


## CMOS/LVCMOS HF VCXO

 ESD Sensitive 17.4 x 14.38 x 6.38 mm  
Datasheet #0706C

### Features

- Frequency Synthesizers, Exceptionally Low Phase Noise Reference
- Ultra Low Phase Noise and Jitter
- No Multiplication
- Absolute Pull Range (APR) to  $\pm 1,000$ ppm
- SONET  $\pm 20$ ppm overall free-run stability available
- High Shock Resistance, to 1000g

### Applications

- COTS/Dual use

### Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Operating Temperature Range	To		-40		+85	°C	
Storage Temperature Range	Tst		-50		+90	°C	
Supply Voltage	Vcc		-0.5		5.5	V	
Control Voltage	Vc		-0.5		5.5	V	

### Electrical (1\*)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Nominal Frequency	Fo		12		250	MHz	
Supply Voltage	Vcc	Code 0 Code A Code B	4.75 3.135 2.375	5.0 3.3 2.5	5.25 3.465 2.625	V	
Supply current	Icc	No load, Vcc = 3.3V 40MHz			80	mA	
Output Logic Type				CMOS			
Load			10KOhm//15pF				
Output Levels	Voh Vol	overall	0.9Vcc		0.1 Vcc	V	
Duty Cycle (Symmetry)		At 50% Vcc	45/55	50/50	55/45	%	
Rise/Fall Time	Tr/Tf	0.2Vcc to 0.8Vcc; F<70 MHz 70 MHz<F<125 MHz 125MHz<F<250MHz		3 2 1.5	5 3 2.5	ns	
Jitter	Integrated, RMS	J	Integrated from Phase Noise, 12KHz to 20MHz, RMS	0.1	0.15	ps	
					0.8	ps	
	Wavecrest characterized			0.2		ps	
				17		ps	
			0		ps		
Sub-harmonics			None			dBc	

## Electrical (cont.)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Phase Noise	$\epsilon(\Delta f)$	125 MHz 3.3V APR 50ppm or less		@10Hz @100Hz @1KHz @10KHz @100KHz @>1MHz	-80 -110 -140 -168 -171 -172	-75 -105 -135 -166 -169 -170	dBc/Hz
Frequency Stability, usually not specified- unless necessary, APR is specified to incorporate stability	$\Delta F/F$	Overall, including temperature, aging 10 years, shock and vibration @Vc=Vcc/2; APR 50 ppm, or less	$\pm 20$	$\pm 30$		ppm	
Control Voltage Range	Vc		0V		Vcc	V	
Setability	Vcs	Vc to set the F at Fo; T, Vcc, load – nominal, as shipped	0.4 Vcc	0.5 Vcc	0.6 Vcc	V	
Absolute Pull Range	APR	Over all conditions, see part # creation	10, 20, 32, 50, 100			ppm	
Input impedance	Zin	@ Fmod < 100 KHz	50			KOhm	
Modulation Bandwidth		At Vc = Vcc/2, -3dB	20			KHz	

## Environmental and Mechanical

Parameter	Description
Operating temp. range	See part # table
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. A
Thermal Shock	Per MIL-STD-883, Method 1011, Cond. A
Vibration	Per MIL-STD-883, Method 2007, Cond. A
Hermetic Seal	Leak rate less than $5 \times 10^{-8}$ atm.cc/s of helium, crystal only.
Soldering conditions	See MAX reflow profile below; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.

## Creating a Part Number

**AE - X 32B X X - X - XXX.XXX MHZ - X**

**Package Code**  
AE-8 pad 17x14mm SMD

Packaging	
Blank	Bulk

Operating Voltage	
Code	Specification
0	5.0 V ± 5%
A	3.3 V ± 5%
B	2.5 V ± 5%

**Output Frequency**  
Please specify the frequency in units of MHz out to 3-digit accuracy after the decimal.  
Example: 125.000MHZ

Environmental	
Code	Specification
L	Contains a level of lead that is in Excess of RoHS directive
R	RoHS compliant

Temperature Range	
Code	In 5°C steps
A	0 to 50°C
B	0 to 70°C
C	-20 to 70°C
D	-40 to 85°C
9	Customer specific

Absolute Pull Range, ppm	
Code	Specification
E	±20
F	±32
G	±50
H	±100
9	Customer specific

Not all combinations are available. Consult Factory.

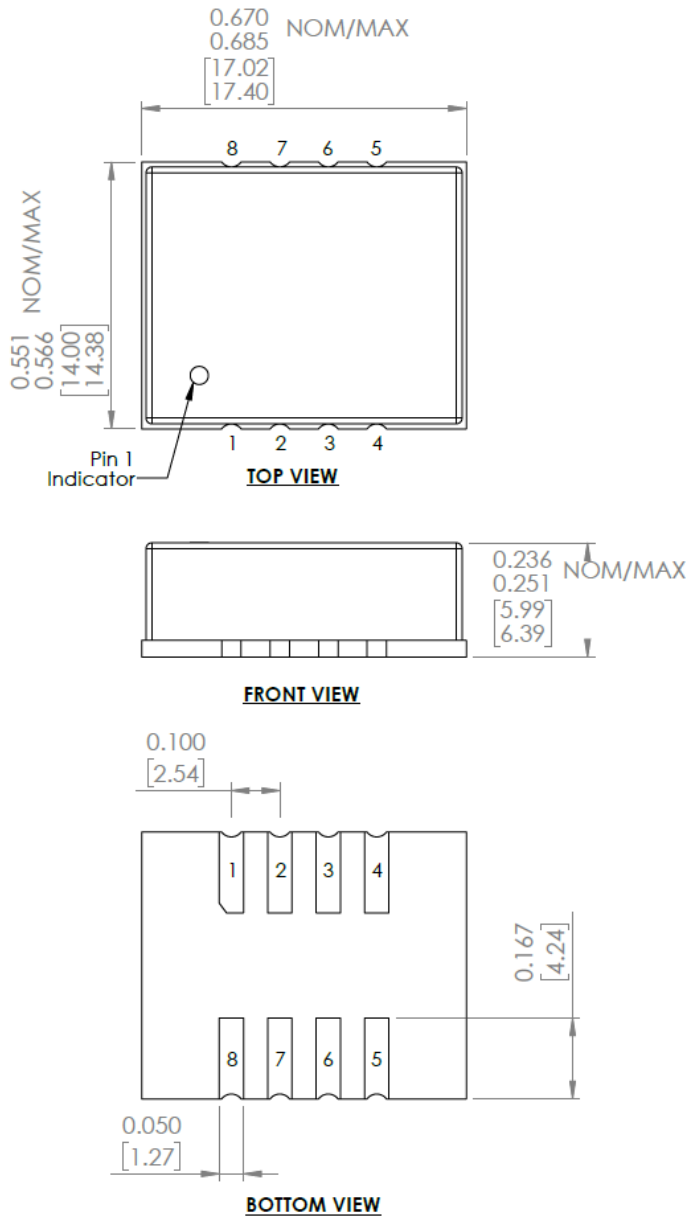
### Temperature Code Table

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		

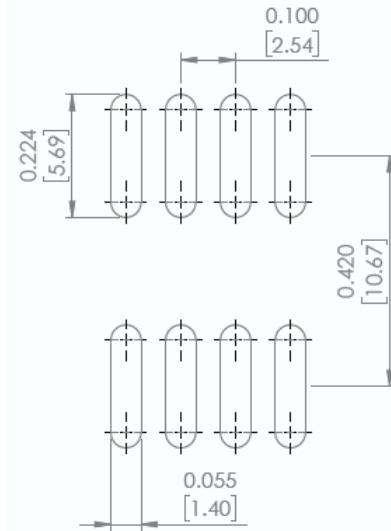
Notes:

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

## Mechanical Dimensions



## Recommended Land Pattern

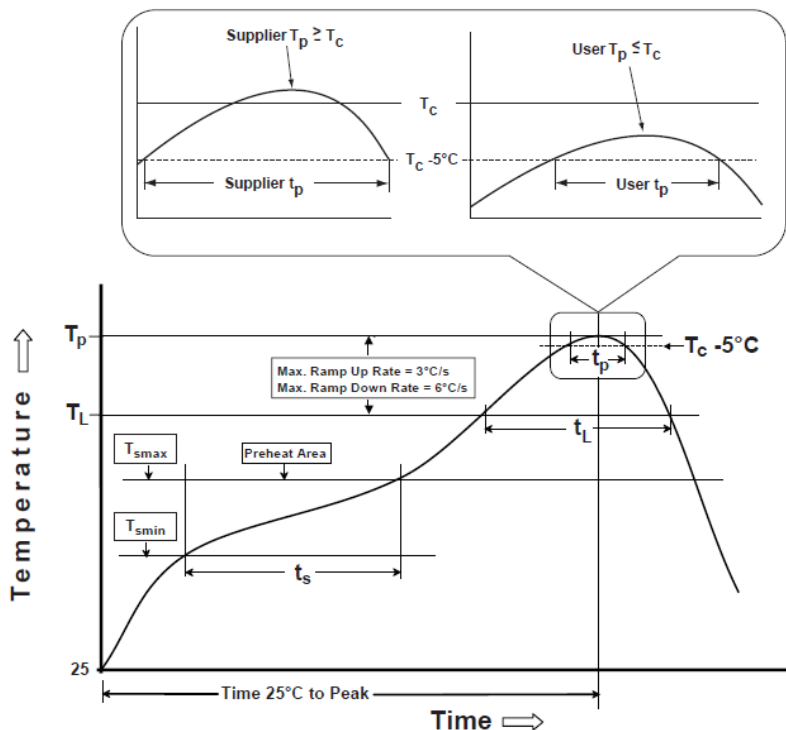


OUTLINE TOLERANCE:  
±0.015 [0.40] (UNLESS OTHERWISE SPECIFIED)

Pin #	Function
1	Vcc
2	GND
3	GND
4	GND
5	OUTPUT
6	N/C
7	GND
8	Vc

Dimensions: inches [mm]

## Reflow Profile [JEDEC J-STD-020]



**Table 1**

SnPb Eutectic Process Classification Temperatures ( $T_c$ )		
Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq$ 350
<2.5 mm	235°C	220°C
$\geq$ 2.5 mm	220°C	220°C

**Table 2**

Pb-Free Process Classification Temperatures ( $T_c$ )			
Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350-2000	Volume $\text{mm}^3$ >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 ( $T_p$ )*	<b>see Table 1</b>	<b>see Table 2</b>
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 Plot

Typical Phase Noise at 100 MHz

