

#### Features

- Extremely low long-term aging: ±1ppm over 20 years
- Stability over temperature: ±10ppb over -20°C to +70°C
- Excellent phase noise:
- (-135dBc/Hz typ. @ 100Hz offset, -148dBc/Hz typ. @ 1kHz offset)
- 10.0MHz, 12.8MHz, 19.44MHz, & 25MHz carrier frequency options
- 20.32 x 12.7mm, 4-pin SMD reflow-solderable package
- 3.3 V<sub>dd</sub> supply
- SC-Cut, High "Q" resonator-based design

#### Applications

Stratum 3 & Stratum 3E compliant

ESD Sensitive (Pb)

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





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**REVISED: 03-19-19** 

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MSL = 1

20.32 x 12.7 x 11.0mm

**RoHS/RoHS II Compliant** 

### AOC2012 Series



ESD Sensitive (Pb)

20.32 x 12.7 x 11.0mm RoHS/RoHS II Compliant MSL = 1

#### **Electrical Specifications**

Parameters		Min.	Typical	Max.	Unit	Notes
Frequency Range (Fc)		10.0000		25.0000	MHz	
Standard Available Frequencies		10.0000,	10.0000, 12.8000, 19.4400, 25.0000		MHz	
Operating Temperature Range		-20		+70	°C	
Storage Temperature Range		-40		+100	°C	
Supply Voltage (V <sub>dd</sub> )		+3.135	+3.3	+3.465	V	
Power Consumption (warm-up)				2.5	W	
Current Consumption (warm-up)				722	mA	@ Max V <sub>dd</sub> =+3.465V
Power Consumption (steady-state @+25°C)				1.0	W	
Current Consumption (steady-state @+25°C)				289	mA	@ Max V <sub>dd</sub> =+3.465V
Frequency Accuracy (calibration)			<u>≤</u> ±300	±500	ppb	See Note 1
Frequency Stability over Operating Temperature Range				±10.0	ppb	See Note 2
Frequency Stability vs. Supply Voltage Change				±3.0	ppb	V <sub>dd</sub> ±5%; (Vc=constant)
Frequency Stability vs. Load Change				±1.0	ppb	Load=15pF±10%
Aging Daily				±1.0	ppb	
Aging 1 <sup>st</sup> Year				±100	ppb	
Aging 20 Years				±500	ppb	
All-Inclusive Frequency Tolerance over 20 Year Product Life				±1.0	ppm	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 <sub>dd</sub>
Output High Voltage ( $V_{OH}$ ) Output Low Voltage ( $V_{OL}$ )	V <sub>OH</sub>	0.9*(V <sub>dd</sub> )			v	Load=15pF±10%;
	V <sub>OL</sub>			0.1*(V <sub>dd</sub> )		V <sub>dd</sub> =+3.3V
Rise (Tr) / Fall (Tf) Time				6	ns	
Center Control Voltage (Vc)			+1.65		V	
Control Voltage Range		+0.0		+3.3	V	
Frequency Pullability		±0.7			ppm	Voltage-Controlled Option (VCOCXO)
Control Port Input Impedance		50			kΩ	
EFC Linearity				±10	%	
Tuning Slope		Positive Monotonic				
Phase Noise (@ +25°C)			-115		dBc/Hz	Offset @10Hz
			-135			Offset @100Hz
			-148			Offset @1kHz
			-152			Offset @10kHz

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:  $@+25^{\circ}C$ ; within  $\pm 100$  ppb of F where F is the stabilized frequency reached after 1 hour of continuous operation



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#### **Mechanical Dimensions**



8

#### RECOMMENDED LAND PATTERN



Pin #	Function				
#1	<u>Option V:</u> Voltage-Control (Vc) <u>Option X:</u> No Connect				
#7	0V & CASE GROUND				
#8	Output				
#14	Supply Voltage (V <sub>dd</sub> )				

**Dimensions: inches [mm]** 

14

0.600 [15.24] BOTTOM VIEW



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Recommended Reflow Profile [Note 5]



Zone	Description	Temperature	Time
1	Preheat / Soak	$\begin{array}{c} T_{_{SMIN}} \sim T_{_{SMAX}} \\ 150^{\circ}C \sim 200^{\circ}C \end{array}$	60 ~ 180 sec.
2	Reflow	Т <sub>ь</sub> 217°С	$60 \sim 150$ sec.
3	Peak heat	T <sub>p</sub> 260°C±5°C	$20 \sim 40$ sec.

Note 5: Can withstand 2 times reflow; all temperatures refer to topside of the package, measured on the package body surface Note 6: Ramp Up Rate  $(T_{L} \rightarrow T_{p}) = 3^{\circ}C / \sec$ . MAX Note 7: Ramp Down Rate  $(T_{p} \rightarrow T_{L}) = 6^{\circ}C / \sec$ . MAX Note 8: Time 25°C to Peak Temperature  $(25^{\circ}C \rightarrow T_{p}) = 8$  minutes MAX



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Packaging

C = Cut Tape 50 units T1 = Tape & Reel 100 units/reel



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 AOC2012VAJC-12.8000C
 AOC2012VAJC-12.8000T1

 AOC2012VAJC-19.4400C
 AOC2012VAJC-19.4400T1
 AOC2012XAJC-19.4400C
 AOC2012XAJC-19.4400T1

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