

# HIGH-STABILITY, LOW PHASE NOISE SMD VCOCXO

**AOC2522A**

Request Samples



Check Inventory



ESD Sensitive



25.4 x 22 x 12.7 mm  
**RoHS/RoHS II Compliant**  
 MSL Level = 1

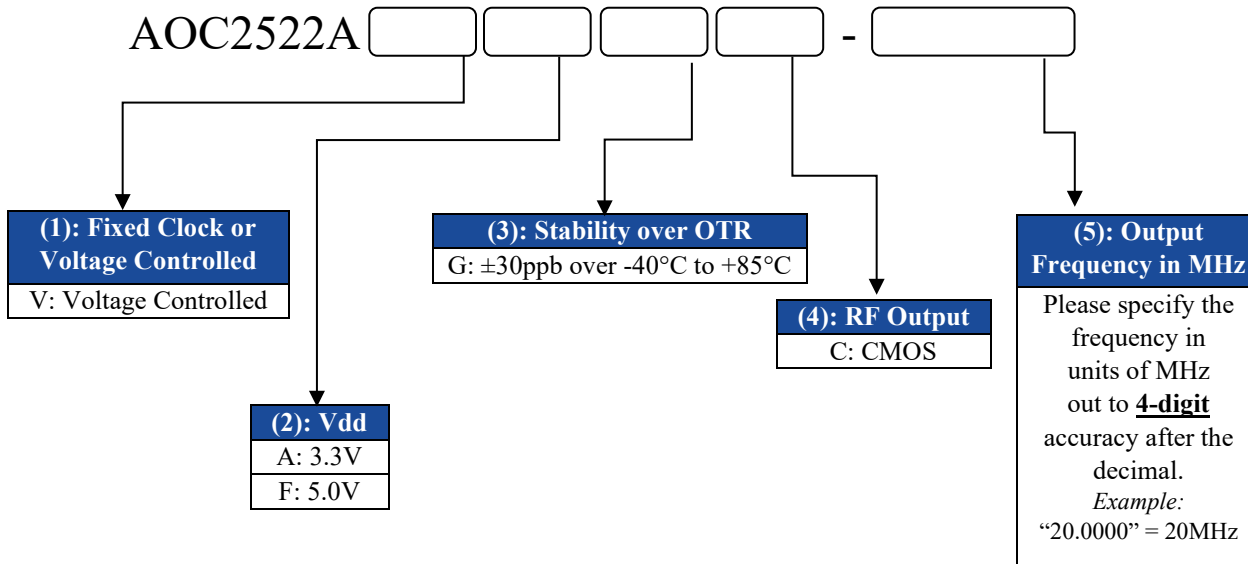
## Features

- Extremely low long-term aging:  $\pm 750$ ppb over 20 years
- Stability over temperature:  $\pm 30$ ppb over  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- 10, 12.8, 16.384, 20, 38.88, 40, 100 MHz standard available frequencies
- 25.4 x 22mm, 5-pad SMD reflow-solderable package
- 3.3V & 5V Vdd supply options
- SC-Cut, High “Q” resonator-based design

## Applications

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

## Part Identification



### Part Number Example:

**AOC2522AVAGC-20.0000**

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## 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   | °C    |                     |
| Storage Temperature Range  | -55                                  |         | +100  | °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°C)  |                                      |         | 1.0   | W     |                     |
| Frequency Accuracy (calibration) <a href="#">[Note 2]</a>                            |                                      | ±100    | ±200  | ppb   | 10MHz ≤ Fc ≤ 40MHz  |
|  |                                      | ±200    | ±300  |       | Fc = 100MHz         |
| Frequency Stability over Operating Temperature Range <a href="#">[Note 3]</a>        |                                      |         | ±30   | ppb   | Over -40°C to +85°C |
| Frequency Stability vs. Supply Voltage Change (Vdd±5%)                               |                                      |         | ±10   | ppb   | 10MHz ≤ Fc ≤ 40MHz  |
|  |                                      |         | ±15   |       | Fc = 100MHz         |
| Frequency Stability vs. Load Change  |                                      |         | ±5    | ppb   | Load=15pF±10%       |
| Aging per Day  |                                      | ±1      | ±2    | ppb   | @+25°C              |
| Aging per Year   |                                      | ±50     | ±100  | ppb   |                     |
| Aging 10 Years   |                                      |         | ±500  | ppb   |                     |
| All-Inclusive Frequency Tolerance over 20 Year Product Life <a href="#">[Note 4]</a> |                                      |         | ±750  | ppb   |                     |
| Warm-Up Time <a href="#">[Note 5]</a>  |                                      |         | 5     | 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 (VOH)  | VOH                                  | 0.9*Vdd |       | V     |                     |
| Output Low Voltage (VOL)   |                                      |         |       |       |                     |
| Rise (Tr) / Fall (Tf) Time   |                                      |         | 6     | 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                                  |         |       | kΩ    |                     |
| EFC Linearity  |                                      |         | 10    | %     |                     |
| 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          |

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| Parameters                  | Min. | Typ. | Max. | Units  | Notes          |
|-----------------------------|------|------|------|--------|----------------|
| Phase Noise (@ 10.0000MHz)  |      | -88  | -85  | dBc/Hz | Offset @1Hz    |
|                             |      | -120 | -115 |        | Offset @10Hz   |
|                             |      | -137 | -135 |        | Offset @100Hz  |
|                             |      | -146 | -143 |        | Offset @1kHz   |
|                             |      | -150 | -147 |        | Offset @10kHz  |
|                             |      | -152 | -150 |        | Offset @100kHz |
| Phase Noise (@ 20.0000MHz)  |      | -85  | -80  | dBc/Hz | Offset @1Hz    |
|                             |      | -128 | -110 |        | Offset @10Hz   |
|                             |      | -142 | -135 |        | Offset @100Hz  |
|                             |      | -149 | -145 |        | Offset @1kHz   |
|                             |      | -151 | -150 |        | Offset @10kHz  |
|                             |      | -152 | -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 | -150 |        | 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: @ +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: @ +25°C; within ±100ppb of F where F is the stabilized frequency reached after 1 hour of continuous operation



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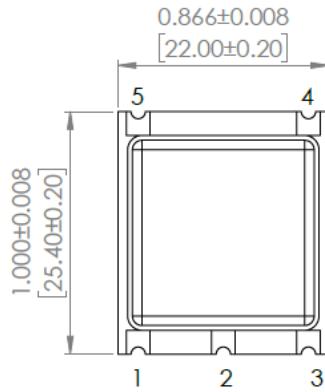


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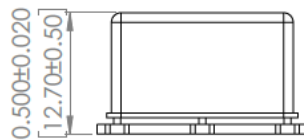


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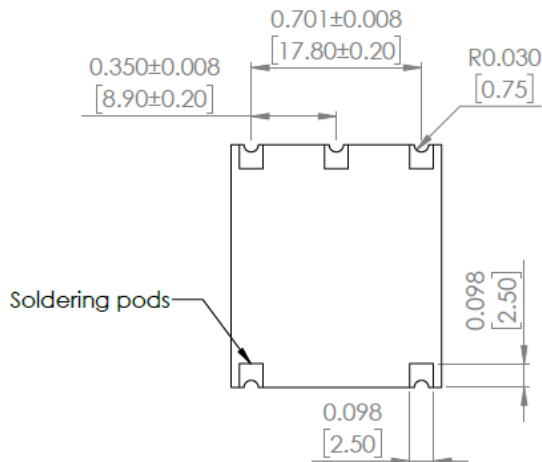
## Mechanical Dimensions



**TOP VIEW**

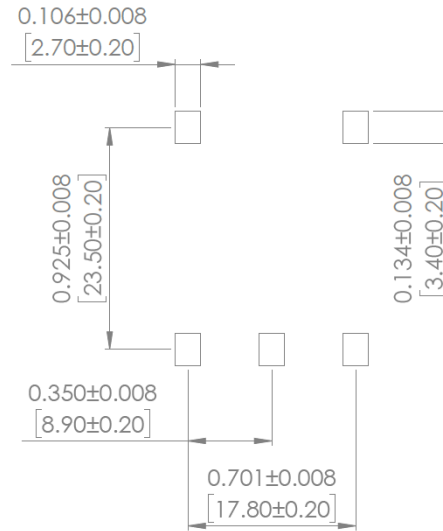


**SIDE VIEW**



**BOTTOM VIEW**

### RECOMMENDED LAND PATTERN



| Pin # | Function                 |
|-------|--------------------------|
| #1    | Voltage-Control (Vc)     |
| #2    | Reference Voltage (Vref) |
| #3    | Supply Voltage (Vdd)     |
| #4    | Output                   |
| #5    | GROUND                   |

Dimensions: inches [mm]



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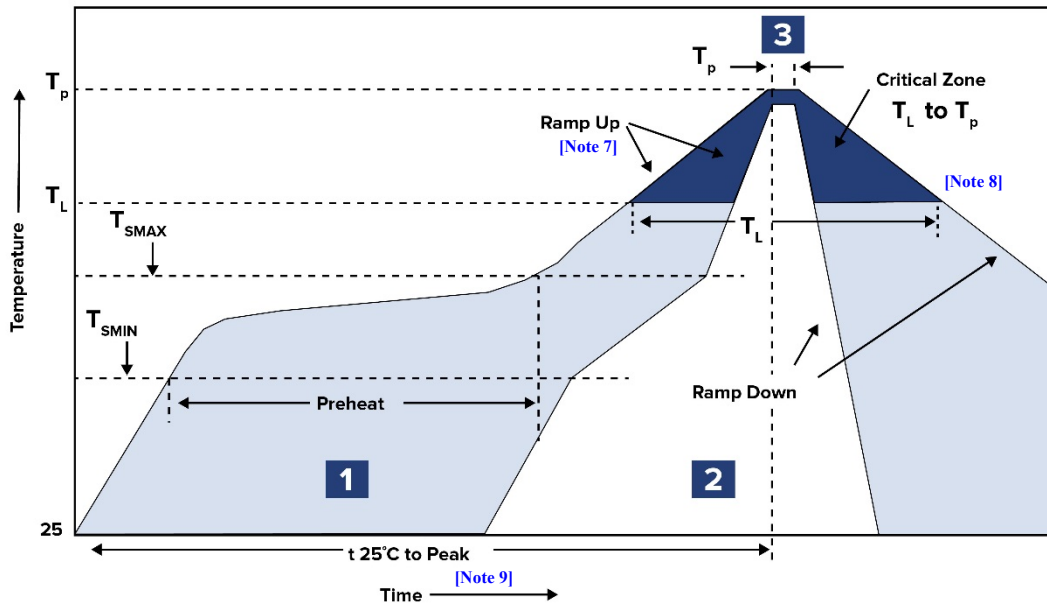


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## Reflow Profile [Note 6]



| Zone | Description | Temperature                               | Times         |
|------|-------------|---|---------------|
| 1    | Preheat     | $T_{SMIN} \sim T_{SMAX}$<br>150°C ~ 200°C | 60 ~ 180 sec. |
| 2    | Reflow      | $T_L$<br>217°C                            | 60 ~ 150 sec. |
| 3    | Peak heat   | $T_P$<br>260°C                            | 10 sec. MAX   |

Note 6: Can withstand 2 times reflow; all temperatures refer to topside of the package, measured on the package body surface

Note 7: Ramp Up Rate ( $T_L \rightarrow T_P$ ) = 3°C / sec. MAX

Note 8: Ramp Down Rate ( $T_P \rightarrow T_L$ ) = 6°C / sec. MAX

Note 9: Time 25°C to Peak Temperature ( $25^\circ\text{C} \rightarrow T_P$ ) = 8 minutes MAX



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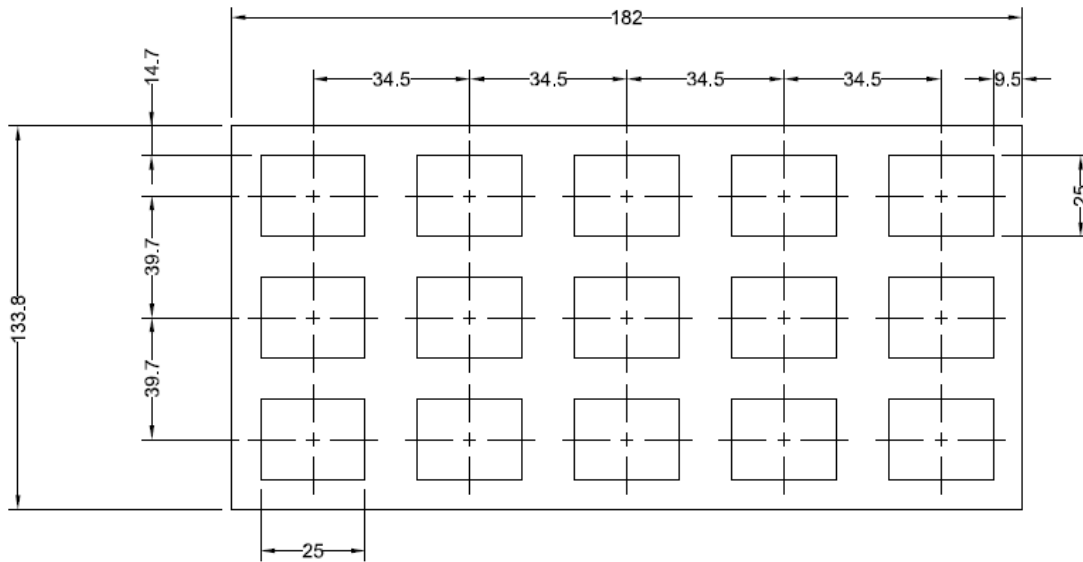
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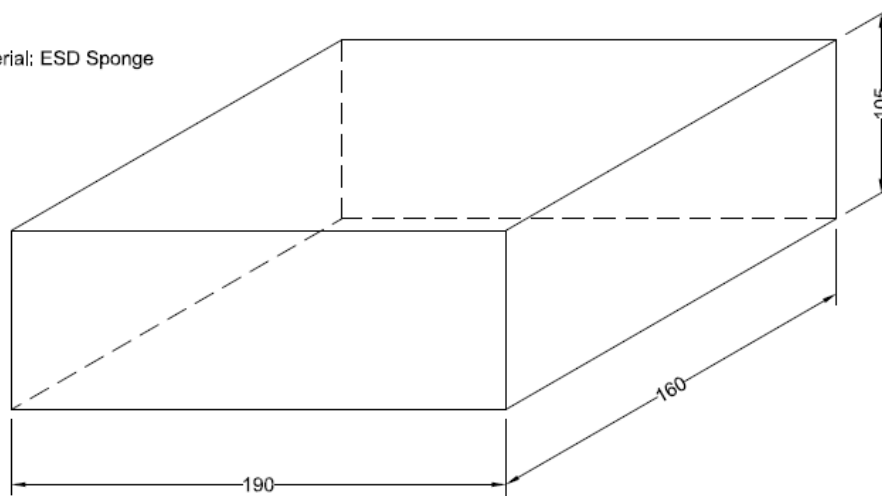
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MSL Level = 1

## Packaging

(15) units per tray



Trap Material: ESD Sponge



Dimensions: mm

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