

Model 1500001

20.0 MHz, 9x14mm Stratum 3 OCXO

Features

- Industry Standard 9x14mm footprint
- 3.3Vdc Supply Voltage
- -40°C to 85°C Operating Temperature Range
- HCMOS Square Wave Output
- Stratum 3 per Telcordia GR-1244-CORE



Description

CTS model 1500001 is a small size, high performance SMT OCXO for use in telecom switching, and wireless communication applications.

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	T_{OP} ; max. rate of change 0.5°C/minute	-40	-	+85	°C
Supply Voltage	V_{CC} ; $\pm 5\%$	3.135	3.3	3.465	Vdc
Power Consumption	P_{MAX}	-	-	2.5	W
	Steady State; $T_A = 25^\circ\text{C}$; Still Air	-	0.6	1.0	W
Load		13.5	15	16.5	pF
Frequency Stability					
Frequency	F_{NOM}		20.000		MHz
Calibration	$\Delta F/F_{NOM}$; $T_A = 25^\circ\text{C}$; $V_{CC} = 3.3\text{Vdc}$ at time of shipment	-	-	± 0.5	ppm
Temperature Stability	$\Delta F/F$; referenced to 25°C	-	-	± 100	ppb
Frequency vs. Voltage	$V_{CC} \pm 5\%$	-	-	± 50	ppb
Frequency vs. Load	15 pf $\pm 5\%$	-	-	± 50	ppb
Aging (After 30 days continuous operation)	Per day	-	± 2	-	ppb
	Per year	-	± 300	-	ppb
	20 years	-	± 3	-	ppm
Free run accuracy	All causes – 20 years	-	-	± 4.6	ppm
Short Term Stability (ADEV)	1.0 sec	-	-	0.1	ppb
Warm-up time	@ 25°C, After 5 mins referenced to the freq after 1 hour on	-	-	± 500	ppb
Holdover (still air)	- Constant temperature (24 hrs)	-	-	± 10	ppb
	- Variable temperature	-	-	250	ppb, pk-pk
Wander Generation	Meets Stratum 3 MTIE and TDEV per Telcordia GR-1244-CORE				

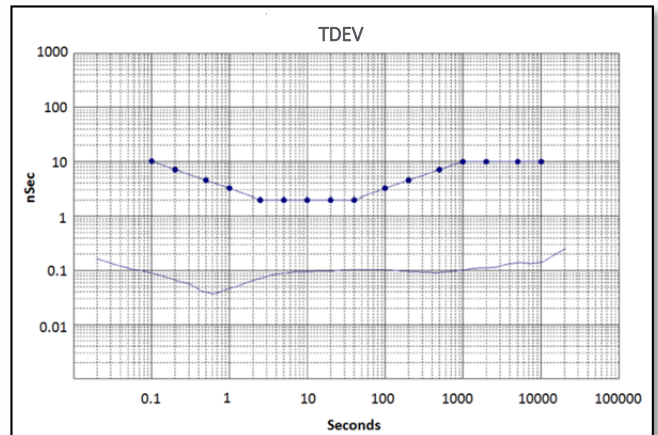
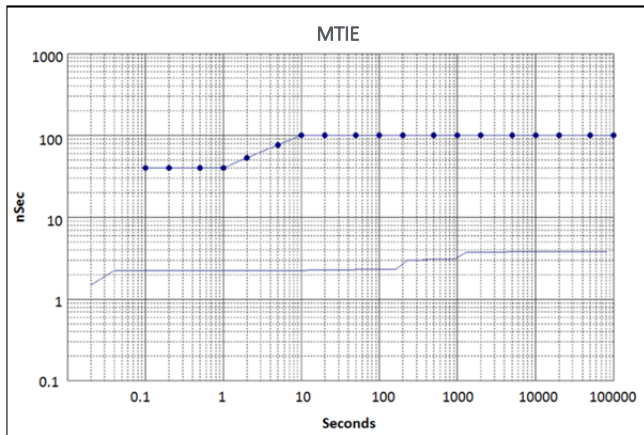
Electrical Specifications (Continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Output Parameters					
Output Signal	LVCMOS Square Wave				
Amplitude	V_{OL}	-	-	0.4	Vdc
	V_{OH}	2.4	-	-	
Rise/Fall Times	10% to 90%, 15pf load	-	-	5	ns
Duty Cycle	@50% of output signal	45	50	55	%
Phase Noise	1Hz	-	-70	-	dBc/Hz
	10Hz	-	-100	-	
	100Hz	-	-125	-	
	1KHz	-	-142	-	
	10KHz	-	-148	-	
	100KHz	-	-151	-	

Electronic Frequency Control (EFC)

EFC Control Voltage	V_C	0.0	1.65	3.3	Vdc
Frequency Adjust Range		± 5	-	-	ppm
Slope	Positive, monotonic	-	-	-	
Input Impedance	Z_{IN}	100	-	-	Kohms
Linearity		-	-	10	%

Typical Stratum 3 Wander Generation performance per Telcordia GR-1244-CORE
(locked through a 0.1Hz loop bandwidth)

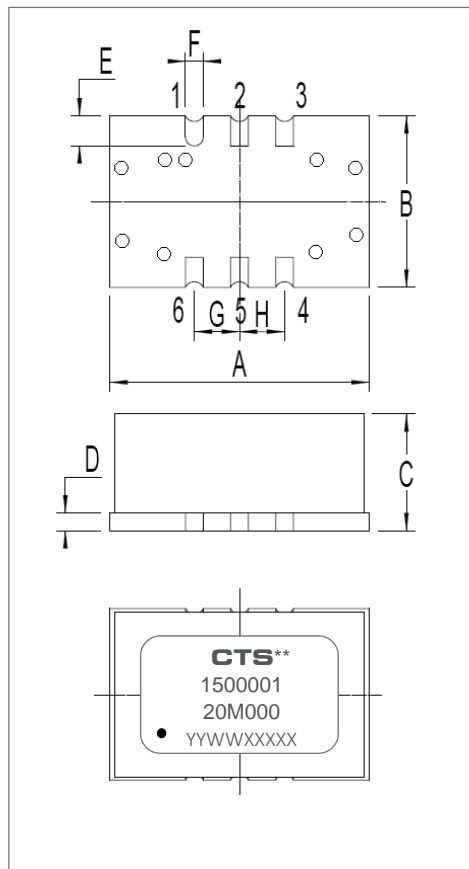


Mechanical and Environmental

Storage Temp Range	-55 to +105°C
Operating Temp Range	-40 to +85°C
Reflow Profile	IPC/JEDEC J-STD-20; >217°C, 1.5 min and 245°C (Absolute max temperature), 10 secs. Note: Part is not designed to be reflowed in an inverted position
Mechanical Shock	100g, 6mS duration, 1/2 sine wave, 3 shocks each direction along 3 mutually perpendicular planes.
Drop	10 cm height, 3 times onto hard board with thickness 3cm. - IEC60028-2-32 test Ed
Vibration	Random: Frequency range: 1Hz-4Hz-100Hz-200 Acceleration: 0.0001g ² /Hz-0.01g ² /Hz-0.01g ² /Hz-0.001g ² /Hz Grms=1.15g – 30 minutes per axis Sine: 10 – 55 Hz, 0.75mm DA, Sweep time 30 minutes per axis
Thermal Shock	-40°C ~ +85°C; 0.5 hour dwells with <30 second transitions. 100 cycles
RoHS	Lead-Free. Fully compliant to RoHS Directive 2011/65/EU
MSL	Level 2

Mechanical Specifications

Package Drawing

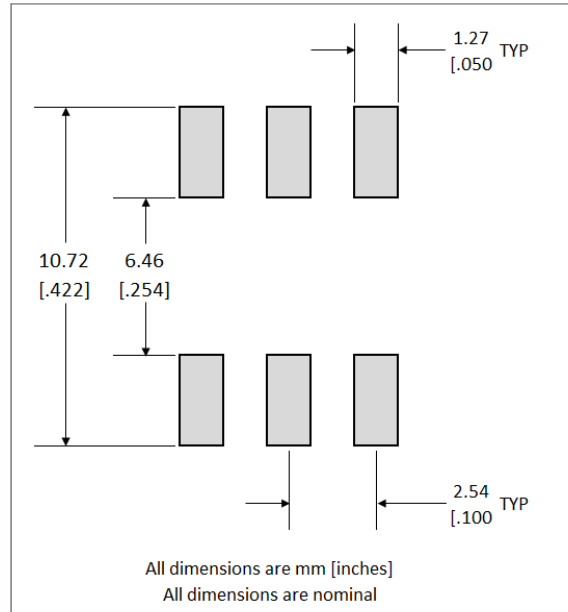


PAD	Connection
1	V _C
2	N/C
3	Ground
4	Output
5	N/C
6	V _{CC}

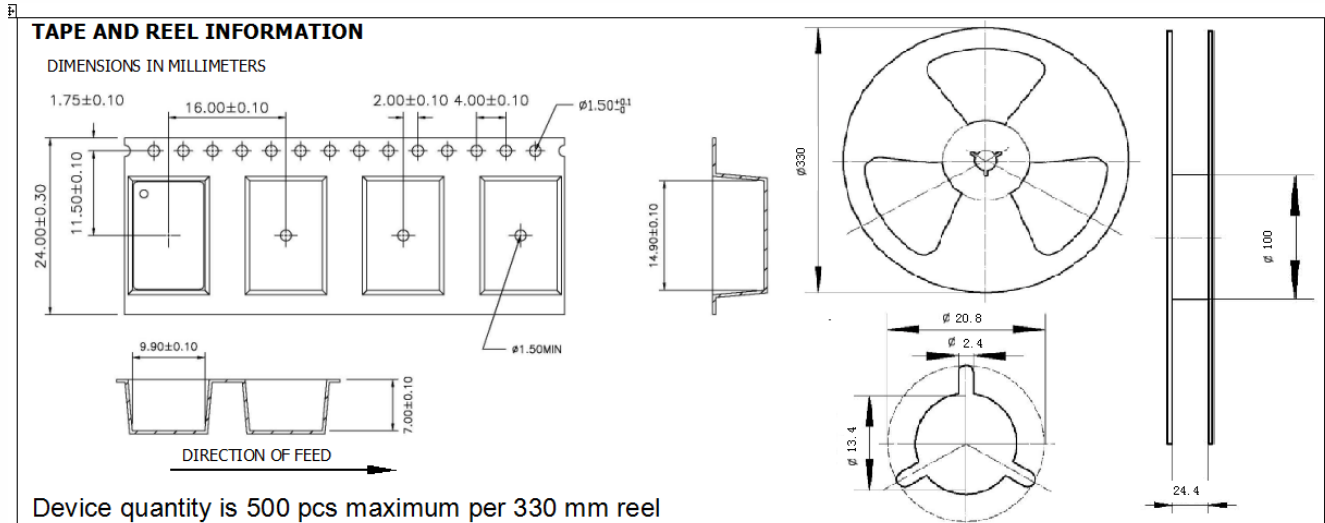
Symbol	Dimension (mm)	
	Min	Max
A		14.9
B		9.7
C		7.0
D	0.9	1.1
E	1.6	1.8
F	0.9	1.1
G	2.54 nominal	
H	2.54 nominal	

Marking	
**	Mfg Site Code
YYWWXXXXX	Serial Number (mfg date code = first 4 digits of s/n)

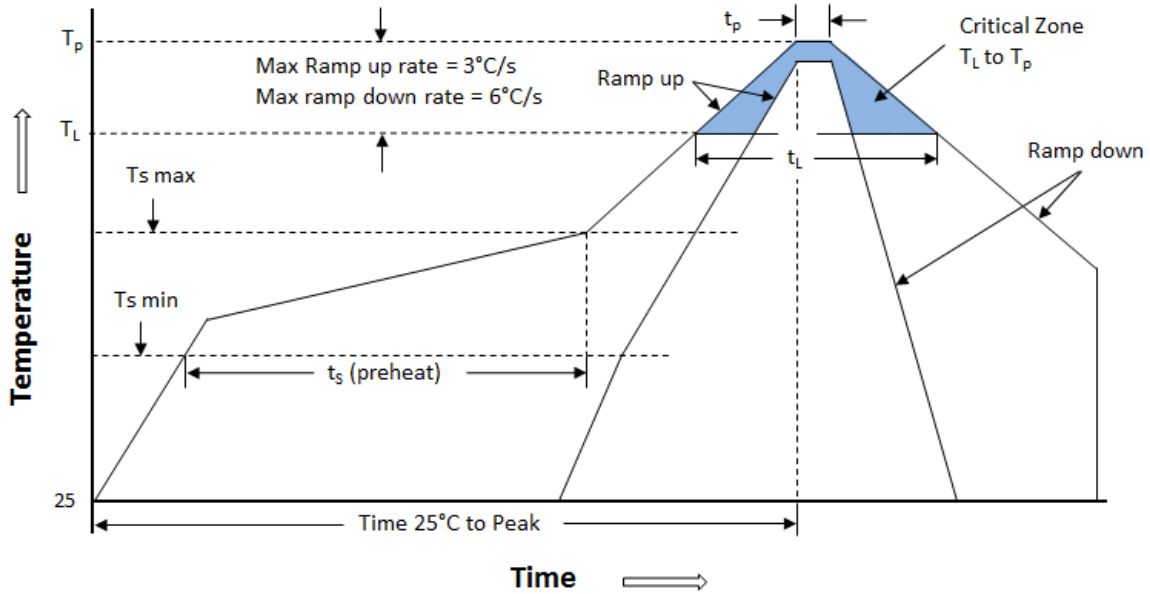
Recommended Solder Pad Geometry



Packing: Tape and Reel



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



Note: The temperatures shown below represent the device body temperature

Ts max to T_L (Ramp-up Rate)	5°C/second max
Preheat	
Temperature Min ($T_s \text{ Min}$)	150°C
Temperature Max. ($T_s \text{ Max}$)	200°C
Time (t_s)	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)	90 seconds max.
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