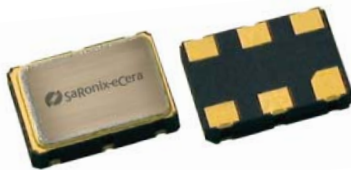


## 3.3V CMOS Ultra Low Jitter VCXO

**FR**



7.0 x 5.0mm Ceramic SMD

### Product Features

- 1 - 32MHz Frequency Range
- Cost-effective design
- Commercial and industrial operation
- $\pm 50$  ppm stability (or as specified)
- $\pm 50$  to  $\pm 100$  ppm absolute (net) pull range
- RoHS Compliant

### Product Description

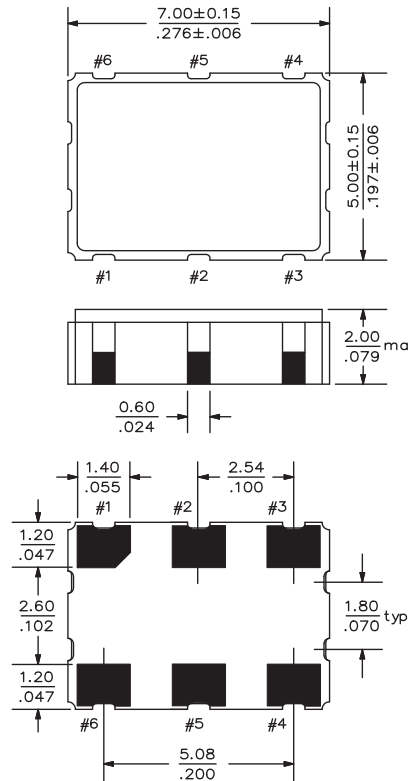
The FR Series voltage controlled crystal oscillator achieves wide pullability over a broad range of operating conditions and frequencies. The device is constructed with a hermetically sealed, quartz crystal resonator and low noise clock IC. The device, available on tape and reel, is contained in a 7.0 x 5.0mm ceramic package.

### Applications

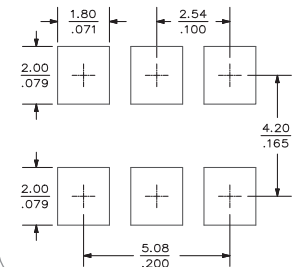
The FR Series VCXO is an ideal component in phase locked loop circuits that perform clock smoothing, clock/data recovery, or frequency translation and card synchronization functions, such as:

- SD/HD Video decoding
- SONET/SDH timing control and line cards
- T3/E3 Platforms
- Satellite and microwave communications
- Wireless base stations
- xDSL and DSLAM
- VoIP

### Package:



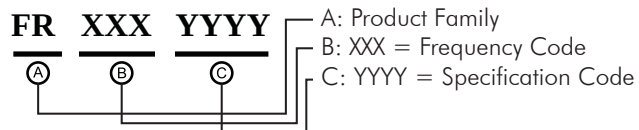
### Recommended Land Pattern:



### Pin Functions:

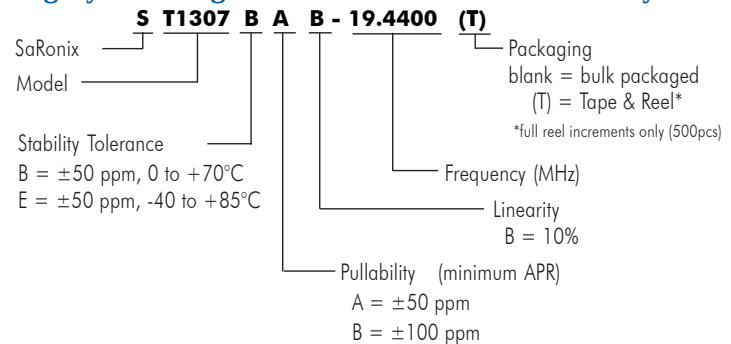
| Pin | Function        |
|-----|-----------------|
| 1   | Voltage Control |
| 2   | OE or NC        |
| 3   | Ground          |
| 4   | Output          |
| 5   | NC              |
| 6   | V <sub>CC</sub> |

### Part Ordering Information:



Following the above format, Saronix-eCera part numbers will be assigned upon confirmation of exact customer requirements.

### Legacy Ordering Information - For Reference Only:



### Electrical Performance

| Parameter                   | Min.         | Typ. | Max.         | Units    | Notes                    |
|-----------------------------|--------------|------|--------------|----------|--------------------------|
| Output Frequency ( $F_N$ )  | 1            |      | 32           | MHz      | As specified             |
| Supply Voltage              | +2.97        | +3.3 | +3.63        | V        |                          |
| Supply Current              |              |      | 15           | mA       |                          |
| Frequency Stability         |              |      | $\pm 50$     | ppm      | See #1 and #2 below      |
| Operating Temperature Range | -40          |      | +85          | °C       | As specified             |
| Output Logic 0, $V_{OL}$    |              |      | 10% $V_{DD}$ | V        | Capacitive load          |
| Output Logic 1, $V_{OH}$    | 90% $V_{DD}$ |      |              | V        |                          |
| Output Load                 |              |      | 30           | pF       |                          |
| Duty Cycle                  | 45           |      | 55           | %        | measured 50% $V_{DD}$    |
| Rise and Fall Time          |              |      | 8            | ns       | measured 20/80% $V_{DD}$ |
| Jitter, Total               |              |      | 20           | ps pk-pk |                          |

#### Notes:

- Stability includes all combinations of operating temperature, load changes, rated input (supply) voltage changes, initial calibration tolerance (25°C), aging (10 year at 40°C average effective ambient temperature), shock and vibration.
- For specifications other than those listed, please contact sales.

### Frequency Modulation Function

| Parameter                 | Min.                  | Typ.  | Max. | Units      | Notes                    |
|---------------------------|-----------------------|-------|------|------------|--------------------------|
| Absolute Pull Range (APR) | $\pm 50$ to $\pm 100$ |       |      | ppm        | See #1 below             |
| Control Voltage Range     | +0.3                  |       | +3.0 | $V_{DC}$   | As rated                 |
| Center Control Voltage    |                       | +1.65 |      | V          | For RMT center frequency |
| Monotonic Linearity       |                       |       | 10   | %          | Positive transfer slope  |
| Input Impedance           | 50                    |       |      | k $\Omega$ | Control voltage pin      |
| Modulation Bandwidth      | 50                    |       |      | kHz        | -3dB                     |

#### Notes:

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

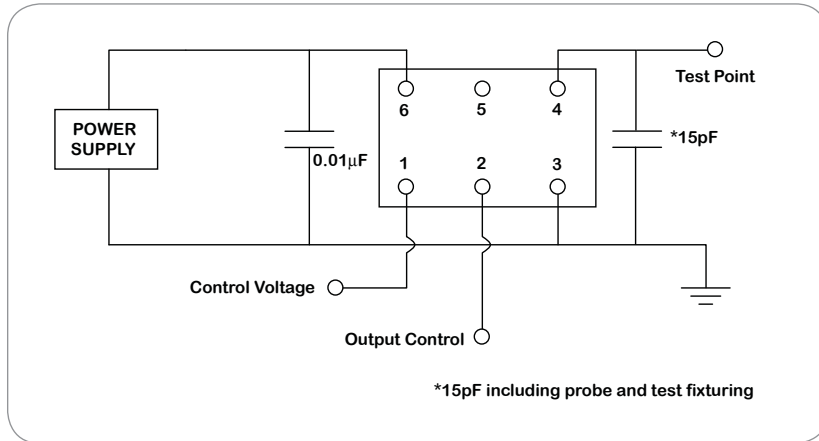
### Output Enable / Disable Function

| Parameter                            | Min. | Typ. | Max. | Units | Notes                    |
|--------------------------------------|------|------|------|-------|--------------------------|
| Input Voltage, Output Enable         | 3.0  |      |      | V     | or open                  |
| Input Voltage, Output High Impedance |      |      | 0.3  | V     | Output is high impedance |

### Absolute Maximum Ratings

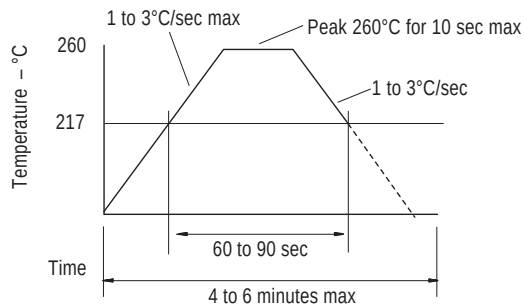
| Parameter           | Min. | Typ. | Max. | Units | Notes |
|---------------------|------|------|------|-------|-------|
| Storage Temperature | -55  |      | +125 | °C    |       |

### Test Circuit

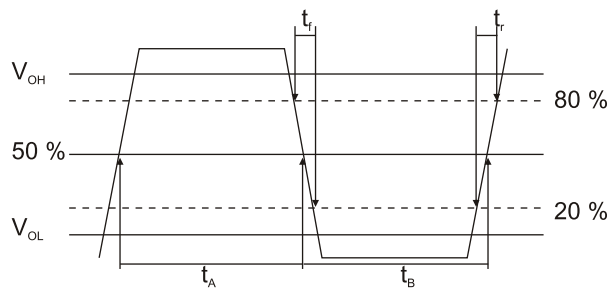


### Reflow Soldering Profile

As per IPC/JEDEC J-STD-020C



### Output Waveform



$$\text{Duty cycle} = 100\% \times (t_A) / (t_A + t_B)$$

### Reliability Test Ratings

This product is rated to meet 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 ( $R_1 = 2 \times 10^{-8}$ 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 Drawing

