

M220x Series

9x14 mm, 3.3/2.5/1.8 Volt, LVPECL/LVDS/CML,
Clock Oscillator

Product Features

- Featuring **QiK Chip™** Technology
- From order to ship in 2 weeks
- Superior Jitter Performance (less than 0.25 ps RMS, 12 kHz - 20 MHz)
- SAW replacement - better performance
- Frequencies from 150 MHz to 1.4 GHz



QiK Chip™



Product Description

The 220x series of oscillators are 9x14 J-Lead oscillators designed with the QiK Chip™ technology. The QiK Chip™ technology was specifically designed for crystal based oscillators to provide low jitter performance (as low as 0.25 ps RMS) and a wide range of frequency support (150.00 MHz to 1.4 GHz) and provides a break-through in lean manufacturing enabling product to be provided in less than 2 weeks. The M220x provides design engineers with the stability needed in their advanced applications and supports the need for parts to be supplied quickly so that the rest of their circuit design can be solidified.

Product Applications

- Telecommunications such as SONET / SDH / DWDM / FEC / SERDES / OC-3 thru OC-192
- 1-2-4-10 Gigabit Fibre Channel
- Wireless Base Stations / WLAN / Gigabit Ethernet
- Avionic Flight Controls
- Military Communications
- Clock and Data Recovery
- SD/HD Video
- FPGA/ASIC Clock Generation
- Test and Measurement Equipment

Product Ordering Information

Ordering Information		00.0000 MHz	
		M220	0 6 8 B P J
Product Series			
Supply Voltage	0: 3.3 V 1: 2.5 V 2: 1.8 V		
Temperature Range	2: -40°C to +85°C 6: -20°C to +70°C		
Stability	4: ±50 ppm 3: ±100 ppm 8: ±20 ppm		
Enable/Disable	B: Enable High (pin 1) G: Enable High (pin 2) S: Enable Low (pin 1) M: Enable Low (pin 2) U: No Enable/Disable		
Logic Type	P: LVPECL L: LVDS M: CML		
Package/Lead Configuration	J: 9x14 mm J-lead		
Frequency (customer specified)			

M2200Sxxx, M2201Sxxx, M2202Sxxx - Contact factory for datasheets.

Performance Characteristics

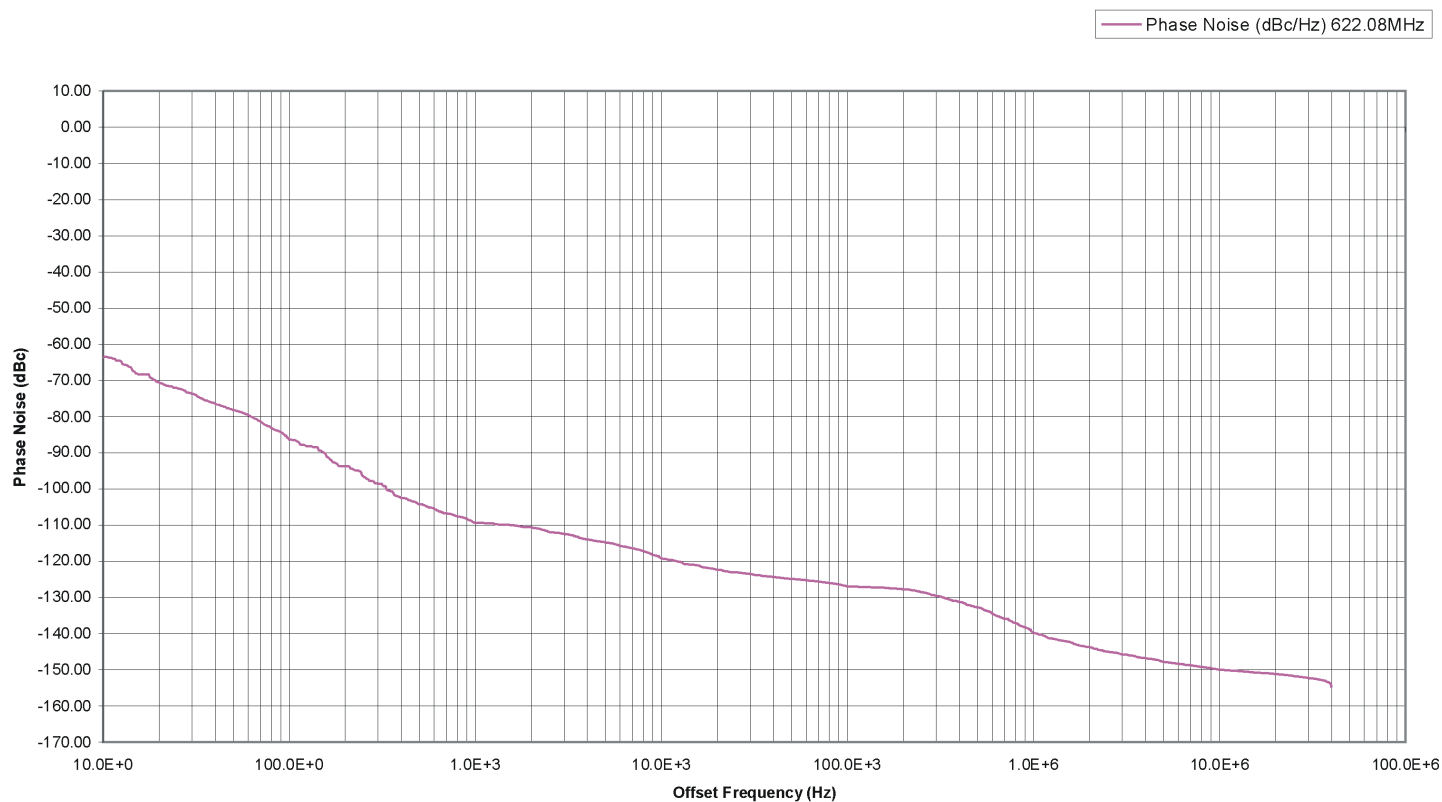
	Electrical Specifications						
	PARAMETER	Symbol	Min.	Typ.	Max.	Units	Condition/Notes
	Frequency Range	F	150		1400	MHz	See Note 1
	Operating Temperature	T _A	(See ordering information)				
	Storage Temperature	T _S	-55		+125	°C	
	Frequency Stability	ΔF/F	(See ordering information)				
	Aging						
	1st Year		-3		+3	ppm	
	Thereafter (per year)		-1		+1	ppm	
	Supply Voltage	V _{CC}	1.71 2.375 3.135	1.8 2.5 3.3	1.89 2.625 3.465	V V V	LVDS/CML
	Input Current	I _{CC}			125	mA	LVPECL/LVDS/CML
	Load		50 Ohms to (V _{CC} - 2) V _{DC} 100 Ohm differential load				See Note 3 LVPECL Waveform LVDS/CML Waveform
	Symmetry (Duty Cycle)		45		55	%	LVPECL – V _{DD} -1.3 V LVDS – 1.25 V
	Output Skew			20 15 20		ps ps ps	LVPECL CML LVDS
	Differential Voltage	V _{OD}	250	350	450	mV	LVDS
		V _{OD}	0.7	.095	1.20	V _{PP}	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	T _r /T _f		0.23	0.50	ns	@ 20/80% LVPECL
	Enable Function		80% V _{CC} min or N/C: Output active 0.5V max: Output disables to high-Z				Output Option B or G
			0.5V max or N/C: Output active 80% V _{CC} min: Output disables to high-Z				Output Option S or M
	Start up Time				10	ms	
	Phase Jitter @ 622.08 MHz	φ _J		0.25		ps RMS	Integrated 12 kHz – 20 MHz
	Phase Noise			-60 -97 -107 -116 -121 -134 -146 -148			@ 622.08 MHz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
Environmental	Mechanical Shock	Per MIL-STD-202, Method 213, Condition C (100 g's, 6 mS duration, ½ sinewave)					
	Vibration	Per MIL-STD-202, Method 201 & 204 (10 g's from 10-2000 Hz)					
	Hermeticity	Per MIL-STD-202, Method 112, (1x10 ⁻⁸ atm. cc/s of Helium)					
	Thermal Cycle	Per MIL-STD-883, Method 1010, Condition B (-55°C to +125°C, 15 min. dwell, 10 cycles)					
	Solderability	Per EIAJ-STD-002					
	Max Soldering Conditions	See solder profile, Figure 1					

Note 1: Contact factory for standard frequency availability over 945 MHz

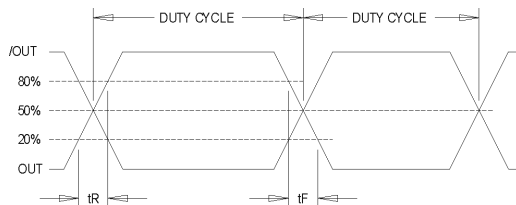
Note 2: Stability is inclusive of initial tolerance, deviation over temperature, shock, vibration, supply voltage, and aging for one year at 50°C mean ambient temperature.

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

Phase Noise Plot



Output Waveform

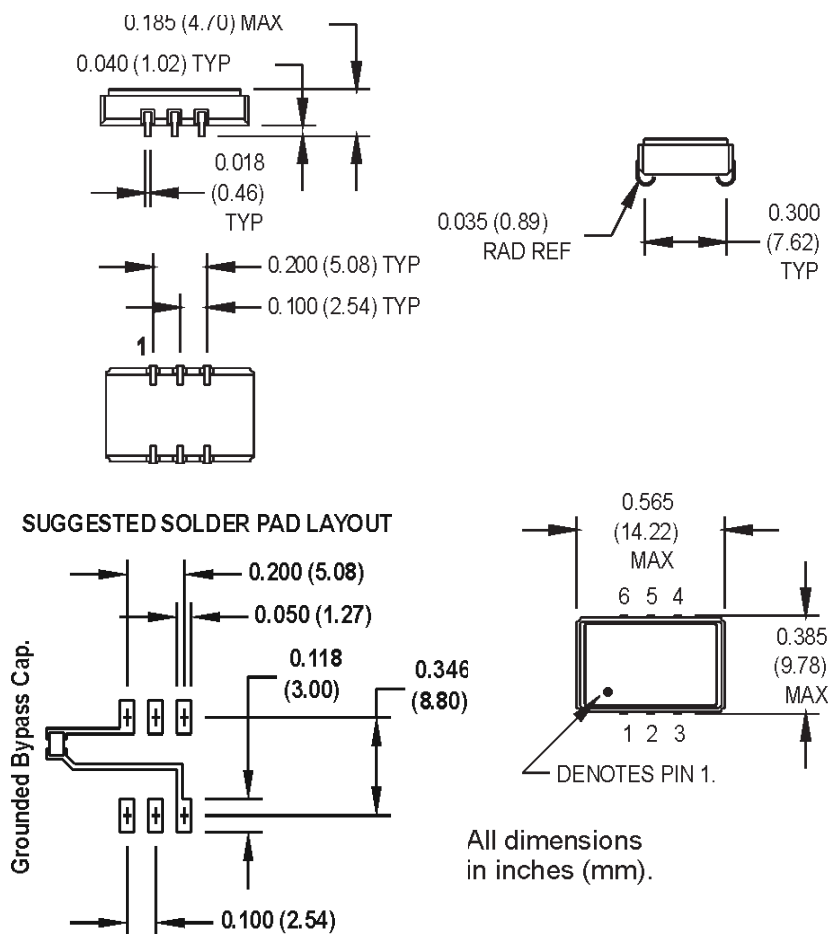


Output Waveform: LVDS/CML/PECL

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Product Dimension & Pinout Information



PIN 1 ENABLE

Pin1: Enable/Disable
Pin2: N/C
Pin3: Ground
Pin4: Output Q (LVPECL, LVDS, CML)
Pin5: Output $\bar{Q}$ (LVPECL, LVDS, CML)
Pin6: Vcc

PIN 2 ENABLE

Pin1: N/C
Pin2: Enable/Disable
Pin3: Ground
Pin4: Output Q (LVPECL, LVDS, CML)
Pin5: Output $\bar{Q}$ (LVPECL, LVDS, CML)
Pin6: Vcc

Handling Information

Although protection circuitry has been designed into the M220x oscillator, 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 Ω , 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



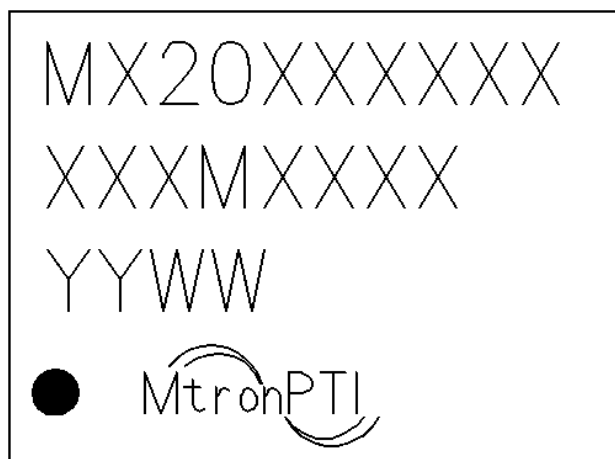
ATTENTION
Static Sensitive
Devices
Handle only at
Static Safe Work
Stations

Quality Parameters

Environmental Specifications/Qualification Testing Performed on the M220 Clock Oscillator		
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^{-8}
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

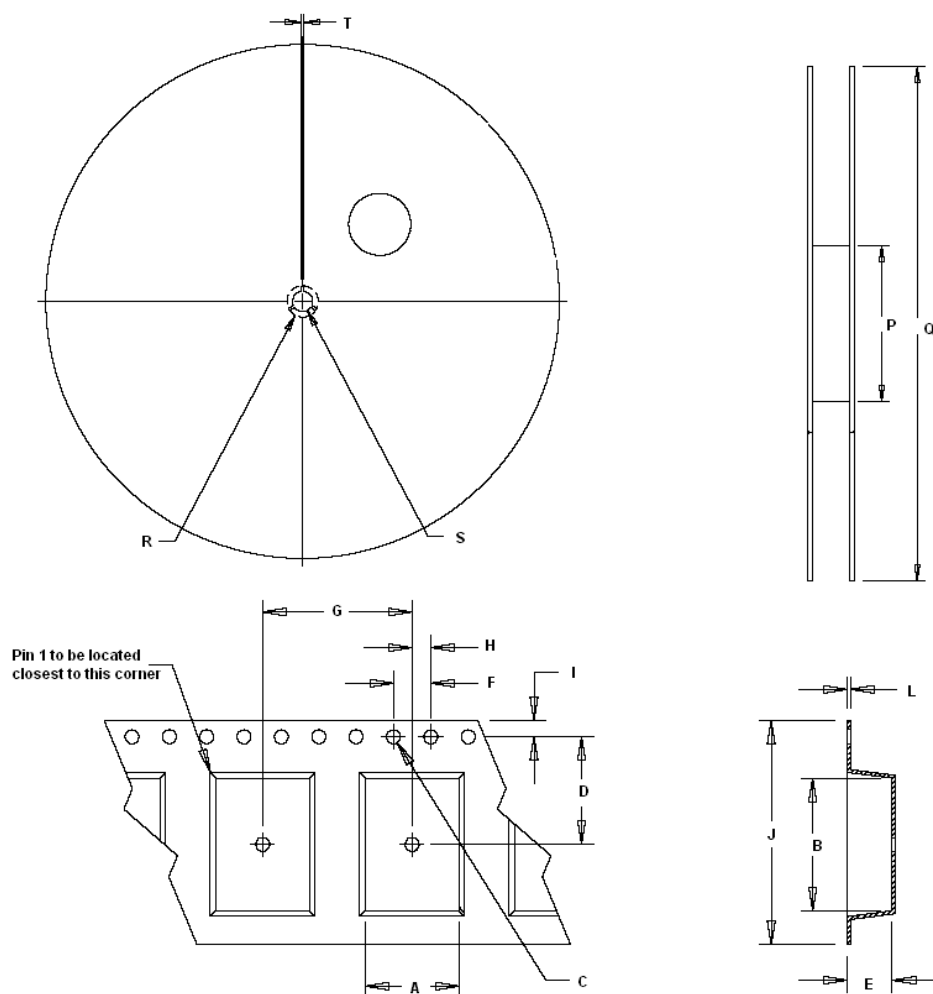
Part Marking Guide

Line 1: Model Number
Line 2: Frequency
Line 3: Date Code
Line 4: Pin 1 Indicator / MtronPTI



Tape & Reel Specifications

(all measurements are in mm)	A	B	C	D	E	F	G	H	I	J	L	P	Q	R	S	T
M220x	10.00	14.20	1.50	11.50	4.85	4.00	16.00	2.00	1.75	24.00	0.35	100.00	330.00	20.20	13.00	2.00

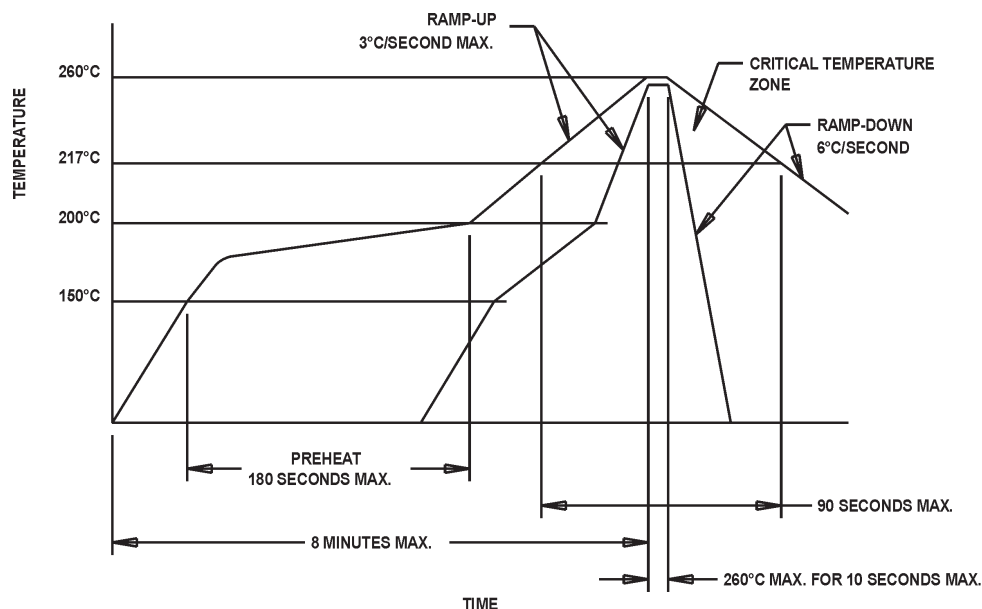


Standard Tape and Reel: 500 parts per reel

Product Revision Table

Date	Revision	PCN Number	Details of Revision
7/20/07	A	10118	IC Revision to improve phase noise and electrical performance

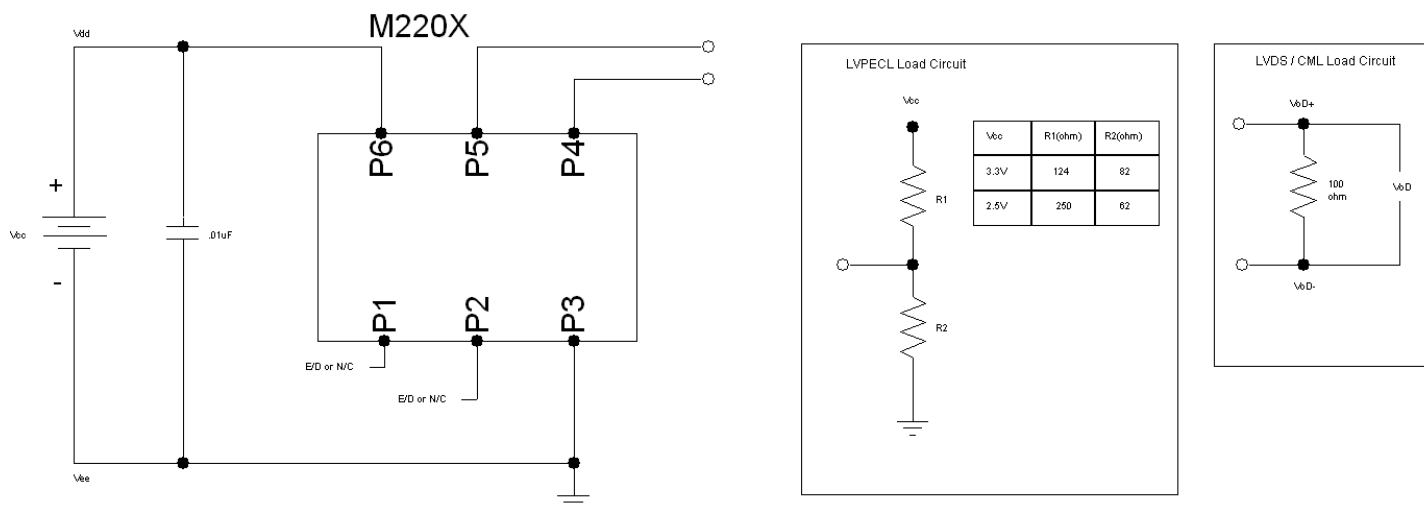
Maximum Soldering Conditions



Solder Conditions

Note: Exceeding these limits may damage the device.

Typical Test Circuit & Load Circuit Diagrams



For custom products or additional specifications contact our sales team at
800.762.8800 (toll free) or 605.665.9321

For more information on this product visit the MtronPTI website at
www.mtronpti.com