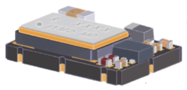
HT7500

Ultra Stable SMD TCXO/VCTCXO

High performance TCXO incorporating hybrid technology offering excellent Phase Noise and Frequency Stability.



Product description

The HT7500/HVT7500 combines Rakon's precision IT technology with our superior discrete oscillator performance. This unique hybrid combines 5th order compensation, excellent temperature stability, superb phase noise, with a voltage control option. In a compact 7 mm x 5 mm SMD package.

Applications

- WiMAX/WiBro
- LTE
- WLAN
- Basestation
- Communications
- Femtocell
- GPS
- Handset
- IP timing
- SONET/SDH
- Satellite Communication
- Other

Features

- Excellent phase noise performance
- Excellent temperature stability
- Clipped sinewave or CMOS output options
- High frequency option available

Specifications

1.0	SPECIFICATION REFERENCES	
Line	Parameter	Description
1.1	Model series	HT7500 / HVT7500
1.2	RoHS compliant	Yes
1.3	Reference number	
1.4	Rakon part number	

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Frequency		10 to 50	MHz
2.2	Frequency calibration	Offset from nominal frequency measured at 25°C±2°C	±1 max	ppm
2.3	Reflow shift	Two consecutive reflows as per attached profile after 1 hour recovery at 25°C	±1 max	ppm
2.4	Frequency stability over temperature	Referenced to the midpoint between minimum and maximum frequency value over the specified temperature range (Note 1, 2)	±0.18 to 5	ppm
2.5	Temperature range	The operating temperature range over which the frequency stability is measured (Note 3)	-40 to 85	°C
2.6	Frequency slope	Minimum of 1 frequency reading every 2°C, over the operating temperature range (Note 2)	0.02 to 0.5	ppm/°C
2.7	Static temperature hysteresis	Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C	±0.4 max	ppm
2.8	Supply voltage stability	Supply voltage varied ±5% at 25°C	±0.05 max	ppm
2.9	Load sensitivity	Frequency change when the specified load is varied ±10% measured at 25°C	±0.4 max	ppm
2.10	Long term stability	Frequency drift over 1 year at 25°C	±1 max	ppm
2.11	G sensitivity	Gamma vector of all three axes from 30Hz to 1500Hz	2 to 3	ppb/G
2.12	Root Allan Variance	1 second averaging time (Tau) (Note 5)	0.5 max	ppb
2.13	Start-up time (amplitude)	Time taken for output to reach 90% of specified output level	5 max	ms
2.14	Settling time (frequency)	Time taken for frequency to reach specified calibration tolerance (Note 6)	50 max	ms

3.0 POWER SUPPLY

Line	Parameter	Test Condition	Value	Unit
3.1	Supply voltage	Nominal supply voltage range	2.7 to 5.5	V
3.2	Supply current	Nominal supply current measured at maximum supply voltage and load conditions specified in output section (Note 7)	4 to 10	mA

4.0 CONTROL VOLTAGE (VCO) OPTION

Line	Parameter	Test Condition	Value	Unit
4.1	Control voltage range	1.5 mid VCO (Note 8)	0.5 to 2.5	V
4.2	Control voltage range	1.65V mid VCO (Note 8)	0.5 to 2.8	V
4.3	Control voltage range	2.5V mid VCO (Note 8)	0.5 to 4.5	V
4.4	Frequency tuning range	Frequency shift from minimum to maximum control voltages	10 to 30	ppm
4.5	Frequency tuning linearity	Deviation from straight line curve fit	10 max	%
4.6	Voltage control pin input impedance		100 min	kΩ

5.0 CLIPPED SINE WAVE OSCILLATOR OUTPUT

Line	Parameter	Test Condition	Value	Unit
5.1	Output waveform	AC coupled clipped sine-wave		
5.2	Output voltage level	Peak-to-peak voltage measured at minimum supply voltage and load conditions specified (Note 7)	0.6 min	V
5.3	Output load resistance	Operating range	9 to 11	kΩ
5.4	Output load capacitance	Operating range	9 to 11	pF

6.0 CMOS OSCILLATOR OUTPUT

Line	Parameter	Test Condition	Value	Unit
6.1	Output waveform	HCMOS		
6.2	Output voltage level low	Measured with a capacitive load of 10pF	10 max	%Vcc
6.3	Output voltage level high	Measured with a capacitive load of 10pF	90 min	%Vcc
6.4	Rise and fall times	Measured with a capacitive load of 10pF	3 max	ns
6.5	Duty cycle	Measured at 50% Vcc trigger level	40 to 60	%
6.6	Output load		10 max	pF

7.0 SSB PHASE NOISE

Line	Parameter	Test Condition	Value	Unit
7.1	SSB phase noise power density at 1 Hz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-57	dBc/Hz
7.2	SSB phase noise power density at 10 Hz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-87	dBc/Hz
7.3	SSB phase noise power density at 100 Hz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-122	dBc/Hz
7.4	SSB phase noise power density at 1 kHz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-140	dBc/Hz
7.5	SSB phase noise power density at 10 kHz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-151	dBc/Hz
7.6	SSB phase noise power density at 100 kHz	Typical value for a 30.72MHz oscillator at 25°C (Note 9)	-151	dBc/Hz

8.0 ENVIRONMENTAL INFORMATION

Line	Parameter	Description
8.1	Shock	Half sine-wave acceleration of 100G peak amplitude for 6ms duration; 3 cycles each plane. IEC 60068-2-27
8.2	Random vibration	5G RMS 30Hz to 1500Hz duration of 6 hours per axis
8.3	Humidity	85% relative humidity non-condensing for 48 hours at 85°C
8.4	Thermal shock test	-40°C for 30 minutes followed by 85°C for 30 minutes, continuously cycled for 5 days
8.5	Storage temperature	-40 to 85°C

9.0 MARKING

Line	Parameter	Description
9.1	Line 1	R and product code
9.2	Line 2	Pin 1 and date code

10.0 MANUFACTURING INFORMATION

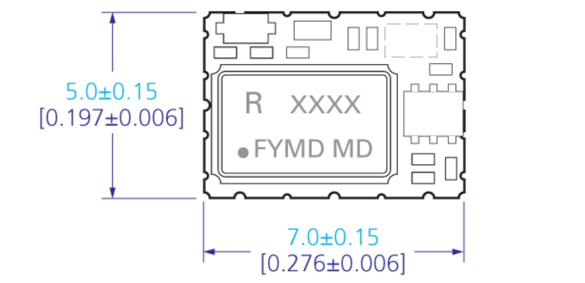
Line	Parameter	Description
10.1	Washing	Not recommended for aqueous washing process
10.2	Reflow	Solder reflow process as per attached profile
10.3	Packaging	Tape and Reel. Standard packing quantity is 2000 units per reel

11.0 SPECIFICATION NOTES

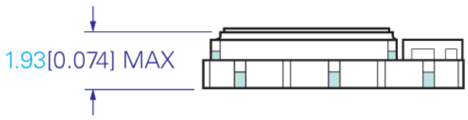
Line	Parameter	Description
11.1	Note 1	A maximum frequency stability over the temperature is required to be specified. Standard options are ±0.3ppm, ±0.5ppm, ±1.0ppm, and ±2.5ppm
11.2	Note 2	Part should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents on the oscillator can lead to short term frequency drift
11.3	Note 3	The operating temperature range needs to be specified. The extremes for this model are -40 to 85°C
11.4	Note 4	The maximum value is the specification. A minimum value, if present, indicates the best specification available
11.5	Note 5	Specifications below 0.5 ppb may require additional screening processes
11.6	Note 6	Specification assumes that no special phase noise filtering is required. If low phase noise is required then frequency settling time will increase. Full details are available from your Rakon Sales office
11.7	Note 7	Exact figure will be frequency, supply voltage and output option dependant
11.8	Note 8	3 options are available. Please specify one option only. Using 1.5V mid-VCO will result in a lower pull range. VCO of 4.5V only applicable whit a Vcc of 5.0V
11.9	Note 9	For specific frequency phase noise, please contact your Rakon Sales office for more information

Drawing Name: H(V)T7500 Model Drawing

MODEL DRAWING

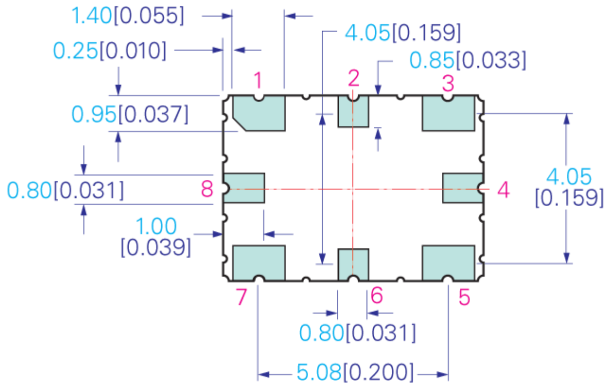


TOP VIEW



SIDE VIEW

END VIEW

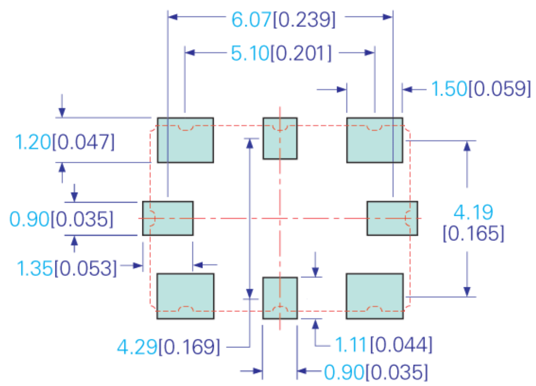


BOTTOM VIEW

PIN CONNECTIONS

Pin	HT	HVT
1	NC	VCO
2	NC	NC
3	GND	GND
4	NC	NC
5	OUTPUT	OUTPUT
6	NC	NC
7	VCC	VCC
8	NC	NC

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: H(V)T7500 MODEL

RELATED DRAWINGS:

FILENAME: CAT391

REVISION: E

DATE: 09-Sep-10

SCALE: 5 : 1

Millimetres [inch]

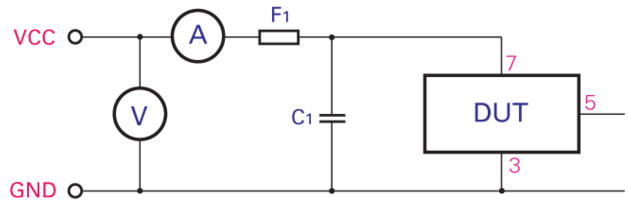
Tolerance:

XX	=±0.5
X.X	=±0.2
X.XX	=±0.10
X.XXX	=±0.05
X°	=±1.0°
Hole	=±0.10

Drawing Name: H(V)T7500 Series Test Circuit

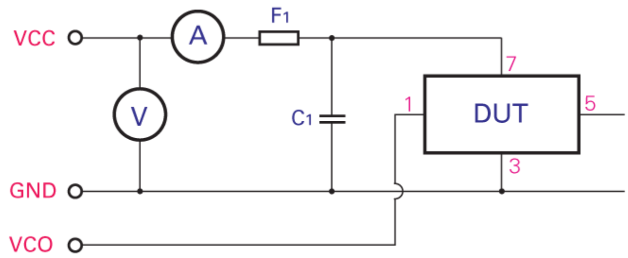
HT INPUT:

C_1: 100nF
F_1: A ferrite bead or a resistor between
22Ω ~ 47Ω recommended.



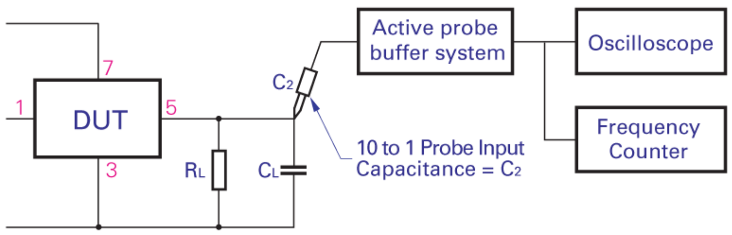
HVT INPUT:

C_1: 100nF
F_1: A ferrite bead or a resistor between
22Ω ~ 47Ω recommended.



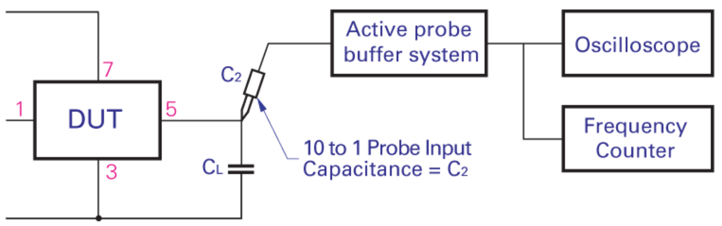
CLIPPED SINEWAVE OUTPUT:

R_L: 10K
$C_T = C_L + C_2$ (C_2 - Oscilloscope probe capacitance)
C_T as stated in OSCILLATOR OUTPUT section



CMOS OUTPUT:

$C_T = C_L + C_2$ (C_2 - Oscilloscope probe capacitance)
C_T as stated in OSCILLATOR OUTPUT section

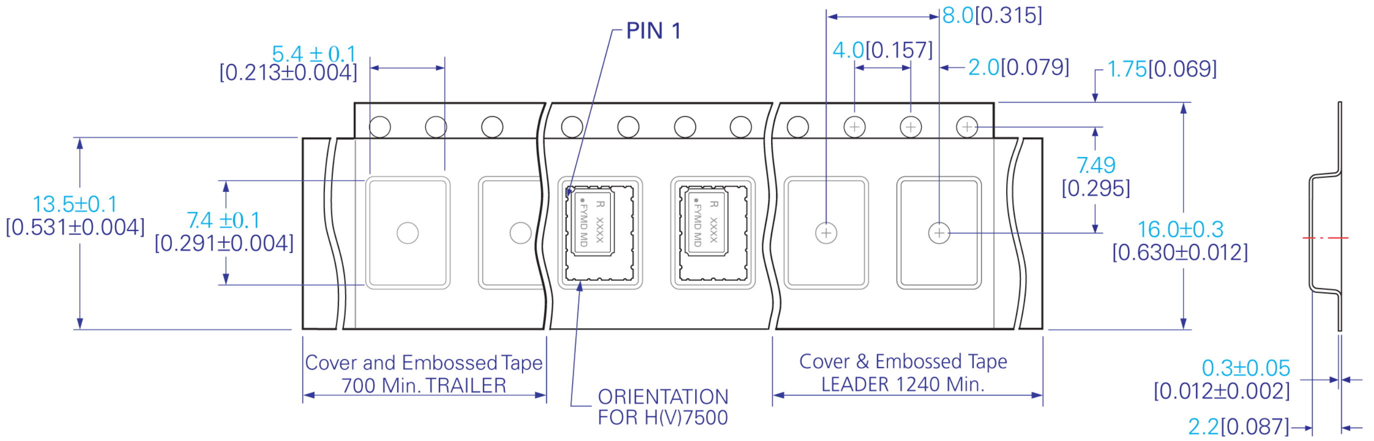


TITLE: H(V)T7500 SERIES TEST CIRCUIT
RELATED DRAWINGS:

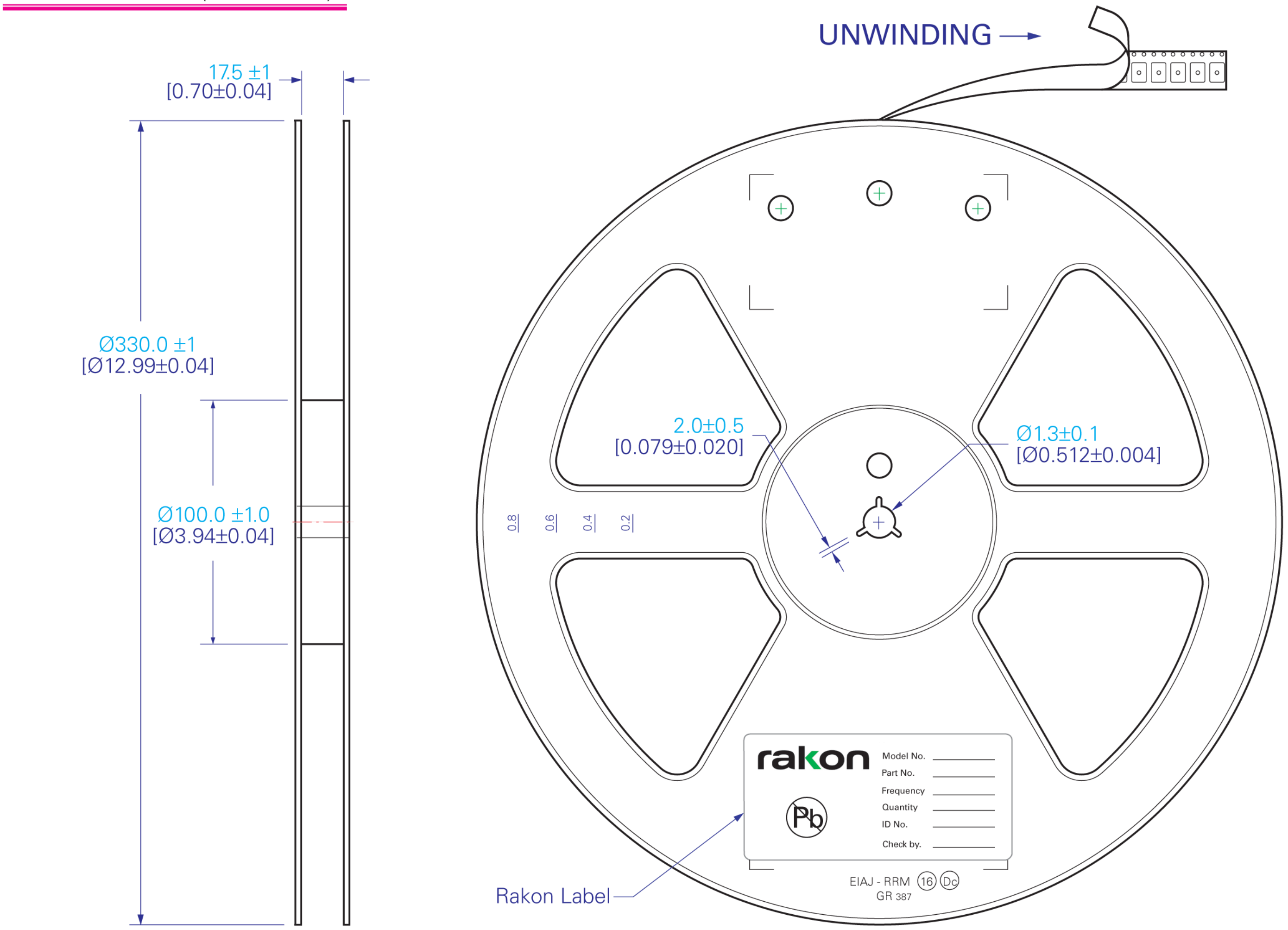
FILENAME: CAT542
REVISION: B
DATE: 16-Aug-10
SCALE: NTS
Millimetres [inch]

Drawing Name: H(V)T7500 Tape & Reel

TAPE DETAIL (SCALE 2 : 1)

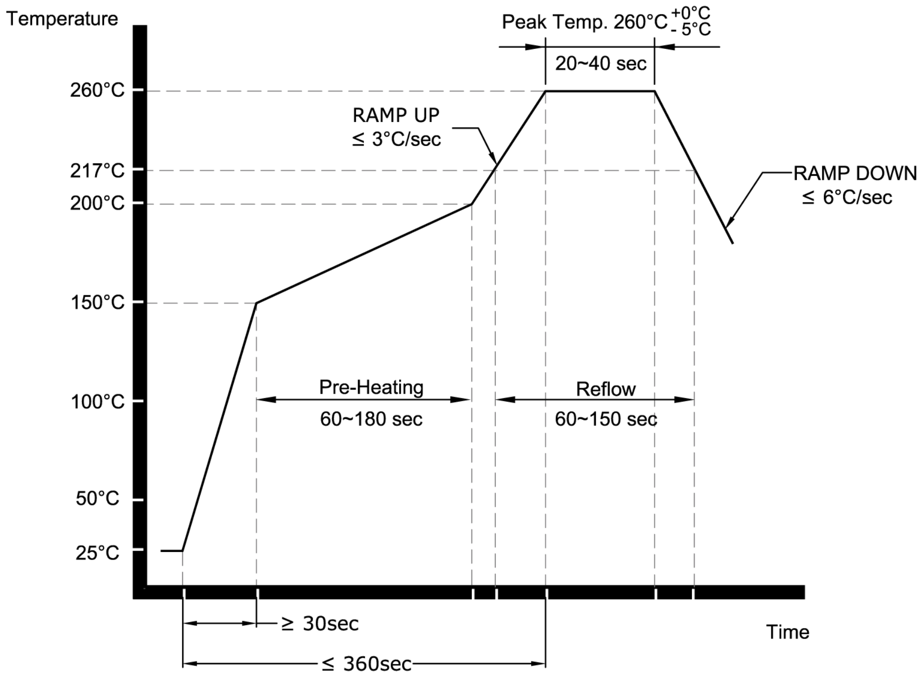


REEL DETAIL (SCALE 1 : 2.5)



TITLE: H(V)T7500 SERIES TAPE & REEL	FILENAME: CAT462	Tolerance:
RELATED DRAWINGS:	REVISION: B	XX = ±0.5
		X.X = ±0.2
	DATE: 26-Mar-10	X.XX = ±0.10
	SCALE: See above	X.XXX = ±0.05
		X° = ±1.0°
	Millimetres [inch]	Hole = ±0.10

Drawing Name: Pb-Free Reflow



NOTE:
The product has been tested to withstand the Reflow Profile shown. The Reflow Profile used to solder Rakon products is determined by the solder paste Manufacturer's specification. It is recommended that the Reflow Profile used does not exceed the one shown above.

TITLE: Pb-FREE REFLOW	FILENAME: CAT541
RELATED DRAWINGS:	REVISION: B
	DATE: 05-Sep-11
	SCALE: NTS
	Millimetres

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