LEO/ MEO Space Orbit OCXO

25 x 25mm Low Noise OCXO – Family Data Sheet

FEATURES

- Radiation Tolerant TID 50 kRad
- Radiation Tolerant SEE > 60 MeV cm^2/mg
- Superior Frequency Stability
- Ultra Low Phase Noise
- Low Acceleration Sensitivity
- 25 x 25mm Package

KYOCERA AVX's OCXO is specifically designed for commercial space Low Earth Orbit (LEO) and Mid Earth Orbits (MEO) applications, designed to be radiation tolerant for both Total Ionizing Dosage (TID) and Linear Energy Transfer (LET) typical of LEO/MEO orbits. The LEO/MEO Space OCXO offers excellent phase noise performance and low-g acceleration sensitivity.

HOW TO ORDER

KSP A N T E 100 M E A P B A B E

KAVX Space OCXO Series

Phase Noise
A, B, C (See Table)

Acceleration Sensitivity
N: > 1.0 ppb/g
G: < 0.3 ppb/g

Mounting
T: Through Hole
S: Gullwing SMT

E Package = 25mm x 25mm

Center Frequency
>20M: MHz to
100M: MHz

MHz

Supply Voltage = E: 5V

Type-Test Units
E: Engineering Model
F: Flight Model
Q: Qualification Model

Shipping Bulk/Hermetically Sealed

Output Type
A: Sine
C: CMOS/TTL

Operating Range
A: 0 to 70ºC
B: -20 to 70ºC
C: -40 to 85ºC
H: -10 to 60ºC

Frequency vs. Temperature
P: ±25ppb
F: ±100ppb

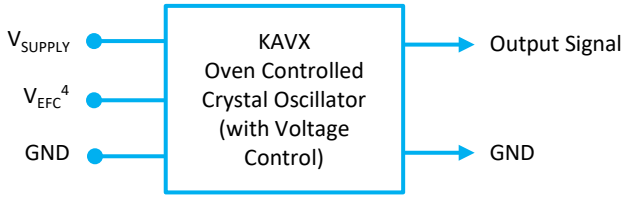
EFC
N: N/A
A: ±0.5ppm
B: ±1ppm
C: ±2ppm

1. *Not all combinations of options may be possible*
2. *Other options may be available*

APPLICATIONS

- LEO/MEO Satellite Master Clock
- LEO/MEO Satellite GPS Precision Timing Devices
- LEO/MEO Satellite Master Reference Oscillator
- LEO/MEO Satellite Radar
- LEO/MEO Satellite Weather Radar

BLOCK DIAGRAM



4. *If EFC Option "N" is used, connect VEFC to GND*

PERFORMANCE SPECIFICATIONS

Parameter	Conditions	Values			Unit
		MIN	TYP	MAX	
Frequency Range		>20		100	MHz
Initial Tolerance	100 MHz @ +25ºC (Nominal)			±250	ppb
Warm Up Time	To initial tolerance			3	Min
Frequency Stability					
vs. Temperature	Options p - (Max-Min)/2		±25		ppb
	Options E - (Max-Min)/2		±50		ppb
	Options F - (Max-Min)/2		±100		ppb
vs. Load	± 5% Δ in Load		±10		ppb
vs. Supply Voltage	± 5% Δ in supply		±10		ppb
ADEV (Short Term Stability)					
100 MHz	T = 1 second		8E-11		
Aging	After 30 Days Operation				
Per Day	100 MHz			±5.0	ppb
1st Year	100 MHz			±500	ppb
Supply Voltage (Vdd)	Option E	4.75	5	5.25	Vdc
Power Dissipation					
Start Up	@ +25ºC (Nominal)		2.5	3.0	W
Steady State	@ +25ºC (Nominal)		1.5		W
Electronic Frequency Control					
Voltage Range	Vdd = 5 Vdc	0	2.5	5	Vdc
Frequency Range	Option N	0			ppm
	Option A	±0.5			ppm
	Option B	±1.0			ppm
	Option C	±2.0			ppm
Slope			positive		
Input Impedance			100		kΩ
Linearity			10		%

5. *Values typical of 100MHz units unless defined within*

PERFORMANCE SPECIFICATIONS

Parameter	Conditions	Values			Unit
Output Characteristics (CMOS/TTL)		MIN	TYP	MAX	
High Output Level	Logic "1"	90% Vdd			Vdc
Low Output Level	Logic "0"			10% Vdd	Vdc
Rise/Fall Time				5	nSec
Duty Cycle		45	50	55	%
Load			15		pF
Output Characteristics (Sinusoid)		MIN	TYP	MAX	
Output Level		8	10		dBm
Spurious				-80	dBc
Harmonics				-30	dBc
Load		47.5	50	52.5	Ω

Parameter	Conditions	Values			Unit
Phase Noise		A[6,7]	B[6]	C	
Phase Noise (100 MHz)	Tested at +25°C (Nominal)				
	10Hz	-103	-100	-95	dBc/Hz
	100Hz	-133	-130	-125	dBc/Hz
	1kHz	-157	-155	-145	dBc/Hz
	10kHz	-172	-168	-160	dBc/Hz
	100kHz	-175	-172	-170	dBc/Hz

6. *Specific Phase Noise performance is subject to Export Control restrictions from the U.S.*
7. *Please contact Kyocera AVX to analyze Phase Noise requirements that must be lower*

ENVIRONMENTAL COMPLIANCE

Parameter	Conditions	Values			Unit
		MIN	TYP	MAX	
Operating Temperature	Option A	0		+70	°C
	Option B	-20		+70	°C
	Option C	-40		+85	°C
	Option H	-10		+60	°C
Qualification Temperatures	Powered "ON" Survivability	-50		+125	°C
Storage Temperature	Powered "OFF" Survivability	-55		+125	°C
Solderability	MIL-STD-202 Method 208				
Solvent Resistance	MIL-STD-202 Method 215				
Seal	MIL-STD-202 Method 112 Test Condition D				
Shock	MIL-STD-202G Method 213 Test Condition C[8]				
Random Vibration	MIL-STD-810G Method 514 Test Procedure I[8]				
Sinusoidal Vibration	MIL-STD-202G Method 204 Test Condition A[8]				
MTTF	Calculated using MIL-HDBK-217		114,914,394		Hours
Acceleration Sensitivity	10MHz output Vibration profile: $0.001G^2/Hz$ 10Hz to 2kHz		1.0		ppb/g
	"G" Option			0.3	ppb/g
Radiation Tolerance		MIN	TYP	MAX	Unit
Total Ionizing Dose (TID)	Radiation tolerant up to total mission life dosage			50[9]	kRad
Single Event Effects (SEE)	SEE immune by design up to Linear Energy Transfer (LET)	60[9]			MeV · cm^2/mg

8. *Other shock and vibration profiles have been tested, please contact Kyocera AVX to discuss other profiles as required.*
9. *Kyocera AVX LEO/MEO Space OCXO is built using AEC qualified (or higher) passives and active components. The parts list is controlled (and available upon request). The active components in the BOM that are subject to radiation degradation have been previously up-screened to the radiation levels listed above; however, due to the potential for lot-to-lot variation, actual radiation tolerance may vary. Radiation Lot Acceptance Testing (RLAT) is available as an additional test charge if required by the customer's radiation environment. Please contact Kyocera AVX to request a formal quote for RLAT program.*

TYPE-TESTING SPECIFICATIONS

Kyocera AVX Part Number	Description	Group Testing Performed		
KSPXXXEXXXMEXXXXBE	Engineering Model	I		
KSPXXXEXXXMEXXXXBF	Flight Model	I	II	
KSPXXXEXXXMEXXXXBQ	Qualification Model	I	II	III

Group I – Functional Testing	
Test	Method
Pre-Cap Inspection (Optional)[10]	N/A
Electrical Functional Testing	Kyocera AVX Datasheet Performance Specifications

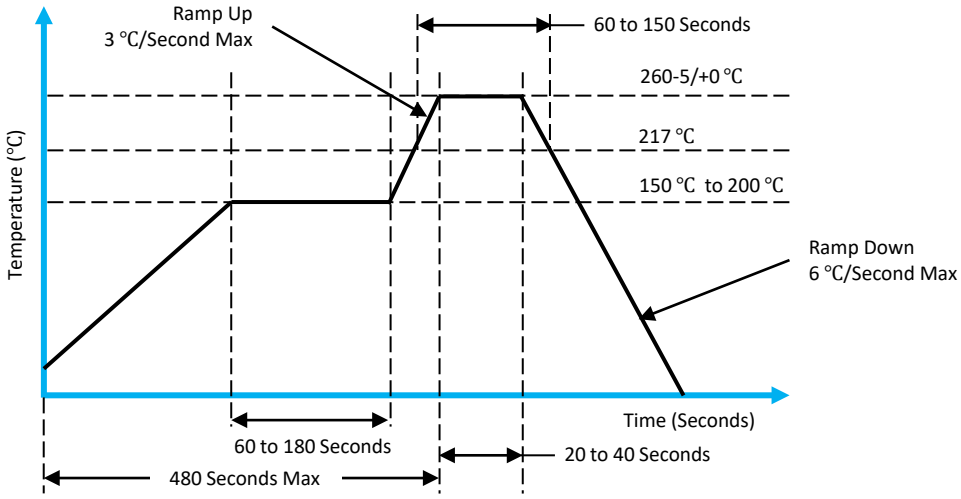
Group II – Flight Screening	
Test	Method
Thermal Shock	MIL-STD-202 Method 107, Condition A Profile 1
Burn In	MIL-STD-883 Method 1015, Condition B 160 Hrs.
Electrical Functional Testing	Kyocera AVX Datasheet Performance Specifications
Gross Leak Testing	MIL-STD-202 Method 112 Condition D

Group III – Qualification Testing	
Test	Method
Random Vibration[11]	MIL-STD-810G Method 514, Procedure 1
Sinusoidal Vibration[11]	MIL-STD-202G Method 204, Condition A
Shock[11]	MIL-STD-202G Method 213, Condition C
Thermal Shock	MIL-STD-202 Method 107, Condition A Profile 1
Storage Temperature	24 Hrs. Soak at -55°C and +125°C
Resist to Soldering Heat	MIL-STD-202 Method 210, Condition A-D
Terminal Strength	MIL-STD-202 Method 211A, Condition A-E
Solderability	MIL-STD-202 Method 208
Electrical Functional Testing	Kyocera AVX Datasheet Performance Specifications
Life Test	MIL-STD-883 Method 1005, Condition B (1,000 Hrs.)

10. Please state the requirement for Pre-Cap inspection on the Purchase Order (PO).
11. Other shock and vibration profiles have been tested, please contact Kyocera AVX to discuss other profiles as required.
12. Additional testing can be performed at an additional charge upon request, please contact Kyocera AVX.
13. All Flight Models (FM) will be delivered with traceability documentation.
14. Upon request Kyocera AVX will provide a copy of the DPL, DCL and DML documentation.

Note: Values typical of 10MHz units

ACCEPTABLE REFLOW PROFILE



15. Profile Classification per IPC/JEDEC J-STD-020C Pb-Free Small Body Assembly

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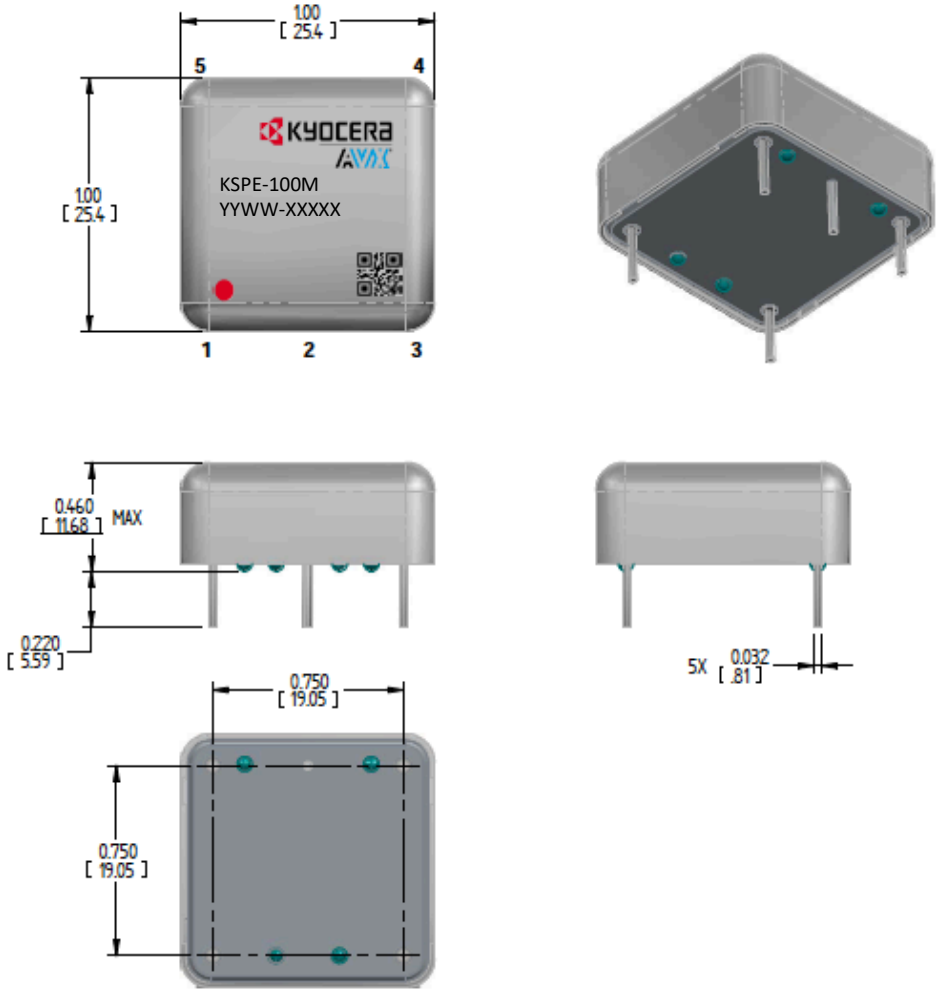
MECHANICAL SPECIFICATIONS – THROUGH HOLE



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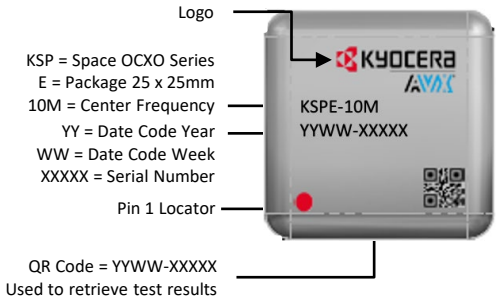
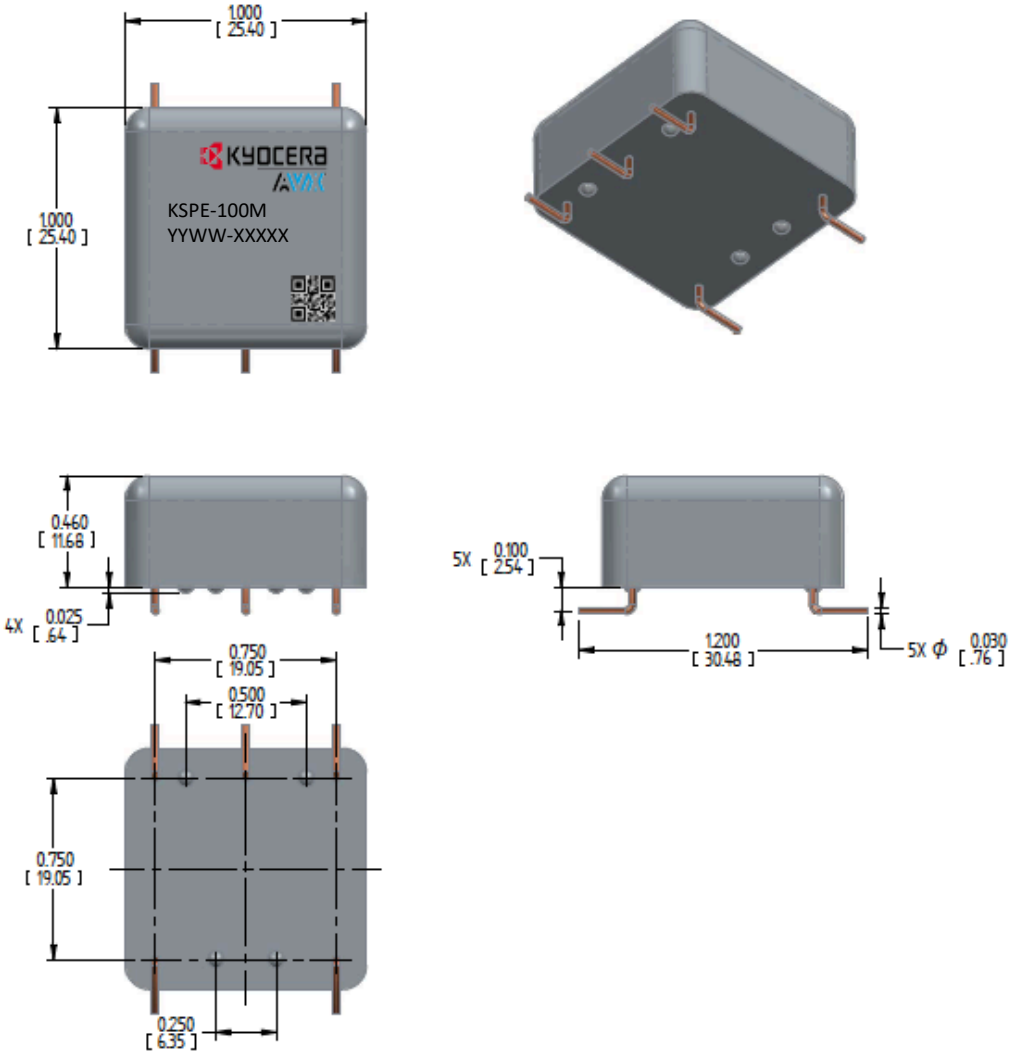


Tolerances (mm) .X = ± 0.5, .XX = ±0.2 unless otherwise specified

PIN	FUNCTION
1	RF Output
2	Ground
3	EFC / N.C.
4	N.C.
5	Supply Voltage

Notes:
- Weight = 16g
- Board washing is acceptable with the hermetically sealed device

MECHANICAL SPECIFICATIONS – SURFACE MOUNT (GULLWING)



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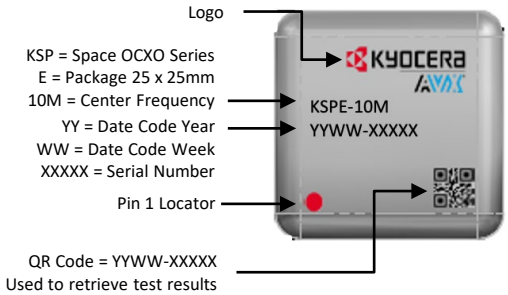

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