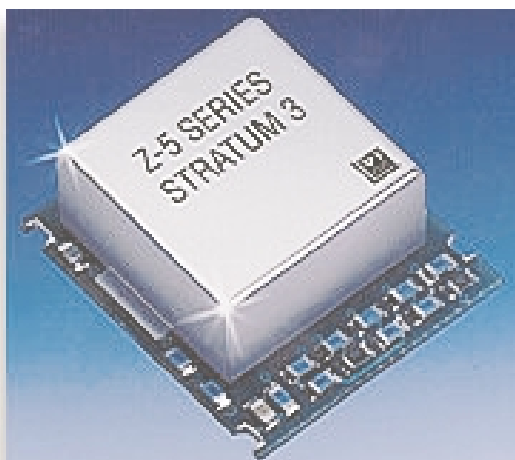


# TC-210 (Z5) Series TCXO's

## Temperature Compensated Crystal Oscillators



### Features

- Frequency from 0.5 to 160 MHz
- Stability as tight as  $\pm 0.28$  ppm
- Aging to  $< 3.5$  ppm for ten years
- Package: 29.21 x 25.40 x 10.03mm (1.15" x 1.0" x 0.395")
- 3.3 Vdc or 5 Vdc operation
- All outputs available (TTL, HCMOS, PECL, SINEWAVE)

### Applications

- Stratum 3 Applications
- SONET/SDH Network Timing Sources
- DWDM / FDM / ATM
- Wireless Communications
- VSAT, LMDS, WLL

### Description

Vectron International has introduced a series of surface mount, Temperature Compensated Crystal Oscillators (TCXO's) available in frequencies from 0.5 to 160 MHz.

Model Z5 surface mount TCXO's can be mounted using the standard convection reflow process. The units can meet the  $\pm 0.37$  ppm Holdover requirement of GR-1244-CORE Table 3-1 from 0°C to +70°C temperature range and operate from a 3.3V or 5V supply. Current drain to lower than 2 mA is available upon request. Aging  $< 3.5$  ppm for ten years. Phase noise is -115 dBc/Hz at 100 Hz and -155 dBc/Hz at 100k Hz at 10 MHz.

These units are ideal for Stratum 3 applications.

For additional Stratum 3 solutions please visit our website at: [www.stratum3.com](http://www.stratum3.com)

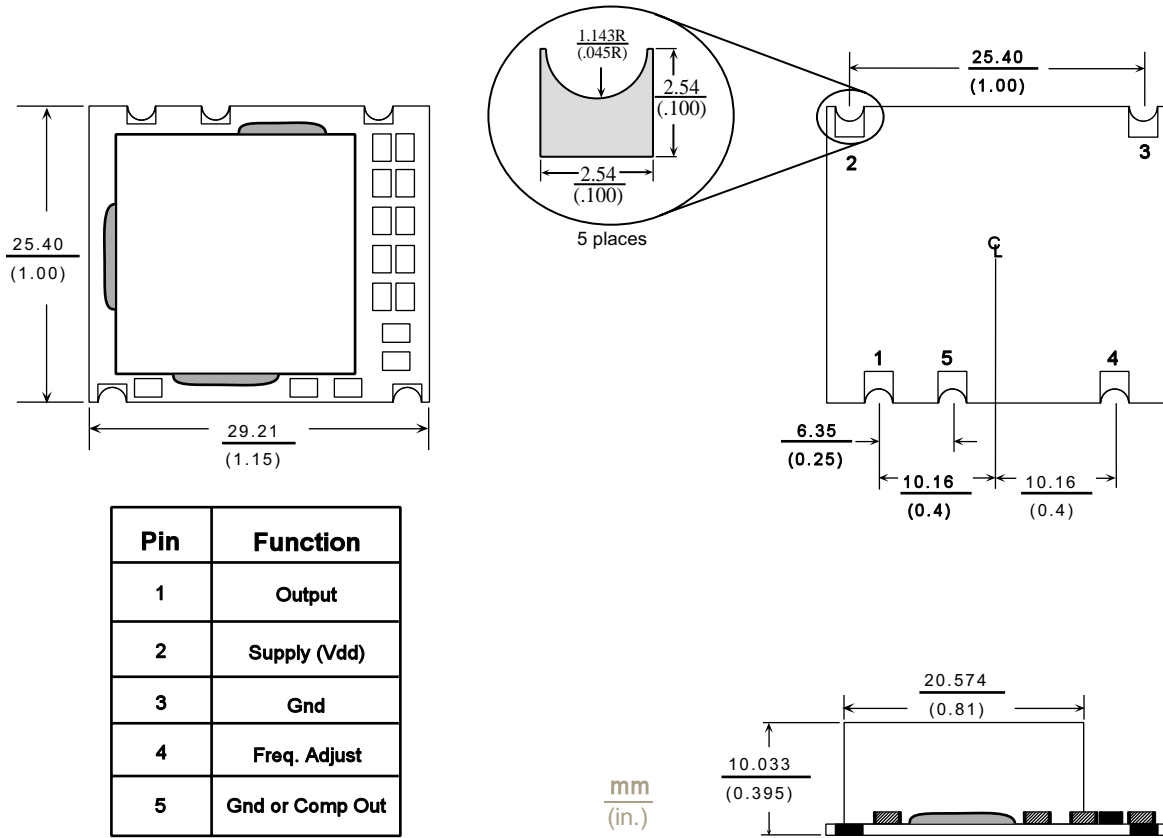
# Z5 Series Stratum 3 TCXO's

## Performance Characteristics

Parameter	Characteristics															
<b>Standard Frequencies:</b>	<b>10.00, 12.80, 16.384, 19.44, 20.00, 38.88, 40.00, 77.76, 155.52 MHz,</b> Available from 0.5 MHz to 160 MHz															
<b>Package:</b>	<b>210</b> = 29.21 x 25.40 x 10.03 mm (1.15" x 1.00" x 0.395") (See page 3)															
<b>Supply Voltage (Vdd):</b> (Other options are available upon request)	<b>C</b> = 5 Vdc ±5% <b>D</b> = 3.3 Vdc ±5%															
<b>Current Draw:</b>	Current draw will vary greatly depending on frequency and output type. For this series TCXO typical current draw will be about 15 mA and depending on output type may be less than 2 mA. Please consult the factory about your exact current requirements.															
<b>Output Options:</b>	<table> <tr> <td><b>A</b> = HCMOS / ACMOS</td> <td>0.5 to 160 MHz</td> </tr> <tr> <td><b>B</b> = 10 TTL</td> <td>0.5 to 160 MHz</td> </tr> <tr> <td><b>F</b> = Complementary PECL</td> <td>35 to 160 MHz</td> </tr> <tr> <td><b>G</b> = 0 dBm / 50 ohm</td> <td>5.0 to 100 MHz</td> </tr> </table>	<b>A</b> = HCMOS / ACMOS	0.5 to 160 MHz	<b>B</b> = 10 TTL	0.5 to 160 MHz	<b>F</b> = Complementary PECL	35 to 160 MHz	<b>G</b> = 0 dBm / 50 ohm	5.0 to 100 MHz							
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<b>Standard Stability Options:</b> <b>Note:</b> Other stability options are available. Contact the factory for assistance.	<table> <tr> <td><b>B-307</b> = ±3.0 x 10<sup>-7</sup></td> <td>over</td> <td>0°C to +50°C</td> </tr> <tr> <td>* <b>B-ST3</b> = Stratum 3</td> <td>over</td> <td>0°C to +50°C</td> </tr> <tr> <td>* <b>C-ST3</b> = Stratum 3</td> <td>over</td> <td>0°C to +70°C</td> </tr> <tr> <td><b>C-507</b> = ±5.0 x 10<sup>-7</sup></td> <td>over</td> <td>0°C to +70°C</td> </tr> <tr> <td><b>F-106</b> = ±1.0 x 10<sup>-6</sup></td> <td>over</td> <td>-40°C to +85°C</td> </tr> </table> <p>* <b>STRATUM 3 per GR-1244-CORE Table 3-1</b>            Total Stability: &lt;±4.6 x 10<sup>-6</sup> for all causes &amp; 10 years            Vs Holdover: &lt;±3.7 x 10<sup>-7</sup> for all causes and 24 Hours            (Available in Temperature Ranges <b>B</b> &amp; <b>C</b>)</p>	<b>B-307</b> = ±3.0 x 10 <sup>-7</sup>	over	0°C to +50°C	* <b>B-ST3</b> = Stratum 3	over	0°C to +50°C	* <b>C-ST3</b> = Stratum 3	over	0°C to +70°C	<b>C-507</b> = ±5.0 x 10 <sup>-7</sup>	over	0°C to +70°C	<b>F-106</b> = ±1.0 x 10 <sup>-6</sup>	over	-40°C to +85°C
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<b>Stability vs Supply:</b>	<±0.1 ppm for a ±5% change in Supply Voltage															
<b>Aging (typical):</b>	<3.5 ppm for ten years @ +70°C															
<b>Electrical Frequency Adjust:</b>	±5 ppm minimum via external voltage, 0 to Vdd															
<b>Phase Noise (Typical):</b> 10 MHz	<table> <tr> <td><u>Offset</u></td> <td><u>Phase Noise</u></td> <td rowspan="5">For HCMOS / ACMOS / TTL &amp; PECL outputs with frequencies above 35 MHz a low phase noise PLL multiplier may be used. Please inform that factory of your phase noise requirements.</td> </tr> <tr> <td>100 Hz</td> <td>-115 dBc/Hz</td> </tr> <tr> <td>1k Hz</td> <td>-145 dBc/Hz</td> </tr> <tr> <td>10k Hz</td> <td>-150 dBc/Hz</td> </tr> <tr> <td>100k Hz</td> <td>-155 dBc/Hz</td> </tr> </table>	<u>Offset</u>	<u>Phase Noise</u>	For HCMOS / ACMOS / TTL & PECL outputs with frequencies above 35 MHz a low phase noise PLL multiplier may be used. Please inform that factory of your phase noise requirements.	100 Hz	-115 dBc/Hz	1k Hz	-145 dBc/Hz	10k Hz	-150 dBc/Hz	100k Hz	-155 dBc/Hz				
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# Z5 Series Stratum 3 TCXO's

## 210 Package Outline Drawing:

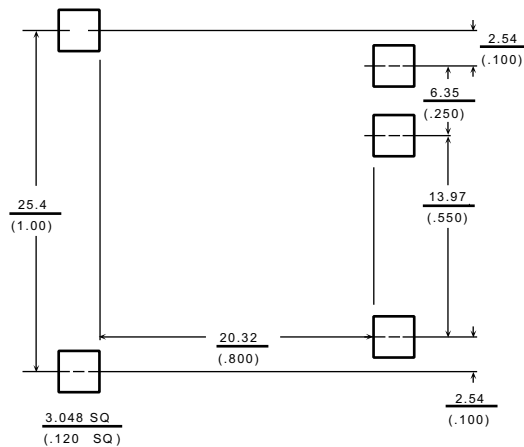


Pin	Function
1	Output
2	Supply (Vdd)
3	Gnd
4	Freq. Adjust
5	Gnd or Comp Out

mm  
(in.)

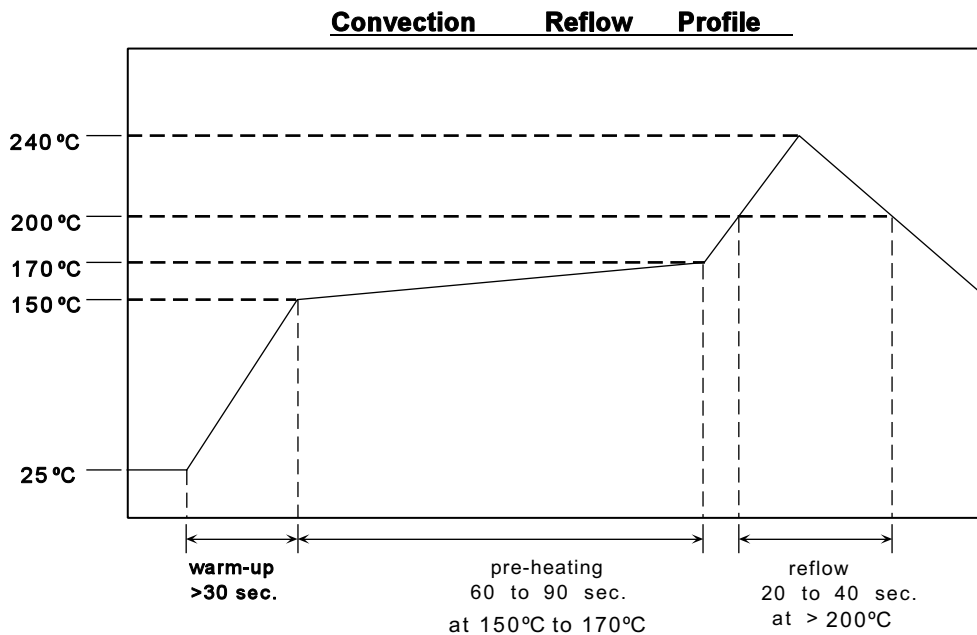
## Recommended Land Pattern

### Land Pattern for 210 Package



# Z5 Series Stratum 3 TCXO's

## Recommended Reflow Profile



Note: TCXO's are precision subsystems with tolerances measured to  $\pm 0.01$  ppm. Non-Hermetically sealed TCXO's should not be subjected to a wash process that will immerse the TCXO in solvents. NO CLEAN is the recommended procedure. The Z5 series of TCXO's has been designed for pick and place reflow soldering. The suggested reflow profile is shown above. The TCXO may be reflowed once, and should not be reflowed in the inverted position. Typical frequency shift as a result of reflow is  $< 1.0$  ppm per reflow.

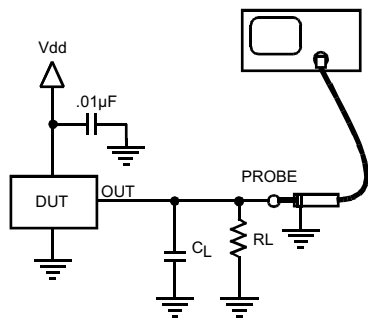
## Output Levels

Output Option	A	B	F
Output	HCMOS / ACMOS	10 TTL	Comp. PECL
Voh min.	0.8(Vdd)	+2.4 Vdc.	Vdd - 1.04 Vdc
Vol max.	+0.5 Vdc	+0.5 Vdc	Vdd - 1.60 Vdc.
Load (typical)	100k ohm // 10 pF	10 TTL	50 ohms into Vdd - 2V
Symmetry	50% $\pm$ 10%	50% $\pm$ 10%	50% $\pm$ 10%
Rise / Fall Time	5 ns max.	10 ns max.	3 ns max.

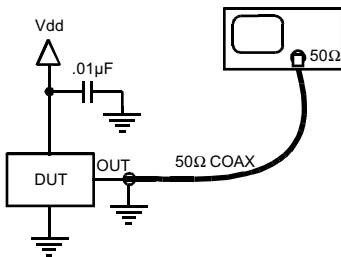
Output Option	G
Output	Sinewave
Level	0 dBm to +6 dBm
Load	50 ohm
Harmonics / Subs	-20 dBc max.
Other Spurious	-60 dBc max.

# Z5 Series Stratum 3 TCXO's

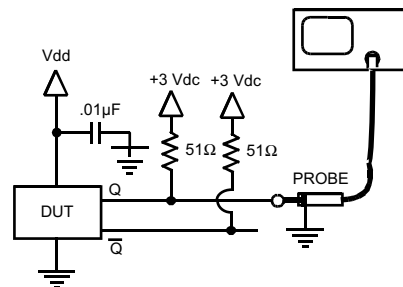
## Output Test Loads



Standard CMOS (A)



50 Ohm Sinewave (G)



PECL (F)

## How to Order

TC- 210 - X X X - X X X A - [ ] MHz

### Supply Voltage

C = 5 Vdc +/-5%  
D = 3.3 Vdc +/-5%

### Output Type

A = HCMOS / ACMOS  
B = 10 TTL  
F = Comp. PECL  
G = 0 dBm / 50 ohm

### Output Frequency

0.5 to 160 MHz

### Other Options

A = Standard, No Options (Default)

### Temperature & Stability

B-307 =  $\pm 3.0 \times 10^{-7}$  over 0°C to +50°C

B-ST3 = Stratum 3 over 0°C to +50°C

C-ST3 = Stratum 3 over 0°C to +70°C

C-507 =  $\pm 5.0 \times 10^{-7}$  over 0°C to +70°C

F-106 =  $\pm 1.0 \times 10^{-6}$  over -40°C to +85°C

**Note:** Other stabilities are available upon request

## Example:

TC-210-DAC-507A - 10 MHz

This is a 10 MHz Z5 series TCXO in our 210 package configuration, 3.3 Vdc supply, HCMOS / ACMOS output, with a Temp stability of  $\pm 5.0 \times 10^{-7}$  over 0°C to +70°C.

Visit Our Website at [www.vectron.com](http://www.vectron.com)

For additional information please contact:



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