



M623x Series 9.0x14 mm, TCXO/TCVCXO

FEATURES

Frequencies from 10 MHz to 125 MHz
 Supports both TCXO and VCTCXO formats
 Tight stability ± 0.1 ppm over -40°C to $+85^{\circ}\text{C}$
 3.0 V and 3.3 V versions
 Low phase noise performance
 Low G-sensitivity (0.6 ppb/G) version available

APPLICATIONS

Telecom / Datacom
 Industrial Controls
 Communications & Navigation

ORDERING INFORMATION

	M623x	2	J	F	C	K	00.0000 MHz
Product Series M6231 = 3.3 V M6232 = 3.0 V							
Temperature Range 1: 0°C to $+70^{\circ}\text{C}$ 6: -20°C to $+70^{\circ}\text{C}$ 2: -40°C to $+85^{\circ}\text{C}$		3: -55°C to $+105^{\circ}\text{C}$ 4: -55°C to $+125^{\circ}\text{C}$					
Stability L: ± 4.6 ppm H: ± 2.5 ppm K: ± 2.0 ppm	J: ± 1.0 ppm G: ± 0.5 ppm P: ± 0.3 ppm	M: ± 0.20 ppm Q: ± 0.14 ppm N: ± 0.10 ppm					
Output Type T: Voltage Control With Tristate F: No Voltage Control With Tristate							
Output Waveform C: HCMOS S: Clipped Sine Wave							
Package/Lead Configurations K: FR-4 leadless Package							
Frequency (Customer Specified)							

Example Part Number: M62312JFCK 10.0000 MHz

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Frequency Range	F ₀	10		125	MHz	
Frequency Stabilities						
Initial Accuracy		-1.0		+1.0	ppm	@ +25°C
vs. Operating Temperature	ΔF/F	See ordering information			ppm	(F _{MAX} -F _{MIN})/2 ¹
vs. Reflow		-1		+1	ppm	2 reflows max
vs. Supply Voltage			±0.02	±0.1	ppm	5% voltage variation
vs. Load			±0.02	±0.1	ppm	5% load variation
vs. Aging (First Year)		-1.0		+1.0	ppm	F ₀ ≤ 20 MHz ²
vs. Aging (First Year)		-2.0		+2.0		F ₀ > 20 MHz
vs. Aging (10 Year)		-3.0		+3.0	ppm	F ₀ ≤ 20 MHz
vs. Aging (10 Year)		-5.0		+5.0		F ₀ > 20 MHz
RF Output						
Output Logic Level (HCMOS)	V _{OL} V _{OH}	80		20	%V _{CC} %V _{CC}	I _{OL} = +4mA, V _s = +3.0 V I _{OH} = -4mA, V _s = +3.0 V
Output Logic Level (Clipped Sinewave)	0.8				V _{pk-pk}	
Waveform Symmetry (duty cycle)	T _{DC}	40	50	60	%	@ 50% of waveform (CMOS)
Rise/Fall Time	T _R /T _F			6.5	ns	CMOS
Output Load			15 10/10		pF kΩ/pF	CMOS ³ Clipped Sinewave Output ³
Tristate Function		80% or Open			%V _{CC}	Output Enabled
				20	%V _{CC}	Output Disabled: to HIGH Impedance (Z)
Tristate Leakage Current		-100		+100	μA	
Input Leakage Current		-50		+50	μA	
Start-up Time	T _{SU}			10	ms	
Frequency Adjustment						
Control Voltage Range	V _c	0.3		2.7	V	@ 3.0 V supply
		0.3		3.0	V	@ 3.3 V supply
Tuning Range		±5.0			ppm	VCTCXO only ⁴
Linearity				5	%	
Modulation Bandwidth		2			kHz	
Input Resistance		100			kΩ	
Phase Noise						
SSB Phase Noise (measured @ 26 MHz)			-98		dBc/Hz	@ 10Hz Offset
			-127		dBc/Hz	@ 100Hz Offset
			-148		dBc/Hz	@ 1kHz Offset
			-156		dBc/Hz	@ 10kHz Offset

ELECTRICAL SPECIFICATIONS

Operating Voltage and Current

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Operating Voltage	V _{CC}	3.135	3.300	3.465	V	M6231
		2.850	3.000	3.150	V	M6232
Operating Current	I _C			4.4	mA	HCMOS @ 16 MHz
				5.5	mA	HCMOS @ 26 MHz
				7.8	mA	HCMOS @ 50 MHz
				3.5	mA	Clipped Sine @ 16 MHz
				3.9	mA	Clipped Sine @ 26 MHz
				5.0	mA	Clipped Sine @ 50 MHz
				40	mA	Fo > 50MHz

Temperature

Operating Temperature	T _A	See ordering information			°C	
Storage Temperature	T _S	-55		+125	°C	

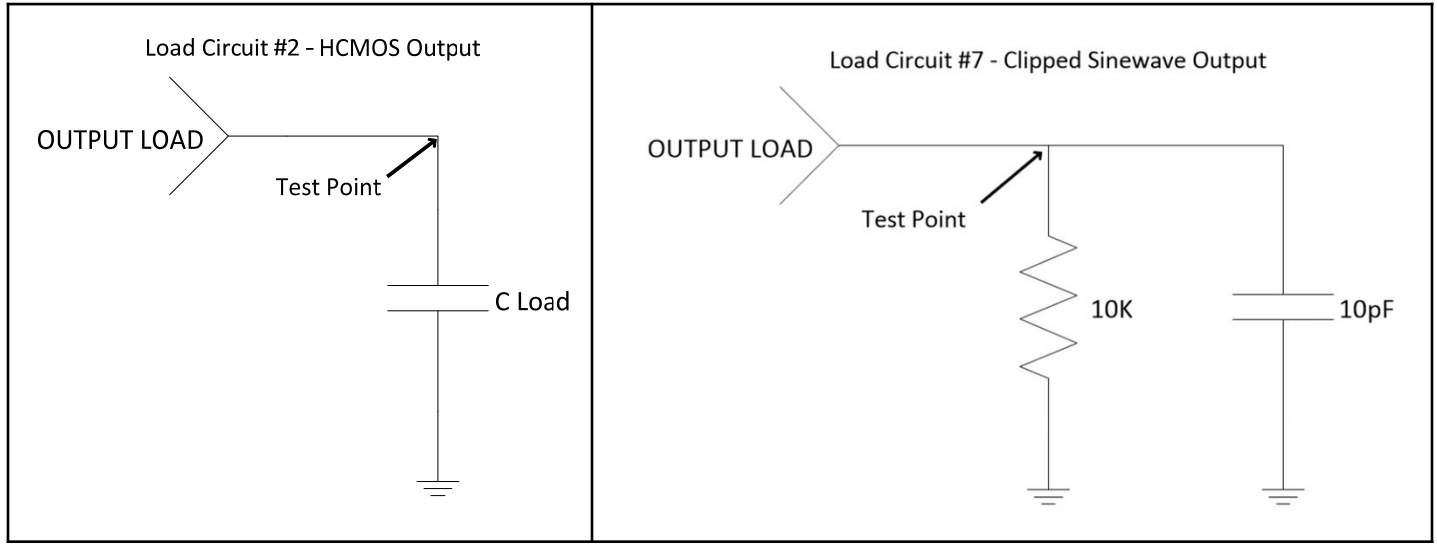
Notes

Note 1	Contact factory for less than ±1 ppm frequency stability.
Note 2	Contact factory for less than ±1 ppm frequency aging.
Note 3	Refer to the load circuit diagram in this data sheet.
Note 4	Contact factory for other tuning range options.

ENVIRONMENTAL CONDITIONS

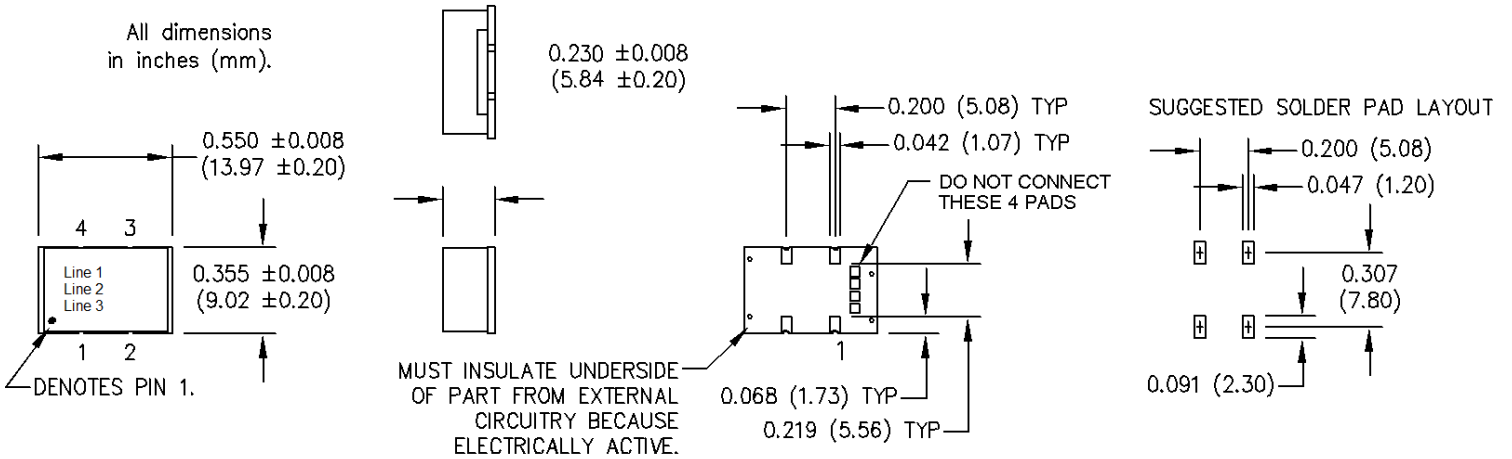
Shock	Per MIL-STD-202, Method 213, Condition C (100 g's, 6msec duration, ½ sinewave)
Vibration	Per MIL-STD-202, Method 201 & 204 Condition D (20 g's from 10-2000Hz)
Solderability	Per EIAJ-STD-002
Max. Soldering Conditions	See solder profile, Figure 1
Package Type	4-Pad FR-4 4-pad 9x14mm
Pad Termination	ENIG over Cu

LOAD CIRCUIT DIAGRAMS



MECHANICAL AND PIN OUT INFORMATION

Pad	Function
1	Voltage Control or N/C
2	Ground
3	Output
4	Supply Vcc+



LEAD FREE SOLDER PROFILE

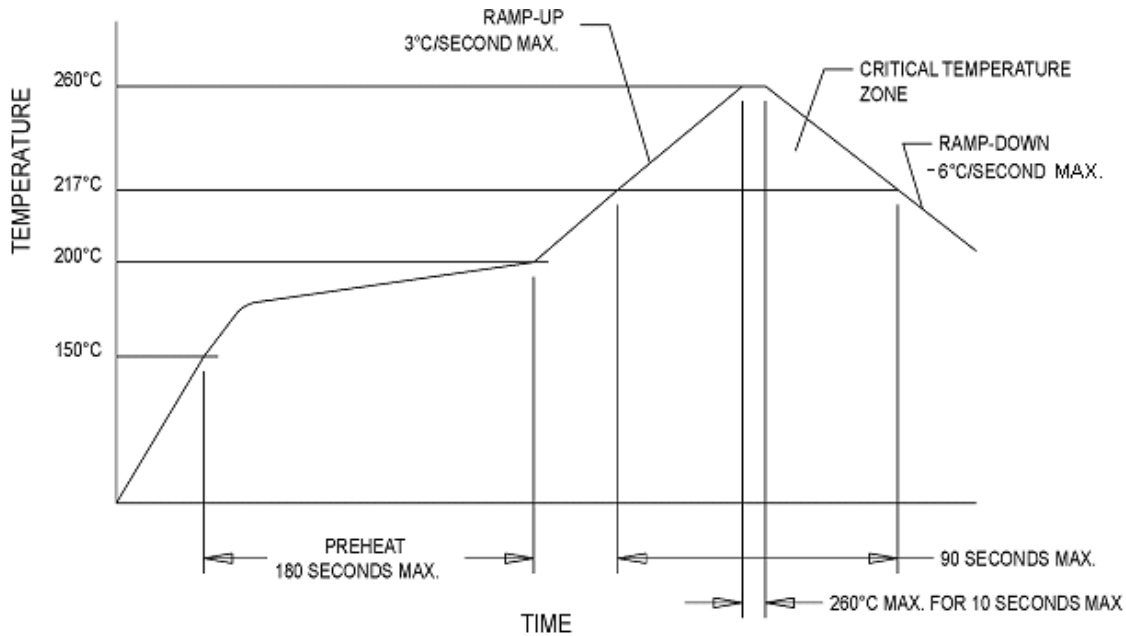
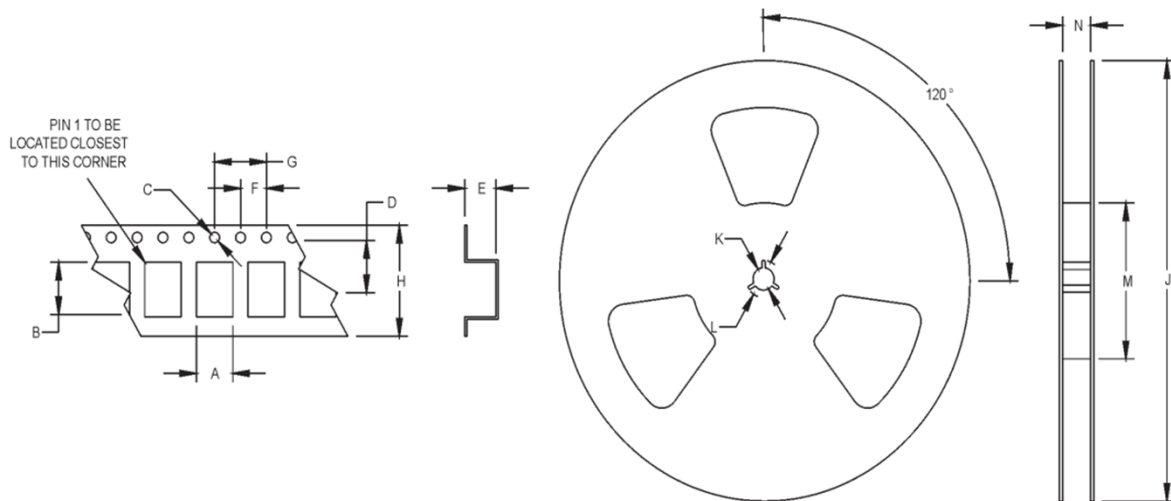


Figure 1

TAPE AND REEL SPECIFICATIONS

All units in mm



A	B	C	D	E	F	G	H	J	K	L	M
9.54	14.62	1.5	11.5	5.4	4	12	24	330	6.5		100

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