

Model 139

Stratum 3E, Low Noise DIL OCXO

Features

- -170 dBc/Hz Phase Noise floor
- Compliant to Stratum 3E of GR-1244-Core
- 10 to 40MHz
- Surface Mount or Thru hole DIL Package
- 3.3V or 5.0V operation
- Tape and Reel Packaging (SMD)



Part Dimensions: 20.3 × 12.7 × 11.0 mm

Description

The CTS Model 139 is a low cost, small size, high performance OCXO. The high quality CTS 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.

Ordering Information

Model	Stability	Temp Range	Supply Voltage	EFC	Package Style	Frequency																						
139	<u>U</u>	<u>G</u>	<u>E</u>	<u>N</u>	<u>I</u>	<u>XXMXXX</u>																						
	↓	↓	↓	↓	↓	↓																						
	<table><tr><th>Code</th><th>Stability</th></tr><tr><td>T</td><td>±50ppb</td></tr><tr><td>U</td><td>±20ppb</td></tr><tr><td>V</td><td>±10ppb</td></tr><tr><td>W*</td><td>10ppb pk-pk**</td></tr></table>	Code	Stability	T	±50ppb	U	±20ppb	V	±10ppb	W*	10ppb pk-pk**		<table><tr><th>Code</th><th>Spec</th></tr><tr><td>D</td><td>5V ± 5%</td></tr><tr><td>E</td><td>3.3V ± 5%</td></tr></table>	Code	Spec	D	5V ± 5%	E	3.3V ± 5%		<table><tr><th>Code</th><th>Spec</th></tr><tr><td>T</td><td>Thru hole</td></tr><tr><td>S</td><td>SMT</td></tr></table>	Code	Spec	T	Thru hole	S	SMT	
Code	Stability																											
T	±50ppb																											
U	±20ppb																											
V	±10ppb																											
W*	10ppb pk-pk**																											
Code	Spec																											
D	5V ± 5%																											
E	3.3V ± 5%																											
Code	Spec																											
T	Thru hole																											
S	SMT																											
		<table><tr><th>Code</th><th>Temp Range</th></tr><tr><td>A</td><td>0 to 50°C</td></tr><tr><td>D</td><td>-20 to 70°C</td></tr><tr><td>G</td><td>-40 to 85°C</td></tr></table>	Code	Temp Range	A	0 to 50°C	D	-20 to 70°C	G	-40 to 85°C		<table><tr><th>Code</th><th>Spec.</th></tr><tr><td>V</td><td>EFC</td></tr><tr><td>N</td><td>None</td></tr></table>	Code	Spec.	V	EFC	N	None										
Code	Temp Range																											
A	0 to 50°C																											
D	-20 to 70°C																											
G	-40 to 85°C																											
Code	Spec.																											
V	EFC																											
N	None																											
					<table><tr><th>Code</th><th>Frequency (MHz)</th></tr><tr><td>10M000</td><td>10.000</td></tr><tr><td>12M800</td><td>12.800</td></tr><tr><td>16M384</td><td>16.384</td></tr><tr><td>19M440</td><td>19.440</td></tr><tr><td>20M000</td><td>20.000</td></tr><tr><td>24M576</td><td>24.576</td></tr><tr><td>25M000</td><td>25.000</td></tr><tr><td>26M000</td><td>26.000</td></tr><tr><td>30M720</td><td>30.720</td></tr><tr><td>Custom</td><td>XX.XXX</td></tr></table>	Code	Frequency (MHz)	10M000	10.000	12M800	12.800	16M384	16.384	19M440	19.440	20M000	20.000	24M576	24.576	25M000	25.000	26M000	26.000	30M720	30.720	Custom	XX.XXX	
Code	Frequency (MHz)																											
10M000	10.000																											
12M800	12.800																											
16M384	16.384																											
19M440	19.440																											
20M000	20.000																											
24M576	24.576																											
25M000	25.000																											
26M000	26.000																											
30M720	30.720																											
Custom	XX.XXX																											

* Order stability option “W” for full GR-1244-CORE, S3E compliance

** Over entire operating temp range

Part Number Example: 139UGENT20M000

Part Number Example: 139UGENT20M000

Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See “Ordering Information” table for options.	-40	-	+85	°C
Supply Voltage (Vcc)	See “Ordering Information” table	3.135 4.75	3.3 5.0	3.465 5.25	Vdc
Power Consumption	During warm up	-	1.8	2.5	W
	Steady state @ 25°C	-	0.75	1.0	W
Load	Output to Ground	5	10	15	pF

Frequency Stability

Frequency	F _{NOM}	10	-	40	MHz
Calibration	$\Delta F/F_{NOM}$; T _A = 25°C; at time of shipment	-	±150	±300	ppb
Temperature Stability	-40 to +85°C (See “Ordering Information” table for available stability options)	-	-	10	ppb, pk-pk
Voltage Stability	V _{CC} ±5%	-	±1	±4	ppb
Aging	Per day	-	±0.5	±1	ppb
	Per year	-	-	±50	ppb
	10 years	-	-	±500	ppb
24-Hour Holdover Stability	Inclusive of operating temp and 24hours aging drift (Stability option W)	-	-	11	ppb, pk-pk
Total Free-Run Accuracy	Under all operating conditions for 10 years	-	-	±0.8	ppm
Drift (24 hours)	Constant temperature per GR-1244-CORE	-	-	±1	ppb
Short Term Stability	1.0 sec	-	<0.01	0.02	ppb
ADEV (in still air)	10 sec	-	0.01	0.03	ppb
Wander Generation	MTIE and TDEV per Stratum 3E requirements of Telcordia GR-1244-CORE				
Warmup-Up Time	T _A =25°C; to within 10ppb of freq. @ 30 min	-	-	5	minutes

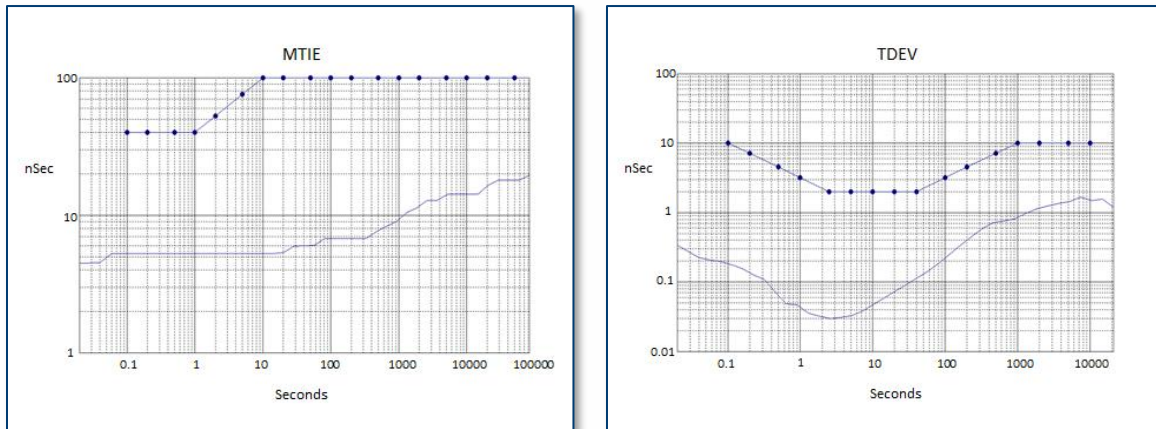
Electronic Frequency Control – EFC (option)

Voltage Range	VC, Control voltage range	0.1Vcc	-	0.9Vcc	V
Pulling Range	Sufficient for 10 years life	±0.8	±1.0	-	ppm
Linearity		-	-	10	%

Electrical Specifications (continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Output Parameters – Square Wave, HCMOS					
Waveform			HCMOS		
Amplitude	V_{OL} V_{OH}	- 0.9Vcc	- -	0.1Vcc -	Vdc
Rise / Fall Times	10% to 90% @ 10pf load	-	3	5	ns
Duty Cycle	@ 50% of output signal	45	50	55	%
Phase Noise (20MHz)	Offset = 10Hz	-	-112	-	dBc/Hz
	100Hz	-	-143	-	
	1KHz	-	-154	-	
	10KHz	-	-164	-	
	100KHz	-	-170	-	
Spurious		-	-	-70	dBc

Typical Stratum 3E Wander Generation performance per Telcordia GR-1244-CORE
(20 MHz, locked through a 0.001 Hz loop bandwidth)



Mechanical and Environmental

Parameter	Condition
Soldering	Maximum reflow temperature, 245°C for 10seconds, 240°C for 20seconds, per IPC/JEDEC J-STD-202D Note: Not intended for inverted reflow
MSL	Level 1
RoHS	Lead-Free. Fully compliant to RoHS Directive 2011/65/EU
Shock	500 G's, 1msec, 5 shocks in each of 6 directions
Sinusoidal Vibration	10Hz to 55Hz with a double amplitude of 1.5mm, 10g's peak from 55Hz to 2000Hz, for 30minutes in each of three perpendicular directions
Random Vibration	5.35G's RMS, 20 to 500Hz, per MIL-STD-202F, Method 214, 15minutes each axis
Seal	Hermetic
Marking Permanency	MIL-STD-202F, Method 215J
Packaging	Tape and Reel for Surface Mount Package; Bulk Pack in Foam for Thru-Hole Package
Storage Temperature Range	-55°C to +105°C

Mechanical Specifications

Figure 1 – Package Drawing – Surface Mount

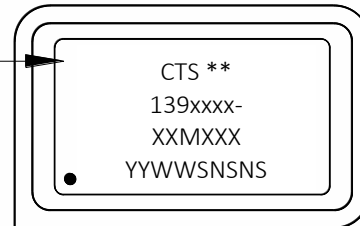
Pad termination finish: Gold flash < 10 µ inch, over Ni plated Cu

MARKING THIS SURFACE

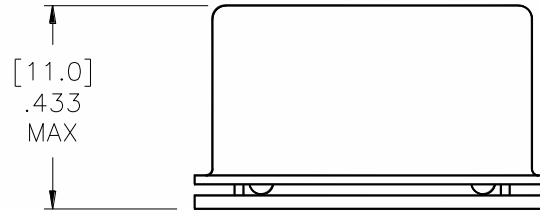
** = MFG SITE CODE

YYWW = DATE CODE

XXXXXX = SERIAL NUMBER



PIN / PAD	FUNCTION
1	N/C or Vc
7	OV & CASE GROUND
8	OUTPUT
14	Vcc



KEY: [MM]
INCH

TOLERANCE: $[\pm .25]$
 $\pm .010$

$[\phi 1.09]$
 $\phi .043$ CASTELLATION
(4) PLACES

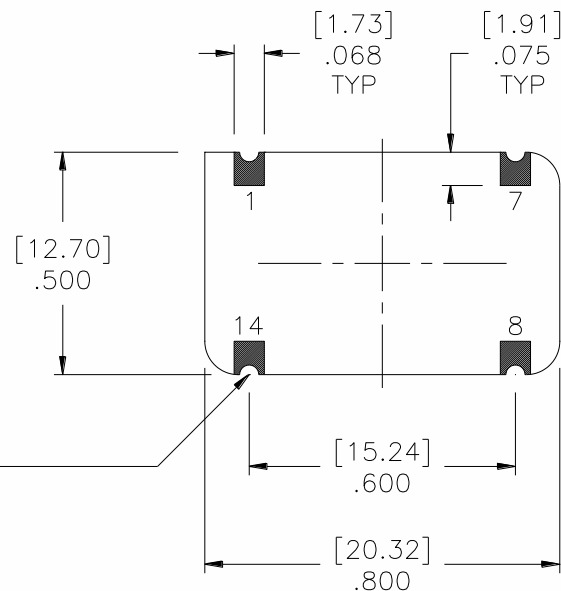


Figure 2 – Package Drawing – Through Hole

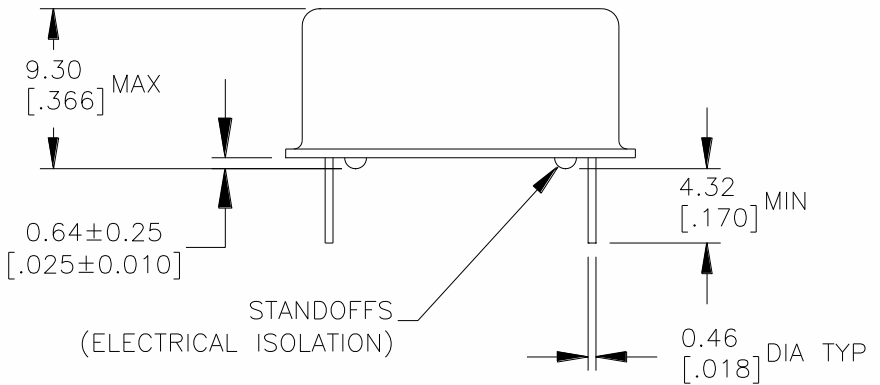
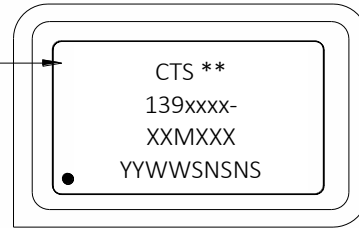
Lead Termination Finish: Solder Coated, Sn96.5% / Ag3.5%

MARKING THIS SURFACE

** = MFG SITE CODE

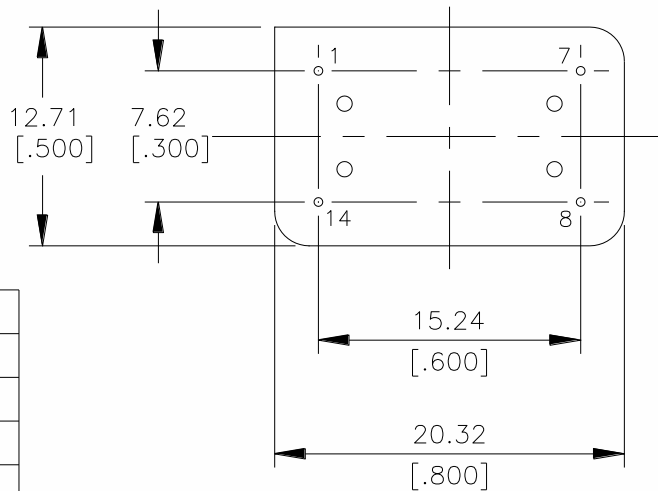
YYWW = DATE CODE

XXXXXX = SERIAL NUMBER



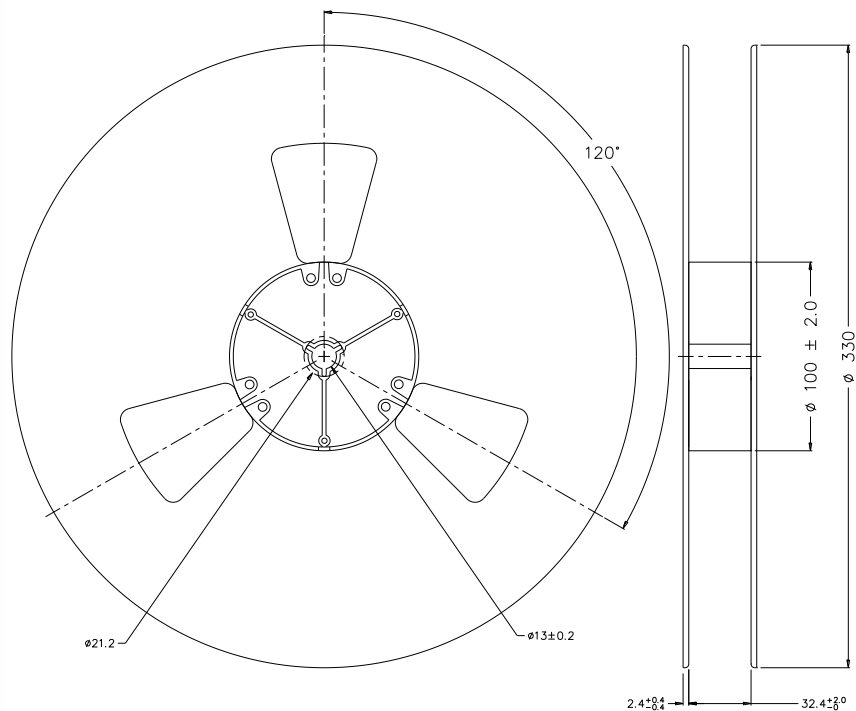
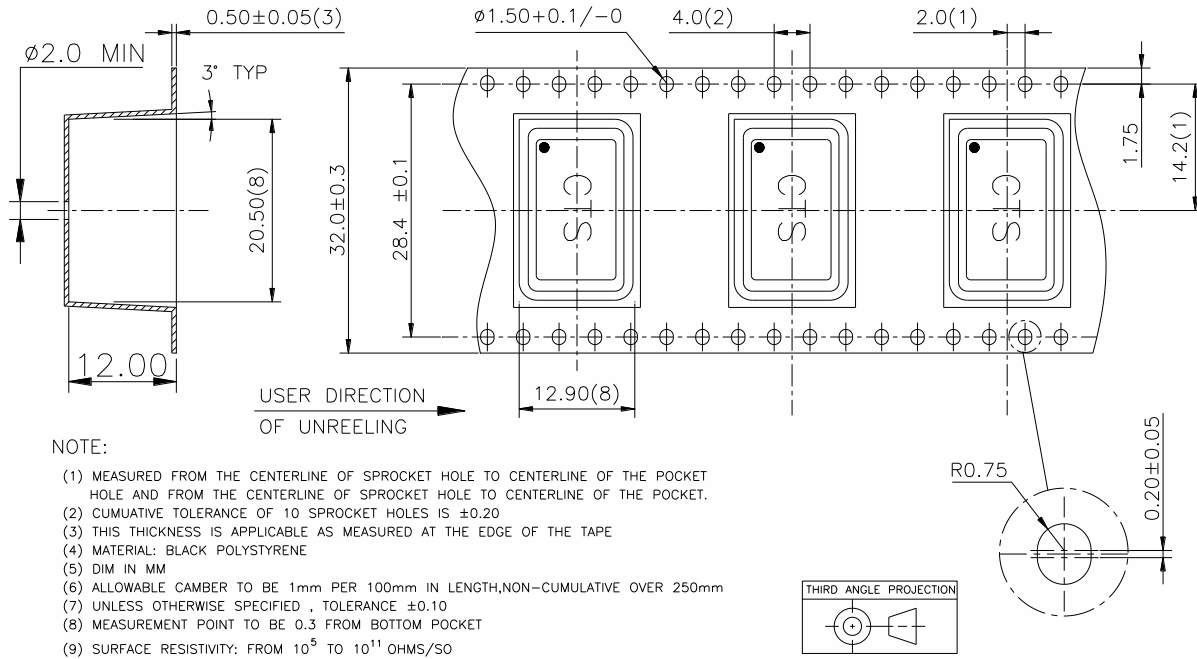
KEY: MM
[INCH]

TOLERANCE: $\pm .25$
[$\pm .010$]

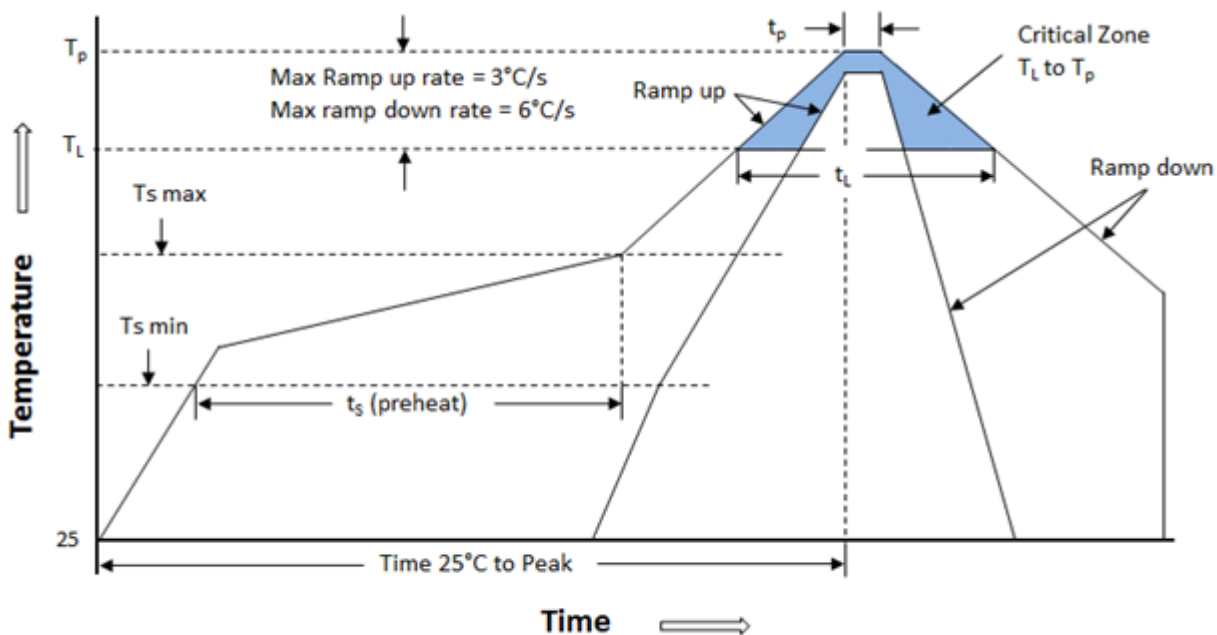


PIN / PAD	FUNCTION
1	N/C or Vc
7	0V & CASE GROUND
8	OUTPUT
14	Vcc

Packing: Tape and Reel



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)	$3^\circ\text{C/second max}$
Preheat:	
Temperature Min ($T_{s\ Min}$)	150°C
Temperature Typical ($T_{s\ Typ}$)	175°C
Temperature Typical ($T_{s\ Max}$)	200°C
Time (t_s)	60-120 seconds
Ramp-Up Rate (T_L to T_p)	$3^\circ\text{C/second max}$
Time Maintained Above:	
Temperature (T_L)	217°C
Time (t_L)	60-150seconds
Peak Temperature (T_p)	$245^\circ\text{C max for 10 seconds}$
Time within 5°C of actual peak (T_p)	30 seconds
Ramp-Down Rate	$6^\circ\text{C/second max}$
Time 25°C to Peak Temperature(T)	8 second 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.