



Introduces

M320x Series PECL/LVDS/CML VCXO

Featuring **QiK Chip™** Technology

Features:

- Superior Jitter Performance (comparable to SAW based)
- Frequencies from 150 MHz to 1.4 GHz
- Designed for a short 2 week cycle time

Phase Lock Loop Applications:

- Telecommunications such as SONET / SDH / DWDM / FEC / SERDES / OC-3 thru OC-192
- Wireless base stations / WLAN / Gigabit Ethernet
- Avionic flight controls and military communications

MtronPTI

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M320x Series

PECL/LVDS/CML Voltage Controlled Crystal Oscillator – 3.3/2.5/1.8 Volt – 5x7/9x14 mm

Product Specifications

Product Features:

- Superior *Jitter Performance* comparable to SAW-based VCSCO products (0.50 pS typical at 622.08 MHz)
- *Frequencies* from 150.0000MHz to 1.4000GHz
- *APR (Absolute Pull Range)* of ± 50 or ± 100 ppm over industrial temperature range
- Crystal resonator based product offering *far better Stability* than SAW
- Designed for *Short Cycle Time* manufacturing (2 weeks or less)
- 0.01 μ F bypass capacitor from Vcc to ground built into 9x14 packages

Description:

The M320x series voltage controlled crystal oscillators are designed specifically for high performance PLL applications. The M320x is available in PECL, LVDS, and CML output while featuring MtronPTI's *QiK Chip™* Technology offering significantly reduced cycle time.

Applications:

- Telecommunications such as SONET / SDH / DWDM / FEC / SERDES / OC-3 thru OC-192
- Wireless base stations / WLAN / Gigabit Ethernet
- Avionic flight controls and communications
- Test Equipment and Instrumentation

Ordering Information:

Part Number Example: **M320** **0** **6** **A** **G** **P** **J** **1000.000000MHz**

M320	0	6	A	G	P	J	1000.000000 MHz	
Product Family	Supply Voltage	Operating Temperature	Absolute Pull Range (APR)	Output Type		Logic Type	Package/Lead Configuration	Frequency
	0 3.3 V 1 2.5 V 2 1.8 V	2 -40°C to +85°C 6 -20°C to +70°C	A ± 50 ppm B ± 100 ppm	G Complementary Enable High (Pad 2) M Complementary Enable Low (Pad 2) U Complementary Output		P PECL L LVDS M CML	J 9x14 mm J-Lead	150 – 1400 MHz

Part Number Example: **M32006ABPJ – 1000.000000 MHz**

M320x Series PECL/LVDS/CML Voltage Controlled Crystal Oscillator – 3.3/2.5/1.8 Volt – 9x14 mm

Applications Note:

The MtronPTI M320x series of voltage controlled crystal oscillators, featuring *QiK Chip™* technology, provides for extremely low jitter of 0.50 ps RMS, typical at 622.08 MHz. For applications requiring low jitter, frequencies from 150 MHz to 1.4 GHz are available. LVPECL, LVDS, or CML compatible outputs, as well as operating voltage of 1.8 V, 2.5 V, and 3.3 V are also options on the M310x.

The M320x is available with a standard APR of ± 50 ppm and ± 100 ppm, over the industrial operating temperature range of -40°C to $+85^{\circ}\text{C}$. The M320x achieves this level of performance by utilizing an AT-cut crystal. An enable/disable function is also an available option on the M320x. An internal 0.01 μF by-pass capacitor also assures optimum noise suppression on the supply voltage pad.

The superior integrated jitter performance of 0.50 pS RMS, typical at 622.08 MHz, makes the M320x suitable for 10 Gig-E, broadband networks, network switches, SONET, SDH, SERDES, DWDM, FEC, WLAN, and OC-3 thru OC-192 systems. The M320x is available in a six-J-lead, 9x14 mm, ceramic, surface mount package, that is RoHS and $+260^{\circ}\text{C}$ reflow compatible (see page 4, J package drawing). Figures 1 and 2 below show load termination conditions for LVPECL and LVDS. The M320x oscillators are backward compatible to many of the existing products in the industry from Vectron, Epson, and others.

For superior performance in a high frequency clock oscillator, the M310x is a logical choice for designers. The unique design architecture allows the M320x fast turn around on engineering design samples, as well as production quantities in 2 weeks or less.

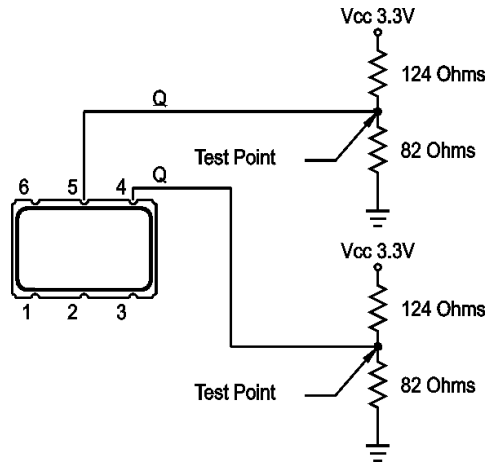


Figure 1. 3.3V LVPECL Load Circuit

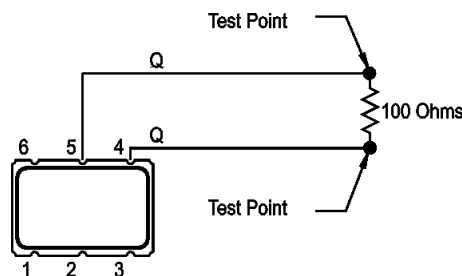


Figure 2. LVDS Load Circuit

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M320x Series PECL/LVDS/CML Voltage Controlled Crystal Oscillator – 3.3/2.5/1.8 Volt – 9x7.0x1.4 mm

Performance Characteristics:

PARAMETER	Symbol	Min.	Typ.	Max.	Units	Condition/Notes
Frequency Range	F	150		1400	MHz	See Note 1
Operating Temperature	T _A	(See ordering information)				
Storage Temperature	T _S	-55		+125	°C	
Frequency Stability	ΔF/F		±25		ppm	
Aging						
1st Year		-3		+3	ppm	
Thereafter (per year)		-1		+1	ppm	
Pullability/APR		(See ordering information)				
Control Voltage	V _c	0.18	0.90	1.62	V	@ 1.8V V _{cc}
		0.25	1.25	2.25	V	@ 2.5V V _{cc}
		0.30	1.65	3.0	V	@ 3.3V V _{cc}
Linearity			1	5	%	Positive Monotonic
Modulation Bandwidth	f _m	20			KHz	-3 dB bandwidth
Input Impedance	Z _{in}	500k	1M		Ohms	@ DC
Supply Voltage	V _{cc}	1.71	1.8	1.89	V	
		2.375	2.5	2.625	V	
		3.135	3.3	3.465	V	
Input Current	I _{cc}			125	mA	PECL/LVDS/CML
Load		50 Ohms to (V _{cc} -2) V _{dc} 100 Ohm differential load				See Note 3 PECL Waveform LVDS/CML Waveform
Symmetry (Duty Cycle)		45		55	%	@ 50% of waveform
Output Skew			TBD			
Differential Voltage		350	425 TBD	500	mVppd	LVDS CML
Common Mode Output Voltage	V _{cm}		1.2		V	LVDS
Logic "1" Level	V _{oh}	V _{cc} -1.02			V	LVPECL
Logic "0" Level	V _{ol}			V _{cc} -1.63	V	LVPECL
Rise/Fall Time	Tr/Tf		0.23	0.50	ns	@ 20/80% LVPECL
Enable Function		80% V _{cc} min. or N/C: output active 20% V _{cc} max: output disables to high-Z				Output Option G
		20% V _{cc} max: output active 80% V _{cc} min: output disables to high-Z				Output Option M
Start up Time			10		ms	
Phase Jitter @ 622.08 MHz	φ _J		0.50		ps RMS	Integrated 12 kHz – 20 MHz

Note 1: Contact factory for exact frequency availability over 945 MHz.

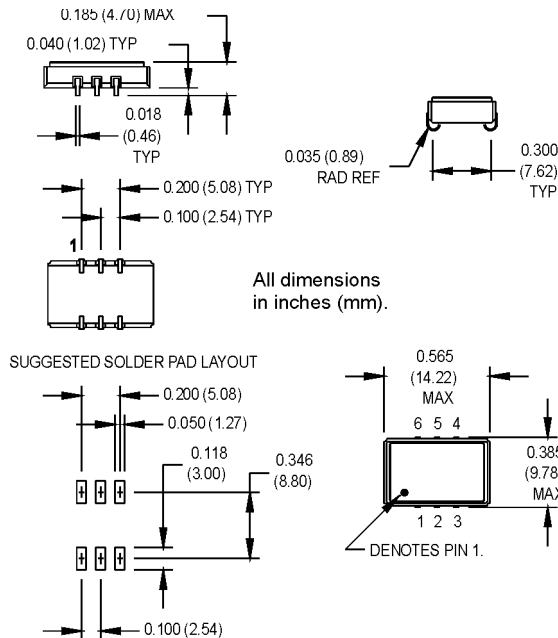
Note 2: APR specification is inclusive of initial tolerance, deviation over temperature, shock, vibration, supply voltage, and aging for one year at 50°C mean ambient temperature.

Note 3: See Load Circuit Diagram in this Datasheet. Consult factory with nonstandard output load requirements.

M320x Series PECL/LVDS/CML Voltage Controlled Crystal Oscillator – 3.3/2.5/1.8 Volt – 9x7.62x1.4 mm

Product Dimensions & Pinout Information:

- Pin1: Voltage Control
- Pin2: Enable/Disable (or N/C)
- Pin3: Ground
- Pin4: Output Q (PECL, LVDS, CML)
- Pin5: Output Q̄ (PECL, LVDS, CML)
- Pin6: Vcc



Handling Information:

Although protection circuitry has been designed into the M320 VCXO, proper precautions should be taken to avoid exposure to electrostatic discharge (ESD) during handling and mounting. MtronPTI utilizes a human-body model (HBM) and a charged-device model (CDM) for ESD-susceptibility testing and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used to define the mode. Although no industry-wide standard has been adopted for the CDM, a standard HBM (resistance = 1500, capacitance = 100 pF) is widely used and therefore can be used for comparison purposes. The HBM ESD threshold presented here was obtained using these circuit parameters.

Model	ESD Threshold, Minimum	Unit
Human Body	1500*	V
Charged Device	1500*	V

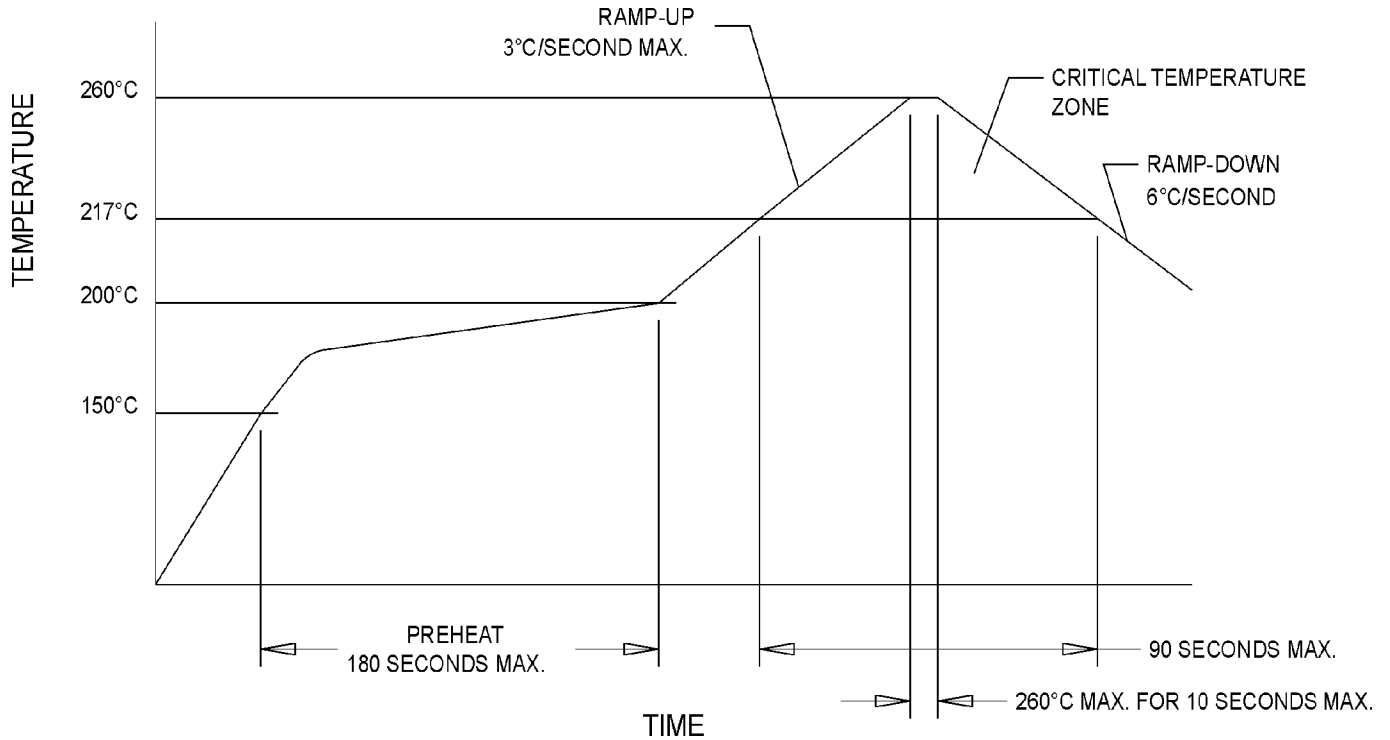
* MIL-STD-883D, Method 3015, Class 1

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Solder Profile:



Quality Parameters:

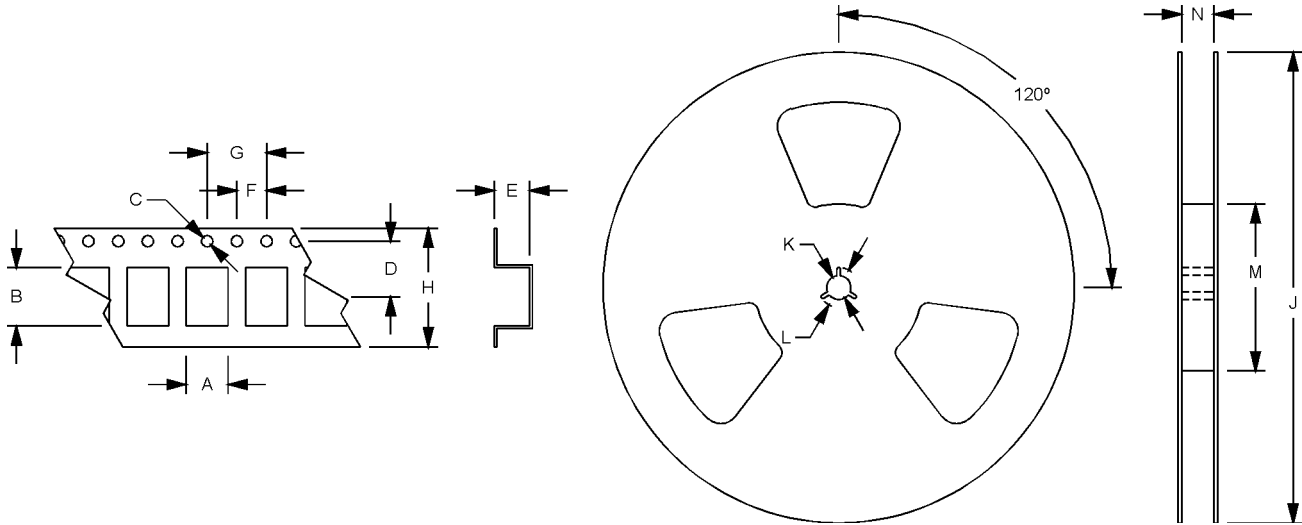
Environmental Specifications/Qualification Testing Performed on the M320 VCXO		
Test	Test Method	Test Condition
Electrical Characteristics	Internal Specification	Per Specification
Frequency vs. Temperature	Internal Specification	Per Specification
Mechanical Shock	MIL-STD-202, Method 213, C	100 g's
Vibration	MIL-STD-202, Method 201-204	10 g's from 10-2000 Hz
Thermal Cycle	MIL-STD-883, Method 1010, B	-55 Deg. C to +125 Deg. C, 15 minute Dwell, 10 cycles
Aging	Internal Specification	168 Hours at 105 Degrees C
Gross Leak	MIL-STD-202, Method 112	30 Second Immersion
Fine Leak	MIL-STD-202, Method 112	Must meet 1×10^{-5}
Solderability	MIL-STD-883, Method 2003	8 Hour Steam Age – Must Exhibit 95% coverage
Resistance to Solvents	MIL-STD-883, Method 2015	Three 1 minute soaks
Terminal Pull	MIL-STD-883, Method 2004, A	2 Pounds
Lead Bend	MIL-STD-883, Method 2004, B1	1 Bending Cycle
Physical Dimensions	MIL-STD-883, Method 2016	Per Specification
Internal Visual	Internal Specification	Per Internal Specification

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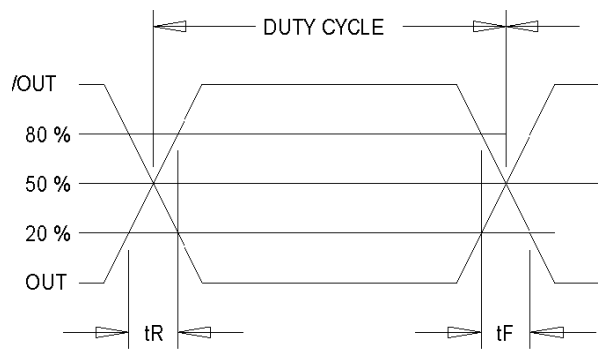
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M320x Series PECL/LVDS/CML Voltage Controlled Crystal Oscillator – 3.3/2.5/1.8 Volt – 9x14 mm

Tape and Reel Specifications:



Product	A	B	C	D	E	F	G	H	I	J	K	L
M320x	6.51	9.29	1.5	7.5	2.8	4	8/12	16	180-330	13	21	60-100



Output Waveform: LVDS/CML/PECL

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