AN-xA7xU Series

NEL FREQUENCY CONTROLS
Powered By ABRACON

SMD TCXO/VCTCXO Ultra-Low Phase Noise with Low G-Sensitivity

ESD Sensitive

17.4x 14.38 x 5.6 mm
Datasheet #1820A

Features

- **Small, Low Profile SMD Package**
- **Ultra-Low Phase Noise**
- **Excellent Frequency Stability**
- **Low G sensitivity**
- **No Multiplication – no sub-harmonics**
- **Stratum3 available**

Applications

- **COTS/Dual use**

Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	Vcc		-0.5		5.5	V	
Storage temper.	Ts		-55		105	°C	
Control Voltage	Vc		-1		4	V	

Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Frequency Range	F	Sine-wave	10		125	MHz	
Input Voltage	Vcc		3.135 4.75	3.30 5.0	3.465 5.25	V	A 0
Input Current	Icc	Sine			40 10	mA	@100MHz, 3.3V @10MHz, 3.3V
Frequency Stab.	ΔF/F	Overall, available			±4.6		20 years
Frequency Stability	ΔF/F	vs. Temperature vs. Vcc aging		±0.5 ±0.1 ±1 ±2.5 ±3.5	±1	ppm ppm/V ppm/year ppm ppm	See chart First Year 7 years 10 years
G-sensitivity		Worst Direction		0.2 0.5		ppb/G	100 MHz 10 MHz
Calibration	ΔF/F	As shipped, 25°C		±0.5	±1	ppm	
Load		Sine CMOS	Internally AC-coupled 50 Ohm 10 KOhm // 15 pF				
Output Power (output code "S")	P	Sine-wave Into 50 Ohms	7 10	10 13		dBm	3.3V 5.0V
Logic 1 (CMOS)	Voh		0.7Vcc			V	Output Code T
Logic 0 (CMOS)	Vol				0.1V	V	Output Code T
Duty Cycle			45/55		55/45	%	Output Code T
Rise/Fall Time	Tr/Tf			2	3		Output Code T
Spurious		Not setup related			-80	dBc	
Harmonics		Sine-wave		-30	-25	dBc	

Electrical (cont.)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
SSB Phase Noise	£(Δf)	@10 Hz @100 Hz @1 KHz @10 KHz @100 KHz		-95 -125 -152 -165 -170		dBc/Hz	@100MHz, Grade U
		@1 Hz @10 Hz @100 Hz @1 KHz @10 KHz @100 KHz		-90 -120 -143 -158 -160 -160			@10 MHz, Grade U
ADEV		0.1 s to 1 s		1E-11			@10 MHz, Grade U
Input Impedance			>10k Ohm				
Control voltage	Vc		0		3.0	V	
Modulation bandwidth	MB				1.5 0.1	Hz	100 MHz 10 MHz
Deviation	ΔF/F	Vc=0V to 3.3V, 25°C	±5	±7		ppm	

Environmental and Mechanical

Parameter	Description
Operating temp. range	-20°C to 70°C MAX, for wider range only 5V Vcc option is available, contact factory, see table to specify.
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. E
Thermal Shock	Per MIL-STD-883, Method 1011, Cond. A
Vibration	Per MIL-STD-883, Method 2007, Cond. A
Soldering Conditions	See MAX reflow profile; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.
Hermetic Seal	Leak rate less than $1x10^{-8}$ atm.cc/s of helium (crystal only)

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Creating a Part Number

AN - X A7 X U X XX X - X – XX.XXX MHZ - X

Package Code
AN 8 Pad 17x14x6mm SMD

Packaging	
Blank	Bulk

Supply Voltage	
Code	Specification
0	5V ±5%
A	3.3V ±5%

Output Frequency
Please specify the frequency in units of MHz out to 3-digit accuracy after the decimal.
Example: 10.000MHZ

Environmental	
Code	Specification
L	Contains a level of lead that is in excess of RoHS directive
R	RoHS Complaint

Voltage Control	
Code	Specification
V	Voltage Control
N	No Voltage Control

Phase Noise Grade	
Code	Specification
U	Ultimate

Temp. Frequency Stability	
Code	Specification
1	±1.0ppm
2	±2.5ppm
3	±0.28ppm
9	Customer Specific

Output	
Code	Specification
S	Sinewave
T	CMOS/TTL

Temperature Range	
Code	In 5ºC steps
First letter	Lowest temperature from A = -40°C
Second letter	Highest temperature from Z = 85°C
Examples	
IS	0°C to 50°c
GU	-10°C to 60°c
EW	-20°C to 70°c

Not all combinations are available. Consult Factory.

Temperature Code Table

Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	F	-15	K	10	P	35	U	60	Z	85
B	-35	G	-10	L	15	Q	40	V	65		
C	-30	H	-5	M	20	R	45	W	70		
D	-25	I	0	N	25	S	50	X	75		
E	-20	J	5	O	30	T	55	Y	80		

Notes:
1) All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal Load.

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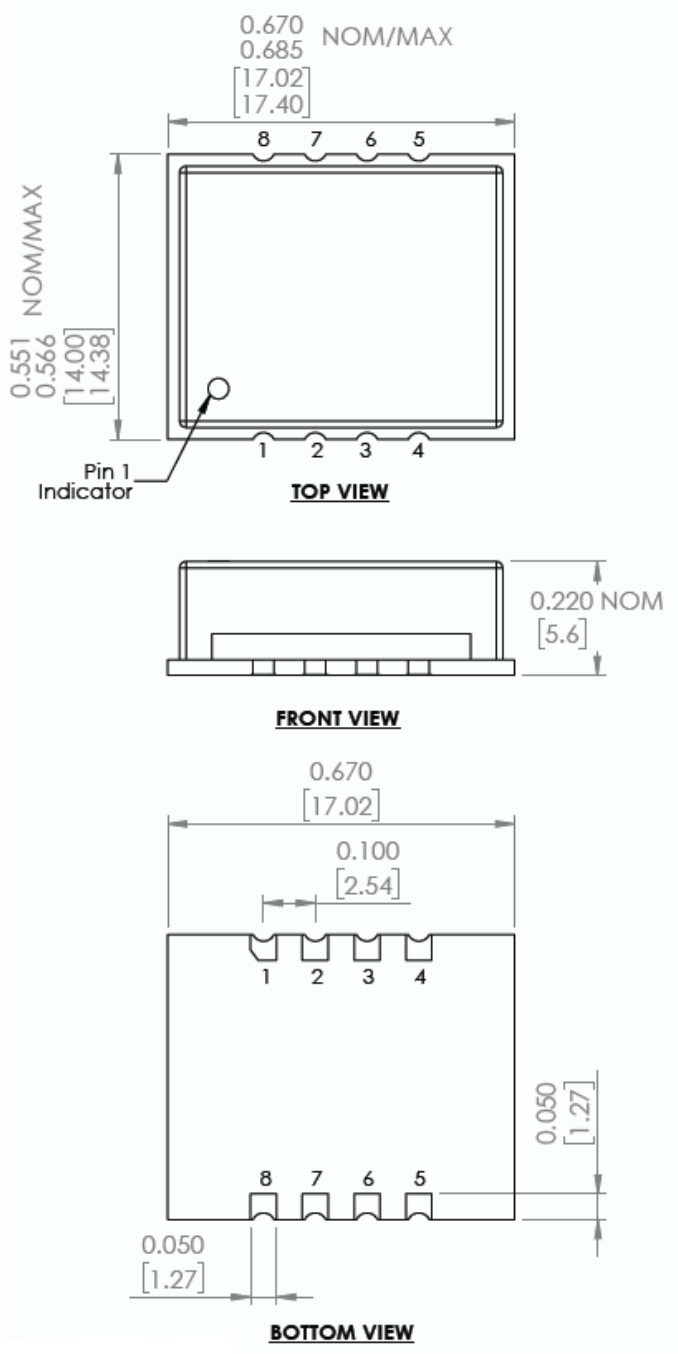
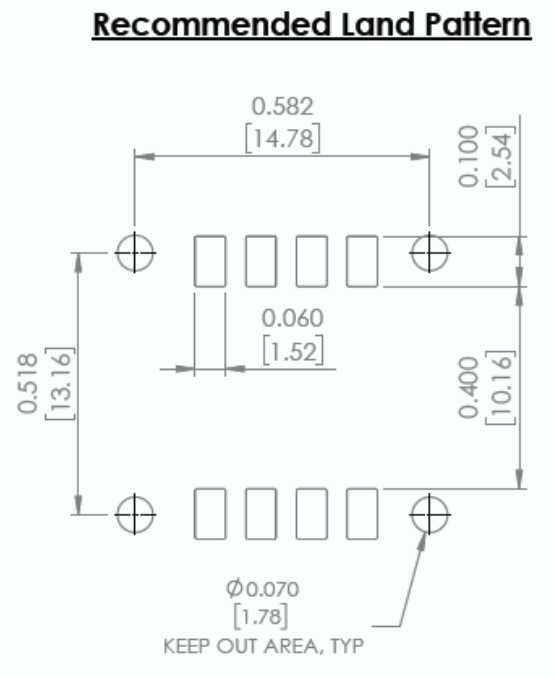
Mechanical Dimensions





Pin #	Function
1	Vcc
2	GND
3	GND
4	GND
5	Output
6	Optional Voltage Control
7	Do Not Connect
8	GND

Dimensions: inches [mm]

Reflow Profile [JEDEC J-STD-020]

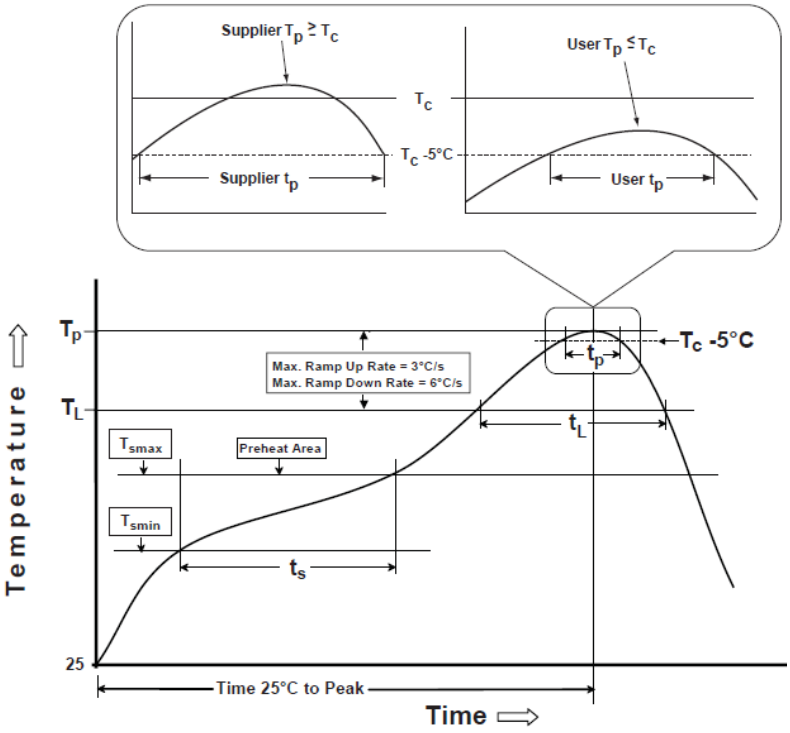


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	**Volume mm³ <350**	**Volume mm³ ≥350**
<2.5 mm	235°C	220°C
≥2.5 mm	220°C	220°C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	**Volume mm³ <350**	**Volume mm³ 350-2000**	**Volume mm³ >2000**
<1.6 mm	260°C	260°C	260°C
1.6 mm - 2.5 mm	260°C	250°C	245°C
>2.5 mm	250°C	245°C	245°C

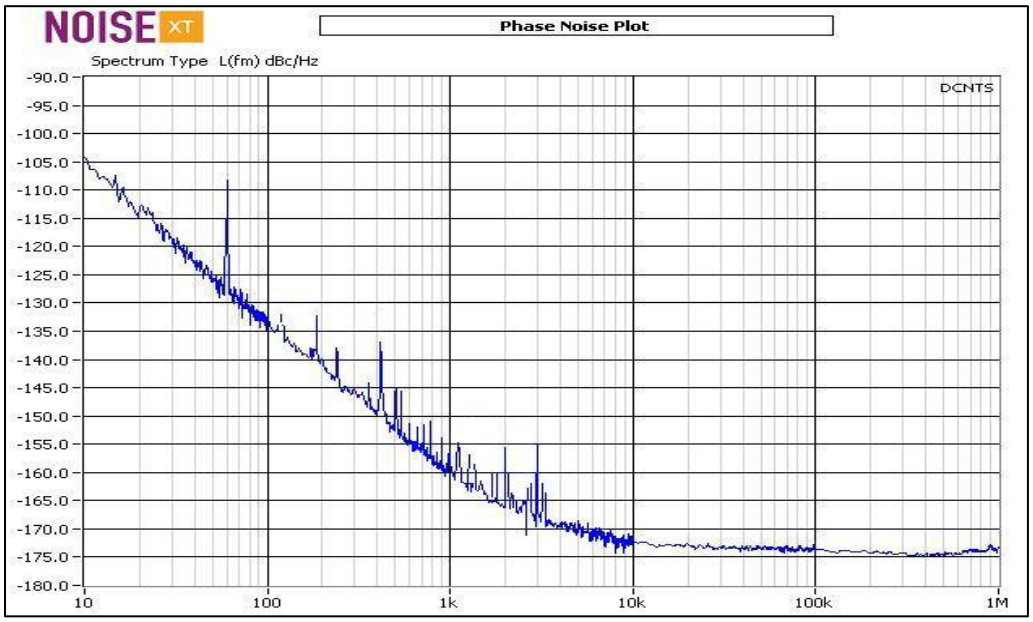
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_P)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_P)*	**see Table 1**	**see Table 2**
Time (t_p)** within 5°C of the specified classification temperature (T_C)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	1 max	1 max

*Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

Phase Noise Plots

100MHz example



12MHz example