The RST2016H is a high temperature TCXO (Temperature Compensated Crystal Oscillator) / VCTCXO (Voltage Controlled Temperature Compensated Crystal Oscillator). It is designed for high-performance automotive and communication applications where a frequency stability of ±0.5 ppm is required over an operating temperature range of -40 to 105°C.

The RST2016H has an analogue ASIC and a high-order temperature compensation circuit in a small font factor 2.0 x 1.6 x 0.7 mm package. This low-power SMD TCXO provides a voltage control option of VCTCXO, with a wide frequency range available from 10 to 52 MHz. Supply voltage options are 1.8 to 3.3 V.

### Features
- High-end operating temperature up to 105°C
- Frequency stability ±0.5 ppm over extended temperature ranges
- Excellent phase noise performance
- Output: Clipped sinewave, temperature sensor

### Applications
- Automotive
- Communications
- Consumer devices
- Wi-Fi

### Standard Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Test Condition / Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal frequency (F&lt;sub&gt;n&lt;/sub&gt;)</td>
<td>13 – 52</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency calibration</td>
<td>±1 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>Offset from nominal frequency measured at 25°C ±2°C</td>
</tr>
<tr>
<td>Reflow shift</td>
<td>±1 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>Two consecutive refloows</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40 105 °C</td>
<td>°C</td>
<td></td>
<td></td>
<td>The operating temperature range over which the frequency stability is measured</td>
</tr>
<tr>
<td>Frequency stability over temperature</td>
<td>±0.5 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>Referenced to the midpoint between minimum and maximum frequency value over the specified temperature range&lt;sup&gt;1&lt;/sup&gt;. Control voltage set to the midpoint of V&lt;sub&gt;c&lt;/sub&gt;. For a 100% screen-tested product, please refer to the alternative RIT2016H</td>
</tr>
<tr>
<td>Static temperature hysteresis</td>
<td>0.6 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C</td>
</tr>
<tr>
<td>Sensitivity to supply voltage variations</td>
<td>±0.1 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>V&lt;sub&gt;DD&lt;/sub&gt; varied ±5% at 25°C</td>
</tr>
<tr>
<td>Sensitivity to load variations</td>
<td>±0.1 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>±10% load change at 25°C&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Long term stability (Ageing)</td>
<td>±1 ppm</td>
<td>ppm</td>
<td></td>
<td></td>
<td>Frequency drift over 1 year at 25°C</td>
</tr>
<tr>
<td>Supply voltage (V&lt;sub&gt;DD&lt;/sub&gt;)</td>
<td>1.8 – 3.3 V</td>
<td>V</td>
<td></td>
<td></td>
<td>With a tolerance of ±5%</td>
</tr>
<tr>
<td>Control voltage (V&lt;sub&gt;c&lt;/sub&gt;) range</td>
<td>0.2 0.9 1.2 V&lt;sub&gt;DD&lt;/sub&gt; - 0.2 V</td>
<td>V</td>
<td>V&lt;sub&gt;DD&lt;/sub&gt; ≤ 2.3V</td>
<td>V&lt;sub&gt;DD&lt;/sub&gt; &gt; 2.3V</td>
<td></td>
</tr>
<tr>
<td>Supply current</td>
<td>2 mA</td>
<td></td>
<td></td>
<td></td>
<td>At maximum V&lt;sub&gt;DD&lt;/sub&gt;&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Output voltage level</td>
<td>0.8 V&lt;sub&gt;pk-pk&lt;/sub&gt;</td>
<td>V</td>
<td></td>
<td></td>
<td>At minimum V&lt;sub&gt;DD&lt;/sub&gt; specified for load stated in oscillator output section at 25°C&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Output waveform</td>
<td>DC coupled clipped sinewave&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Parts should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents on the oscillator can lead to short term frequency drift.

<sup>2</sup> Specified for load stated in oscillator output section at 25°C.

<sup>3</sup> External AC-Coupling capacitor required. 1 nF or greater recommended.
Model Outline and Recommended Pad Layout

![Model Outline and Recommended Pad Layout](image)

RECOMMENDED PAD LAYOUT

**TOP VIEW**

- External Bypass Cap 100nF
- To GND
- Output to Circuit
- External AC-Coupling Capacitor ≥ 1nF

**RECOMMENDED PAD LAYOUT**

**TOP VIEW**

- Recommended No Tracks Including Plains Under Device
- 1.2m (x4)
- 0.58 (x4)

**BOTTOM VIEW**

- C0.15
- 0.63
- 1.14

Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>Do not connect, GND, VCO (Vc), or Tsense</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>RF output</td>
</tr>
<tr>
<td>4</td>
<td>Supply voltage (Vdd)</td>
</tr>
</tbody>
</table>

* Depending on the specifications

**NOTE:** Dimensions are in millimetre.

Test Circuit

**CLIPPED SINEWAVE:**

- Vdd
- GND
- Do Not Connect for TCXO or VCO for VCTCXO (Depending on specifications)

**TEMPERATURE SENSOR:**

- Vdd
- GND
- V temp

**CIRCUIT:**

- C1: 100nF
- C2: ≥1nF
- R1: 10K
- C1 = C2 + C3 (C3 - Oscilloscope probe capacitance)

**SPECIAL NOTES:**

- C1 as stated in OSCILLATOR OUTPUT section
- F: A ferrite bead or a resistor between 22Ω - 47Ω recommended.