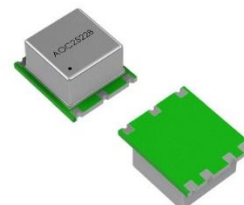


HIGH-STABILITY, LOW PHASE NOISE SMD VCOCXO

Description

Abracon's AOC2522B series is a high-stability, low phase noise VCOCXO. The AOC2522B combines the high frequency stability and low long-term aging of an OCXO with the frequency tuning capabilities of a VCXO. The AOC2522B series supports either a 3.3V or 5V supply voltage with a CMOS output and incorporates a SC-cut, high "Q" resonator based-design.



Features

- Extremely low long-term aging: ± 700 ppb over 20 years
- Stability over temperature: ± 10 ppb over -40°C to $+85^{\circ}\text{C}$
- 10, 12.8, 16.384, 20, 38.88, 40, 100 MHz standard Available frequencies
- 25.4 x 22mm, 7-pin SMD reflow-solderable package
- 3.3V & 5V Vdd supply options
- SC-Cut, High "Q" resonator-based design

Typical Applications

- Stratum 3 & Stratum 3E compliant
- Cellular infrastructure; Base stations
- Test & measurement equipment
- Switches & routers
- Time & frequency references
- Precision GPS

Electrical Specifications [Note 1]

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency (Fc)	10		100	MHz	
Standard Available Frequencies	10, 12.8, 16.384, 20, 38.88, 40, 100			MHz	
Operating Temperature Range	-40		+85	$^{\circ}\text{C}$	
Storage Temperature Range	-55		+100	$^{\circ}\text{C}$	
Supply Voltage (Vdd)	3.135	3.3	3.465	V	
	4.75	5.0	5.25		
Power Consumption (warm-up)			3.2	W	
Power Consumption (steady state @ $+25^{\circ}\text{C}$)			1.0	W	
Frequency Accuracy (calibration) [Note 2]		± 100	± 200	ppb	10MHz $\leq$ Fc $\leq$ 40MHz Fc = 100MHz
		± 200	± 300		
Frequency Stability over Operating Temperature Range [Note 3]			± 10	ppb	Over -40°C to $+85^{\circ}\text{C}$
Frequency Stability vs. Supply Voltage Change (Vdd $\pm 5\%$)			± 10	ppb	10MHz $\leq$ Fc $\leq$ 40MHz Fc = 100MHz
			± 15		
Frequency Stability vs. Load Change			± 5	ppb	Load = 15pF $\pm 10\%$
Aging per Day		± 1	± 2	ppb	@ $+25^{\circ}\text{C}$
Aging per Year		± 50	± 100	ppb	
Aging 10 Years			± 500	ppb	
All-Inclusive Frequency Tolerance over 20 Year Product Life [Note 4]			± 700	ppb	
Warm-Up Time [Note 5]			15	Min.	
Output Signal	LVCMOS				@ Vdd=3.3V
	HCMOS				@ Vdd=5.0V
Output Load	13.5	15	16.5	pF	Output to ground
Duty Cycle	45	50	55	%	@ 50% Vdd
Output High Voltage (V _{OH})	V _{OH}	0.9*Vdd		V	
Output Low Voltage (V _{OL})					
Rise (Tr) / Fall (Tf) Time			5	ns	@ 10%Vdd-90%Vdd
Center Control Voltage (Vc)		Vdd/2		V	
Control Voltage Range	0		Vdd	V	
Frequency Pullability	± 0.7			ppm	
Control Port Input Impedance	100			k Ω	
EFC Linearity			10	%	

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Parameters	Min.	Typ.	Max.	Units	Notes
Tuning Slope		Positive			
Reference Voltage (Vref)	2.6	2.8	3.0	V	@ Vdd=3.3V
	4.3	4.5	4.7		@ Vdd=5.0V
Phase Noise (@ 10.0000MHz)		-85	-80	dBc/Hz	Offset @1Hz
		-120	-115		Offset @10Hz
		-138	-135		Offset @100Hz
		-146	-145		Offset @1kHz
		-156	-150		Offset @10kHz
		-156	-150		Offset @100kHz
Phase Noise (@ 20.0000MHz)		-85	-80	dBc/Hz	Offset @1Hz
		-118	-110		Offset @10Hz
		-142	-135		Offset @100Hz
		-150	-145		Offset @1kHz
		-154	-150		Offset @10kHz
		-155	-150		Offset @100kHz
Phase Noise (@ 100.0000MHz)		-60	-55	dBc/Hz	Offset @1Hz
		-93	-80		Offset @10Hz
		-125	-120		Offset @100Hz
		-146	-140		Offset @1kHz
		-158	-152		Offset @10kHz
		-158	-155		Offset @100kHz

Note 1: Above table: All measurements at +25°C, nominal Vdd, nominal Vc, and nominal load, unless otherwise specified

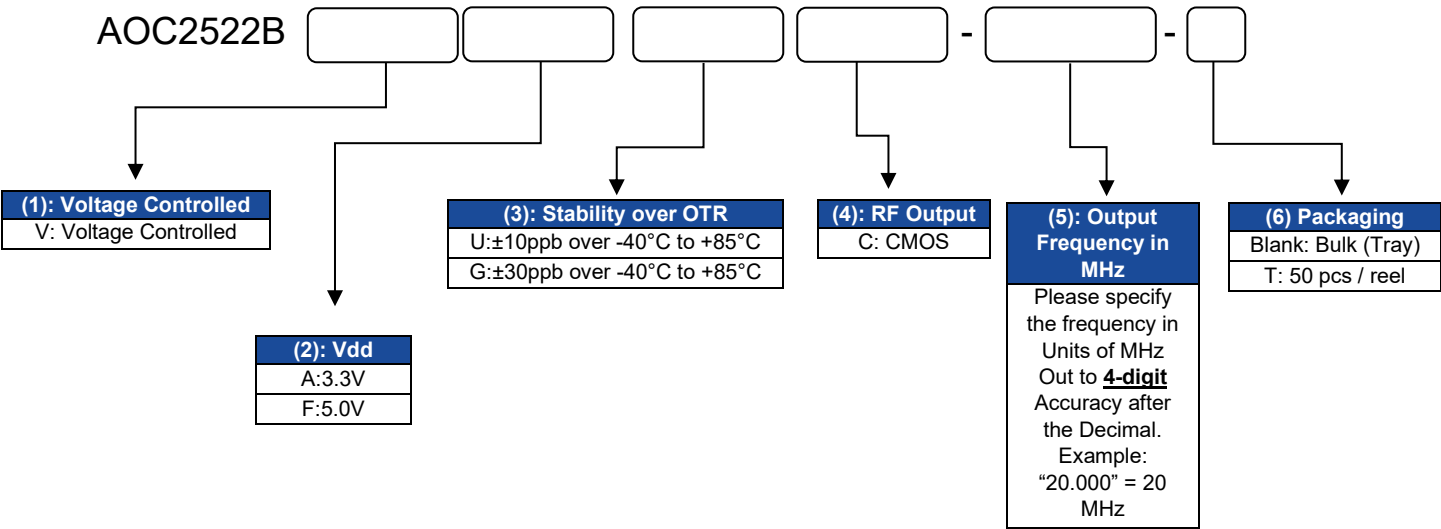
Note 2: at +25°C; relative to carrier; initial set-tolerance frequency at time of shipment, pre-reflow

Note 3: Over -40°C to +85°C; relative to stabilized frequency (at +25°C) after 1 hour of continuous operation, post-reflow

Note 4: Includes stability over temperature, initial frequency accuracy (calibration), load pulling, power supply variation, and 20 years aging

Note 5: at +25°C; within ±100ppb of F where F is the stabilized frequency reached after 1 hour of continuous operation

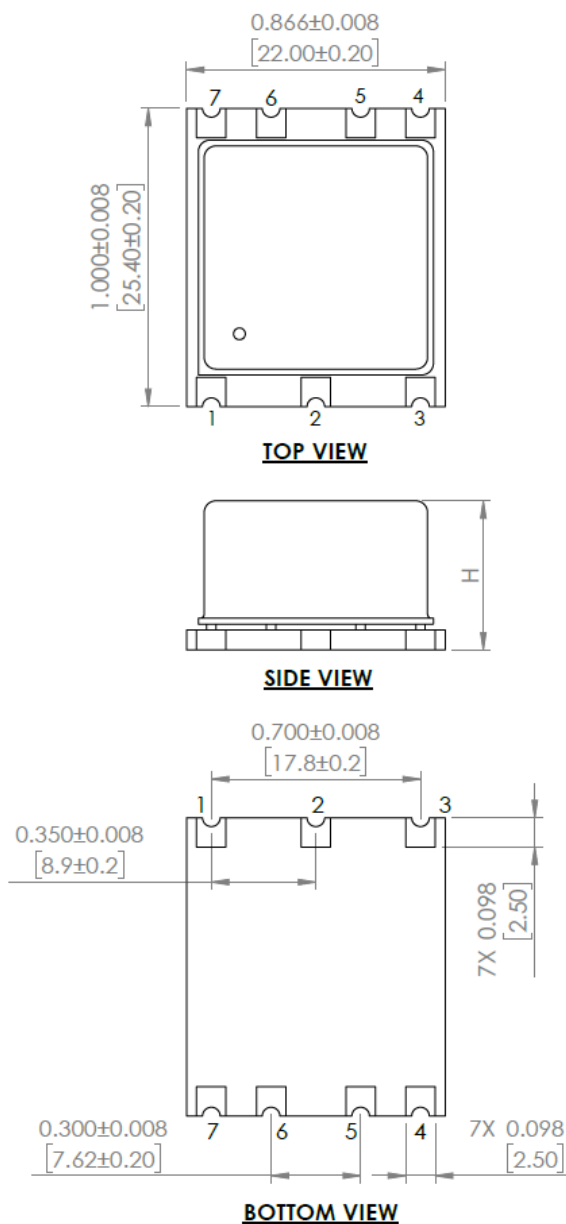
Part Identification



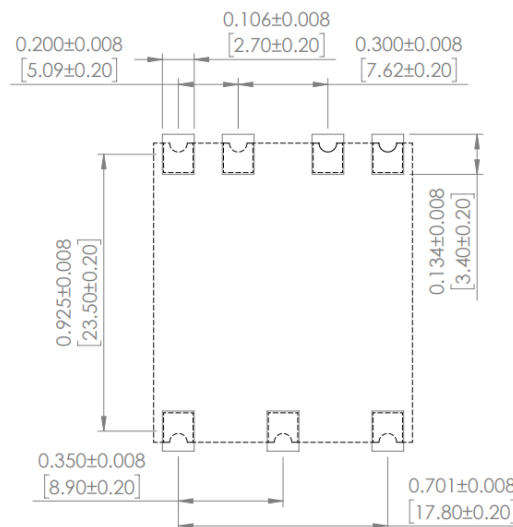
Part Number Example:

AOC2522BVAGC-20.0000

Mechanical Dimensions



RECOMMENDED LAND PATTERN



Frequency	Package Height (H)
≤ 20 MHz	12.7 mm
> 20 MHz	12 mm

Pin #	Function
1	VOLTAGE-CONTROL (Vc)
2	REFERENCE VOLTAGE (Vref)
3	SUPPLY VOLTAGE (Vdd)
4	OUTPUT
5	NO CONNECT (NC)
6	NO CONNECT (NC)
7	GROUND

Dimensions: Inches [mm]

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Reflow

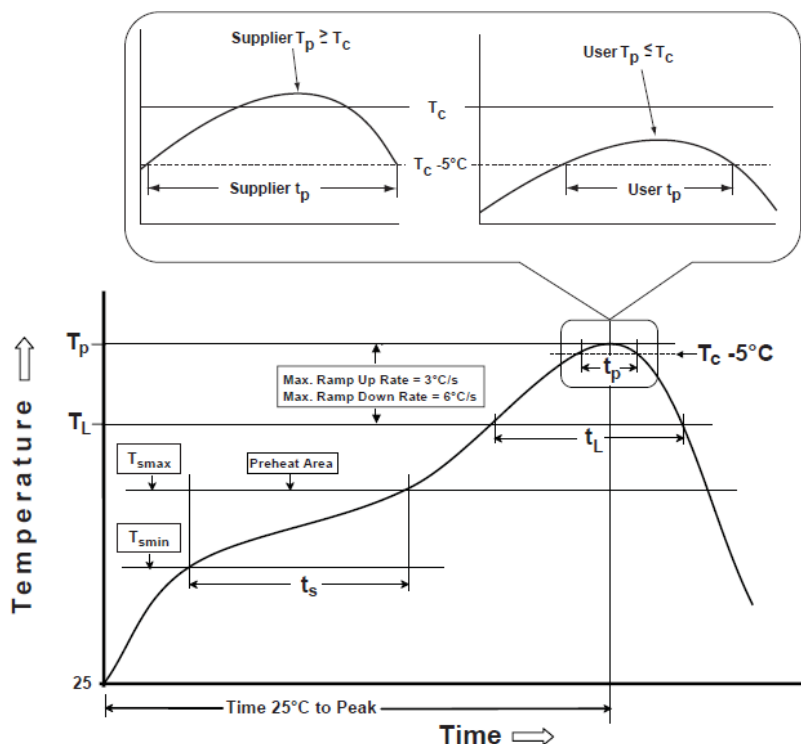


Table 1

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

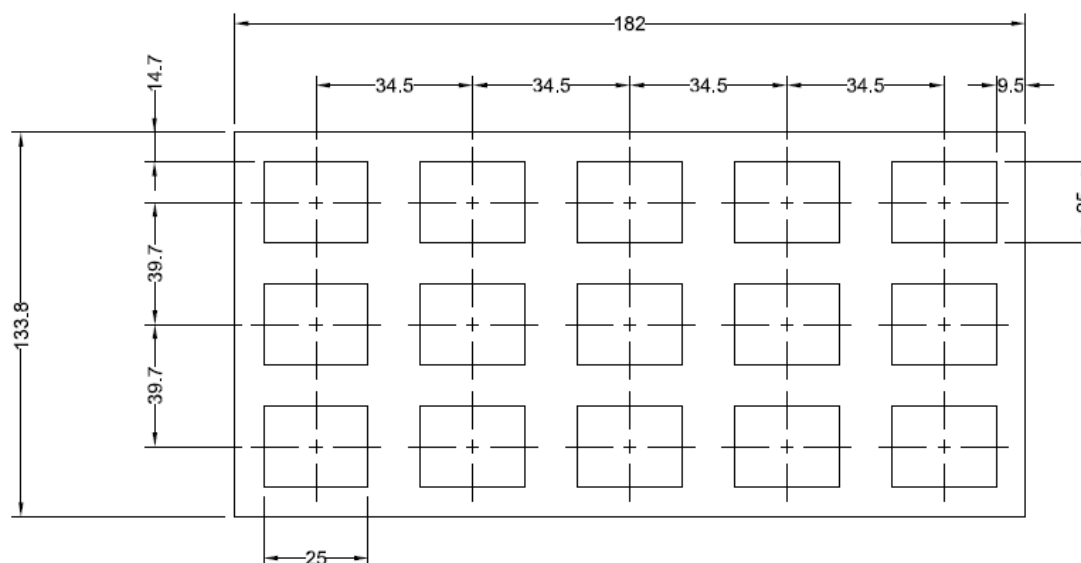
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 180 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (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.	20 - 40 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	2 max	2 max

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

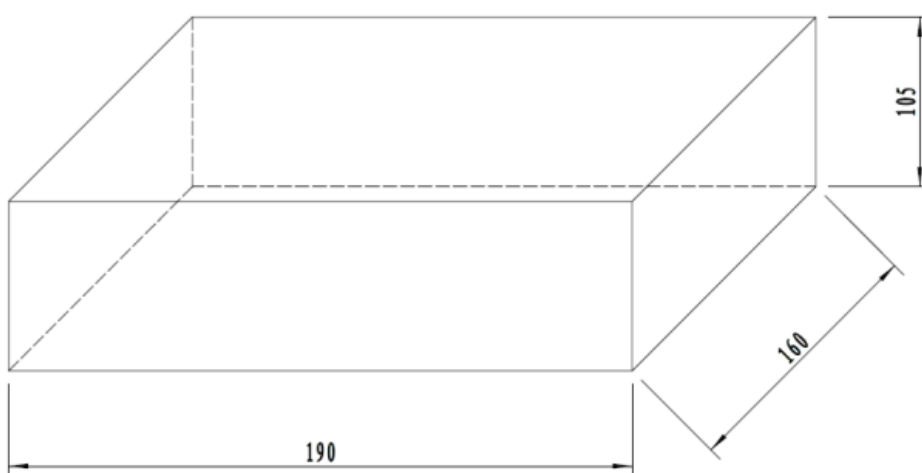
**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

Packaging (Bulk)

15 units per tray maximum



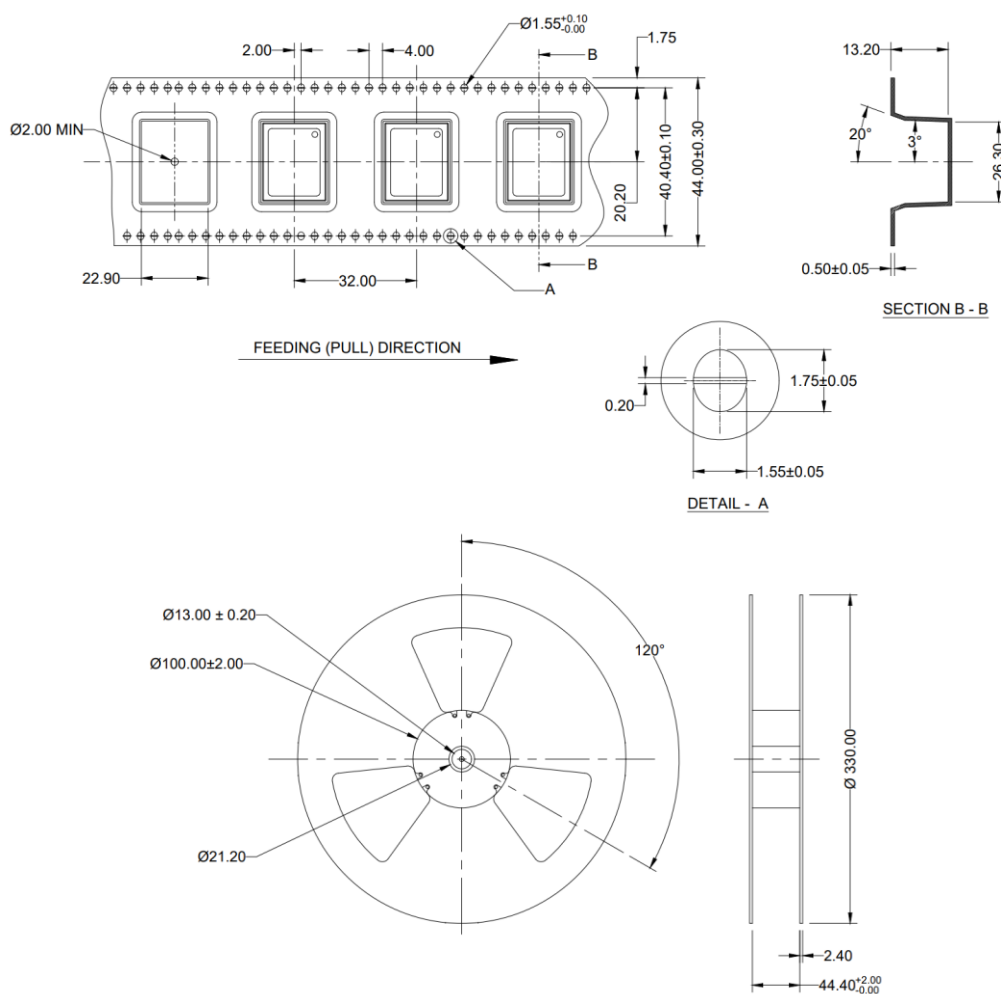
Trap Material: ESD sponge.



Dimensions: mm

Packaging (Tape and Reel)

50 pcs per 330mm reel



Note 1: Measured from the centerline of sprocket hole to centerline of the pocket hole and from the centerline of sprocket hole to centerline of the pocket

Note 2: Cumulative tolerance of 10 sprocket holes is ±0.20 mm

Note 3: This thickness is applicable as measured at the edge of the tape

Note 4: Material is black polystyrene

Note 5: Allowable camber to be 1mm per 100 mm in length, non-cumulative over 250mm

Note 6: Tolerance is ±0.10 mm, unless otherwise specified

Note 7: Measurement point to be 0.3 mm above the indicated point

Note 8: Surface resistivity from 10⁵ to 10¹¹ Ω/mm²

Dimensions: mm

Revision: B
Released 6/30/2025

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