Model 591

14 x 9 mm SMD TCXO

Part Dimensions: 14.6 × 9.6 × 6.4 mm

Features

- Small 14x9 SMD package size
- Output frequency range up to 50MHz
- 3.3V operation
- Ultra Low Phase Noise
- Tape and Reel Packaging

Description

The CTS Model 591 is a low noise, high performance TCXO that provides a LVCMOS output for frequencies up to 50.000 MHz. It offers temperature stabilities as high as ±0.1 ppm over select temperature ranges in an industry standard 14x9 mm package. This TCXO is ideal for 5G mmWave communications applications, Telecom switching and other wireless communications applications.

Table 1. Ordering Information

Model		Stability	Temp Range	Supply Voltage	Voltage Control		Frequency
591	—	17	B	E	N	—	XXMXXX

Code	Stability
X1	±0.280ppm
17	±0.100ppm

Note: See Table 2 below 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
Y	-40 to 105°C

Code	Spec
E	+3.3Vdc

Code	Spec.
V	Voltage Control
N	Fixed Freq

Table 2. Stability Options

		Stability (ppm)	
	Temperature	X1	17
Code	Range	±0.28	±0.1
B	0 to 70°C	*	*
D	-20 to 70°C	*	*
G	-40 to 85°C	*	
X	-40 to 95°C	*	
Y	-40 to 105°C	*	

Part Number Example:

591-17BEN-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	Ambient temperature at 25°C	-	-	25	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	-	-	±1	ppm
Temperature Stability (See Table 1 options)	(Fmax+Fmin) /2	±0.1	-	±0.28	ppm
Voltage Stability	V_{CC} ±5%, ref to V_{CC} = +3.3V	-	-	±0.05	ppm
Aging	Per year	-	±1	-	ppm
	10 years	-	±3	-	ppm
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	±5	-	±12	ppm
Slope	Positive, monotonic				
Linearity		-	-	10	%
V_C Input Impedance		100	-	-	KΩ
Modulation bandwidth		-	6	-	Hz

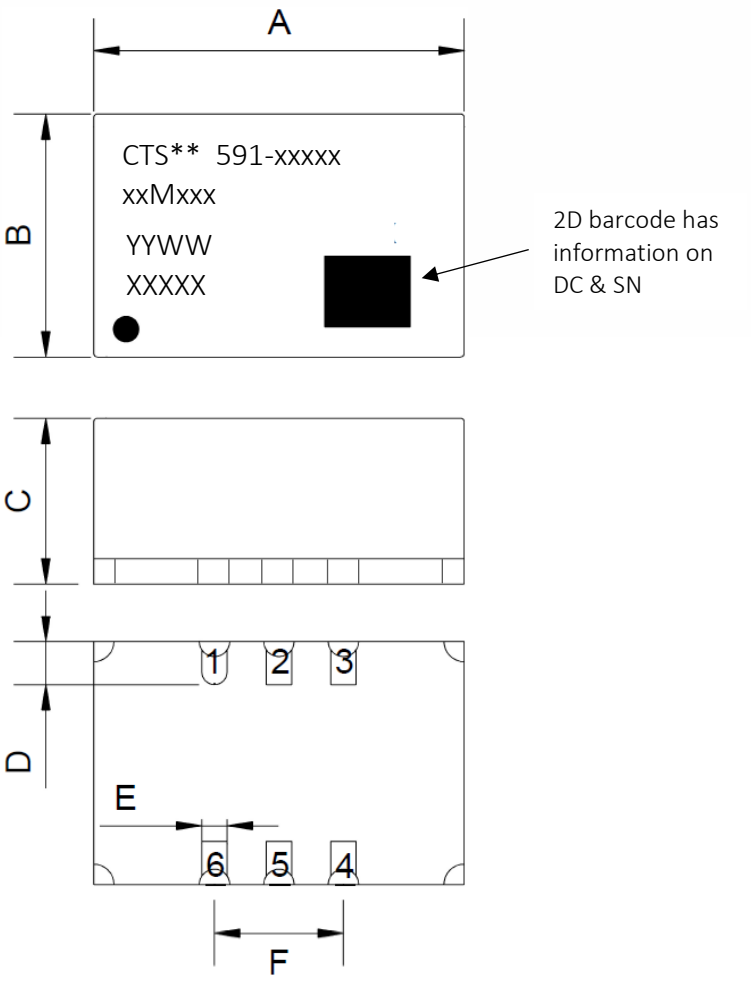
Electrical Specifications (continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Output Parameters – Square Wave, LVCMOS					
Waveform			LVCMOS		
Amplitude	V_{OL} V_{OH}	- 2.97	- -	0.33 -	Vdc
Rise / Fall Times	10% to 90% @ 15pf load	-	-	3	ns
Duty Cycle	@ 50% of output signal	45	50	55	%
Phase Noise (38.4MHz)	Offset = 10Hz 100Hz 1KHz 10KHz 100KHz 1MHz 5MHz	- - - - - - -	-95 -123 -143 -160 -170 -172 -172	-91 -119 -139 -155 -167 -169 -169	dBc/Hz

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
Mechanical Shock	1500G, 0.5msec, 6-axis 3 times per IEC 60068-2-27, Test Ea
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

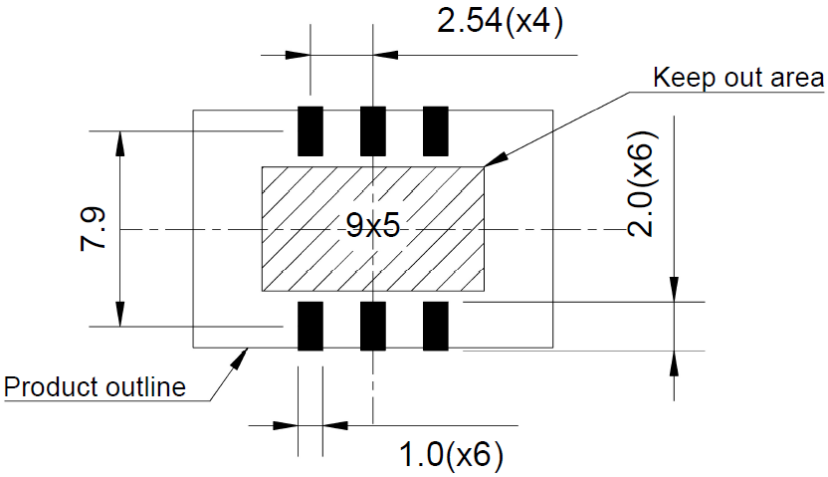
Pin Assignments

Pin/Pad	Function
1	V_C – Voltage control
2	DNC
3	Ground
4	RF Output
5	DNC
6	V_{CC} – Supply voltage

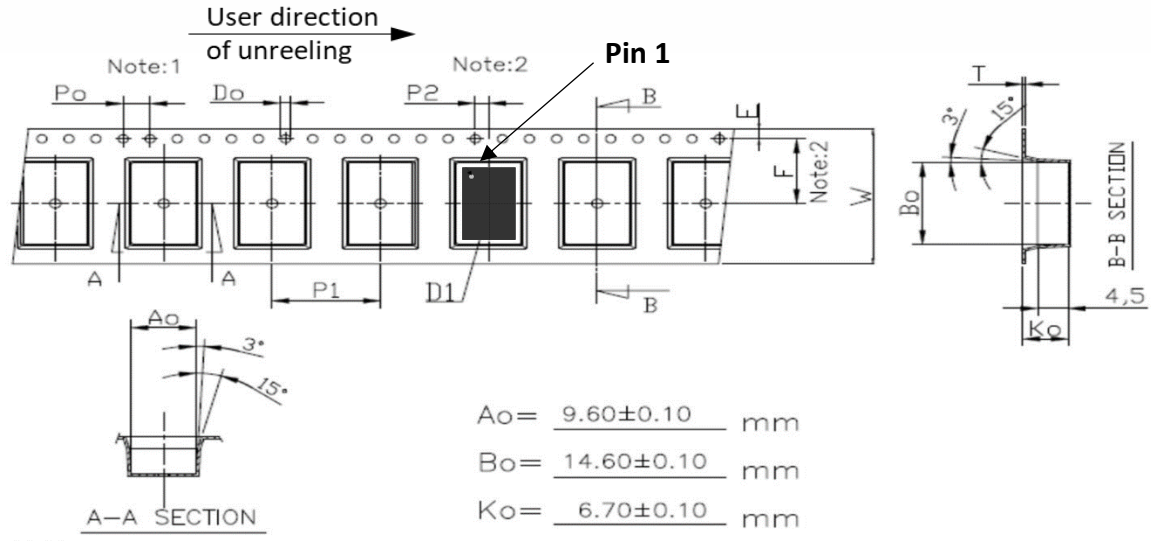
Dimension (mm)

Symbol	Min	Max
A	-	14.6
B	-	9.6
C	-	6.4
D	1.7 (x6)	
E	0.7 (x6)	
F	5.08	

Recommended Solder Pad Geometry



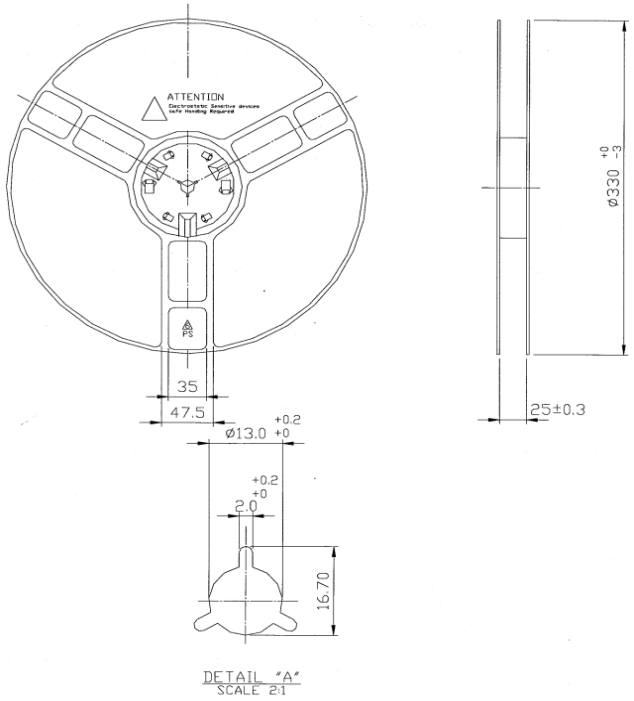
Packing: Tape and Reel



Ao= 9.60±0.10 mm
Bo= 14.60±0.10 mm
Ko= 6.70±0.10 mm

Unit: mm

Symbol	Spec.
Po	4.0±0.10
P1	16.0±0.10
P2	2.0±0.10
Do	$1.50^{+0.1}_{-0.}$
D1	1.50(Min)
E	1.75±0.10
F	11.50±0.10
10Po	40.0±0.20
W	$24.0^{+0.3}_{-0.1}$
T	0.40±0.05

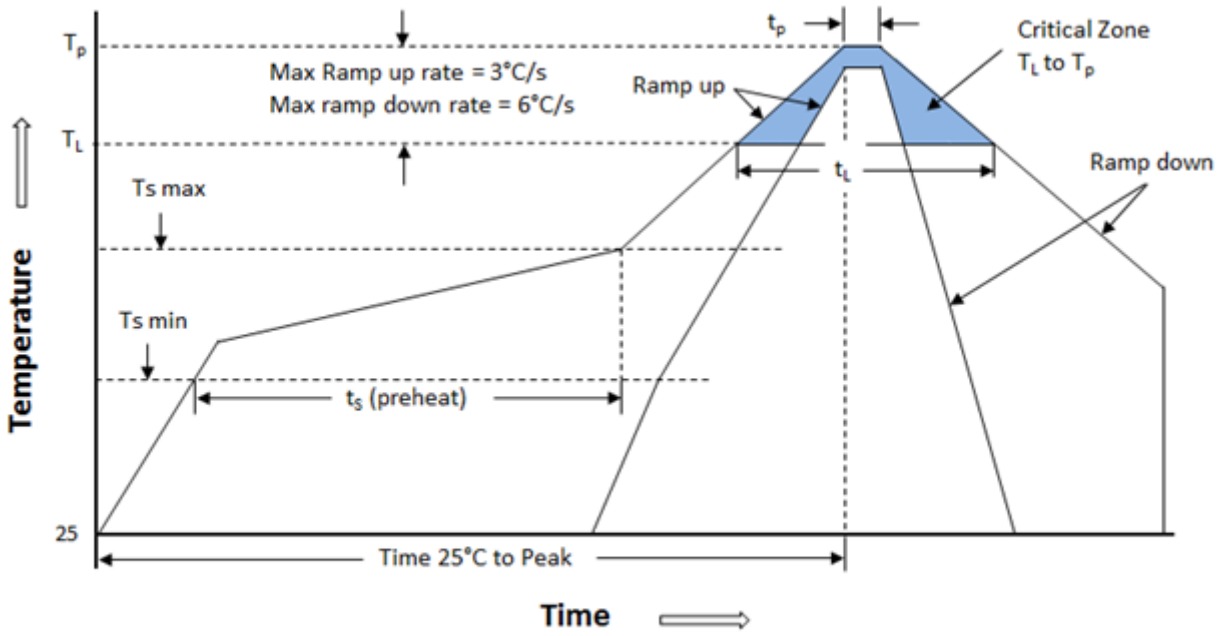


Standard reel quantity is 450pcs

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

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