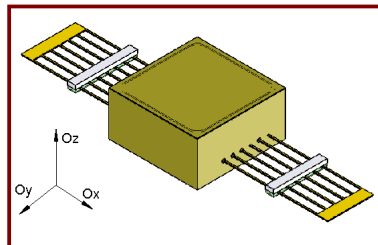




SPACE TCXO Series 310

Space qualified TCXO – Temperature Compensated Crystal Oscillator,
 General Specification (rev 18 janvier 2010) **DRAFT**



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▣ Features

- Frequency Range : 10MHz to 100 MHz
- Supply Voltage : +5V
- Low Consumption : 20 mA max
- Frequency Stability vs. Operating Temperature : from +/- 0.5ppm to +/- 2ppm
- Ageing :from +/- 2ppm to +/- 10ppm over 15 years
- Output Wave Form : square
- Output Level :CMOS 5V , 3.3V or 2.5V (AHC MOS)
- Manufacturing in accordance with:
 - MIL-PRF-55310 (Class 1, type 4, level S,B)
 - ECSS-Q-ST-70-08C and ECSS-Q-ST-70-38C

▣ Applications

- Transponders
- GPS receivers
- Converters
- Board calculators
- Synthesizers
- FGU

▣ Environmental conditions

Parameters	Unit	Minimum	Typical	Maximum
Operating temperature range	°C	- 40		+ 85
Storage temperature range	°C	- 55		+ 125
Shocks (half sine)		1500g, 0.35ms		
Sine vibration		20g as per MIL-STD-202, Method 204, Condition D		
Random vibration		37.8 grms as per MIL-STD-202, Method 214, Condition I-J		
Radiation		Up to 100 krad total dose		



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▣ Mechanical characteristics

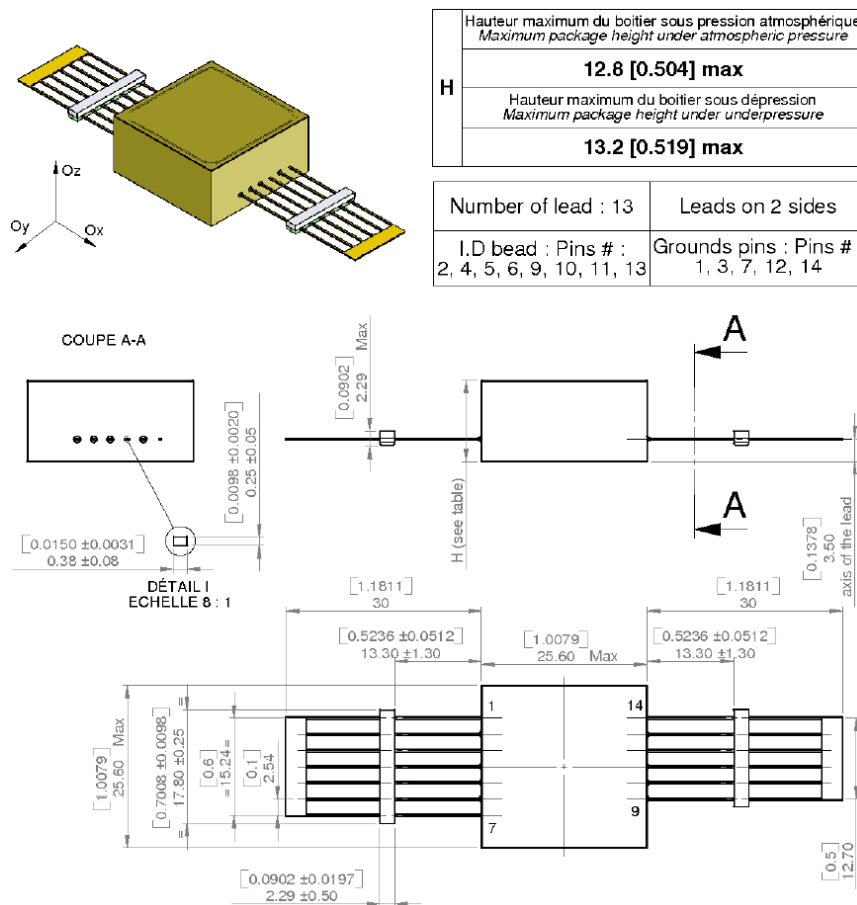


Figure 1 : Oscillator outline 1

Pin description

Pin number	Name	Function
6	Adj	External Adjustment Resistor
4-5-9-10-11	NC	
1-3-7-12-14	GND	Electrical & Mechanical ground
2	Vcc	Power supply
13	Fout	Frequency Output



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▣ Performance Characteristics

Electrical Parameters	Unit	Minimum	Typical	Maximum
Frequency output				
Nominal frequency range	MHz	10	40	100
Output level (CMOS 5V,3.3V or 2.5V)	V			
High level	V	90% Vcc		
Low level	V			10% Vcc
Duty cycle	%		45/55	40/60
Rise & fall time	ns			5
Phase noise in static conditions @ 40 MHz				
@ 1 Hz offset	dBc/Hz		- 65	-55
@ 10 Hz offset	dBc/Hz		- 95	-85
@ 100 Hz offset	dBc/Hz		- 125	-115
@ 1 kHz offset	dBc/Hz		- 145	-135
@ 10 kHz offset or greater	dBc/Hz		- 155	-150
Allan variance				
@ 1s	ppb			1
Free running mode				
Initial setting	ppm			±1
Stability vs. temperature	ppm	±0.5	±1	±2
Stability vs. 5 % supply voltage variation	ppm			0.1
Stability vs. 10 % load variation	ppm			0.1
Aging over first year	ppm	0.5		1
Aging over 15 years	ppb	5		10
Frequency adjustment with external resistor				
Relative pulling frequency range	ppm	± 5		
Resistor value range	Ω	0		10k
Supply voltage (Vcc pin)				
Voltage range (±5%)	V _{DC}	5		12
Supply power	W			0.2
Start up conditions				
Start up time	ms			10
Cold start	°C			-40



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▣ Proposed Components quality levels

- Full ESA ECSS-Q-ST-60C components
- Full ESA ECSS-Q-ST-60C components with specific radiation test
- ESA ECSS-Q-ST-60C components with only LVT 3

▣ Screening options according to MIL PRF55310

- Full Level S
- Level S with combined burn in aging of 480 hours
- Full Level B
- Level B with combined burn in aging of 480 hours



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▣ Model philosophy

Representativeness	DM	EM	EQM	QM	FM	FM-C
Component	Commercial parts	Passive commercial parts Active parts from the same manufacturer of HiRel parts	Mil Grade parts procured from the same manufacturer of HiRel parts	HiRel Parts	HiRel Parts	HiRel Parts
Crystal material	HiQ	HiQ	HiQ	Swept ESA-SCC3501	Swept ESA-SCC3501	Swept ESA-SCC3501
Resonator stabilized	Not stabilized	Stabilized	Stabilized	Stabilized & Aged as per specification	Stabilized & Aged as per specification	Stabilized & Aged as per specification
Mechanical interface	Size & shape could not be representative	Flight representative in form-fit-function	Flight representative in form-fit-function	Flight design	Flight design	Flight design
Electrical interface	Total conformity with functional electrical	Flight design without HiRel parts	Flight design without HiRel parts	Flight design	Flight design	Flight design
Other tests	Development testing	Partial functional qualification testing	Functional Qualification testing & Environment	Qualification testing	Acceptance testing	Acceptance testing + group C
Workmanship	IPC610	IPC610	ECSS-Q-70-08 & 70-38	ECSS-Q-70-08 & 70-38	ECSS-Q-70-08 & 70-38	ECSS-Q-70-08 & 70-38



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Standard Tests

DOCxxxxFM S520-A1	SN/YYWW		Initial Tests	Pre-Burn-In Measurements	Frequency aging group B	Final tests Group A	Visual tests group A
	CONDITIONS	PARAMETERS	GO NO-GO	GO NO-GO	GO NO-GO	GO NO-GO	GO NO-GO
24°C ±2°C	Frequency	GO	GO	GO	GO	NA	
24°C ±2°C	Output level	GO	GO	NA	GO	NA	
-20°C ±2°C	Output level	GO	NA	NA	GO	NA	
70°C ±2°C	Output level	GO	NA	NA	GO	NA	
-20°C to +70°C	Output level vs. Temperature	GO	NA	NA	GO	NA	
-20°C ±2°C	start up Time	GO	NA	NA	GO	NA	
+70°C ±2°C	Steady state consumption	GO	NA	NA	GO	NA	
24°C ±2°C	Steady state consumption	GO	GO	NA	GO	NA	
-20°C ±2°C	Steady state consumption	GO	NA	NA	GO	NA	
24°C ±2°C	Duty cycle	GO	NA	NA	GO	NA	
24°C ±2°C	Rise & Fall time	GO	NA	NA	GO	NA	
24°C ±2°C	Phase noise	GO	NA	NA	GO	NA	
24°C ±2°C	Frequency vs. load variation	GO	NA	NA	GO	NA	
24°C ±2°C	Frequency vs. power variation	GO	NA	NA	GO	NA	
24°C ±2°C	Frequency Adjustment	GO	NA	NA	GO	NA	
-40°C	Cold start	GO	NA	NA	GO	NA	
	Dimensions	NA	NA	NA	NA	GO	
	Marking	NA	NA	NA	NA	GO	
	Weight	NA	NA	NA	NA	GO	
-20°C to 70°C	Frequency vs. Temperature	GO	NA	NA	GO	NA	



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Ordering part number definition

The part number breakdown is defined as follows:

