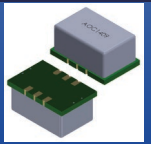


High-Stability & Ultra-Low Phase Noise SMD OCXO/VCOCXO



AOC1409 Series



ESD Sensitive 

14.9 x 9.7 x 7.0mm
RoHS/RoHS II Compliant
MSL = 1

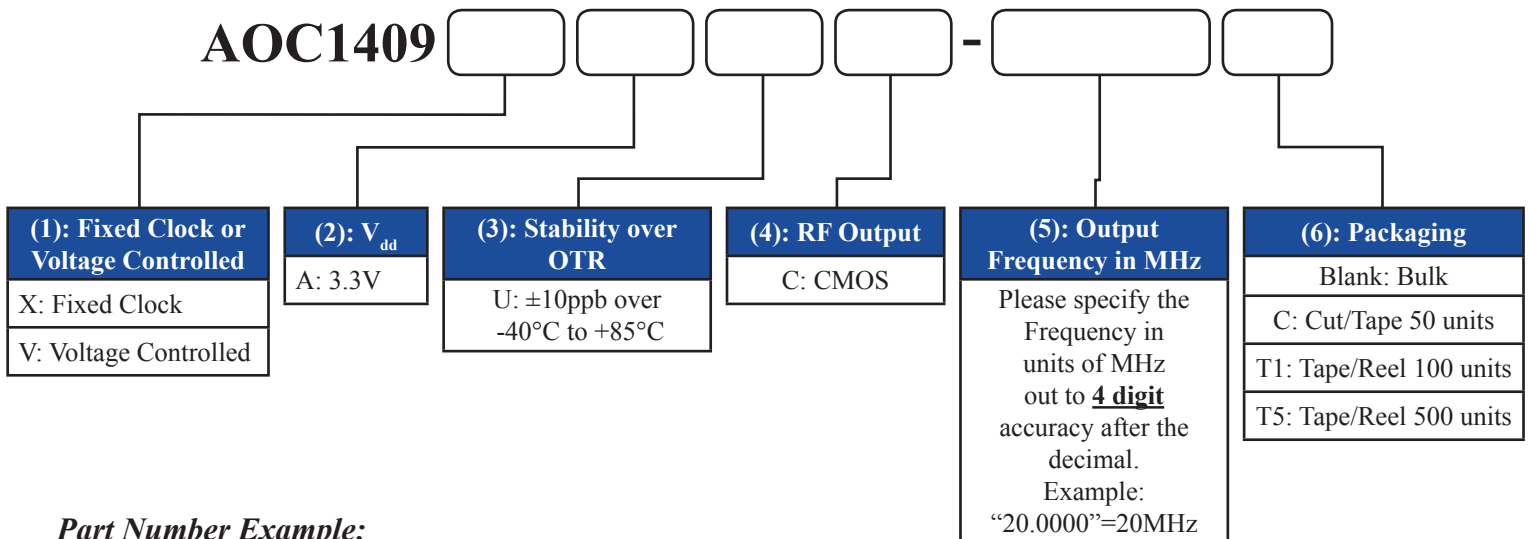
Features

- Extremely low long-term aging: ± 700 ppb over 20 years
- Stability over temperature: ± 10 ppb over -40°C to $+85^{\circ}\text{C}$
- Excellent phase noise:
(-138 dBc/Hz typ. @ 100Hz offset, -148 dBc/Hz typ. @ 1kHz offset)
- 20.0MHz carrier frequency
- 14.9 x 9.7mm, 6-pin SMD reflow-solderable package
- 3.3 V_{dd} supply
- 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:
AOC1409VAUC-20.0000C

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Electrical Specifications

| Parameters | Min. | Typical | Max. | Unit | Notes |
|---|--------------------|------------------------|------------------------|--------|---|
| Frequency (Fc) | 20.0000 | | | MHz | |
| Operating Temperature Range | -40 | | +85 | °C | |
| Storage Temperature Range | -40 | | +100 | °C | |
| Supply Voltage (V _{dd}) | +3.135 | +3.3 | +3.465 | V | |
| Power Consumption (warm-up) | | | 2.5 | W | |
| Current Consumption (warm-up) | | | 722 | mA | @ Max V _{dd} = +3.465V |
| Power Consumption (steady-state @+25°C) | | | 1.0 | W | |
| Current Consumption (steady-state @+25°C) | | | 289 | mA | @ Max V _{dd} = +3.465V |
| Frequency Accuracy (calibration) | | ≤ ±100 | ±200 | ppb | See Note 1 |
| Frequency Stability over Operating Temperature Range | | | ±10.0 | ppb | See Note 2 |
| Frequency Stability vs. Supply Voltage Change | | | ±5.0 | ppb | V _{dd} ±5%; (Vc=constant) |
| Frequency Stability vs. Load Change | | | ±2.0 | ppb | Load=15pF±10% |
| Aging Daily | | | ±1.0 | ppb | |
| Aging 1 st Year | | | ±100 | ppb | |
| Aging 20 Years | | | ±500 | ppb | |
| All-Inclusive Frequency Tolerance over 20 Year Product Life | | | ±700 | ppb | See Note 3 |
| Warm-Up Time | | | 3 | min. | See Note 4 |
| Output Signal | LVCMOS | | | | |
| Output Load | 13.5 | 15 | 16.5 | pF | |
| Duty Cycle | 45 | 50 | 55 | % | @ 50% V _{dd} |
| Output High Voltage (V _{OH}) | V _{OH} | 0.9*(V _{dd}) | | V | Load=15pF±10%; V _{dd} = +3.3V |
| Output Low Voltage (V _{OL}) | V _{OL} | | 0.1*(V _{dd}) | | |
| Rise (Tr) / Fall (Tf) Time | | | 6 | ns | |
| Center Control Voltage (Vc) | | +1.65 | | V | Voltage-Controlled Option (VCOCXO) |
| Control Voltage Range | +0.0 | | +3.3 | V | |
| Frequency Pullability | ±0.7 | | | ppm | |
| Control Port Input Impedance | 100 | | | kΩ | |
| EFC Linearity | | | ±10 | % | |
| Tuning Slope | Positive Monotonic | | | | |
| Phase Noise (@ 25 °C) | | -85 | | dBc/Hz | Offset @1Hz |
| | | -115 | | | Offset @10Hz |
| | | -138 | | | Offset @100Hz |
| | | -148 | | | Offset @1kHz |
| | | -152 | | | Offset @10kHz |
| | | -154 | | | Offset @100kHz |

Note 1: @ +25°C; initial set-tolerance frequency (relative to carrier) at time of shipment, pre-reflow

Note 2: Over -40°C to +85°C; relative to stabilized frequency after 1 hour of continuous operation, post-reflow

Note 3: Over -40°C to +85°C; includes stability over temperature, initial frequency accuracy (calibration), load pulling, power supply variation, and 20 years aging

Note 4: @ +25°C; within ±10ppb of F, where F is the stabilized frequency reached after 1 hour of continuous operation

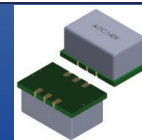


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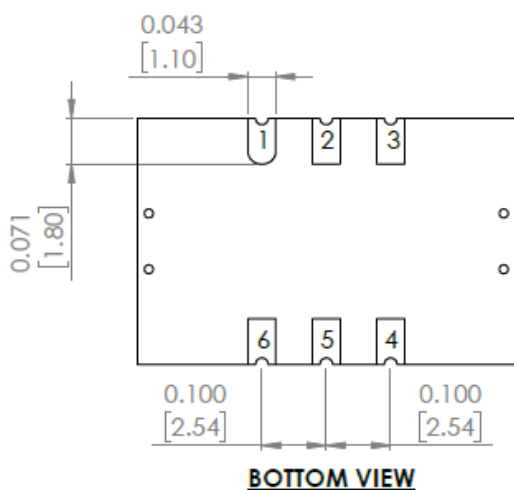
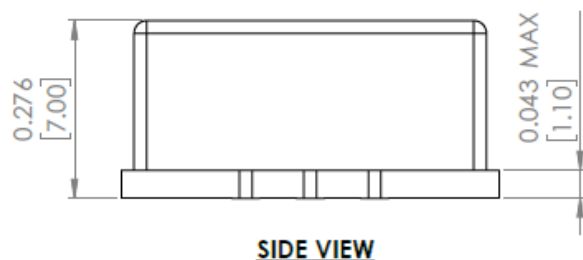
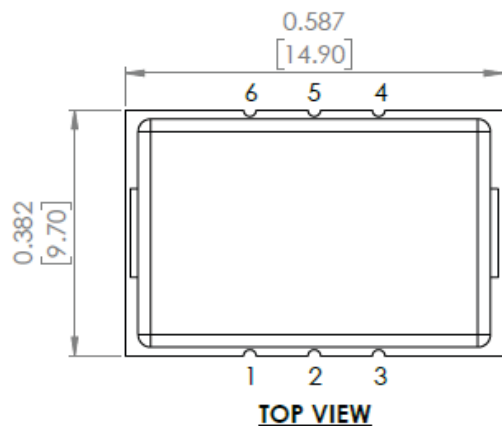
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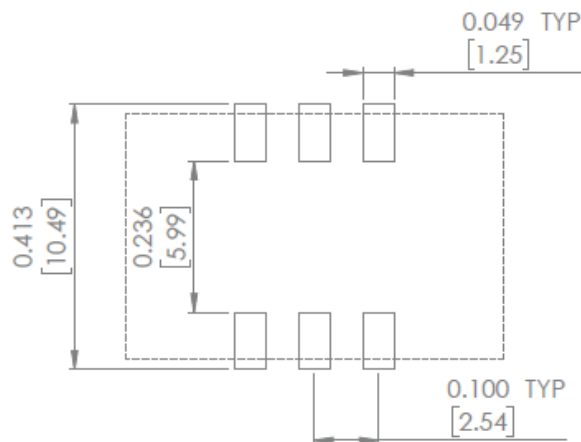
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RoHS/RoHS II Compliant
MSL = 1

Mechanical Dimensions



RECOMMENDED LAND PATTERN



| Pin # | Function |
|-------|--|
| #1 | Option V: Voltage-Control (Vc) Option X: No Connect |
| #2 | Do Not Connect (DNC) ^[Note 5] |
| #3 | GROUND |
| #4 | Output |
| #5 | Do Not Connect (DNC) ^[Note 5] |
| #6 | Supply Voltage (V _{dd}) |

Dimensions: inches [mm]

Note 5: Do not electrically connect pins #2 & #5 as they are for factory use only.

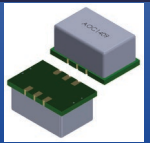


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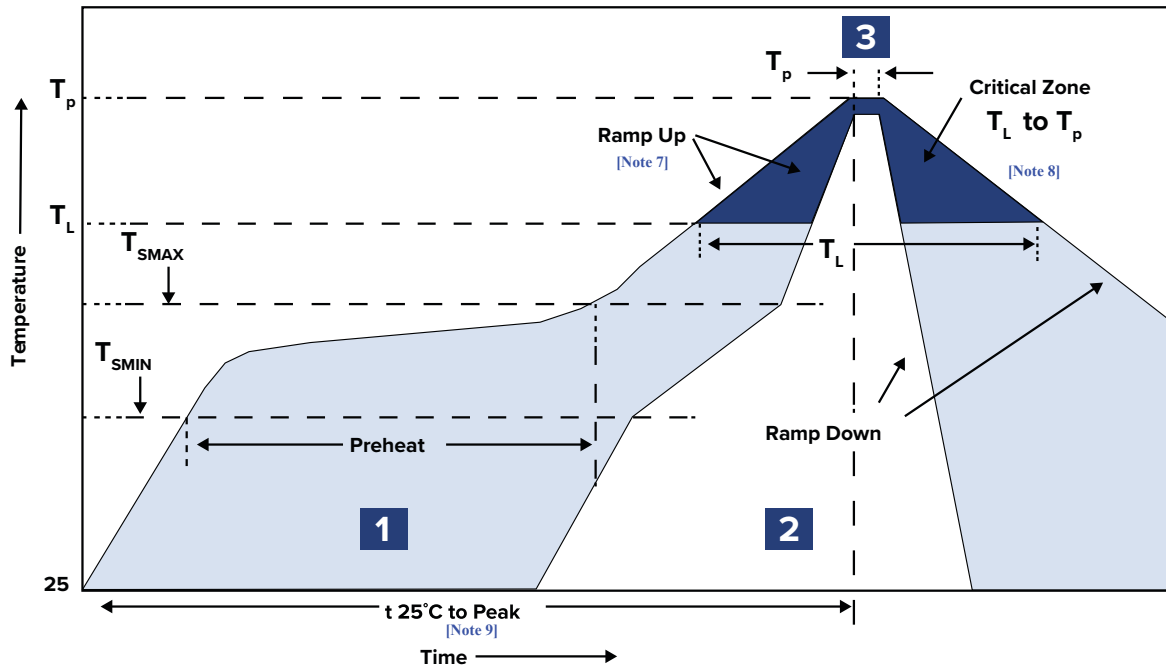
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Recommended Reflow Profile ^[Note 6]



| Zone | Description | Temperature | Time |
|------|----------------|---|---------------|
| 1 | Preheat / Soak | $T_{SMIN} \sim T_{SMAX}$ 150°C ~ 200°C | 60 ~ 180 sec. |
| 2 | Reflow | T_L 217°C | 60 ~ 150 sec. |
| 3 | Peak heat | T_P 260°C±5°C | 20 ~ 40 sec. |

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°C \rightarrow T_P) = 8 minutes MAX

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Packaging ^[Note 10]

C = Cut Tape 50 units

T1 = Tape & Reel 100 units/reel

T5 = Tape & Reel 500 units/reel



Dimensions: mm

Note 10: 500 units = maximum quantity per 330mm reel

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