



# TX-401

## Temperature Compensated Crystal Oscillator

Helping Customers Innovate, Improve & Grow



TX-401

### Features

- High Frequency
- Low Phase Noise
- Low power consumption
- Output: True Sinewave
- Tight Tolerances
- Frequency range <sup>1</sup> of 250 - 700 MHz
- Standard Frequencies : 256; 400; 500; 502 MHz

### Applications

- Test & Measurement
- Communication Equipment
- Industrial
- Military

### Performance Specifications

Parameter	Frequency Stabilities <sup>1</sup>				Units	Condition	Options <sup>3</sup>
	Min	Typical	Max				
vs. operating temperature range (referenced to +25°C)	-2		+2		ppm	-40 to +85°C	
	-1		+1		ppm	-40 to +85°C	
	-1		+1		ppm	-20 to +70°C	
Initial tolerance	-2		+2		ppm	at time of shipment, nominal EFC V <sub>s</sub> ±5% static Load ±10% static after 30 days of operation	
vs. supply voltage change	-0.8		+0.8		ppm		
vs. load change	-0.2		+0.2		ppm		
vs. aging 10 years	-4		+4		ppm		

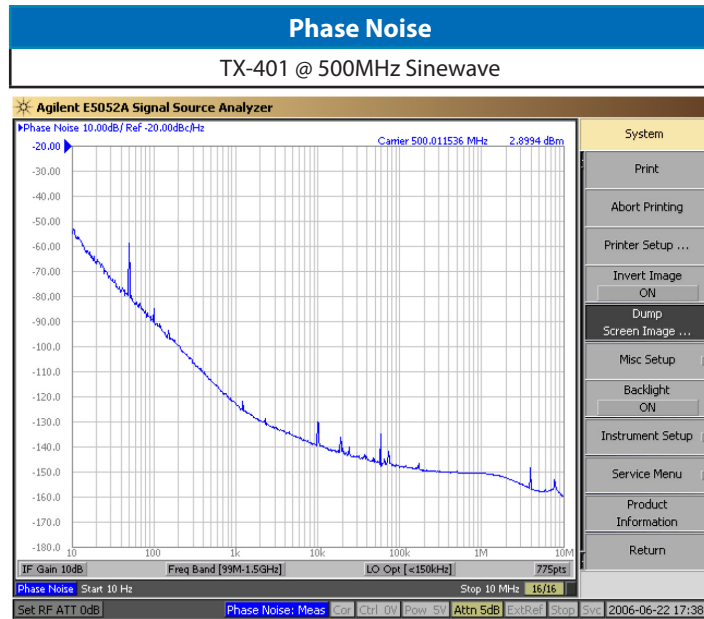
## Performance Specifications

Supply Voltage (Vs)						
Parameter	Min	Typical	Max	Units	Condition	
Supply voltage (standard)	3.135	3.3	3.465	VDC		
Supply voltage (Option)	4.75	5	5.25	VDC		
Current consumption			75 50	mA mA	@ 3.3V @ 5V	
RF Output						
Signal [Option]	True Sinewave					
Load	45	50	55	Ohm		
Output power	0	3	6	dBm		
Harmonics			-25	dBc		
Subharmonics			-40	dBc		
Frequency Tuning (EFC)						
Tuning Range	Fixed TCXO; No adjust					Opti- on <sup>s</sup>
Tuning Range	±5		±18	ppm		
Linearity	<10%					
Tuning Slope	Positive					
Control Input Impedance	10			kOhm		
Control Voltage Range	0.3 0.5	1.65 2.5	3.0 4.5	VDC	Vs=3.3V Vs=5V	
Additional Parameters						
Phase Noise <sup>2</sup>		-54		dBc/Hz	10 Hz	@ 500MHz Sinewave 5V
		-90		dBc/Hz	100 Hz	
		-122		dBc/Hz	1 kHz	
		-140		dBc/Hz	10 kHz	
		-147		dBc/Hz	100 kHz	
		-150		dBc/Hz	1 MHz	
		-160		dBc/Hz	10 MHz	
Jitter			0.1	ps RMS	@ 12 kHz to 20 MHz	
Weight			2.0	g		
Processing & Packing	Handling & Processing Note					

### Absolute Maximum Ratings

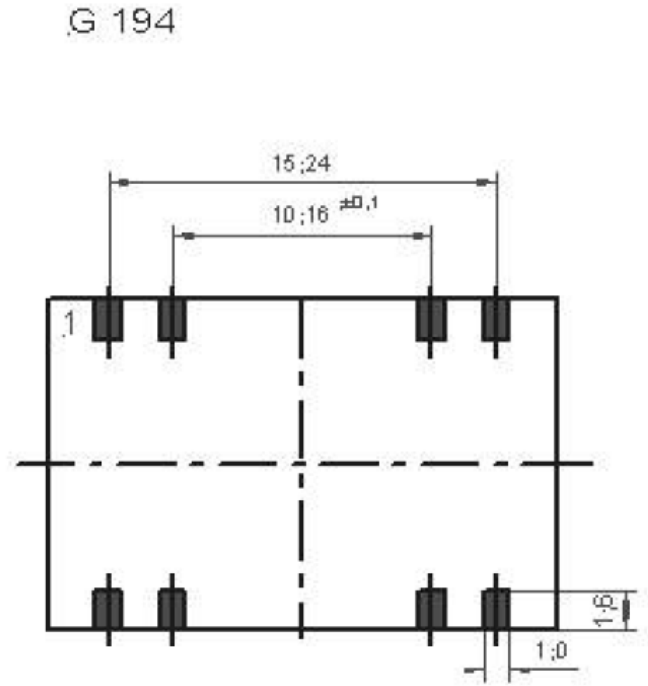
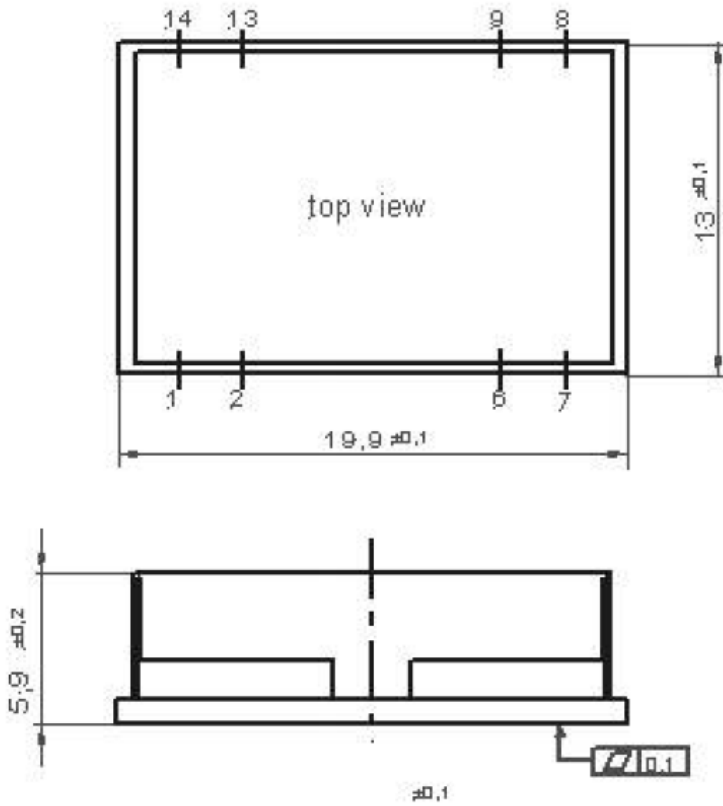
supply voltage (Vs)			6.0	V	
Operable Temperature Range	-40		+85	°C	
Storage Temperature Range	-40		+105	°C	

## Typical Performance



## Outline Drawing / Enclosure

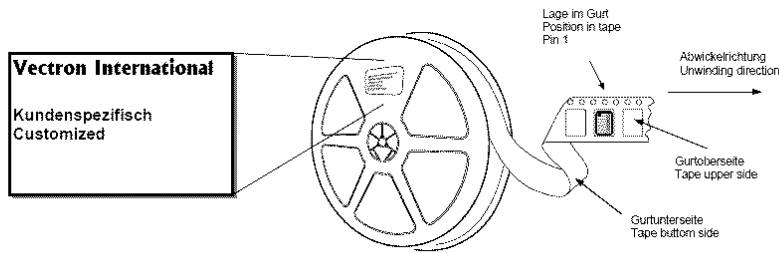
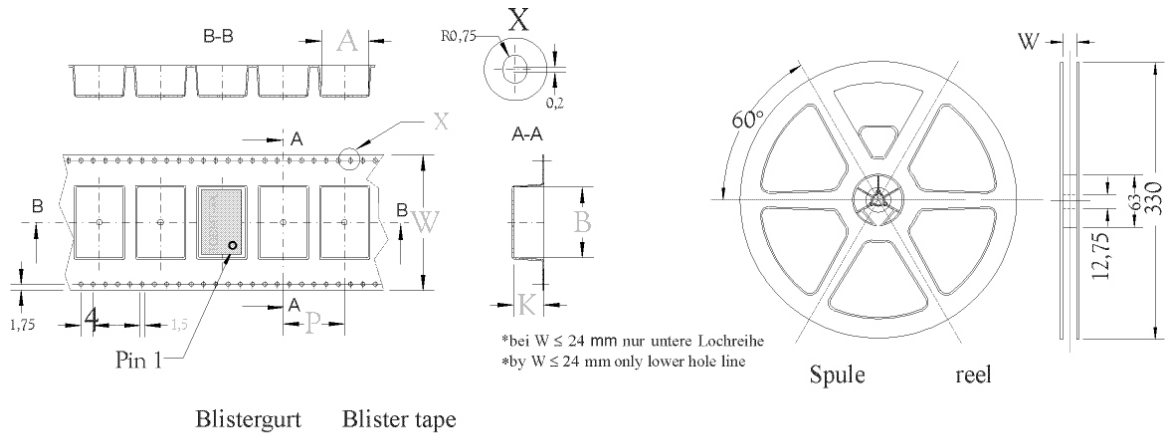
TX-401	
Type	Height "H"
G194	5.9



all units in mm

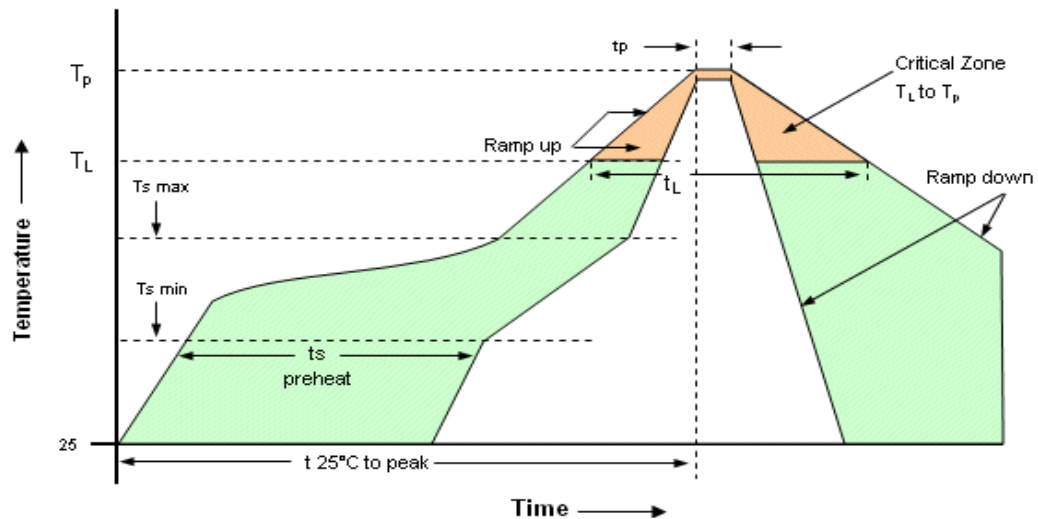
Pin Connections	
1	Control Voltage Input (Vc) / N.C.
2	N.C.
6	GND (Case)
7	GND (Case)
8	RF-Output
9	GND (Case)
13	N.C.
14	Supply Voltage Input (Vs)

## Standard Shipping Method (TX-401)



Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
G194	32		500	20

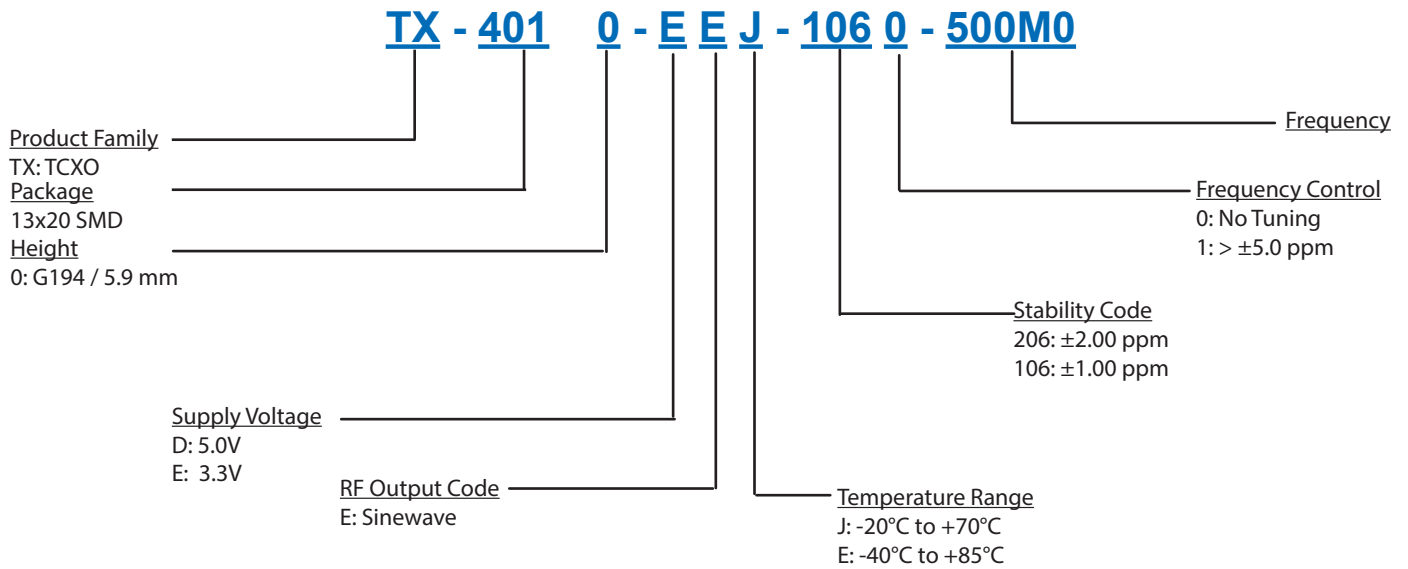
## Recommended Reflow Profile



Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly	Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly
Average ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat -Temperature Min $T_{Smin}$ -Temperature Max $T_{Smax}$ -Time (min to max) $t_s$	150°C 200°C 60-180 seconds	Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
$T_{Smax}$ to $T_L$ -Ramp-up Rate	3°C/second max		
Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Peak Temperature ( $T_p$ )	max 260°C	Ramp-down Rate	6°C/ second max

**Note:** All temperatures refer to topside of the package, measured on the package body surface.  
SMD oscillators must be on the top side of the PCB during the reflow process.

## Ordering Information



### Notes:

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Phase noise degrades with increasing output frequency.
3. Contact factory for availability.

Unless other stated all values are valid at typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).

Subject to technical modification.

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