

MODEL VTXO700

Voltage Controlled Temperature Compensated Crystal Oscillators

Low profile surface mountable VCTCXO available in custom frequencies from 8.2MHz to 32MHz with a clipped sinewave output

Product Description

This Colpitts oscillator uses the direct two-port temperature compensation method. Operating on the fundamental mode, the circular AT-cut crystal is housed in the environmentally rugged UM-1 SLIM resistance weld package.

The product can be configured to operate on any voltage between 2.7V and 5V. A mechanical trimmer is available for adjusting the frequency.

Customized frequencies readily available make this model suitable for many timing and frequency applications where an HCMOS output is required.



Features

- Compatible with normal solder reflow processes
- Excellent temperature stability performance
- Able to operate over industrial temperature ranges
- Low hysteresis
- Low power consumption
- Excellent vibration performance
- Very good phase noise performance
- Frequency control ranges from 6 to 50ppm available

1.0 SPECIFICATION REFERENCES

1.1	Model Description	VTXO710R 10.0 MHz
1.2	Reference Number	3515
1.3	Company	Wireless Bypass

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Min.	Max.	Units
2.1	Nominal Frequency	Nominal Frequency referenced to 25 deg. C.		10.0	MHz
2.2	Frequency calibration	Frequency at 23 deg. C +/-2 deg. C (see Note 1)		1.0	+/-ppm
2.3	Frequency stability over temperature	Referenced to frequency reading at 25 deg. C. Temperature varied at max. of 2 deg. C per minute. Control voltage held at voltage control range midpoint. (Note 2)		1.0	+/-ppm
2.4	Temperature range	The operating temperature range over which the frequency stability is measured (Note 3)	-20.0	70.0	Degrees C
2.5	Frequency perturbations	Peak to peak amplitude of frequency perturbation within operating temperature range (Note 1)		0.5	ppm
2.6	Frequency slope	Minimum of 1 frequency reading every 2 degrees C, over the operating		0.5	ppm/deg C

	of perturbations	temperature range (Note 1)			
2.7	Static temperature hysteresis	Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25 deg C	0.4		+/-ppm
2.8	Supply voltage stability	Supply voltage varied +/-5% at 25 deg C. Frequencies above 25MHz are not able to be specified below the max. value given. (Note 1)	0.3		+/-ppm
2.9	Load sensitivity	+/-10% load change	0.2		+/-ppm
2.10	Root Allan Variance	1 second Tau. (Note 1)	1.0		ppb
2.11	Long term stability	Frequency drift over 1 year (Note 1)	1.0		+/-ppm
2.12	G Sensitivity	Gamma vector of all three axes from 30Hz to 1500Hz (Note 1)	1.0		ppb/G
2.13	Trimmer adjustment	Manual adjustment using trimmer tool	3.0		+/-ppm

3.0 POWER SUPPLY

Line	Parameter	Test Condition	Min.	Max.	Units
3.1	Supply voltage	Supply voltage range based on nominal 5V	4.75	5.25	V
3.2	Current	At Max. supply voltage		2.0	mA

4.0 CONTROL VOLTAGE

Line	Parameter	Test Condition	Min.	Max.	Units
4.1	Control voltage range	Determined by supply voltage (Note 5). The nominal control voltage value is midway between the minimum and maximum.	0.5	4.5	V
4.2	Frequency tuning	Frequency shift from Min. to Max. control voltages (Note 6)	6.0		ppm
4.3	Frequency tuning linearity	Deviation from straight line curve fit (Note 1)		20.0	%
4.4	Port input impedance		100.0		K Ohms

5.0 OSCILLATOR OUTPUT

Line	Parameter	Test Condition	Min.	Max.	Units
5.1	Output waveform	Clipped sinewave			
5.2	Output voltage level	At min. supply voltage	1.0		V
5.3	Output load resistance	Operating range	18.0	22.0	K Ohms

5.4	Output load capacitance	Operating range	4.5	5.5	pF
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6.0 SSB PHASE NOISE

Line	Parameter	Test Condition	Min.	Max.	Units
<i>Quiescent measurement at room temperature. Phase noise dependent on oscillator frequency. The dBc/Hz are typical values.</i>					
6.1	SSB Phase noise density	1Hz offset		-70.0	dBc/Hz
6.2	SSB Phase noise density	10Hz offset		-100.0	dBc/Hz
6.3	SSB Phase noise density	100Hz offset		-130.0	dBc/Hz
6.4	SSB Phase noise density	1KHz offset		-145.0	dBc/Hz
6.5	SSB Phase noise density	10KHz offset		-150.0	dBc/Hz

7.0 ENVIRONMENTAL

The oscillator shall meet electrical characteristics and suffer no physical damage after being subject to the following conditions:

7.1	Shock	Half sinewave acceleration of 100G peak amplitude for 11ms duration, 3 cycles each plane.
7.2	Random Vibration	10G RMS 30Hz to 1500Hz duration of 6 Hours.
7.3	Humidity	After 48hours at 85 deg C +/-2% deg C 85% relative humidity non-condensing
7.4	Thermal shock test	Exposed at -40 deg C for 30 minutes then to 85 deg C for 30 minutes constantly for a period of 5 days.
7.5	Storage temperature	-40 to 85 deg C

8.0 MARKING

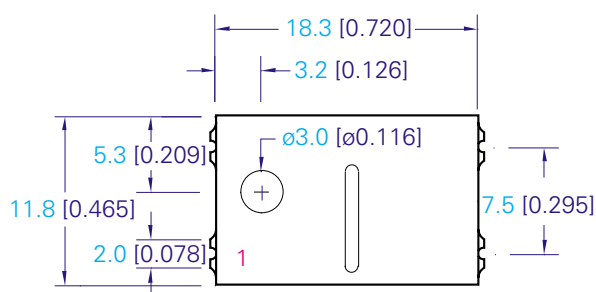
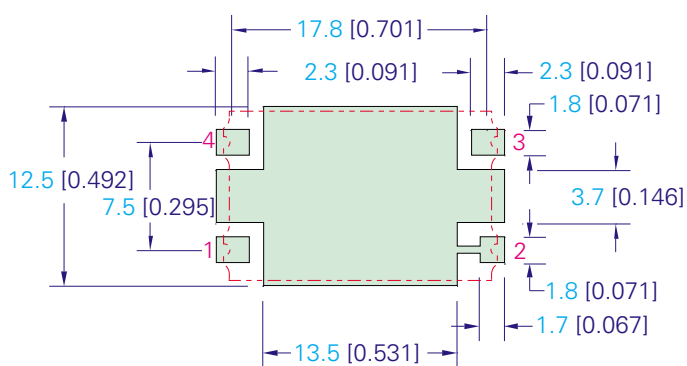
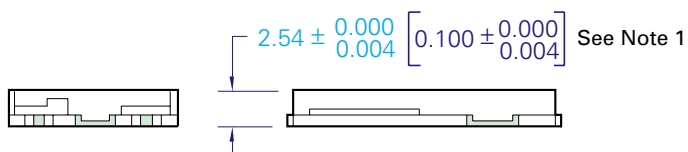
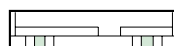
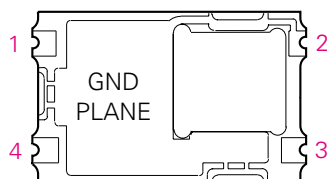
8.1	Type	Engrave
8.2	Line 1	Rakon logo
8.3	Line 2	Model descriptive
8.4	Line 3	Frequency in MHz (to 3 decimal places or greater depending on the no. of significant digits after the decimal point)
8.5	Line 4	Date code WWYY

9.0 MANUFACTURING INFORMATION

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|----------------------------------|--|
| 9.1 Reflow and washing | Able to withstand normal solder reflow processes but not aqueous washing due to presence of trimmer with open dielectric exposure. |
| 9.2 Packaging description | Tape and reel |

10.0 SPECIFICATION NOTES

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|--------------------|---|
| 10.1 Note 1 | The Max. value is the specification. A Min. value, if present, indicates the tightest specification available. |
| 10.2 Note 2 | A max. frequency stability over the temperature is required to be specified. For this model, values between to $\pm 1\text{ppm}$ and $\pm 10\text{ppm}$ are available. Standard options are $\pm 1\text{ppm}$, $\pm 1.5\text{ppm}$, $\pm 2\text{ppm}$ and $\pm 2.5\text{ppm}$. |
| 10.3 Note 3 | The operating temperature range needs to be specified. The extremes for this model are -40 and $+85$ deg C. If either or both ends of the operating temperature range are at these extremes, then the frequency stability options are limited to greater than $\pm 1.5\text{ppm}$. |
| 10.4 Note 4 | Standard power supply options are 2.7V, 3V, 3.3V, 4V or 5V, but any value between Min. & Max. is available. |
| 10.5 Note 5 | This range is normally 0.5V to Supply voltage less 0.5V i.e. for a supply voltage of 3V, the range is 0.5V to 2.5V. |
| 10.6 Note 6 | The Min value is the specification. A Max value, if present, indicates the widest tuning range available for this model (subject to other parameters). |


TOP VIEW

**TOP VIEW
RECOMMENDED PAD LAYOUT**

END VIEW
SIDE VIEW

END VIEW

BOTTOM VIEW
PIN CONNECTIONS

- 1 CONTROL VOLTAGE
- 2 COMMON & CASE
- 3 OUTPUT
- 4 +Vcc

Note: 1. 2.54 Max Without Label

TITLE: VTXO700 MODEL

FILENAME: CAT024

REVISION: B

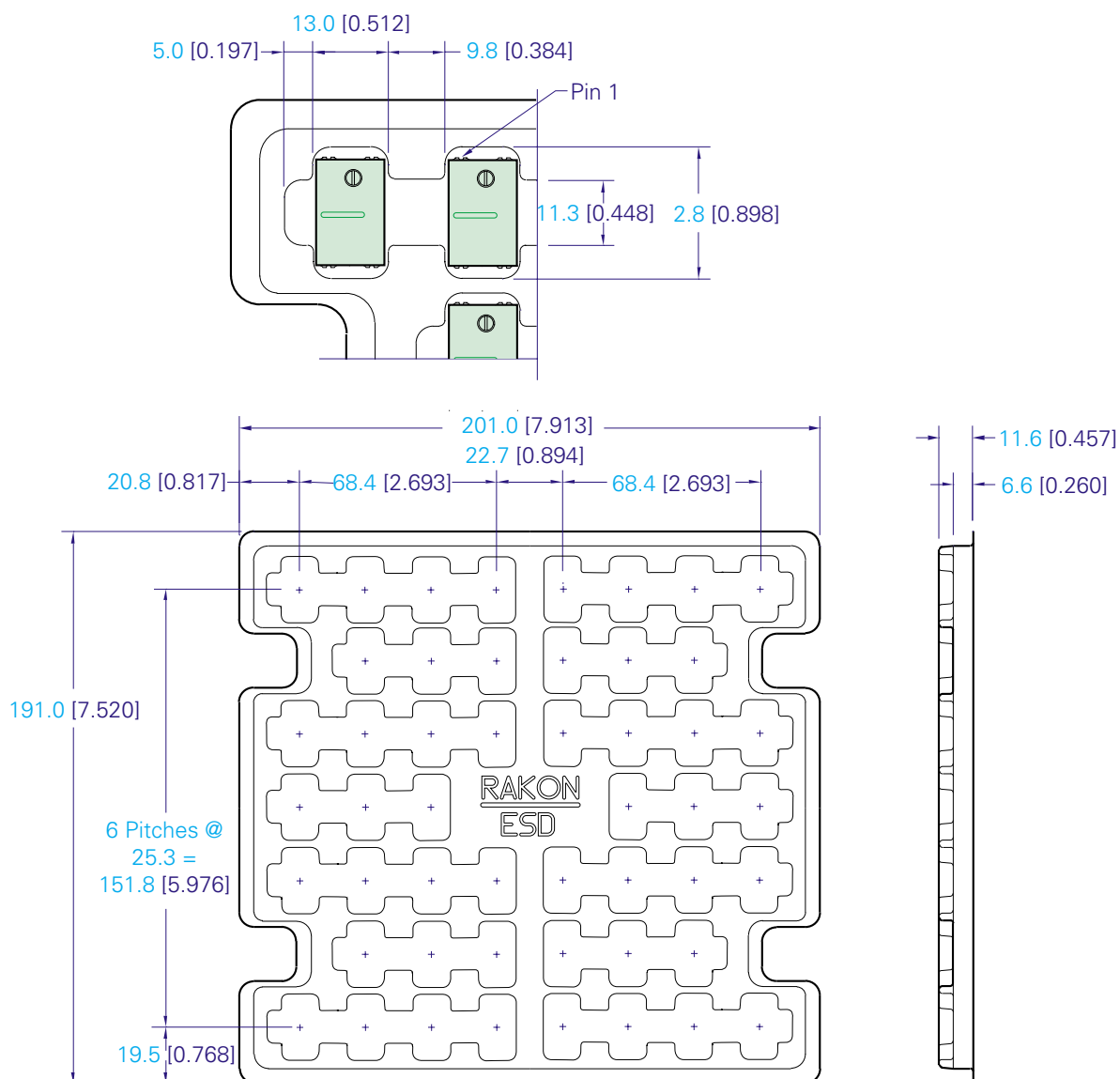
RELATED DRAWINGS: VTXO CLIPPED SINEWAVE
TEST CIRCUIT (CAT135)
700 SERIES TRAY (CAT095)

DATE: 27 JAN 99

SCALE: 2:1

Millimetres [inch]

Tolerances:
XX = ±0.5
X.X = ±0.10
X.XX = ±0.05
X.XXX = ±0.05
X° = ±1.0°
Hole = ±0.10



TRAY DETAIL (Scale 1:2)
50 Oscillators Per Tray
21 (20+1 top) Trays Per Small Box
4 Small Boxes Per Large Box

TITLE: 700 SERIES TRAY

FILENAME: CAT095

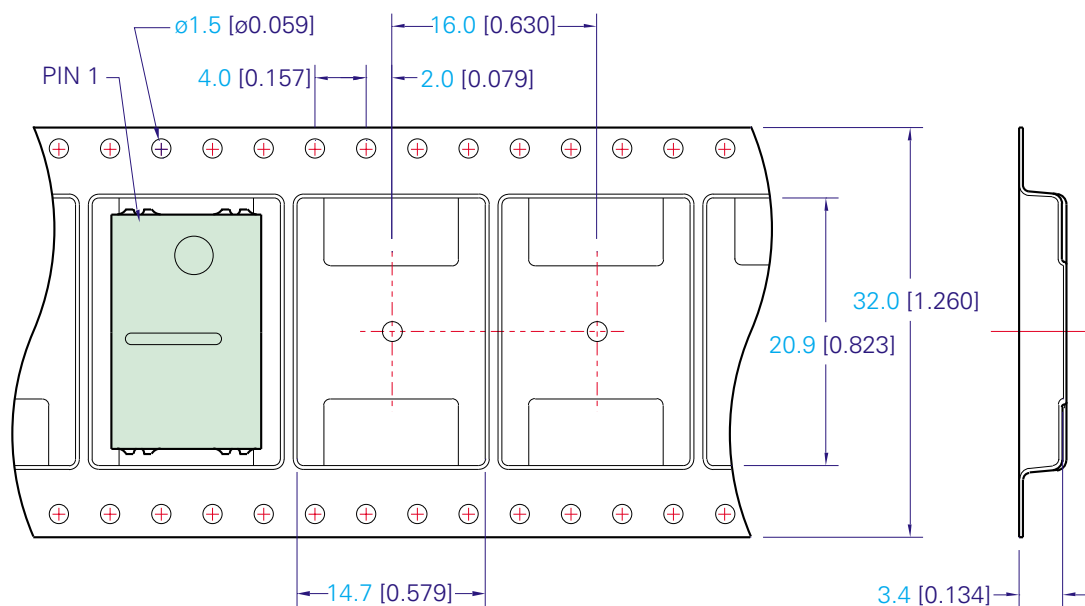
REVISION: A

RELATED DRAWINGS: TXO700 MODEL (CAT017)
 VTXO700 MODEL (CAT024)

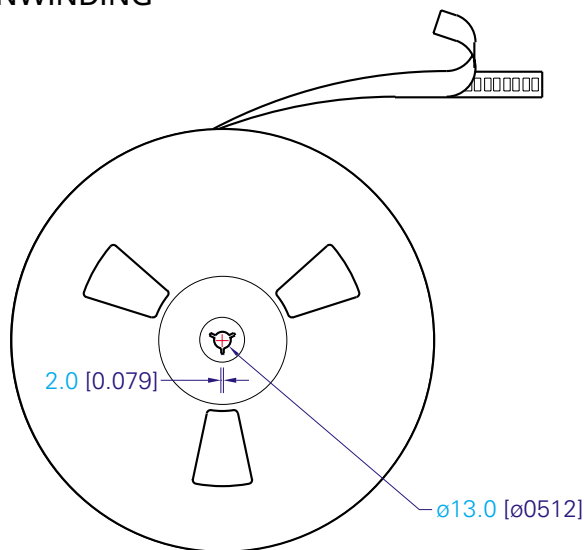
DATE: 24 JULY 98

SCALE: 1:1

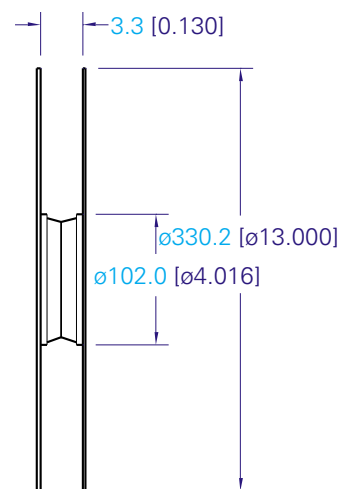
Millimetres [inch]



UNWINDING →



REEL DETAIL
SCALE 1:5



TITLE: 700 TAPE & REEL

FILENAME: CAT098

REVISION: A

RELATED DRAWINGS: TXO700 VTXO700

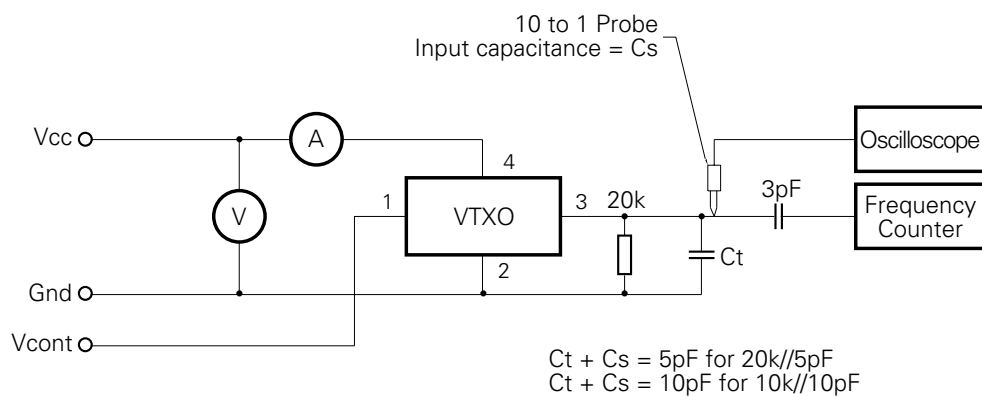
DATE: 16 DEC 98

SCALE: 2:1 1:5

Millimetres [inch]

Tolerances:

XX = ± 0.5
X.X = ± 0.10
X.XX = ± 0.05
X.XXX = ± 0.05
X° = $\pm 1.0^\circ$
Hole = ± 0.10



TITLE: VT XO CLIPPED SINEWAVE TEST CIRCUIT

FILENAME: CAT135

REVISION: A

RELATED DRAWINGS: VT XO400
VT XO4080
VT XO4080S

VT XO500
VT XO700

DATE: 3 SEPT 98

SCALE: NTS

Millimetres [inch]