



"XC4" Series, 3.2 x 5.0mm,
High Reliability Hybrid Microcircuit Crystal Oscillators
5.0V HC/ACMOS, 3.3V, 2.5V & 1.8V LVHCMOS
1 MHz to 130 MHz

Features

- High Shock & Vibration Design, **3 Point Crystal Mount**
- **Radiation Tolerant to 20K Rads**
- **Tristate Enable/Disable function is provided by default**
- Low Profile Surface Mount, 0.064" Max. Height
- 100% Screening Options
- Low Phase Noise
- Hermetically Sealed, Ceramic Package
- Tape & Reel packaging
- Made in USA, ECCN: EAR99

Applications

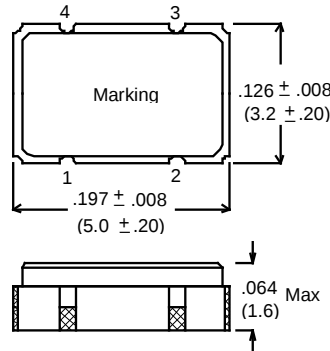
- High Shock & Vibration Applications
- Navigation Systems
- Aerospace Instrumentation
- Digital Signal Processing
- Gun Launched Munitions

Package Specifications & Outline:

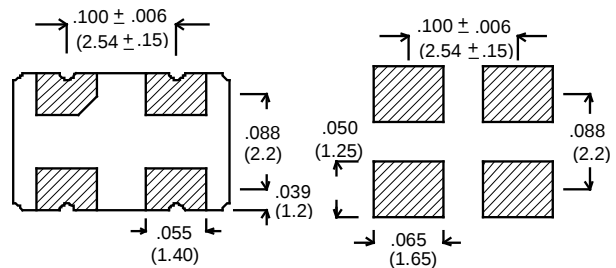
- Package: Ceramic 90% Al₂O₃
- Seal: Hermetic – Resistance Welded
- Weight: 0.06g Typical, 0.07g Max.
- Thermal Resistance, Junction to Case (θ_{JC}): 49 °C / Watt
- Solder Reflow, Temp./Time: 260 °C Max for 10 Seconds Max.
- Pad Finish: 1.27 to 1.9 μ m gold over 2.0 to 3.5 μ m nickel

Hot Solder Tinning per MIL-PRF-55310 is optional at additional cost.

Contact Xsis Electronics at xisis@xisis.com for any special requirements.



PAD#	FUNCTION
1	E/D (TRISTATE)
2	GND/CASE
3	OUTPUT
4	VDD



Typical PCB Layout

Dimensions: Inches (mm).

E/D (Enable/Disable) Input: A "Low" level at the input disables the Output into a high impedance state.

E/D Input has internal pull-up. It can be left floating or connected to Vdd.

ORDERING INFORMATION (Please build your part number from options below) :

P/N EXAMPLE: XC4L – 7M – 24.000 MHz = 3.3 V LVHCMOS, ± 75 PPM Overall Frequency Accuracy over -55 °C to +125 °C, 55/45% Symmetry, Tristate Output , 100% Screening, 24.000 MHz

XC4
Model #

Supply Voltage & Output Type
A = 5.0V, HC/ACMOS
L = 3.3V, LVHCMOS
N = 2.5V, LVHCMOS
R = 1.8V, LVHCMOS

*** Overall Frequency Accuracy Options**
1 = ± 50 PPM over -10°C to +70°C
2 = ± 25 PPM over -10°C to +70°C
3 = ± 100 PPM over -40°C to +85°C
4 = ± 50 PPM over -40°C to +85°C
5 = ± 25 PPM over -40°C to +85°C
6 = ± 100 PPM over -55°C to +125°C
7 = ± 75 PPM over -55°C to +125°C
8 = ± 20 PPM over -40°C to +85°C
9 = ± 50 PPM over -55°C to +105°C

Output Frequency

100% Screening Options
X = No Screening
M = 100% Screening per MIL-PRF-55310 Level B

*Overall frequency accuracy includes: initial accuracy, frequency changes due to temperature, supply voltage & load variations and **5 year aging**.



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5.0V HC/ACMOS, 3.3V, 2.5V & 1.8V LVHCMOS
1 MHz to 130 MHz

Electrical Specifications, 5V HC/ACMOS & 3.3V LVHCMOS Oscillators

Parameter	5V “ Model XC4-A ”	3.3V “ Model XC4-L ”
Output Frequency Range	1 MHz - 85 MHz	1 MHz to 130 MHz
Overall Frequency Accuracy (<i>See Note Below</i>)	See Options in the Ordering Information on Page 1	
Operating Temperature Range	See Options in the Ordering Information on Page 1	
Supply Voltage (Vdd)	+ 5 VDC $\pm$ 10%	3.3V $\pm$ 10%
Input Current (no Load)	1.0 MHz - 8 MHz 4 mA Max. 8.1 MHz - 32 MHz 10 mA Max. 32.1 MHz - 64 MHz 40 mA Max. 64.1 MHz - 85 MHz 60 mA Max.	1.0 MHz - 8 MHz 3 mA Max. 8.1 MHz - 32 MHz 6 mA Max. 32.1 MHz - 64 MHz 25 mA Max. 64.1 MHz - 100 MHz 40 mA Max. 100.1 MHz - 130 MHz 50 mA Max.
Output Waveform	Square Wave	
Output Duty Cycle - HCMOS (at 50% Level)	45/55%	
Output High Level	0.9 Vdd Min.	0.9 Vdd Min.
Output Low Level	0.1 Vdd Max.	0.1 Vdd Max.
Output Current	$\pm$ 16 mA Max.	$\pm$ 8 mA Max.
Output Load	10K // 15 pF	10K // 15 pF 50 pF Max. for <50 MHz
Rise & Fall Times (Typical Load) (10% to 90% Output Levels)	$\leq$ 40 MHz 6 nS Max. 40 MHz to 75 MHz 3 nS Max. > 75 MHz 2 nS Max.	$\leq$ 40 MHz 6 nS Max. 40 MHz to 75 MHz 3 nS Max. > 75 MHz 2 nS Max.
Enable/Disable (E/D) Input	$\geq$ 3.5V or Open : Normal Output $\leq$ 0.8V: High Impedance	$\geq$ 2.2V or Open : Normal Output $\leq$ 0.8V: High Impedance
Start-Up Time	10 mS Max.	10 mS Max.
Phase Jitter (10 KHz - 20 MHz Integrated)	0.3 pS rms Typical	0.3 pS rms Typical
Aging at 70 °C	$\pm$ 3 PPM Max. first year, $\pm$ 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 7VDC	+ 5VDC
Storage Temperature	-65 °C to +125 °C	-65 °C to +125 °C

NOTE: Overall Frequency Accuracy Includes, Initial Accuracy at 25 °C, Frequency changes over Operating Temperature, Aging over 5 years, Frequency changes due to Supply Voltage & Load Variations.

For special requirements, such as, tighter output symmetry, faster start-up time, PIND screening, etc., please contact Xsis Electronics at xisis@xisis.com or call us at 913-631-0448.



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1 MHz to 130 MHz

Electrical Specifications, 2.5V & 1.8V LVHCMOS Oscillators

Parameter	2.5V “ Model XC4-N ”	1.8V “ Model XC4-R ”
Output Frequency Range	1 MHz to 125 MHz	1 MHz to 100 MHz
Overall Frequency Accuracy (See Note Below)	See Options in the Ordering Information on Page 1	
Operating Temperature Range	See Options in the Ordering Information on Page 1	
Supply Voltage (Vdd)	2.5V $\pm$ 10%	1.8V $\pm$ 10%
Input Current (no Load)	1 MHz - 8 MHz 3 mA Max. 8.1 MHz - 16 MHz 4 mA Max. 16.1 MHz - 32 MHz 8 mA Max. 32.1 MHz - 60 MHz 15 mA Max. 60.1 MHz - 100 MHz 20 mA Max. 100.1 MHz - 125 MHz 30 mA Max.	1 MHz - 8 MHz 3 mA Max. 8.1 MHz - 16 MHz 4 mA Max. 16.1 MHz - 32 MHz 6 mA Max. 32.1 MHz - 60 MHz 10 mA Max. 60.1 MHz - 85 MHz 20 mA Max. 85.1 MHz - 100 MHz 25 mA Max.
Output Waveform	Square Wave	
Output Duty Cycle (at 50% Output Level)	45/55%	
Output High Level	0.9 Vdd Min.	
Output Low Level	0.1 Vdd Max.	
Output Current	$\pm$ 4 mA Max	
Output Load	10K // 15 pF	
Rise & Fall Times (Typical Load) (at 10% to 90% Output Levels)	$\leq$ 40 MHz 6 nS Max. 40 MHz to 75 MHz 3 nS Max. > 75 MHz 2 nS Max.	$\leq$ 48 MHz 6 nS Max. 48 MHz to 75 MHz 3 nS Max. > 75 MHz 2 nS Max.
Enable/Disable (E/D) Input	$\geq$ 0.7 Vdd or Open : Normal Output $\leq$ 0.3 Vdd: High Impedance	
Start-Up Time	10 mS Max.	
Phase Jitter (10 KHz - 20 MHz Integrated)	0.3 pS rms Typical	0.3 pS rms Typical
Aging at 70 °C	$\pm$ 3 PPM Max. first year, $\pm$ 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 3.6 VDC	
Storage Temperature	-65 °C to +125 °C	

NOTE: Overall Frequency Accuracy Includes, Initial Accuracy at 25 °C, Frequency changes over Operating Temperature, Aging over 5 years, Frequency changes due to Supply Voltage & Load Variations.

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Packaging: Tape & Reel, See Page 5

Thermal Characteristics:

Junction to case Thermal Constant (θ_{JC}): 49 °C / Watt

Junction to Ambient (Device floating in free air) Thermal Constant (θ_{JA}): 141 °C / Watt

Typical Phase Noise (dbc/Hz):

Output Frequency	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz
10 MHz	- 90	-122	-145	-158	-161	-164
25 MHz	-83	-111	-135	-143	-149	-157
50 MHz	-81	-108	-133	-142	-146	-154
96 MHz	-79	-106	-132	-141	-147	-153
110 MHz	-77	-106	-131	-140	-146	-153

Environmental Specifications:

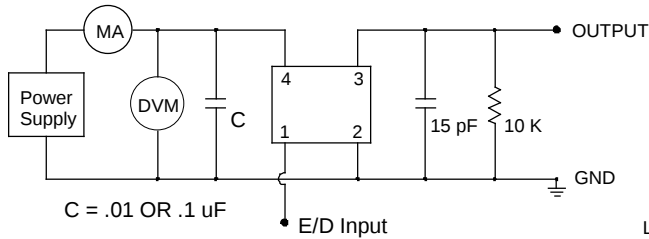
XC4 series oscillators are designed to meet or exceed the Environmental tests specified below. Customized screening and environmental testing are also available to meet your special requirements.

Test	Test Conditions
Vibration	0.06" DA, 30 G peak, 10 - 2000 Hz, MIL-STD-202, Method 204, Cond. G
Shock	1500 G, 0.5 mS, half-Sine, MIL-STD-883, Method 2002, Cond. B
Temperature Cycling	MIL-STD-883, Method 1010, Cond. C
Thermal Shock	MIL-STD-202, Method 107, Cond. B
Seal (Fine and Gross)	MIL-STD-883, Method 1014 Cond. A & C
Burn-in	160 Hours, 125 °C, Nominal Supply Voltage & Load
Frequency Aging	30 days at 70 °C, $\pm$ 1.5 PPM Max.
Altitude	MIL-STD-202, Method 105, Cond. C
Constant Acceleration	MIL-STD-883, Method 2001, 5000 G
Moisture Resistance	MIL-STD-202, Method 106, Vibration Sub Cycle Omitted
Solderability	MIL-STD-202, Method 208
Resistance to Soldering Heat	MIL-STD-202, Method 210, Cond B. or C as applicable
Resistance to Solvents	MIL-STD-202, Method 215
Internal Water Vapor Content	MIL-STD-883, Method 1018
ESD Classification	MIL-STD-883, Method 3015, Class 1C, HBM 1000 to 1999
Moisture Sensitivity Level	J-STD-020, MSL=1



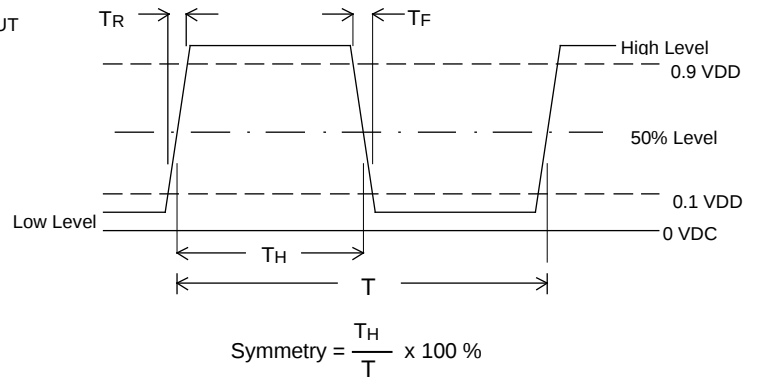
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HCMOS Test Circuit

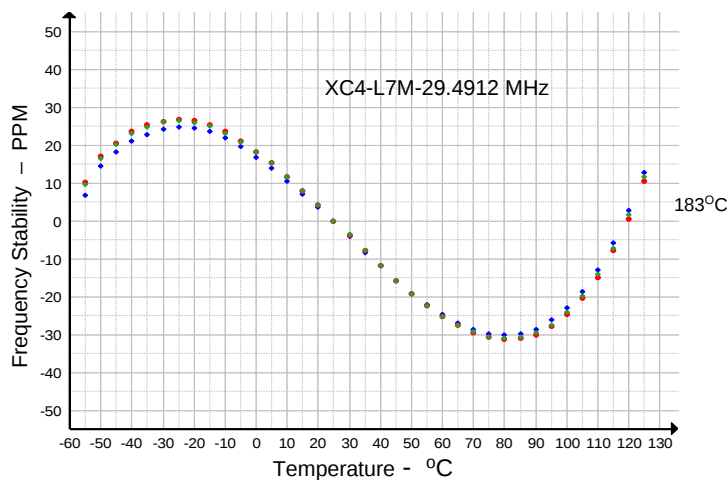


E/D (Enable/Disable) Input has an internal pull-up resistor. It can be left floating or connected to Vdd.

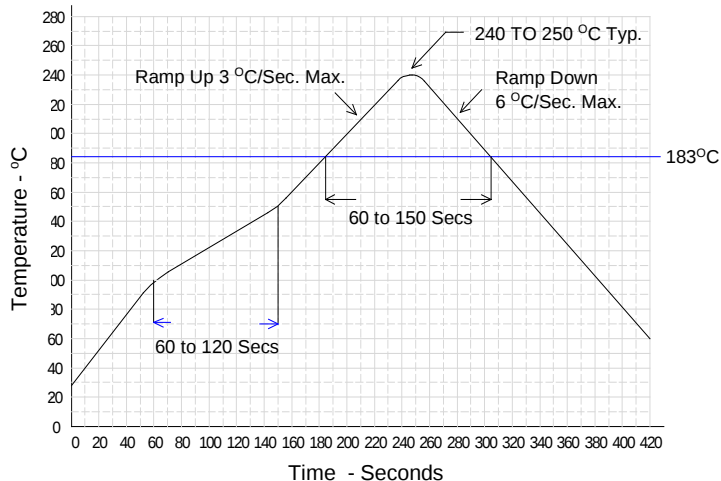
HCMOS Output Waveform



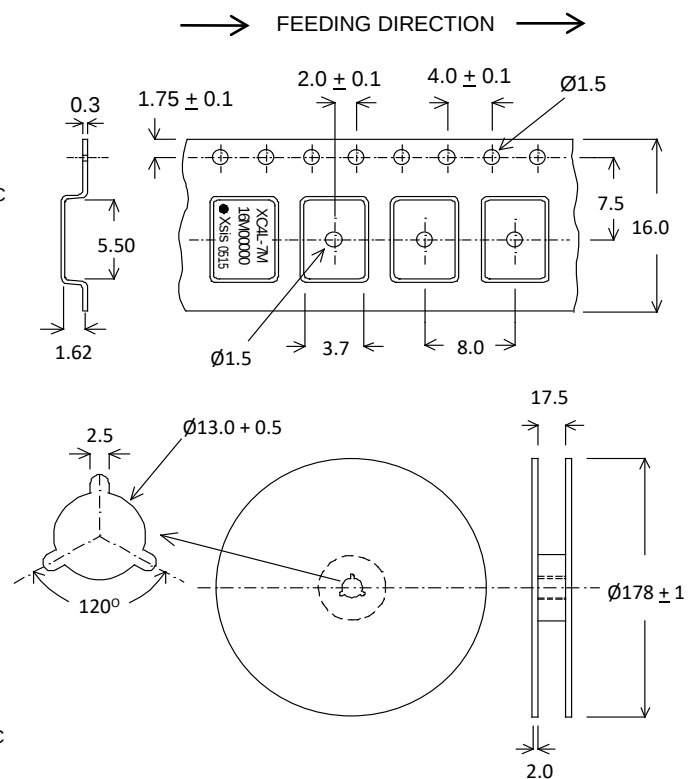
Typical Freq. Stability Vs. Temperature



Typical Solder Reflow Profile



Tape & Reel Data for XC4 parts



Dimensions are in mm.

Tape is EIA-481-A Compliant.