

Helping Customers Innovate, Improve & Grow



[TX-500]

Features

*EFC Standard
 Standard Surface Mount Package
 Low Phase Noise Option
 Low Profile*

Typical Applications

*PCS Base Stations
 Land Mobile Radio
 Cellular Telephony
 Radio in the Local Loop*

Previous Vectron Model Numbers

C2310; STO50; STO50S3; STO50S3-01

Frequency Range

6.4 MHz – 800 MHz

Standard Frequencies

10; 12.288; 12.8; 19,44; 20; 20,48; 77,76; 100MHz

Frequency stabilities¹ [Standard TCXO]

Parameter	Min	Typ	Max.	Units	Operating temperature range	Options ⁵
vs. operating temperature range (Referenced to +25°C)	-2.5		+2.5	ppm	-40 ... +85°C	
	-1.0		+1.0	ppm	-40 ... +85°C	
	-2.5		+2.5	ppm	-20 ... +70°C	
	-1.0		+1.0	ppm	-20 ... +70°C	
	-1.0		+1.0	ppm	0 ... +50°C	
	-0.5		+0.5	ppm	0 ... +50°C	
Parameter	Min		Max	Units	Condition	
Initial tolerance	- 1.5		+1.5	ppm	at time of shipment, nominal EFC V _s ± 5% Load ± 10%	
vs. supply voltage change	- 0.2		+0.2	ppm		
vs. load change	- 0.2		+0.2	ppm		
vs aging /1. Year	- 1.0		+1.0	ppm		

Frequency stabilities¹ [Stratum 3 TCXO]

Parameter	Min	Typ	Max	Units	Operating temp range	Options ⁵
vs. operating temperature range (Referenced to +25°C)	-0.8		+0.8	ppm	-40 ... +85°C	
	-0.28		+0.28	ppm	-30 ... +85°C	
	-0.8		+0.8	ppm	-20 ... +70°C	
	-0.28		+0.28	ppm	-20 ... +70°C	
	-0.28		+0.28	ppm	0 ... +50°C	
Parameter	Min	Typ	Max	Units	Condition	
Initial tolerance	-1.0		+1.0	ppm	at time of shipment, nominal EFC $V_s \pm 5\%$ Load $\pm 10\%$ Note: * Stratum 3 per GR-1244-CORE: < ± 4.6 ppm for all causes and 20 years aging, Holdover: < ± 0.37 ppm over 24 hours	
vs. supply voltage change	-0.2		+0.2	ppm		
vs. load change	-0.1		+0.1	ppm		
vs. aging/ 20 years	-2.5		+2.5	ppm		
overall tolerance	-4.6		+4.6	ppm		

Supply Voltage (Vs)

Parameter	Min	Typ	Max	Units	Condition	Options ⁵
Supply voltage [Standard]	3.135	3.3	3.465	VDC		
Supply voltage [Option]	4.75	5	5.25	VDC		
Current consumption			35 35 100	mA mA mA	steady state @ +25°C & 3.3VDC steady state @ +25°C & 5.0VDC steady state @ +25°C & PECL-Output	

RF Output

Parameter	Min	Typ	Max	Units	Condition	
Signal [Standard]	HCMOS				with $V_s = 5.0V$ and 15pF load with $V_s = 3.3V$ and 15pF load with $V_s = 5.0V$ and 15pF load with $V_s = 3.3V$ and 15pF load	
Load	13.5	15	16.5	pF		
Signal Level (Vol)			0.5	VDC		
Signal Level (Voh)	4.5		0.3	VDC		
Rise and Fall time	3.0		5	ns		
Duty cycle	40	50	60	%		@ (Voh-Vol)/2
Signal [Option]	clipped Sinewave					> 12.288MHz
Load R	9	10	11	kΩ	@ 10kΩ 10pF	
C	9	10	11	pF		
Output power	0.7			V_{pp}		
Signal [Standard]	PECL				to $V_s - 2V$ 20 to 80%	
Load		50		Ω		
Rise and Fall time			1	ns		
Duty cycle	45	50	55	%		

Frequency Tuning (EFC)

Parameter	Min	Typ	Max	Units	Condition	
Tuning Range	± 8.0	±14.0	± 20.0	ppm	Standard Version	
	± 5.0	±12.0	± 20.0	ppm	S3 Version	
Linearity	10 %					
Tuning Slope	Positive					
Control Voltage Range	0.3	1.65	3.0	VDC	with Vs=3.3VDC	
	0.5	2.5	4.5	VDC	with Vs=5.0VDC	
Freq. control input impedance	10			kΩ		

Additional Parameters

Parameter	Min	Typ	Max.	Units	Condition		
Phase Noise ³		-90		dBc/Hz	10	Hz	TCXO @19.44MHz
		-120		dBc/Hz	100	Hz	
		-135		dBc/Hz	1	kHz	
		-140		dBc/Hz	10	kHz	
		-145		dBc/Hz	100	kHz	
Phase Noise ³		-98		dBc/Hz	10	Hz	Low Phase Noise TCXO @12.8 MHz
		-125		dBc/Hz	100	Hz	
		-147		dBc/Hz	1	kHz	
		-153		dBc/Hz	10	kHz	
		-154		dBc/Hz	100	kHz	
Weight			3	g			
Processing & Packing	Handling & processing note						

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Units	Condition
Supply voltage (Vs)			6.0	V	
Control Voltage	0		Vs	V	
Maximum output load @ CMOS			40	pF	
Operable temperature range	-40		+85	°C	
Storage temperature range	-55		+125	°C	

Enclosure

Typ G214B	
Height "H"	Pin Length "L"
5.9	NA
<p>G 214</p>	
Pin Connections	
<ol style="list-style-type: none"> 1 Voltage Control (V_c) 2 N.C. 3 GND, case 4 RF output 5 N.C. / RF output compl. 6 Supply Voltage (V_s) 	
Marking	
<p>TX-500</p> <p>Frequency</p> <p>● AYYWW</p>	

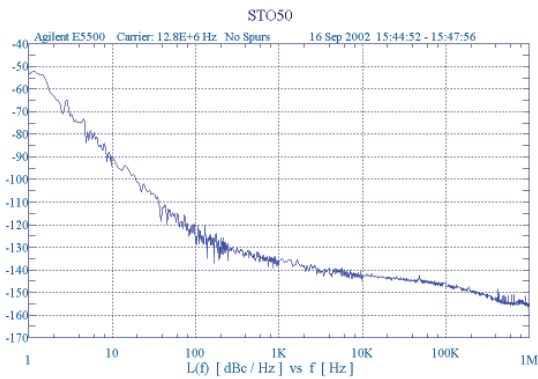
Notes:

- 1 Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- 2 Unless otherwise stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C)
- 3 Phase noise degrades with increasing output frequency.
- 4 Subject to technical modification.
- 5 Contact factory for availability.

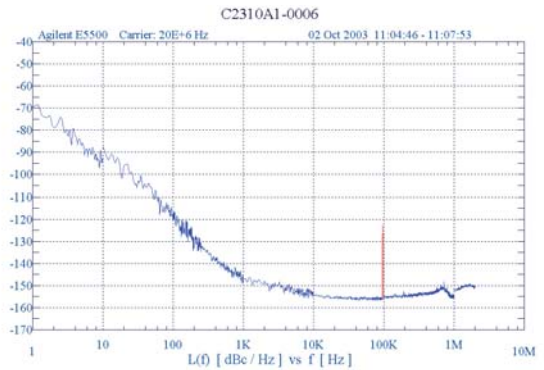
Typical Measurement Data

Phase Noise and Jitter

C2310 @12.8MHz

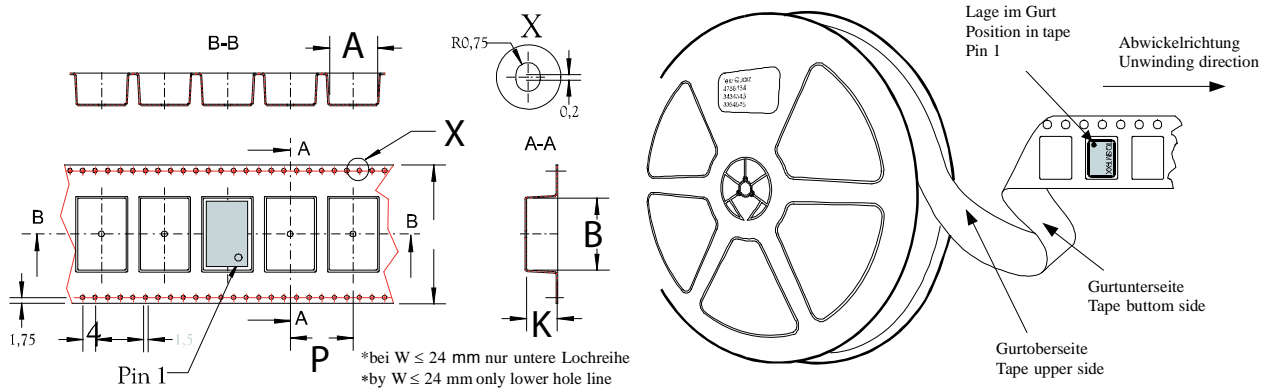


C2310 @20MHz Low phase Noise Version



Frequency range [Hz]	$S_{\phi}(f)$ [dB]	Jitter [ps rms]
20Hz to 0.5 MHz	-85,30 dB	0,675 ps
20kHz to 0.5MHz	-89,10 dB	0,436 ps

Standard Shipping Methode

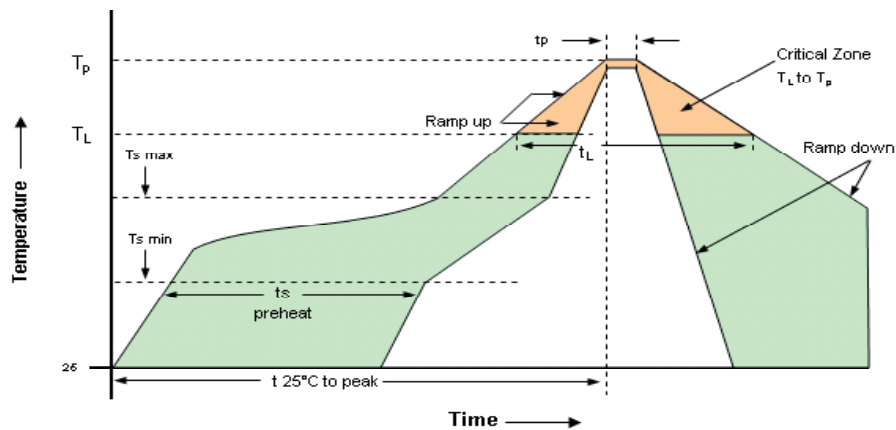


Production tolerance complying DIN IEC 286-3

Enclosure Type	Tape width W [mm]	Quantity per meter	Quantity per reel	Dimension P
G214B	24	83.3	850	12

Recommended Reflow Profile

Solderprofile:



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 Min 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.			

How to order this product:

Use this worksheet to forward the following information to your factory representative :										
Model	Height	-	Supply Voltage Code	RF Output Code	Temperature Range	-	Stability	Frequency Control/ Enable	-	Frequency
TX-500	0	-	D	A	E	-	256	1	-	10MHz

Height: 0: 5,9 mm

Frequency Control:
1: ±5...±20 ppm
2: ±8...±20 ppm

Supply Voltage Code:

D: 5 V
E: 3,3 V

RF Output Code:
A: HCMOS
C: PECL
F: clipped Sinewave

Temperature Range:
E: -40...+85°C
J: -20...+70°C
H: -30...+85°C
P: 0...+50°C

Stability Code:

256 ±2,5ppm
106: ±1,0ppm
807: ±0,8ppm
507 ±0,5ppm
287: ±0,28ppm