

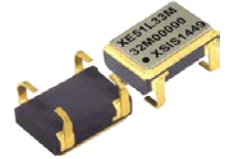


# XE51 SERIES , HCMOS, TTL, LVHCMOS

## High Reliability Hybrid Microcircuit Crystal Oscillators

### 5 x 7 mm, Surface Mount, Formed Leads

### 5V, 3.3V, 2.5V & 1.8V Options



### Features

- High Shock & Vibration Design
- Tristate Output Option
- 883 B & Hi-Rel Screening Options
- HC/ACMOS, LVHCMOS, & TTL Compatible
- 5V, 3.3V, 2.5V and 1.8V Options
- Hermetically Sealed Ceramic Package

### Applications

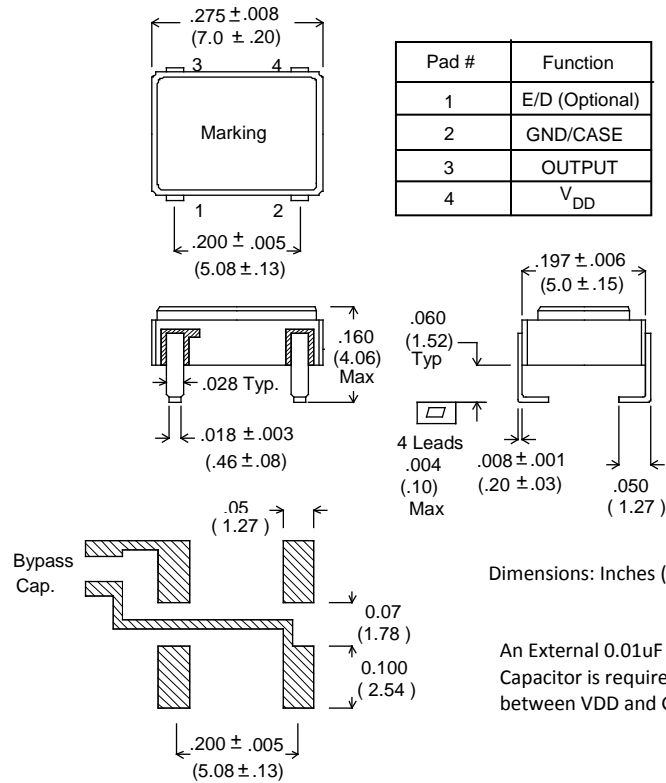
- High Shock & Vibration Applications
- Navigation Systems
- Aerospace Instrumentation
- Telecommunications
- Smart Munitions
- Gun Launched Munitions

**Electrical Specifications:** See Pages 2 and 3

**Environmental Specifications:** See Page 4

### Mechanical Specifications:

Package, Seal & Weight	Ceramic 90% AL <sub>2</sub> O <sub>3</sub> , Hermetic - Resistance Welded, 0.25 Gms typical, 0.30 Gms Max.
Lead Material & Finish	Kovar, 40 to 70 μ inches gold over 100 to 250 μ inches Nickel, Hot Solder Tinning per MIL-PRF-55310 is optional at additional cost.
Solder Reflow, Temp./Time	260 °C Max for 10 Seconds Max.
Package Thermal Resistance ( θ <sub>JC</sub> )	75 °C / Watt



## ORDERING INFORMATION ( Select from options below ) :

Example P/N: " X E 5 1 A 4 3 G M - 24.000 MHz " = 5V, HC/ACMOS, ± 50 PPM over -55C to 125C, Tristate Output, Mil Screened, 24 MHz.

	<b>XE51</b>	<b>A</b>	<b>4</b>	<b>3</b>	<b>G</b>	<b>M</b>	<b>- 24.000 MHz</b>
	Model #						
<b>Supply Voltage &amp; Logic</b> A = +5.0 VDC HC/ACMOS B = +5.0 VDC TTL L = +3.3 VDC LVHCMOS N = +2.5 VDC LVHCMOS R = +1.8 VDC LVHCMOS							
						<b>M = 883B Screening, Leave Blank Otherwise</b>	
					<b>G = Tristate Output, Leave Blank Otherwise</b>		
	<b>* Frequency Stability</b> 1 = ± 0.1% 2 = ± 0.05% 3 = ± 100 PPM 4 = ± 50 PPM 5 = ± 20 PPM 6 = ± 10 PPM 7 = ± 25 PPM			<b>Operating Temperature Range</b> 1 = 0 °C to + 70 °C 2 = -40 °C to + 85 °C 3 = -55 °C to + 125 °C 4 = -55 °C to + 105 °C 5 = -40 °C to + 95 °C 6 = -20 °C to + 70 °C			
							<b>* Enable Disable Input: A "low" level at the input disables the output to a HI-Z state. Enable/disable input has internal pull-up.</b>  <b>* Frequency Stability Options 5, 6 &amp; 7 are not available for all Operating Temperature Range Options.</b>



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Electrical Characteristics, 5 VDC & 3.3 VDC Oscillators

Parameter	5 V AC/HCMOS or TTL	3.3 V LVHCMOS or LVTTTL
Output Frequency Range	500 KHz - 100 MHz	500 KHz - 160 MHz
Frequency Accuracy at +25 °C	± 15 PPM	± 15 PPM
Frequency Stability Vs Temperature	See Options on Page 1	See Options on Page 1
Operating Temperature Range	See Options on Page 1	See Options on Page 1
Supply Voltage (Vdd)	+ 5 VDC ± 10%	+ 3.3 VDC ± 10%
Input Current (no Load)	500 KHz - <5 MHz 10 mA Max. 5 MHz - <20 MHz 20 mA Max. 20 MHz - <40 MHz 30 mA Max. 40 MHz - <60 MHz 40 mA Max. 60 MHz - <100 MHz 60 mA Max.	500 KHz - <8 MHz 3 mA Max. 8 MHz - <16 MHz 6 mA Max. 16 MHz - <32 MHz 10 mA Max. 32 MHz - <60 MHz 20 mA Max. 60 MHz - <100 MHz 35 mA Max. 100 MHz - 160 MHz 60 mA Max.
Output Waveform	Square Wave	Square Wave
Output Duty Cycle – HC/ACMOS ( at 50% of Output Waveform)	< 40 MHz 55/45% Max. ≥ 40 MHz 40/60% Max.	< 40 MHz 55/45% Max. ≥ 40 MHz 40/60% Max.
Output Duty Cycle – TTL ( at 1.4 Vdc Level )	60/40% Max. ( TTL )	60/40% Max. ( LVTTTL )
Output High Level	0.9 Vdd Min.	0.9 Vdd Min.
Output Low Level	0.1 Vdd Max.	0.1 Vdd Max.
Output Load	10K ohms // 15 pF 10 TTL, 50 pF Max. for <50 MHz	10Kohms // 15 pF 30 pf Max for <50 MHz
Rise & Fall Times ( Typical Load ) ( 10% to 90% of Output Level )	< 30 MHz 6 nS Max. ≥ 30 MHz 3 nS Max.	< 30 MHz 6 nS Max. ≥ 30 MHz 3 nS Max
Enable/Disable ( E/D)	E/D Input ≥ 2.2V or Open : Normal Output E/D Input ≤ 0.8V: High Impedance	E/D Input ≥ 2.2V or Open: Normal Output E/D Input ≤ 0.8V: High Impedance
Start-Up Time	10 mS Max.	10 mS Max.
Phase Jitter ( 10 KHz to 20 MHz Integ.)	0.15 pS rms Typical	0.15 pS rms Typical
Frequency Stability Vs Supply Voltage	± 5 PPM Max. for ± 10% change in Supply Voltage	
Aging at 70 °C	± 3 PPM Max. first year, ± 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 7 VDC	+4.5 VDC
Storage Temperature	-65 °C to 125 °C	-65 °C to 125 °C

Contact Xsis Engineering for any other special requirements; e-mail: [xisis@xisis.com](mailto:xisis@xisis.com) , Tel: 913-631-0448



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Electrical Characteristics, 2.5 VDC & 1.8 VDC Oscillators

Parameter	2.5 V AC/HCMOS or TTL	1.8 V LVHCMOS or LVTTTL
Output Frequency Range	500 KHz - 135 MHz	500 KHz - 100 MHz
Frequency Accuracy at +25 °C	± 15 PPM	± 15 PPM
Frequency Stability Vs Temperature	See Options on Page 1	See Options on Page 1
Operating Temperature Range	See Options on Page 1	See Options on Page 1
Supply Voltage (Vdd)	+ 2.5 VDC ± 10%	+ 1.8 VDC ± 10%
Input Current (no Load)	500 KHz - <8 MHz 3 mA Max. 8 MHz - <16 MHz 4 mA Max. 16 MHz - <32 MHz 8 mA Max. 32 MHz - <60 MHz 15 mA Max. 60 MHz - <100 MHz 20 mA Max. 100 MHz - 135 MHz 35 mA Max.	500 KHz - <8 MHz 3 mA Max. 8 MHz - <16 MHz 4 mA Max. 16 MHz - <32 MHz 6 mA Max. 32 MHz - <60 MHz 10 mA Max. 60 MHz - <85 MHz 20 mA Max. 85 MHz - 100 MHz 25 mA Max.
Output Waveform	Square Wave	Square Wave
Output Duty Cycle – HC/ACMOS ( at 50% of Output Waveform)	< 40 MHz 55/45% Max. ≥ 40 MHz 40/60% Max.	< 40 MHz 55/45% Max. ≥ 40 MHz 40/60% Max.
Output High Level	0.9 Vdd Min.	0.9 Vdd Min.
Output Low Level	0.1 Vdd Max.	0.1 Vdd Max.
Output Load	10K ohms // 15 pF	10Kohms // 15 pF
Rise & Fall Times ( Typical Load ) ( 10% to 90% of Output Level )	< 30 MHz 5 nS Max. ≥ 30 MHz 3 nS Max.	< 30 MHz 5 nS Max. ≥ 30 MHz 3 nS Max.
Enable/Disable ( E/D)	E/D Input ≥ 0.7 Vdd or Open : Normal Output E/D Input ≤ 0.3 Vdd: High Impedance	
Start-Up Time	10 mS Max.	10 mS Max
Phase Jitter ( 10 KHz to 20 MHz Integ.)	0.15 pS rms Typical	0.15 pS rms Typical
Frequency Stability Vs Supply Voltage	± 5 PPM Max. for ± 10% change in Supply Voltage	
Aging at 70 °C	± 3 PPM Max. first year, ± 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 4.5 VDC	+ 3.5 VDC
Storage Temperature	-65 °C to 125 °C	-65 °C to 125 °C

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**Typical Phase Noise (dbc/√Hz):**

Output Frequency	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz
10 MHz	-109	-140	-157	-162	-163	-164
25 MHz	-100	-127	-151	-158	-160	-162
50 MHz	-89	-117	-148	-157	-159	-160
96 MHz	-80	-107	-139	-151	-156	-158
110 MHz	-75	-102	-130	-142	-149	-153

**Environmental Specifications:**

Environmental tests are derived from MIL-PRF-55310 and are performed on a sampling basis for qualification to insure that all units in production meet or exceed the required specifications. The sampling method coupled with Workmanship Standards to MIL-PRF-38534, a product assurance program in accordance with MIL-STD-790, and a quality system certified to AS9100/ISO9001, insures a consistently superior product.

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
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

**Hi-Rel Screening:**

When required by the customer, Xsis Oscillators can be subjected to additional screening tests such as Non-Destruct Bond Pull, PIND, Radiographic inspection, 330 hour burn-in, etc., in accordance with the requirements of MIL-PRF-55310 for "Class S" products.

**Hi-Temperature Operation:**

Contact Xsis for all your high temperature requirements for up to +220 °C.