RTX3520S

The RTX3520S is a radiation tolerant TCXO in 35 x 20 mm hermetically sealed package. This TCXO is specifically designed for missions where resistance to demanding environment, short lead-time and radiation tolerance are required. The high reliability TCXO delivers excellent frequency stability.

**Features**
- TID limit of 100 kRad and latch-up free till 32.4/62 MeV
- Hermetically sealed package
- Frequency range: 5.5 to 375 MHz
- Output option: HCMOS and Sinewave
- Low current: 25 mA
- Supply voltage 5.0 or 15.0 V
- Excellent frequency stability: ±1 ppm over -15 to 60°C
- Manufactured in accordance with: MIL-PRF-55310 Class 2, level S

**Applications**
- Space Synthesizers and Transponders
- GPS receivers
- Down and up converters and on-board calculators
- FGU

**Environmental Conditions**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition / Remarks</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td></td>
<td>-15</td>
<td>-30</td>
<td>60</td>
<td>°C</td>
</tr>
<tr>
<td>Switch-on temperature</td>
<td>TSO</td>
<td>-40</td>
<td></td>
<td>65</td>
<td>°C</td>
</tr>
<tr>
<td>Non-operating temperature</td>
<td>TNOp</td>
<td>-55</td>
<td></td>
<td>125</td>
<td>°C</td>
</tr>
</tbody>
</table>

**Frequency Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition / Remarks</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial frequency accuracy @ 25°C</td>
<td></td>
<td>±0.3</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency stability over temperature (FVT)</td>
<td>-15 to 60°C</td>
<td>±1</td>
<td>ppm</td>
<td>±2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-30 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage stability (FVT)¹</td>
<td></td>
<td>±0.2</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ageing</td>
<td>Per year</td>
<td>±1</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Electrical Interface**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition / Remarks</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply (Vcc)</td>
<td>±5% tolerance</td>
<td>5.0</td>
<td>15.0</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Input current¹</td>
<td>No load</td>
<td>25</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Frequency Adjustment Option**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition / Remarks</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency adjustment range</td>
<td>±3</td>
<td></td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of frequency adjustment</td>
<td>By external resistor</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>kΩ</td>
</tr>
</tbody>
</table>

**Phase Noise**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>5.5 to 155 MHz (Typ.)</th>
<th>156 to 250 MHz (Typ.)</th>
<th>251 to 375 MHz (Typ.)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset</td>
<td>10 Hz</td>
<td>-75</td>
<td>-67</td>
<td>-64</td>
</tr>
<tr>
<td></td>
<td>100 Hz</td>
<td>-110</td>
<td>-102</td>
<td>-99</td>
</tr>
<tr>
<td></td>
<td>1 kHz</td>
<td>-130</td>
<td>-122</td>
<td>-119</td>
</tr>
<tr>
<td></td>
<td>10 kHz</td>
<td>-145</td>
<td>-137</td>
<td>-134</td>
</tr>
</tbody>
</table>

¹ Over temperature range

Requests can be emailed to: RIsales@rakon.com
Output Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition / Remarks</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMOS1</td>
<td>Nominal frequency</td>
<td>5.5</td>
<td>50</td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Output voltage (V0i)1</td>
<td>15 pF load</td>
<td></td>
<td></td>
<td>10% Vcc</td>
<td>V</td>
</tr>
<tr>
<td>Output voltage (V0i)1</td>
<td>15 pF load</td>
<td></td>
<td></td>
<td>90% Vcc</td>
<td>V</td>
</tr>
<tr>
<td>Duty cycle1</td>
<td>@50% Vcc</td>
<td>45</td>
<td>55</td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Rise time / fall time 1</td>
<td>10% to 90% Vcc</td>
<td>5</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Sinewave</td>
<td>Nominal frequency</td>
<td>5.5</td>
<td></td>
<td>375</td>
<td>MHz</td>
</tr>
<tr>
<td>Output level 1</td>
<td>50 Ω nominal load</td>
<td></td>
<td>7</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Harmonics &amp; subharmonics 1</td>
<td></td>
<td>-45</td>
<td></td>
<td></td>
<td>dBc</td>
</tr>
<tr>
<td>Spurious 1</td>
<td></td>
<td>-70</td>
<td></td>
<td></td>
<td>dBc</td>
</tr>
</tbody>
</table>

Screening (100%)

Screening Operation | Requirements and Condition
--- | ---
Non-destructive bond pull | MIL-STD-883, method 2023
Internal visual | MIL-STD-883, method 2017 and method 2032
Stabilization bake (prior to seal) | MIL-STD-883, method 1008, condition C (+150°C), 48 hours minimum
Thermal shock | MIL-STD-883, method 1011, condition A
Temperature cycling | MIL-STD-883, method 1010, condition C
Constant acceleration | MIL-STD-883, method 2001, condition A, Y1 only (5000 g's)
Seal (fine and gross leak) | MIL-STD-883, method 1014: Fine leak Test condition A1, A2, or B Gross leak Test condition B2 or B3
Particle impact noise detection (PIND) | MIL-STD-883, method 2020, condition A
Electrical test | Nominal and extreme supply voltages, specified load, 23°C and temperature extremes, record all test parameters by serial number
Burn-in (load) | 125°C, nominal supply voltage and burn-in load, 240 hours minimum
Radiographic | MIL-STD-883, method 2012

Model Outline, Pin Connections

**NOTE:**
- H options: 10 or 15 mm.
- Dimensions are in millimetres.
- Tolerance is ±0.25 mm if it has not been indicated.

Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frequency adjustment option (10 kΩ POT to be connected from pin 1 to GND</td>
</tr>
<tr>
<td>3, 5, 15, 20, 22</td>
<td>No Connection</td>
</tr>
<tr>
<td>13</td>
<td>Fout (Frequency output)</td>
</tr>
<tr>
<td>24</td>
<td>Vcc (Supply voltage)</td>
</tr>
<tr>
<td>All other pins</td>
<td>GND</td>
</tr>
</tbody>
</table>

2 LVDS option is available on request
3 The HCMOS output is available for 5.0 V supply