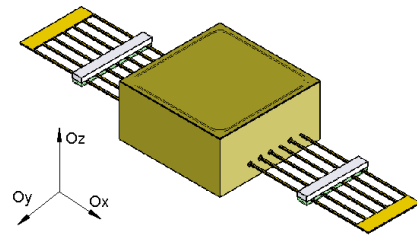




SPACE VCXO Series 200

Space qualified VCXO – Voltage Controlled Crystal Oscillator,
General Specification (rev 18 January 2010)



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General Specification

January 18th 2010

▣ Features

- Frequency Range : 10MHz to 100 MHz
- Supply Voltage : +5V or +12V
- Low Consumption : 20 mA max
- Overall frequency stability including initial setting, stability versus temperature, load and supply change and aging over 15 years: from +/- 50ppm to +/- 100ppm
- Absolute pulling range : from +/- 50ppm to +/- 140ppm
- Output Wave Form : sine 50 Ohms
- Output Level : from 0 to 8 dBm
- Manufacturing in accordance with:
 - MIL-PRF-55310 (Class 1, type 2, level S,B)
 - ECSS-Q-ST-70-08C and ECSS-Q-ST-70-38C

▣ Applications

- Transponders
- Converters
- 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

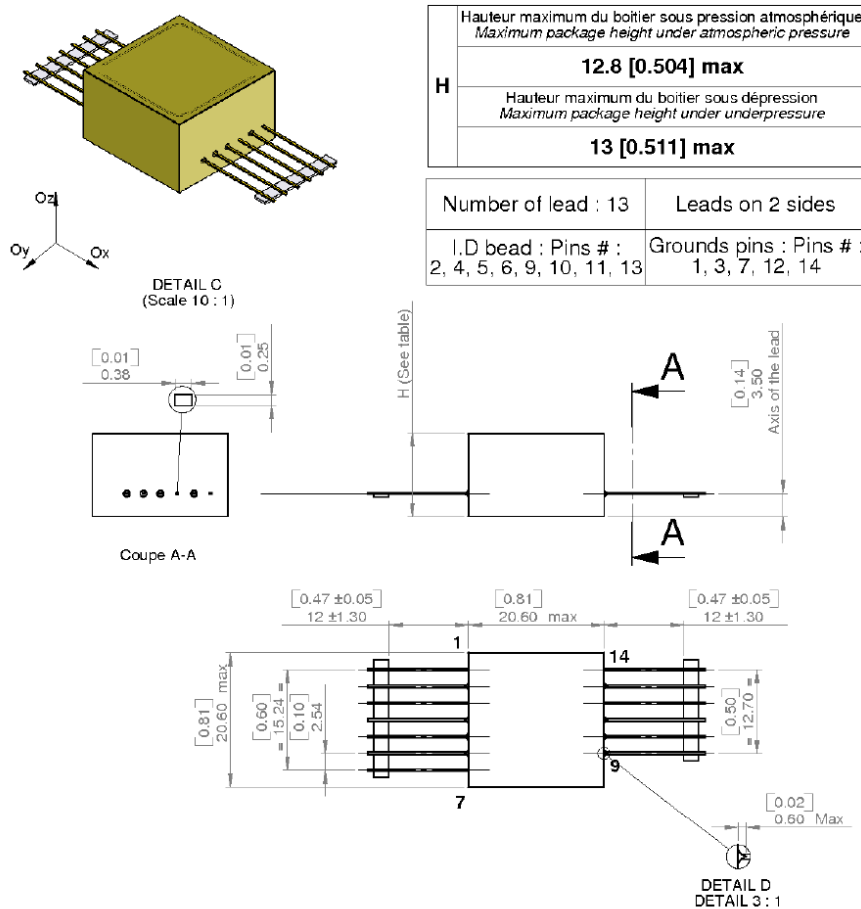


Figure 1 : Oscillator outline 1

Pin description

Pin number	Name	Function
4	Adj	External Adjustment Resistor
6	Vc	Control voltage Input
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 (50 Ω load)	dBm	0		8
Harmonics level	dBc			- 30
Spurious (offset > 50 Hz)	dBc			- 80
Phase noise in static conditions @ 40 MHz				
@ 1 Hz offset	dBc/Hz			
@ 10 Hz offset	dBc/Hz		- 75	-70
@ 100 Hz offset	dBc/Hz		- 105	-100
@ 1 kHz offset	dBc/Hz		- 135	-130
@ 10 kHz offset or greater	dBc/Hz		- 155	-150
Electrical pulling range (at Vc pin)				
With Vc= +/- 3V	ppm	±70		±200
Vc pin input impedance	Ω	10k		
Linearity	%	5		20
Free running mode				
Initial setting at Vc=0V	ppm			±10
Stability vs. temperature	ppm	±15		±25
Stability vs. 5 % supply voltage variation	ppm			0.1
Stability vs. 10 % load variation	ppm			0.1
Aging over first year	ppm	2		7
Aging over 15 years	ppb	10		50
Frequency adjustment with external resistor				
Relative frequency adjustment 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

DOCxxxFM 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		Harmonics	GO	NA	NA	GO	NA
24°C ±2°C		Non Harmonics	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
24°C ±2°C		Frequency pulling range	GO			GO	
-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

