Model 139

Stratum 3E, Low Noise DIL OCXO

Features

- -170 dBc/Hz Phase Noise floor
- Compliant to Stratum 3E of GR-1244-Core
- 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.

Model	Stability	Temp Range	Supply Voltage	EFC	Package Style	Frequency
139	U	G	E	N	T	XXMXXX

Code	Stability
T	±50ppb
U	±20ppb
V	±10ppb
W*	10ppb pk-pk**

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

** Over entire operating temp range

Code	Temp Range
A	0 to 50°C
D	-20 to 70°C
G	-40 to 85°C

Code	Spec
D	5V ± 5%
E	3.3V ± 5%

Code	Spec.
V	EFC
N	None

Code	Spec
T	Thru hole
S	SMT

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

Part Number Example: 139UGENT20M000

Electrical Specifications

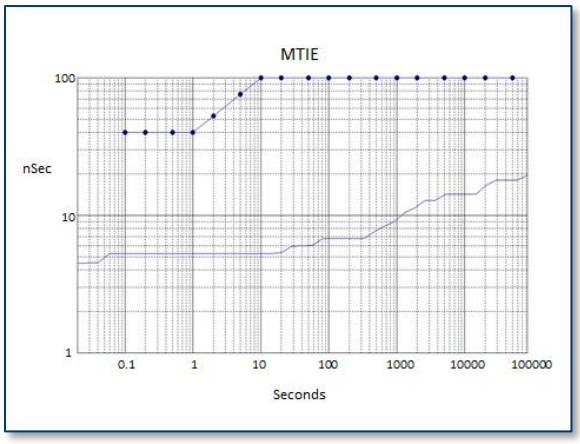
Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Operating Temperature Range	See **Ordering Information** table for options.	-40	-	+85	°C
Supply Voltage (Vcc)	See **Ordering Information** table	3.135 4.75	3.3 5.0	3.465 5.25	Vdc
Power Consumption	During warm up	-	1.8	2.5	W
	Steady state @ 25°C	-	0.75	1.0	W
Load	Output to Ground	5	10	15	pF
Frequency Stability					
Frequency	F_{NOM}		Std Frequencies: 10, 12.8, 16.384, 19.44, 20, 24.576, 25, 26, 30.72		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 ADEV (in still air)	1.0 sec 10 sec	- -	<0.01 0.01	0.02 0.03	ppb 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	%

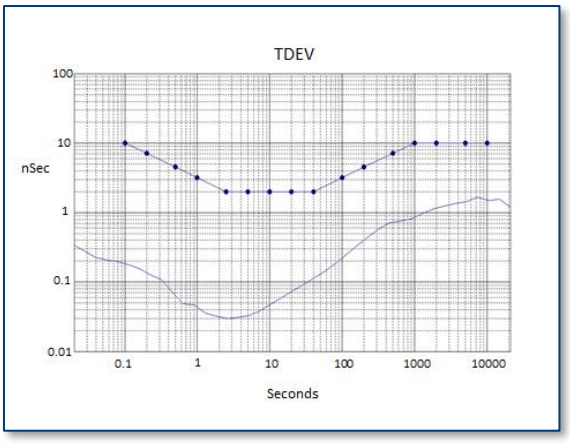
Electrical Specifications (continued)

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Output Parameters – Square Wave, HCMOS					
Waveform			HCMOS		
Amplitude	V_{OL}	-	-	0.1Vcc	Vdc
	V_{OH}	0.9Vcc	-	-	
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)





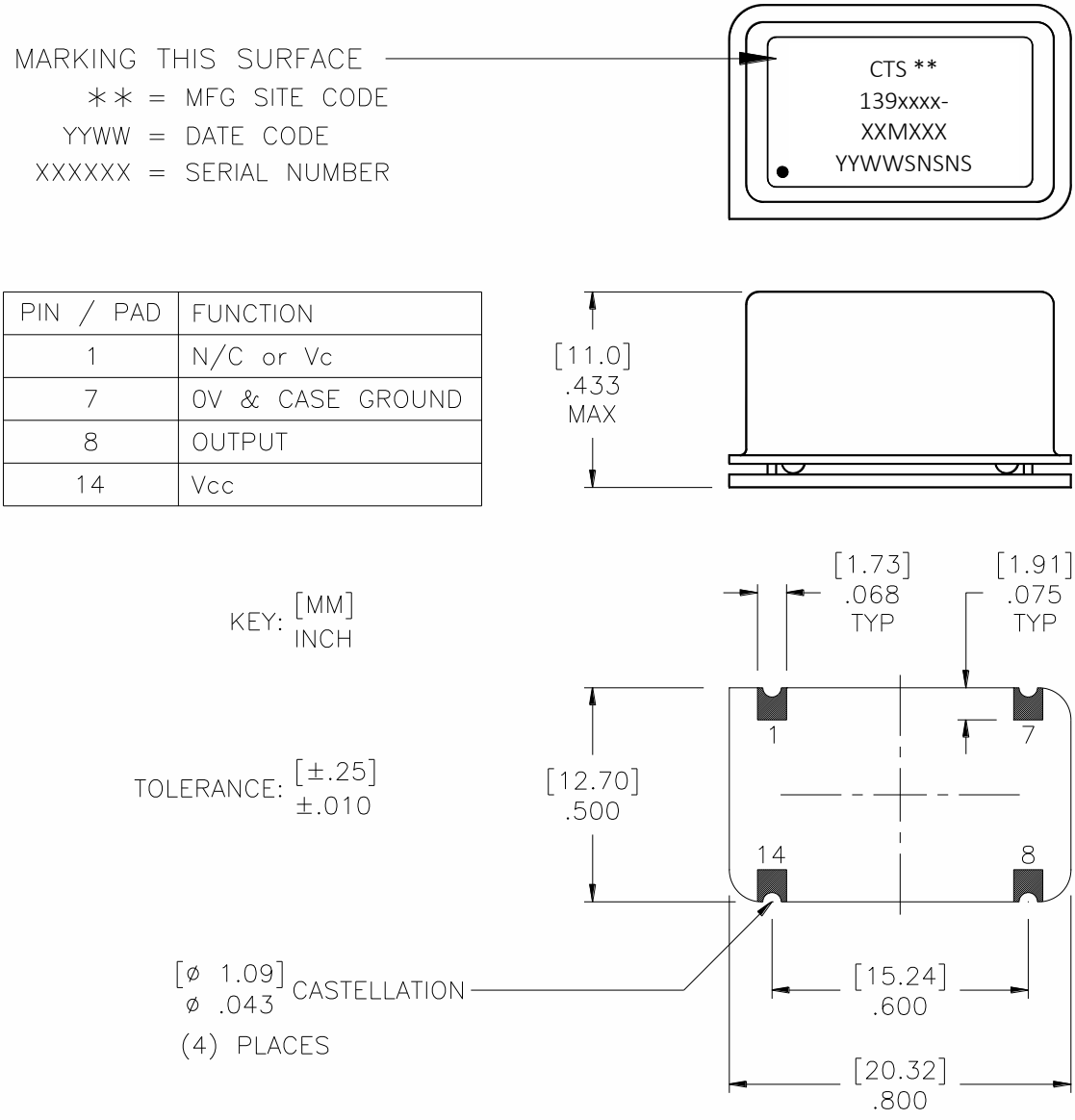
Mechanical and Environmental

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

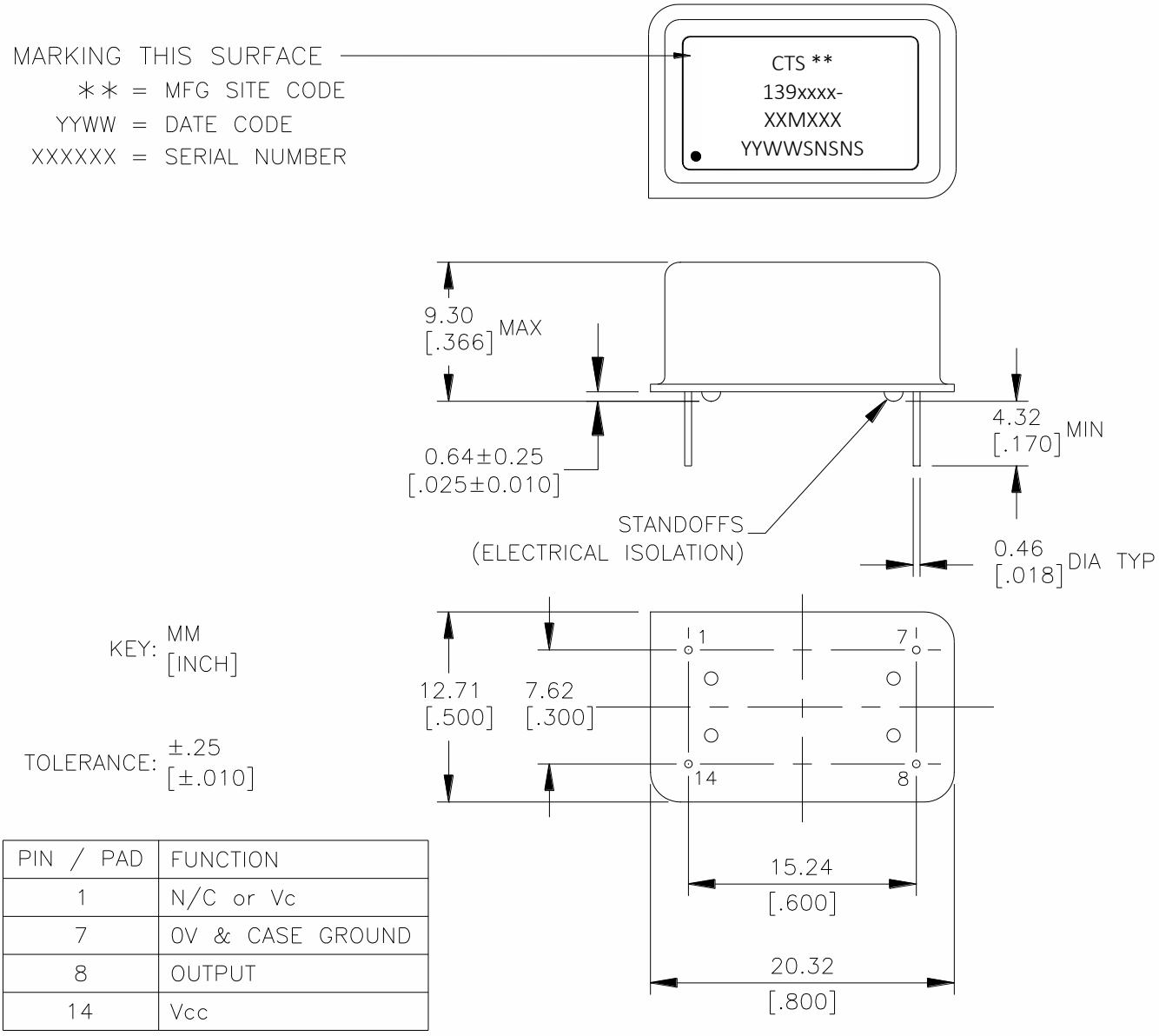
Pad termination finish: Gold flash < 10 µ inch, over Ni plated Cu



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

Figure 2 – Package Drawing – Through Hole

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



PIN / PAD	FUNCTION
1	N/C or Vc
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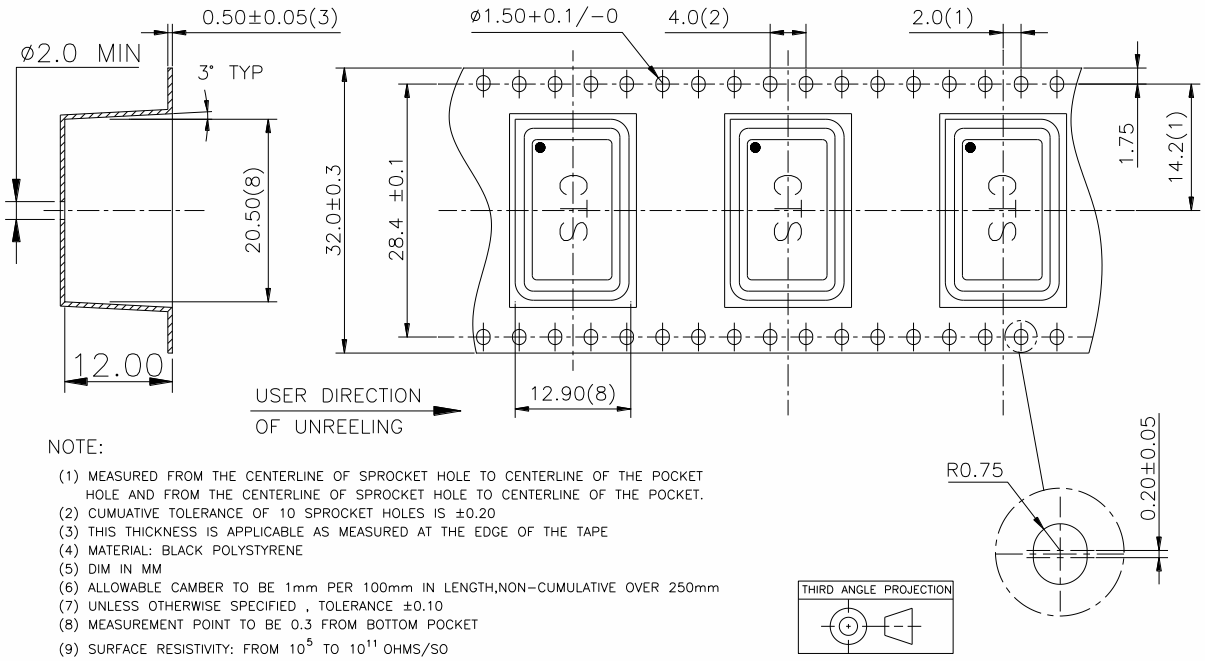
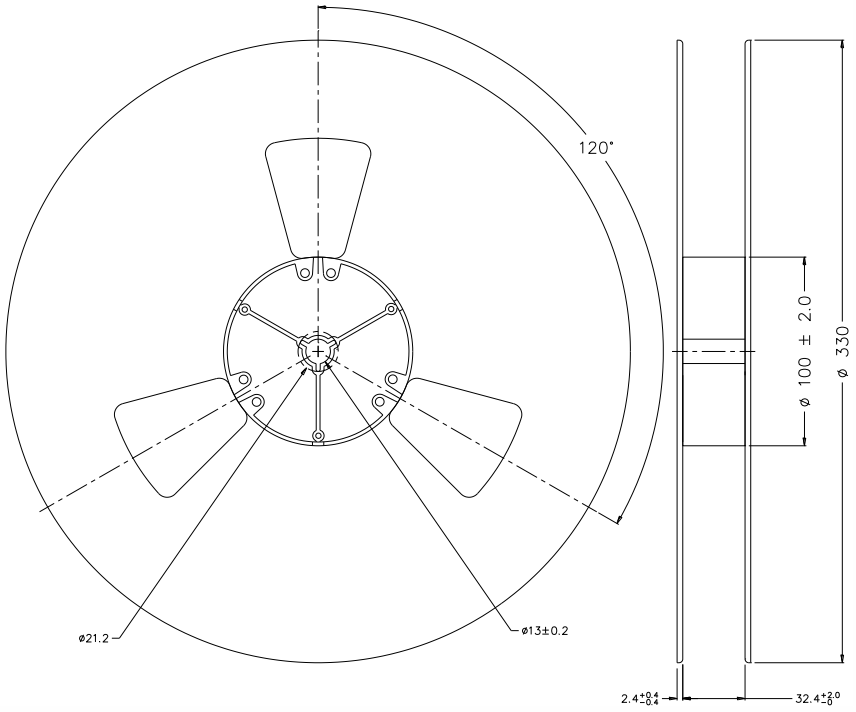
14	Vcc

Packing: Tape and Reel

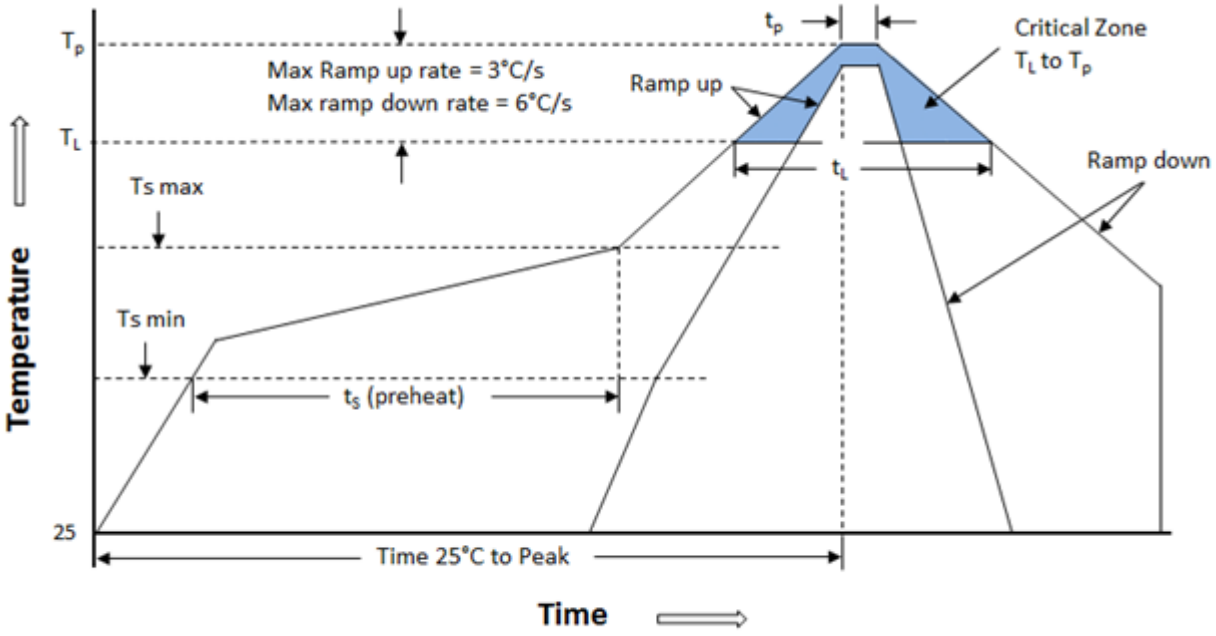


NOTE:

(1) MEASURED FROM THE CENTERLINE OF SPROCKET HOLE TO CENTERLINE OF THE POCKET HOLE AND FROM THE CENTERLINE OF SPROCKET HOLE TO CENTERLINE OF THE POCKET.
(2) CUMUATIVE TOLERANCE OF 10 SPROCKET HOLES IS ±0.20
(3) THIS THICKNESS IS APPLICABLE AS MEASURED AT THE EDGE OF THE TAPE
(4) MATERIAL: BLACK POLYSTYRENE
(5) DIM IN MM
(6) ALLOWABLE CAMBER TO BE 1mm PER 100mm IN LENGTH,NON−CUMULATIVE OVER 250mm
(7) UNLESS OTHERWISE SPECIFIED , TOLERANCE ±0.10
(8) MEASUREMENT POINT TO BE 0.3 FROM BOTTOM POCKET
(9) SURFACE RESISTIVITY: FROM 10^5 TO 10^{11} OHMS/SO



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 second max