



# Pletronics, Inc.

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# Specialized OCXOs

## Ovenized Crystal Oscillators

Designed and manufactured by: **AXTAL GmbH & Co. KG**

D-74821 Mosbach  
 Germany  
[www.axtal.com](http://www.axtal.com)



Model	AXIOM10	AXIOM10HP High Stability	AXION10S Stratum III Stratum Ille	AXIOM20	AXION20S Stratum III	AXIOM20-17 Cospas - Sarsat	AXION25	AXIOM30 High Stability	AXIOM30HP High Performance	AXION30S Stratum Ille	AXIOM35 High Stability	AXIOM40 High Stability	AXION40S Stratum Ille	AXIOM45 High Stability	AXIOM50	AXIOM70	AXIOM75	AXIOM90 SMA out	AXIOM95 SMA out	AXIOM110- 500 SMA out	AXIOM160- 2000 SMA out	AXIOM260- 500 Vibration Prot	AXIOM260	Model	
Output	CMOS	Sinewave	CMOS	CMOS	CMOS	CMOS	Sinewave	CMOS	Sinewave	CMOS	Sinewave	CMOS	CMOS	Sinewave	Sinewave	CMOS	Sinewave	Sinewave	Sinewave	Sinewave	Sinewave	Sinewave	Sinewave	Output	
Frequency Range (MHz)	10 - 120	10.0	10 - 12.8	10 - 80	10 - 20	60.75	10 - 80	10 - 40	10.0	10 - 20	10 - 40	5 - 40	5 - 20	5 - 120	100-120	10 - 40	10-120	10 - 40	80 - 130	120	100	100	120	Frequency Range (MHz)	
Standard Frequencies (MHz)	10.0, 12.8, 19.44, 20.0	10.0	10.0, 12.8	10, 12.8, 16.384	12.8, 16.384, 20.0	60.75	10.0, 12.8, 16.384	10.0, 12.8, 19.44, 20.0	10.0	10.0, 12.8, 20.0	10.0, 16.384, 20.0	10.0, 16.384, 20.0	10.0, 12.8, 20.0	10.0, 16.384, 20.0	100, 120	10.0, 12.80, 19.44	10.0, 12.8, 100.0	10.0, 12.9, 20.0	96.0, 100.0, 116.0, 130.0	120.0	100.0	100.0	120.0	Standard Frequencies (MHz)	
Frequency Stabilities (ppb)																								Frequency Stabilities (ppb)	
Initial tolerance at 25°C	±500	±50, ±20 typ	±500 typ	±500	±500 typ	±2,000	±500 typ	±500 max	±20	±1000	±500 max	±500	±500	±500 max	±500 max	±500 max	±500 max	±500 max	±500 typ	±0.1 max	±200 max	±500 max	±1,000 max	Initial tolerance at 25°C	
vs. Temperature	±200, ±100, ±50, ±25, ±10	±5	±280 (III), ±10 (Ille)	±500, ±300, ±200, ±100	±280	±2ppb/min for dT ±5°C/hr ±2ppb for 30°C shock	±500, ±300, ±200, ±100	±200, ±100, ±50, ±25, ±10, ±5	±5	±10	±200, ±100, ±50, ±25, ±10, ±5	±100, ±50, ±25, ±10, ±5	±10	±100, ±50, ±25, ±10, ±5	±200 typ ±500 max	±200, ±100, ±50, ±25, ±10, ±5	±200, ±100, ±50, ±25, ±10, ±5	±200, ±100, ±50, ±25, ±10, ±5	±200, ±100, ±50, ±25, ±10, ±5	±200, ±100, ±50, ±25, ±10, ±5	±500	±2,000	±2,000	±2,000 T1, ±3,000 T2	vs. Temperature
vs. Supply	±10	±0.5 typ	±10	±10	±10 typ	±20	±10	±10	±0.5	±1	±10	±2	±1	±2	±20	±10	±10	±10	±10	±50	±10	±100	±10	vs. Supply	
vs. Load Change	±10	±0.5	±10 typ	±20	±10 typ	±20	±20	±10	±0.5	±1	±10	±2	±1	±2	±20	±10	±5	±10	±10	±50	±10	±100	±10	vs. Load Change	
Long Term (aging)/day after 30 days operation	±10, ±2	±0.5	---	---	±40	---	---	±10, ±2	±0.5	---	±10, ±2	---	---	±2	±10, ±2	±10, ±2	±10, ±2	±10, ±2	±10, ±2	±70	±70	±70	±10	Long Term (aging)/day after 30 days operation	
long term (aging) 1 <sup>st</sup> year at 40°C, after 30 days	±200, ±100	±30	±200	±500	±800	---	±500	±200, ±100	±30	---	±200, ±100	±200, ±100	---	±200, ±100	±1,000 max ±500 type	±200, ±100	±200, ±100	±200, ±100	±200, ±100	±200	±2000	---	±100	long term (aging) 1 <sup>st</sup> year at 40°C, after 30 days	
long term, 5 years	---	---	---	---	---	±10 ppm	---	---	---	---	---	---	---	---	---	---	---	---	---	---	±2500	±2500	---	long term, 5 years	
long term, 10 years	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	±2,000	±1,500	long term, 10 years	
long term, 15 years	---	---	±4.6 ppm	---	±4.6 ppm	---	---	---	±500	±4.6 ppm	---	---	±4.6 ppm	---	---	---	---	---	---	---	---	---	---	long term, 15 years	
holdover stability	---	---	---	---	±370	---	---	---	---	---	---	---	12	---	---	---	---	---	---	---	---	---	---	holdover stability	
Warm-up time at 25°C	5 min.	5 min.	5 min.	2 min.	5 min.	2 min	2 min.	3 min.	5 typ, 105 max min.	5 min.	5 min.	5 min.	5 min.	5 min.	3 min.	5 min.	5 min.	5 min.	5 min.	5 min.	5 min.	4 min.	80 sec.	Warm-up time at 25°C	
Frequency adjustment																								Frequency adjustment	
Electronic Frequency Control (EFC) (ppm)	±3 min, ±1 typ	±1 min	none	±2 min, ±5 max	none	none	±2 min, ±5 max	±3 min, ±0.8 min	±1 min	none	±3 min, ±0.8 min	±3 min, ±0.8 min	none	±5 min, ±0.8 min	none	±3 min, ±0.8 min	±3 min, ±0.8 min	±3 min, ±1 min	±3 min, ±1 min	±2 min, ±5 max	none	±1.5	±1.6	Electronic Frequency Control (EFC) (ppm)	
EFC Voltage nominal	50% V <sub>S</sub>	2.5	---	50% V <sub>S</sub>	---	---	50% V <sub>S</sub>	50% V <sub>S</sub>	2.5	---	50% V <sub>S</sub>	50% V <sub>S</sub>	---	2.5V	---	50% V <sub>S</sub>	50% V <sub>S</sub>	1.65V, 2.5V	1.65V, 2.5V	0.0V	---	2.5	0.0V	EFC Voltage nominal	
EFC Range	5/95% V <sub>S</sub>	0 to V <sub>REF</sub>	---	5/95% V <sub>S</sub>	---	---	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	0 to 5V	---	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	---	0.25 to 4.75V	---	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	0.15-3.15V 0.25-4.75V	0.15-3.15V 0.25-4.75V	±4.0V	---	0 to 5V	±4.0V	EFC Range	
EFC Slope	Positive	Positive	---	Positive	---	---	Positive	Positive	Positive	---	Positive	Positive	---	Positive	---	Positive	Positive	Positive	Positive	Positive	---	Positive	Positive	EFC Slope	
EFC Input impedance	100K	100K	---	100K	---	---	100K	100K	100K	---	100K	100K	---	100K	---	100K	100K	100K	100K	50K	---	50K	10K	EFC Input impedance	
Load	15pF	50 ohms	15pF	15pF	15pF	15pF	50 ohms	15pF	50 ohms	15pF	50 ohms	15pF	15pF	50 ohms	50 ohms	15pF	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	Load	
Level	5/95% V <sub>S</sub>	+5/+10dBm	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	+3dBm min	5/95% V <sub>S</sub>	+5/+10dBm	5/95% V <sub>S</sub>	+3dBm min	5/95% V <sub>S</sub>	5/95% V <sub>S</sub>	+3dBm min	+11dBm min +15dBm max	5/95% V <sub>S</sub>	+7dBm min	+3dBm min	+3dBm min	+10dBm - +14dBm	+10dBm min +15dBm max	+5dBm min +9dBm max	+5dBm min +9dBm max	Level	
Phase Noise (dBc/Hz) 1Hz	---	-100 typ -130 typ -145 max	-95 typ -120 typ -140 typ -150 max -145 typ	---	---	---	---	-100 typ -130 typ -145 max -150 max -145 typ -150 max	---	-90 typ -120 typ -140 typ -150 max -145 typ -150 max	---	-120 -140 -145 -150 -145 typ -150	-90 typ -120 typ -140 typ -150 max -145 typ -150	---	-90 typ -120 typ -150 typ -165 typ	---	-140 typ -150 typ -155 typ -160 typ	---	---	---	-90 -120 -155 -149 typ -160 typ -165 typ -170	---	---	1Hz Phase Noise (dBc/Hz)	
Short term stability (Allan deviation)	---	5 * 10 <sup>-12</sup> typ 1 * 10 <sup>-11</sup> typ 1 * 10 <sup>-10</sup> max	---	---	---	---	---	5 * 10 <sup>-12</sup> typ 1 * 10 <sup>-11</sup> typ 1 * 10 <sup>-10</sup> max	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	τ=1S Short term stability τ=10S (Allan deviation) τ=100S	
Harmonics (dBc)	---	-20	---	---	---	---	-20	---	-20	---	-20	---	---	-20	-30	---	-30	-30	-30	-30	-30	---	-30	Harmonics (dBc)	
Non-harmonics (dBc)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-80	---	-90	-50	-50	-85	---	---	-80	Non-harmonics (dBc)	
Oven Alarm	no	yes, CMOS	no	no	no	no	no	no	yes, CMOS	no	no	no	no	no	no	no	no	no	no	no	no	no	no	Oven Alarm	
Reference Voltage Output	3.0V	3.0V	no	no	no	no	no	3.0	5.0V	no	3.0	3.0	no	3.0	no	no	no	no	no	no	no	no	no	Reference Voltage Output	
Supply Voltage (V <sub>S</sub> )	3.3, 5.0	12	3.3, 5.0	3.3, 5.0	3.3, 5.0	5.0V osc 5.0V oven	3.3, 5.0	3.3, 5.0	12	3.3, 5.0	5.0, 12.0	5.0, 12.0	3.3, 5.0	5.0, 12.0	12.0	3.3, 5.0	5.0, 12.0	3.3, 5.0, 12.0	3.3, 5.0, 12.0	15.0	12.0	8.0	15.0	Supply Voltage (V <sub>S</sub> )	
Current Steady State 25°C (mA)	3.3V, 300 5.0V, 250	100	3.3V, 300 5.0V, 250	3.3V, 300 5.0V, 200	3.3V, 300 5.0V, 200	15 osc 200 oven	3.3V, 300 5.0V, 200	3.3V, 300 5.0V, 200	100	3.3V, 300 5.0V, 250	5.0V, 200 12V, 100	5.0V, 200 12V, 80	3.3V, 350 5.0V, 250	5.0V, 200 12V, 80	100	3.3V, 350 5.0V, 250	5.0V, 200 12V, 80	3.3V, 400 5.0V, 300 12V, 150	3.3V, 400 5.0V, 300 12V, 150	350	270	310	150	Current Steady State 25°C (mA)	
Current Turn-On (mA)	3.3V, 800 5.0V, 500	350	3.3V, 800 5.0V, 500	3.3V, 800 5.0V, 500	3.3V, 800 5.0V, 500	400 (Cl.1) 300 (Cl.2)	3.3V, 800 5.0V, 500	3.3V, 800 5.0V, 500	340	3.3V, 800 5.0V, 500	5.0V, 500 12V, 250	5.0V, 500 12V, 200	3.3V, 800 5.0V, 500	5.0V, 500 12V, 200	300	3.3V, 900 5.0V, 600	5.0V, 500 12V, 200	3.3V, 1000 5.0V, 800 12V, 400	3.3V, 1000 5.0V, 800 12V, 400	500	580	625	550	Current Turn-On (mA)	
Specified Temperature (°C)	-10 / +60	-10 / +60	-40 / +80 (III) 0 / +70 (Ille)	-10 / +60	-40 / +80	-40/+55(Cl.1) -20/+55(Cl.2)	-10 / +60	-10 / +60	-20 / +70	0 / +70 0 / +50	-10 / +60	-10 / +60	0 / +70 -20 / +70	-10 / +60	-20 / +70	-10 / +60	-10 / +60	-20 / +70	-20 / +70	-20 / +70	-40 / +85	-40 / +85	-40 / +75	-40 / +85	Specified Temperature (°C)
Operable Temperature (°C)	-20 / +70	-20 / +70	---	-30 / +70	-45 / +90	-45 / +60	-30 / +75	-20 / +70	-20 / +70	-20 / +70	-25 / +80	-20 / +70	-30 / +75	-30 / +75	-30 / +75	-40 / +85	-30 / +75	-30 / +75	-25 / +75	-25 / +75	-45 / +90	-45 / +90	-45 / +80	-45 / +90	Operable Temperature (°C)
Storage Temperature (°C)	-40 / +85	-40 / +85	-40 / +85	-40 / +85	-40 / +90	-45 / +105	-40 / +85	-40 / +85	-40 / +85	-45 / +90	-40 / +85	-40 / +85	-40 / +85	-40 / +85	-55 / +105	-40 / +85	-40 / +85	-40 / +85	-40 / +85	-50 / +100	-60 / +100	-55 / +105	-55 / +105	Storage Temperature (°C)	
Weight (grams)	10	10	9	5	5	5	5	10	10	10	10	30	30	30	60	10	10	50	50	100	40	75	75	Weight (grams)	

### Environmental conditions

Typical for these OCXOs  
 see datasheet for those applied to each OCXO type

Test	IEC 60068 Part	IEC 60679-1 clause	Test Condition
Visual inspection, dimensions		4.3	Enclosures styles as in IEC 60679-3 or 61837, if applicable
Sealing tests	2-17	4.6.2	Gross leak: Test Qc Fine Leak: Test QK
Solder ability Resistance to heat	2-20 2-88	4.6.3	Test Ta (235±5)°C Method 1 Test Tb Method 1A, 5s
Shock	2-27	4.6.8	Test each 3 x per axis 100g, 6 ms half-sine pulse
	2-27	4.6.8	Test each 3 x per axis 30g, 18 ms half-sine pulse
Bump	2-29	4.6.6	Test Eb, 4,000 bumps per axis, 40g, 6ms
Free Fall	2-32	4.6.9	Test Ed procedure 1, 2 drops from 1m height
Vibration, sinusoidal	2-6	4.6.7	Test Fc, 30 min per axis, 10 Hz - 55 Hz 0.75mm; 55Hz -2KHz, 10g
	2-6	4.6.7	Test Fc, 6 cycles per axis, 100 Hz -2KHz, 6g
Rapid change of temperature	2-14	4.6.5	Test Na, 10 cycles at extremes of operating temperature range
Dry Heat	2-2	4.6.14	Test Ba, 16 h at upper temperature indicated by climatic category
Damp heat, cyclic	2-30	4.6.15	Test Db variant 1 severity, 55°C/85% R.H., 6 cycles.
Cold	2-1	4.6.16	Test Aa, 2 h at lower temperature indicated by climatic category
Climatic Sequence	1-7	4.6.17	Sequence 4.6.14, 4.6.15 (1 <sup>st</sup> cycle), 4.6.16, 4.5.15 (5 cycles)
Damp heat, steady state	2-3	4.6.18	Test Ca, 56 days
Endurance tests -aging - extended aging		4.7.1 4.7.2	30 days @ 85°C, OCXO @ 25°C 1000h, 2000h, 800h @ 85°C

### For high shock AXIOM260-500 OCXO with shock absorber mounts

Test	Reference	Test Condition
Altitude		Sea level to 55,000 feet
Vibration, random	MIL-STD-810C	20Hz 0.04g <sup>2</sup> /Hz 1000Hz 0.04g <sup>2</sup> /Hz 2000Hz 0.46g <sup>2</sup> /Hz all three axis 7.6g R.M.S.
Mechanical shock	MIL-STD-810E Method 561.4	Procedure I, VI
Endurance tests (aging)	MIL-PRF55310	30 days operation at 25°C

### For high shock AXIOM260 OCXO with shock absorber mounts

Test	Reference	Test Condition
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