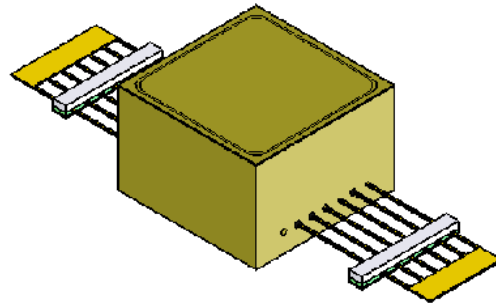




SPACE OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification (rev 26 January 2010)



▣ Features	2
▣ Applications	2
▣ Environmental conditions	2
▣ Mechanical characteristics	3
▣ Performance Characteristics	4
▣ Proposed Components quality levels	5
▣ Screening options according to MIL PRF55310	5
▣ Model philosophy	6
▣ Standard Tests	7
▣ Ordering part number definition	8



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
 General Specification

January 26th 2010

▣ Features

- Frequency Range : 35 MHz to 120 MHz
- Low consumption
- Supply Voltage : +9V or +12V
- Warm up Consumption : 2 Watt
- Maximum Steady state Consumption under vacuum : 0.8 Watt
- Overall Frequency Stability vs. Operating Temperature Range +/- 0.5ppm under vacuum
- Ageing : +/- 2 ppm over 15 years typical
- Output Wave Form : sine 50 Ohms
- Output Level : from 0 to 8 dBm
- Compatible with Flat pack TCXO pin-out
- 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
- Digital cards
- Converters
- Board calculators
- Synthesizers
- FGU

▣ Environmental conditions

Parameters	Unit	Minimum	Typical	Maximum
Operating temperature range	°C	- 40		+ 75
Storage temperature range	°C	- 55		+ 125
Shocks (half sine)		1500g, 0.5ms		
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		

OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

□ Mechanical characteristics

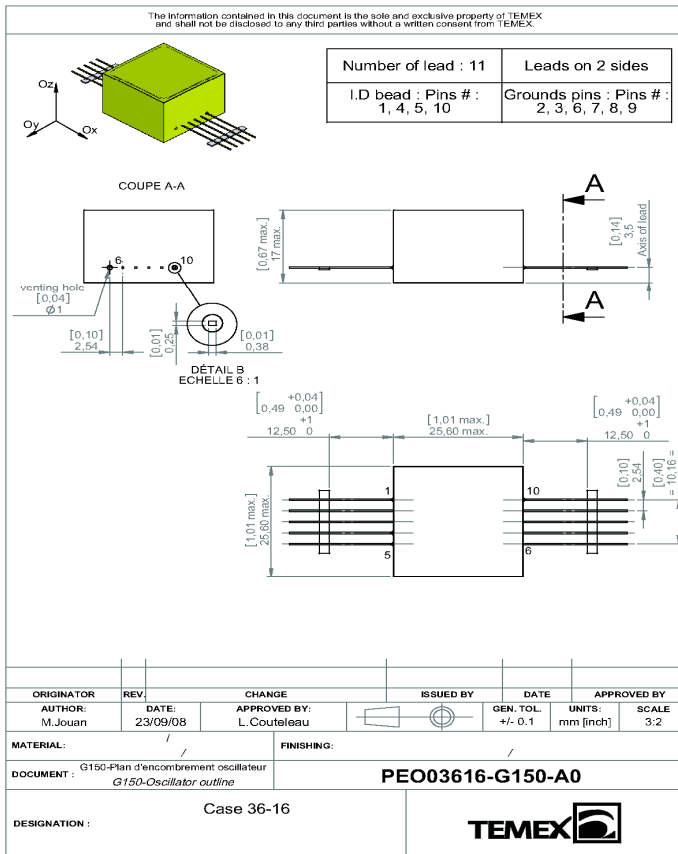


Figure 1 : Oscillator outline

Pin description

Pin number	Name	Function
1	Vcc	Supply Voltage input
2,3,6,7,8,9	Ground	Electrical & Mechanical Ground
4	Vref	Reference voltage output
5	Vc	Voltage control for electric tuning
10	Fout	Frequency Output



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

▣ Performance Characteristics

Electrical Parameters	Unit	Minimum	Typical	Maximum
Frequency output				
Nominal frequency range	MHz	35	40	100
Output level (50 Ω load)	dBm	0	6	8
Harmonics level	dBc			- 25
Spurious (offset > 50 Hz)	dBc			- 80
Phase noise in static conditions @ 100 MHz				
@ 1 Hz offset	dBc/Hz			-55
@ 10 Hz offset	dBc/Hz			-85
@ 100 Hz offset	dBc/Hz			- 115
@ 1 kHz offset	dBc/Hz			- 145
@ 10 kHz offset or greater	dBc/Hz			- 155
Allan variance				
@ 1s	ppb			0.02
Free running mode (Vctrl pin NC)				
Initial setting	ppm			±0.25
Stability vs. temperature	ppm	±0.05	±0.1	±0.5
Stability vs. 5 % supply voltage variation	ppm			0.01
Stability vs. 10 % load variation	ppm			0.01
Aging over first year	ppm			0.3
Aging over 15 years	ppm			2
Electrical tuning (Vctrl pin)				
Relative pulling frequency range	ppm	± 2.5		
Input impedance	Ω	10k		
Bandwidth	Hz	1k		
Linearity	%			20
Supply voltage (Vcc pin)				
Voltage range	V _{DC}	8.5	9	12.6
Supply power @ -20 °C under vacuum	W			0.8
Supply power @ warm up	W			2
Warm up time	mn			10



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

▣ 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



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

□ 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	Acceptance + Qualification testing	Acceptance testing	Acceptance testing + group C
Workmanship	IPC610	IPC610	ECSS-Q-ST-70-08 & 70-38	ECSS-Q-ST-70-08 & 70-38	ECSS-Q-ST-70-08 & 70-38	ECSS-Q-ST-70-08 & 70-38



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

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
under vaccum 24°C ±2°C		Frequency	GO	GO	GO	GO	NA
±24°C ±2°C		Pressure drift	GO	NA	NA	GO	NA
24°C ±2°C		Reference voltage	GO	NA	NA	GO	NA
24°C ±2°C		Output level	GO	GO	NA	GO	NA
-20°C ±2°C		Output level	NA	NA	NA	GO	NA
70°C ±2°C		Output level	NA	NA	NA	GO	NA
-20°C to +70°C		Output level vs. Temperature	NA	NA	NA	GO	NA
24°C ±2°C		Output level vs. Power	GO	NA	NA	GO	NA
under vaccum -20°C ±2°C		Warm up Consumption	NA	NA	NA	GO	NA
under vaccum -20°C ±2°C		Warm up Time	NA	NA	NA	GO	NA
under vaccum 24°C ±2°C		Steady state consumption	GO	GO	NA	GO	NA
under vaccum -20°C ±2°C		Steady state consumption	NA	NA	NA	GO	NA
24°C ±2°C Vadj=0V		Harmonics	GO	NA	NA	GO	NA
24°C ±2°C Vadj=0V		Non Harmonics	GO	NA	NA	GO	NA
24°C ±2°C Vadj init		Phase noise	GO	NA	NA	GO	NA
24°C ±2°C Vadj=0V		Frequency vs. load variation	GO	NA	NA	GO	NA
24°C ±2°C Vadj=0V		Frequency vs. power variation	GO	NA	NA	GO	NA
24°C ±2°C		Frequency Adjustment	GO	NA	NA	GO	NA
-40°C		Cold start	NA	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 Vadj=0V		Frequency vs. Temperature	NA	NA	NA	GO	NA



OCXO Series 400

Space qualified OCXO – Oven controlled Crystal Oscillator
General Specification

January 26th 2010

Ordering part number definition

The part number breakdown is defined as follows:

