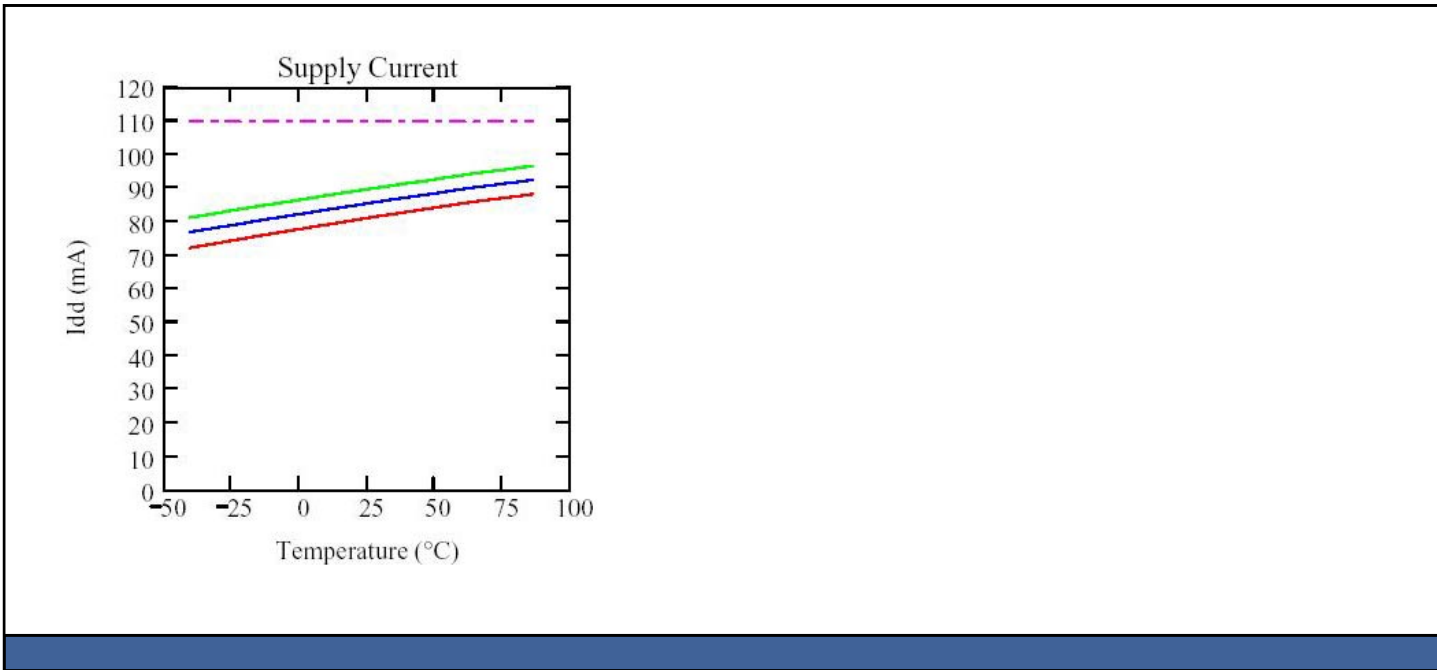
**Typical Stability Characteristics**



**Typical Pull Characteristics**



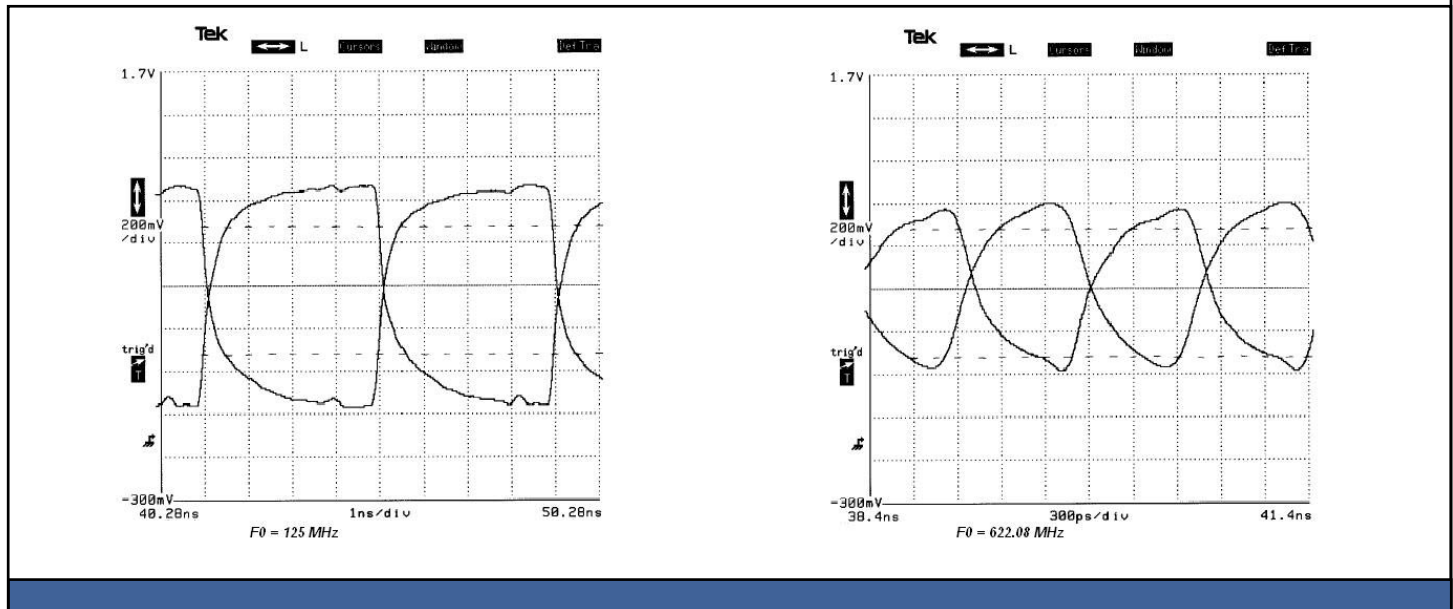
**Typical Supply Current**



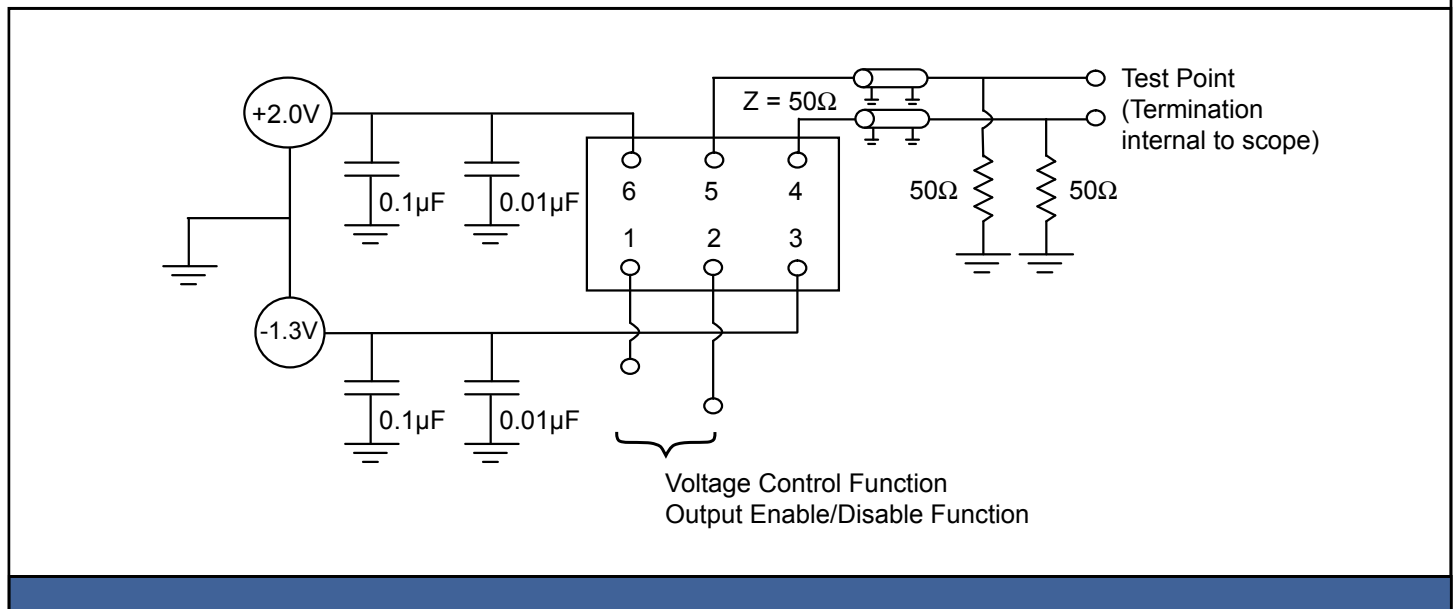
**Absolute Maximum Ratings**

Parameter	Min.	Typ.	Max.	Units	Notes
Storage temperature	-55		+105	°C	
Control voltage range	0		V <sub>CC</sub>	V	

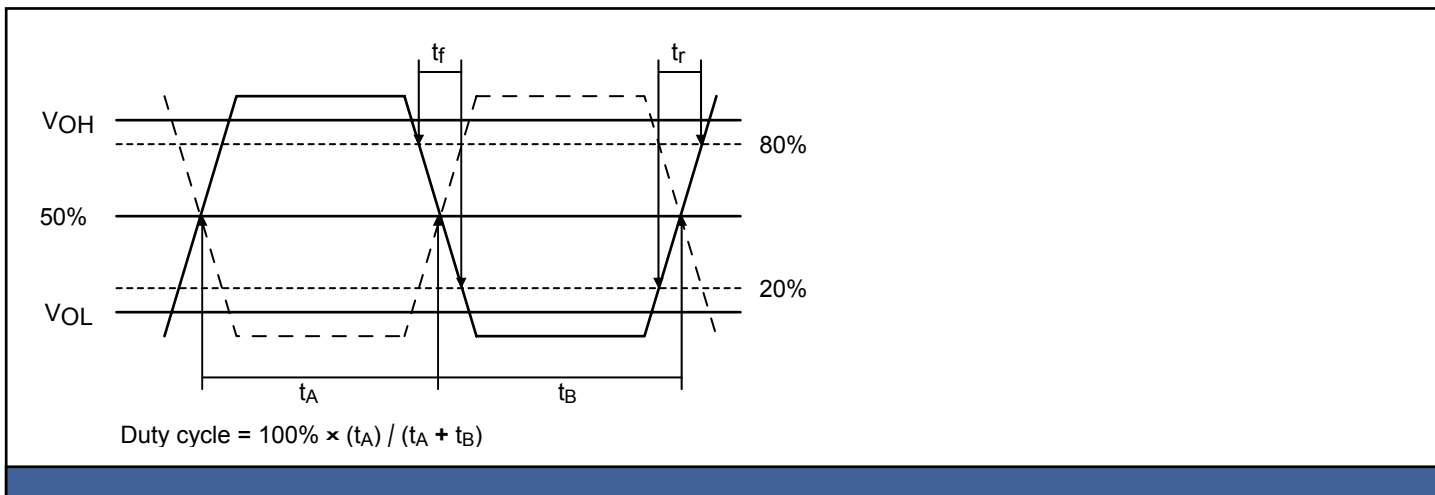
**Typical Output Waveform**



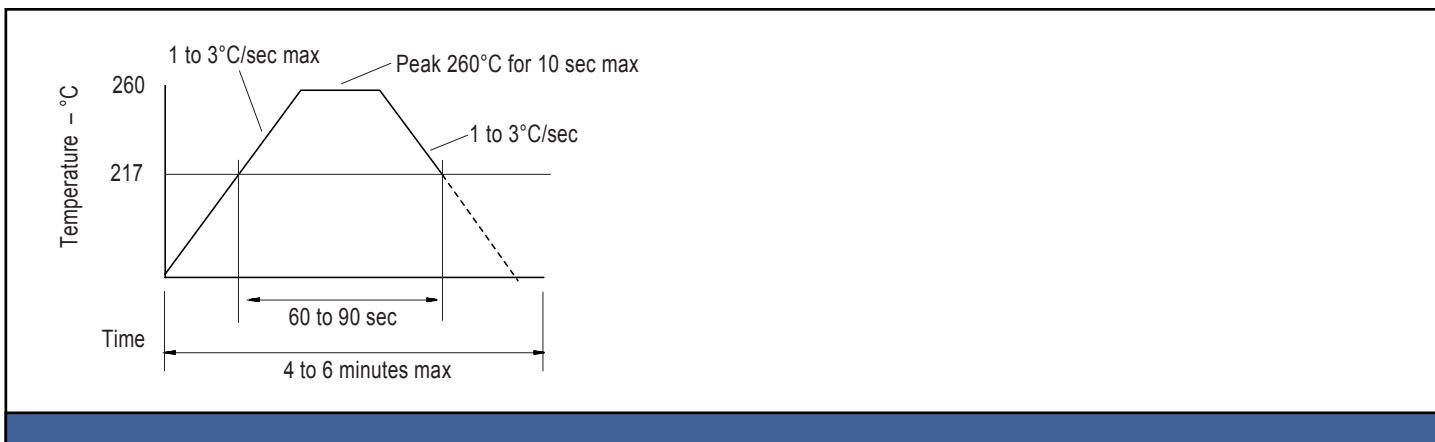
**Test Circuit**



**Output Waveform**



**Solder Reflow Guide**

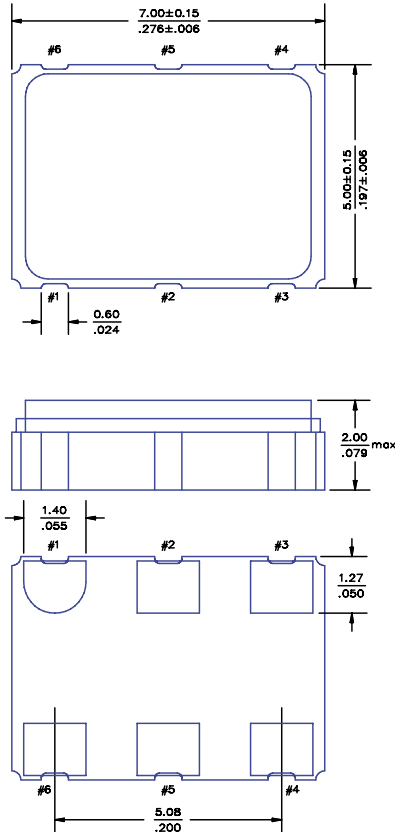


**Reliability Test Ratings**

This product is rated under the following test conditions:

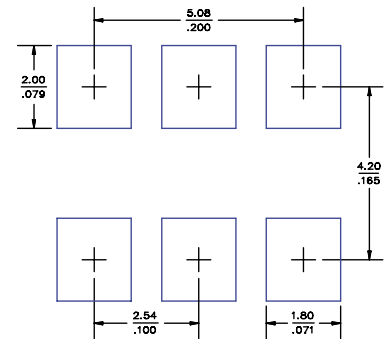
Type	Parameter	Test Condition
Mechanical	Shock	MIL-STD-883, Method 2002, Condition B
Mechanical	Solderability	JESD22-B102-D Method 2 (Preconditioning E)
Mechanical	Terminal strength	MIL-STD-883, Method 2004, Condition D
Mechanical	Gross leak	MIL-STD-883, Method 1014, Condition C
Mechanical	Fine leak	MIL-STD-883, Method 1014, Condition A2 $R_1 = 2 \times 10^{-8} \text{ atm CC/S}$
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	J-STD-020C Table 5-2 Pb-free devices (2 cycles max)

**Mechanical Drawings**



Please note: In 2005, ceramic package design changed to allow pin #1 size decrease as shown. Some older lot codes may be built with the prior package, in which case pin #1 is 1.4 x 1.6 mm max.

**Recommended Land Pattern\***



\*External high-frequency power decoupling is recommended. (see test circuit for minimum recommendation). To ensure optimal performance, do not route traces beneath the package.

Scale: None. Dimensions are in mm/inches.

Marking LINE 1: S1577 X (SaRonix, Model, Stability code)  
 Marking LINE 2: Frequency (Frequency code)  
 Marking LINE 3: ● YY WW X (Pin 1, Year, Week, Origin)

\*\* Exact location of markings may vary