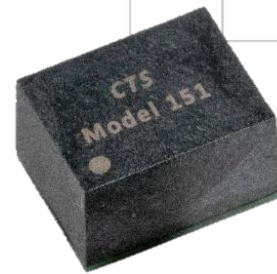


Model 151

9 x 7 mm SMD OCXO

Features

- Small 9x7 SMD package size
- Output frequency range up to 50MHz
- 3.3V operation
- Low Jitter/Phase Noise
- Tape and Reel Packaging



Part Dimensions: 9.8 × 7.6 × 5.65 mm

Description

The CTS Model 151 is a low cost, small size, high performance OCXO. The high quality SC cut Quartz Crystal used in this OCXO offers high stability and low jitter/phase noise, making it the ideal choice for any telecommunications system. Other applications include: Telecom Switching, Wireless Communication and Timing over Packet.

Table 1. Ordering Information

Model	Stability	Temp Range	Supply Voltage	Aging	Voltage Control	Frequency
151	— <u>V</u>	<u>B</u>	<u>E</u>	<u>C</u>	<u>N</u> —	<u>XXMXXX</u>

Code	Stability
R	±100ppb
T	±50ppb
U	±20ppb
V	±10ppb

See Table 2 for available stability options versus temperature range.

Code	Temp Range
B	0 to 70°C
D	-20 to 70°C
G	-40 to 85°C
X	-40 to 95°C ¹

Code	Spec
E	+3.3Vdc

Code	Spec.
V	Voltage Control
N	Fixed Freq

Code	Per day	Per year
C	1ppb	0.3ppm
F	3ppb	0.8ppm

Note 1. Available for aging code F only

Table 2. Stability Options

Code	Temperature Range	Stability (ppb)			
		R ±100	T ±50	U ±20	V ±10
B	0 to 70°C	*	*	*	*
D	-20 to 70°C	*	*	*	*
G	-40 to 85°C	*	*	*	*
X	-40 to 95°C	*	*	*	*

Part Number Example:
151-VBECN-20M000



Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See Table 1 options.	-40	-	+85	°C
Supply Voltage	V _{CC}	+3.135	+3.3	+3.465	Vdc
Current Consumption	During warm up	-	-	750	mA
	Steady state @ 25°C	-	-	200	mA
Load	Output to Ground	-	15	-	pf
Frequency Stability					
Frequency	F _{NOM}	10	-	50	MHz
Calibration	$\Delta F/F_{NOM}$; T _A = 25°C; at time of shipment at V _C = 1.65V	-	-	±500	ppb
Temperature Stability (See Table 1 options)	(F _{max} +F _{min}) /2	-	-	±50	ppb
Voltage Stability	V _{CC} ±2%, ref to V _{CC} = +3.3V	-	±5	-	ppb
Load Stability	±5%, ref. to CL = 15 pf	-	±5	-	ppb
Aging (After 30 days operation. See Table 1 options)	Per day	-	-	±3	ppb
	Per year	-	-	±0.8	ppm
	10 years	-	-	±2	ppm
Total Free-Run Accuracy	Under all operating conditions for 10 years	-	-	±2.5	ppm
Short Term Stability ADEV	In still air; 1.0 sec after 1 hr operation	-	0.02	0.07	ppb
Warmup-Up Time	T _A =25°C; to within 100ppb of freq. @ 30 min	-	-	3	minutes
Electronic Frequency Control – EFC (option)					
Voltage Range	V _C , Control voltage range	0	1.65	3.3	V
Pulling Range	Sufficient for 10 years life	±2.6	-	±4	ppm
Slope	Positive, monotonic				
Linearity		-	-	5	%



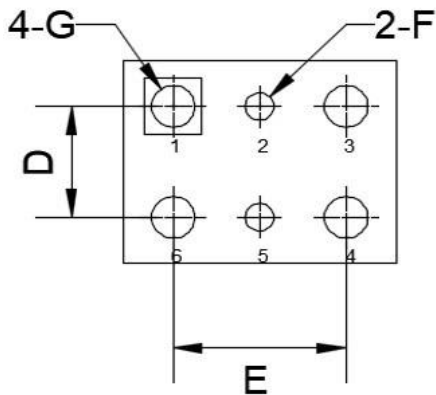
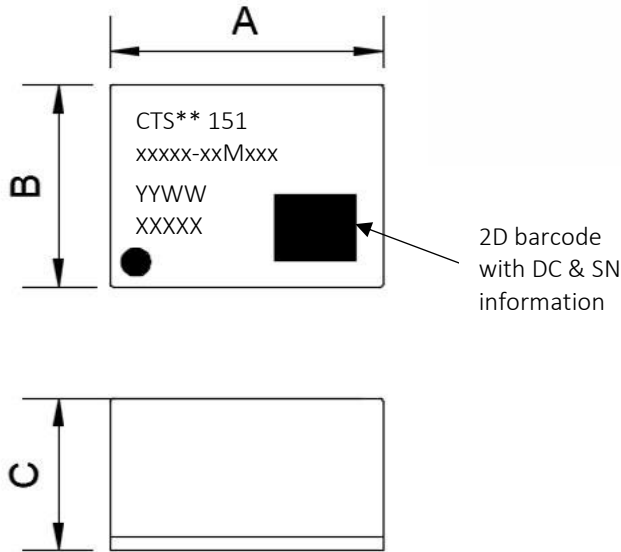
Electrical Specifications (continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Output Parameters – Square Wave, LVCMOS					
Waveform			LVCMOS		
Amplitude	V _{OL}	-	-	0.3	Vdc
	V _{OH}	2.7	-	-	
Rise / Fall Times	10% to 90% @ 15pf load	-	-	4	ns
Duty Cycle	@ 50% of output signal	45	50	55	%
Phase Noise (10 MHz)	Offset = 1 Hz	-	-75	-	dBc/Hz
	10Hz	-	-105	-	
	100Hz	-	-127	-	
	1KHz	-	-145	-	
	10KHz	-	-157	-	
	100KHz	-	-158	-	
	1MHz	-	-159	-	

Mechanical and Environmental

Parameter	Condition
Soldering	Maximum reflow temperature, 245°C for 10seconds, 240°C for 20seconds, per IPC/JEDEC J-STD-020D Note: Not intended for inverted reflow
MSL	Level 2
RoHS	Fully compliant to RoHS Directive EU 2015/863
Shock	1500G, 0.5msec, 6-axis 3 times per MIL-STD-883 Method 2002
Sinusoidal Vibration	20G, 10~2000Hz, 1.52mm, sweep 20minutes, 4 hours per axis per MIL-STD-883 Method 2007
Packaging	Tape and Reel
Storage Temperature Range	-55°C to +105°C

Mechanical Specifications

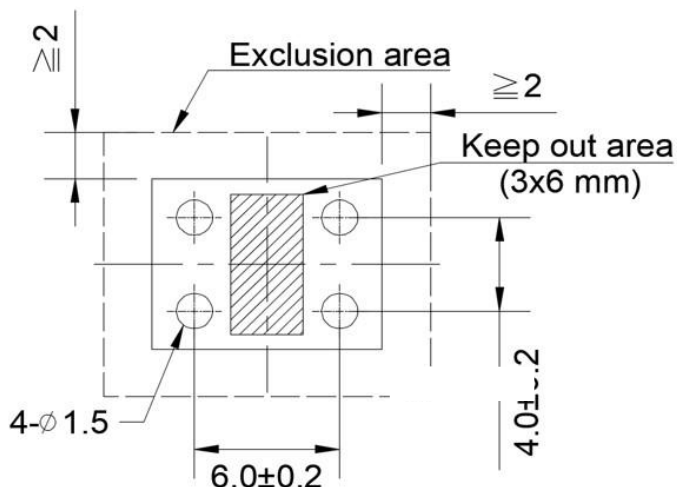


Marking		
**	=	Mfg Site Code
YYWW	=	Date Code
XXXXX	=	Serial Number

Pin Assignments	
Pin/Pad	Function
1	V _c – Voltage control
2	DNC
3	Ground
4	RF Output
5	DNC
6	V _{CC} – Supply voltage

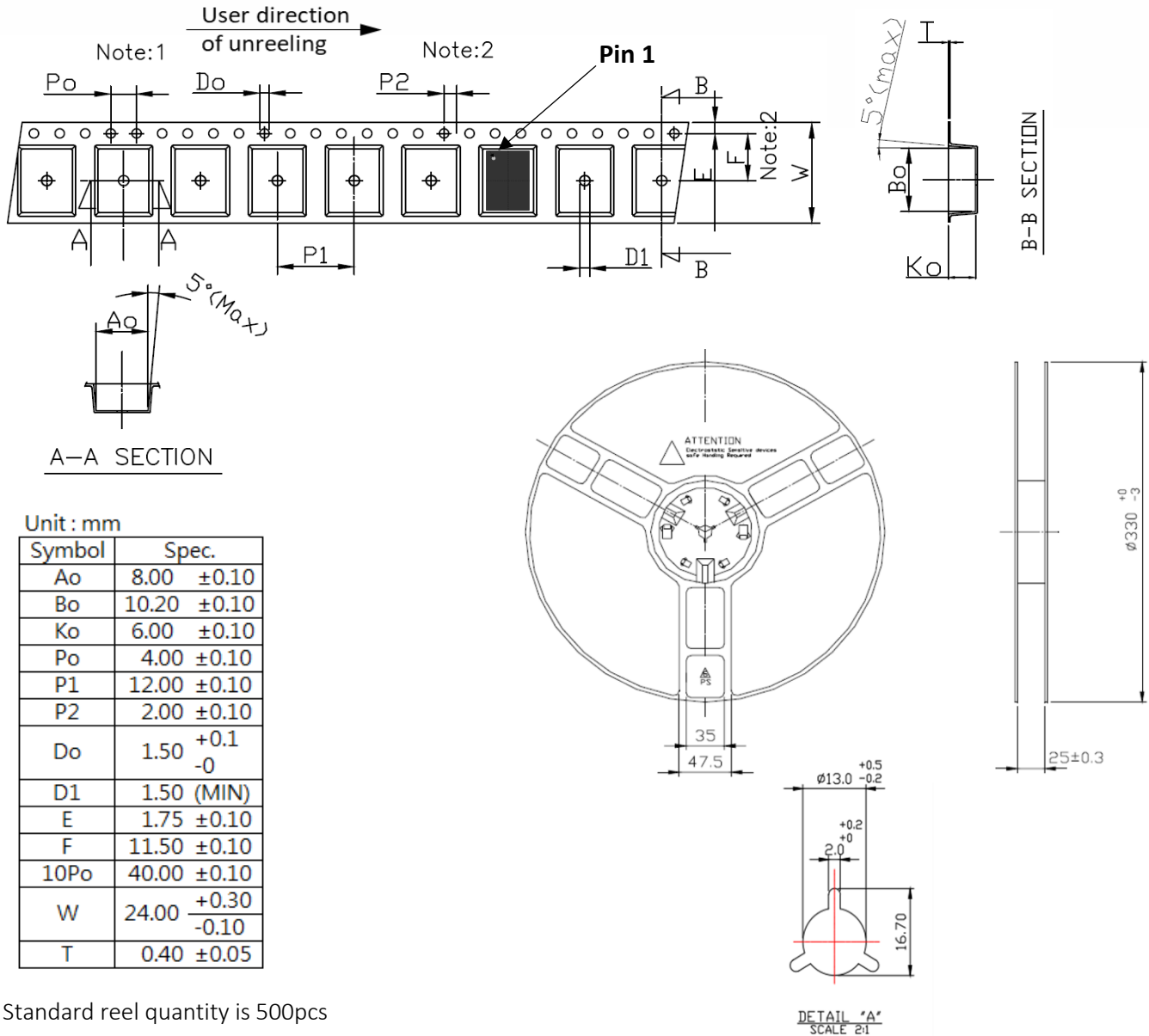
Dimension (mm)		
Symbol	Min	Max
A	-	9.8
B	-	7.6
C	-	5.65
D	3.8	4.2
E	5.8	6.2
F	1.0 nominal	
G	1.5 nominal	

Recommended Solder Pad Geometry



Exclusion area - To reduce thermal losses, a minimum 2 mm perimeter beyond the oscillator dimensions, free of surface or sub-surface ground or power planes, is recommended.

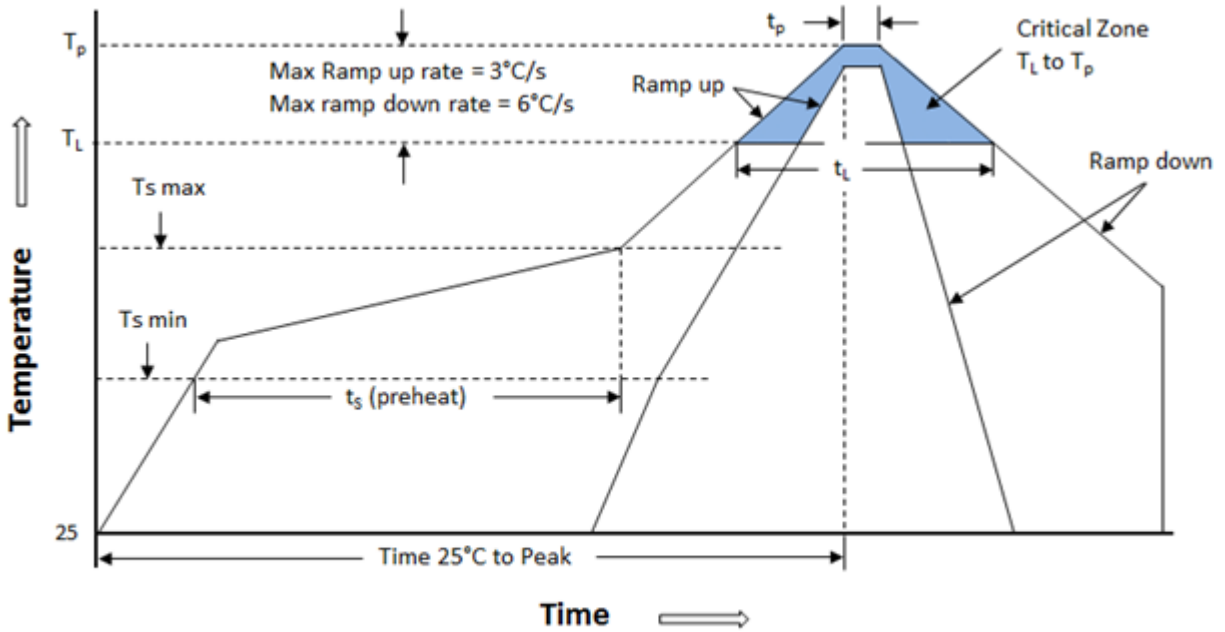
Packing: Tape and Reel



Notes:

1. 10 Sprocket hole pitch cumulative tolerance is ±0.1mm.
2. Pocket position relative to sprocket hole measured as true position of pocket not pocket hole.
3. Ao & Bo measured at 0.3mm above the bottom of the pocket.
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
5. Carrier camber shall not be greater than 1mm per 100mm through length of 250mm.

Reflow profile per IPC/JEDEC J-STD-020D



Note: The temperatures shown below represent the device body temperature

Ts max to Tl (Ramp-Up Rate)	3°C/second max
Preheat:	
Temperature Min (Ts Min)	150°C
Temperature Typical (Ts Typ)	175°C
Temperature Typical (Ts Max)	200°C
Time (ts)	60-120 seconds
Ramp-Up Rate (Tl to Tp)	3°C/second max
Time Maintained Above:	
Temperature (Tl)	217°C
Time (Tl)	60-150seconds
Peak Temperature (Tp)	245°C max for 10 seconds
Time within 5°C of actual peak (Tp)	30 seconds
Ramp-Down Rate	6°C/second max
Time 25°C to Peak Temperature(T)	8 minutes max

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.