

Phase-Locked clean up ULPN VCXO with Low G-sensitivity



17.4 x 14.38 x 5.6 mm
Datasheet #2038A

Features

- Low G-sensitivity
- Low Phase Noise Similar to OCXO
- Compact SMD Package
- Low Power Consumption Independent on Ambient Temperature and no Warm-up
- Fast Ready

Applications

- Significantly improves Phase Noise of incoming signal
- Atomic Clocks
- GNSS Based Clocks
- Test and Measurement
- COTS/Dual use

Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	V _{cc}		-0.5		5.5	V	V _{cc} = 5 V
Operating Temp.	T _o		-20		70	°C	
Operable Temp.	T _O		-40		85	°C	
Storage temper.	T _s		-40		85	°C	

Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Frequency	F _{in}			10.000		MHz	
Output Frequency	F _{out}			10.000		MHz	*2
Frequency Capture Range (APR)	ΔF/F	Overall	±100			ppb	
Allan Deviation		.01s to 1.0s		1E-11			
Frequency stability	ΔF/F	Locked	Equal to incoming signal				
Recommended MAX Input SSB Phase Noise	£(Δf)	10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-80 -110 -130 -140 -140	dBc/Hz	
Input signal		CMOS	2			V	Swing
		Sine Wave	0		5	dBm	
Output SSB Phase Noise Floor	£(Δf)	1 Hz		-85		dBc/Hz	
		10 Hz		-120			
		100 Hz		-143			
		1 KHz		-158			
		10 KHz		-160			
Output SSB Phase Noise Improvement Compared to Input Phase Noise		1 Hz		5		dBc/Hz	Cannot improve beyond listed above noise floor
		10 Hz		40			
		100 Hz		50			
		1 KHz		50			
		10 KHz		50			
		100 KHz		50			
G-sensitivity		worst direction			±0.5	ppb/G	

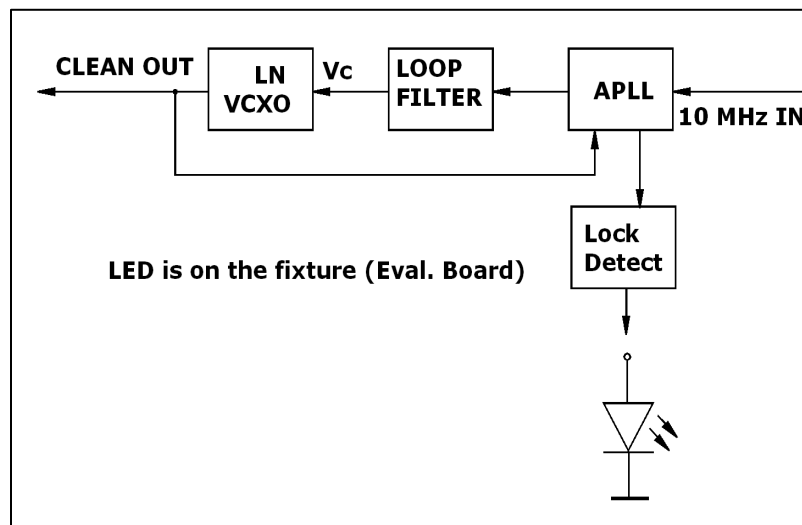
All parameters for output frequency 10 MHz

Electrical (cont.)

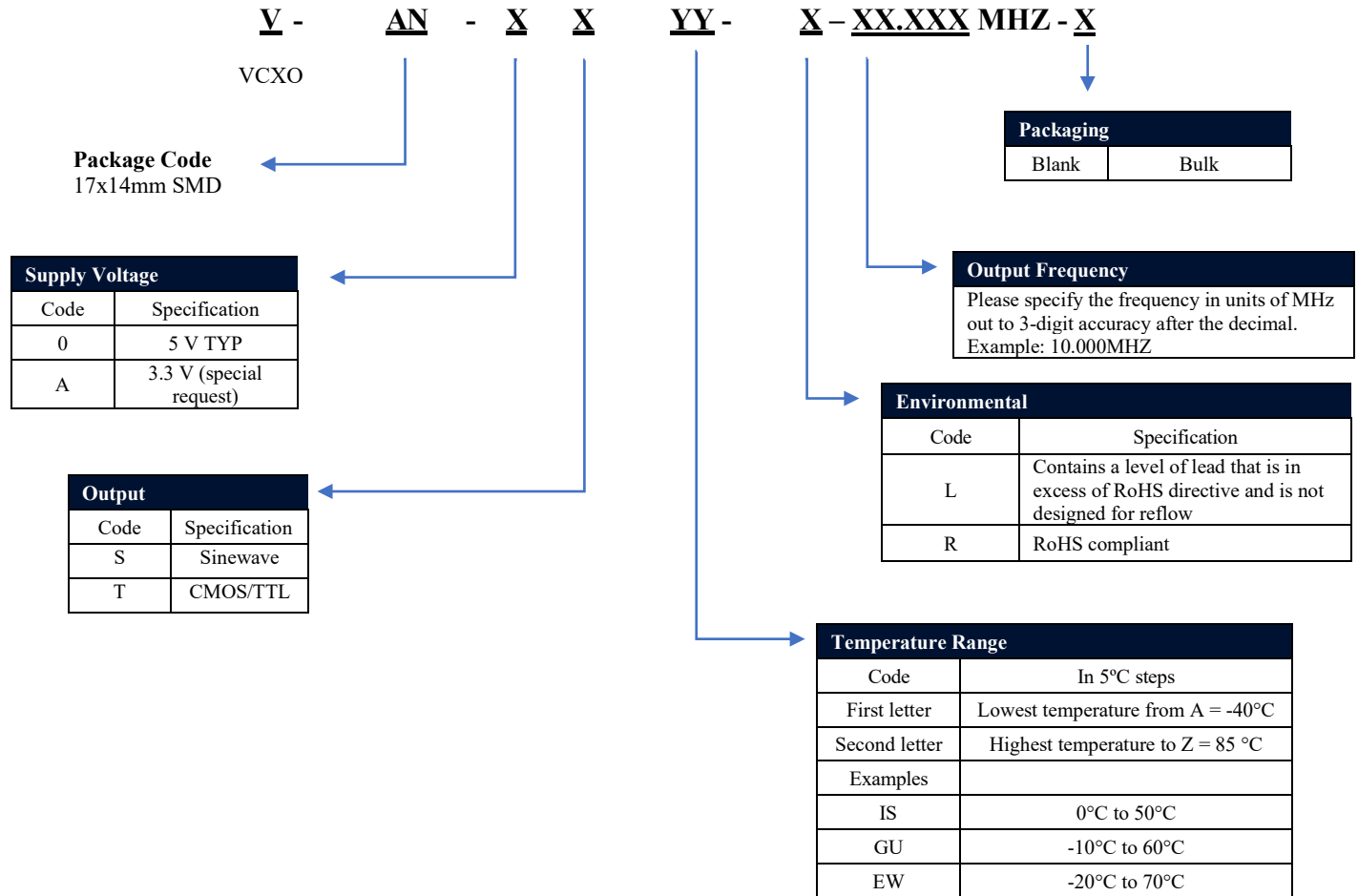
Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes	
Input Voltage	Vcc	Code 0 Code A	4.75 3.2	5.0 3.3	5.25 3.45	V	By special request	
Power consumption	P			50		mW	Driving 50 Ohm code S	
Spectral Purity		Subharmonics Spurious Harmonics		none -35	-80 -30	dBc	Output Code S	
Load	Internally AC coupled 50 Ohm (Sinewave) 10KOhm//15pF (CMOS/TTL)							
Lock time				1		minute		
Output Power	Pout	Into 50 Ohm	8	10		dBm	Output Code S	
Logic 1 (CMOS)	Voh		0.7Vref			V	Output Code T	
Logic 0 (CMOS)	Vol				0.1Vref	V	Output Code T	
Duty Cycle			45/55		55/45	%	Output Code T	
Rise/Fall time	Tr/Tf			4	5	ns	Output Code T	
Lock Detect			Logic "1"				Can drive LED	

Environmental and Mechanical

Parameter	Description
Operating temp. range	-20°C to 70°C Standard, Other options – see chart below
Mechanical Shock	Per MIL-STD-202, 30G, 11ms, survival
Vibration	Per MIL-STD-202, 5G to 2000 Hz, Survival
Soldering Conditions	See MAX reflow profile below; The device may be reflowed once. Reflowing upside down is not allowed. Hand soldering is highly encouraged. NO CLEAN assembly is recommended



Creating a Part Number



Not all combinations are available. Consult Factory.

Temperature Code Table

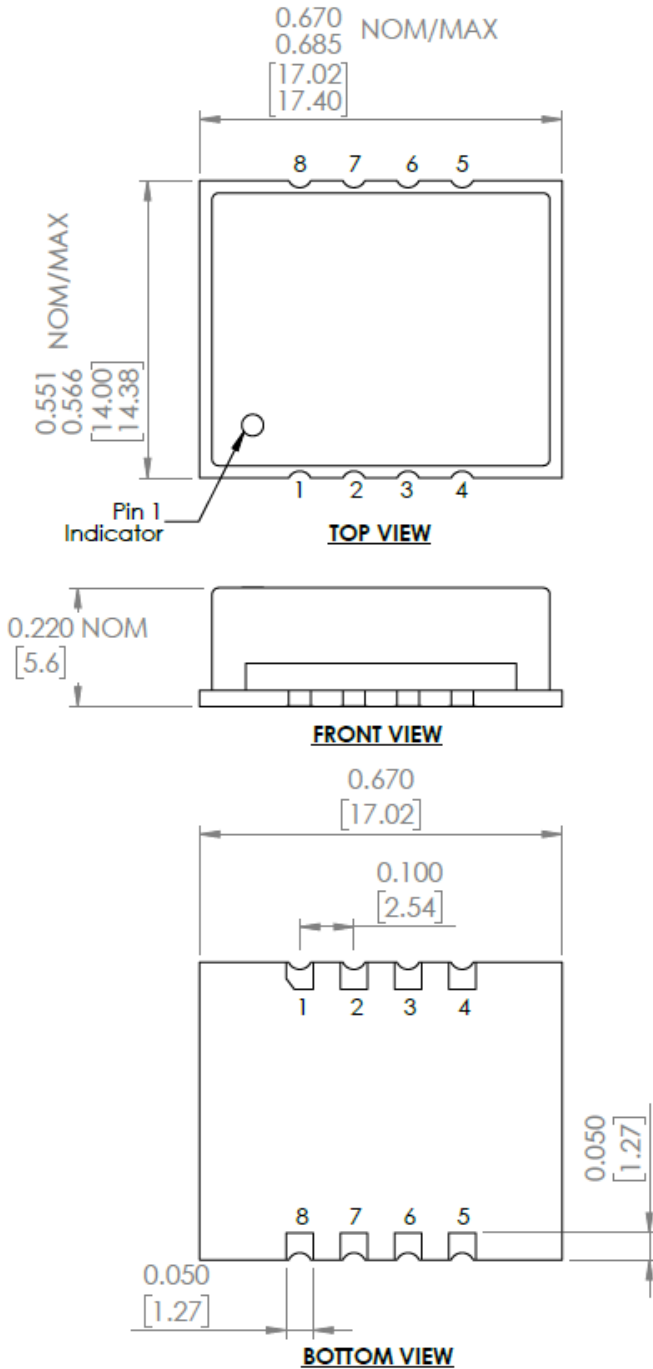
Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	F	-15	K	10	P	35	U	60	Z	85
B	-35	G	-10	L	15	Q	40	V	65		
C	-30	H	-5	M	20	R	45	W	70		
D	-25	I	0	N	25	S	50	X	75		
E	-20	J	5	O	30	T	55	Y	80		

Notes:

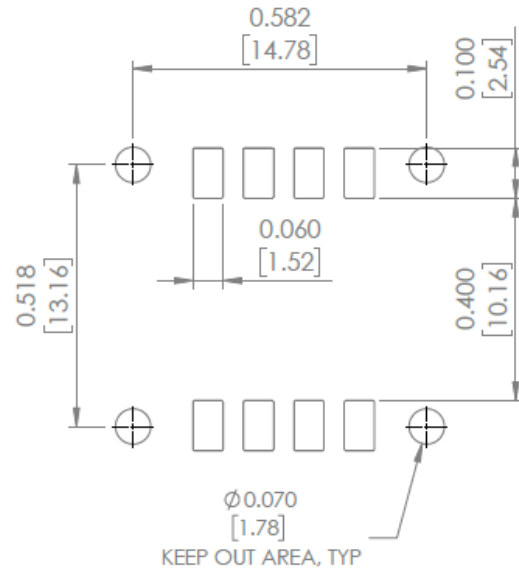
1) All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal

2* Up to 20 MHz Output frequencies can be discussed with NEL. For HF range (80 to 125 MHz) please visit <https://nelfc.com/pdf/2023A.pdf>

Mechanical Dimensions



Recommended Land Pattern



Pin #	Function
1	Vcc
2	GND
3	GND
4	GND
5	RF OUT
6	Do Not Connect
7	10 MHz In
8	Lock Detect

Dimensions: inches [mm]

Reflow Profile [JEDEC J-STD-020]

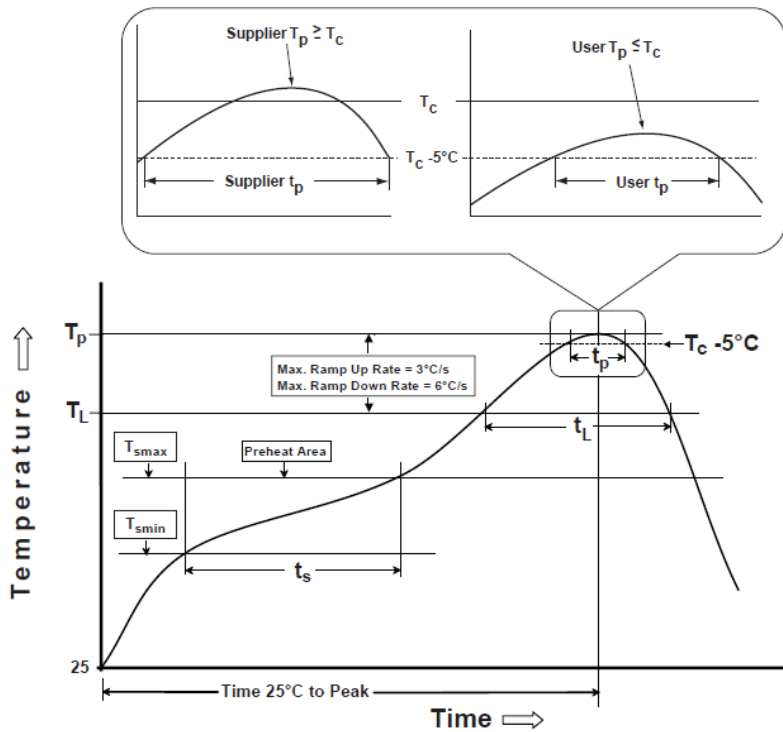


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm ³ <350	Volume mm ³ ≥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 mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >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 (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 Plot

