



# XE43 - 100 Series (TTL), 5 V

## High Reliability Hybrid Microcircuit Crystal Oscillators

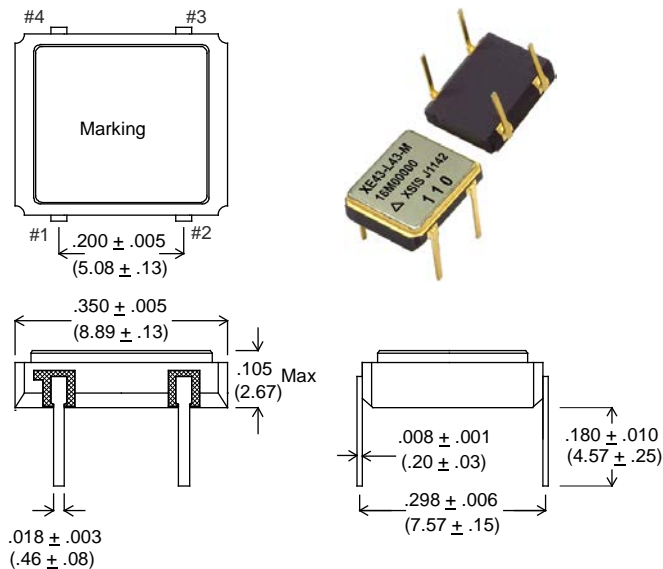
**Low Profile "Thru-hole mount" Package**

### Features

- Ruggedized 4 Point Crystal Mount
- Tristate Output Option
- Radiation Tolerant to 10K Rads
- Low Profile Thru-hole Mount
- 100% Screening Options
- Low Phase Noise
- Hermetically Sealed, Ceramic Package
- ECCN: EAR99

### Applications

- High Shock & Vibration Applications
- Navigation Systems
- Aerospace Instrumentation
- Benign Space Applications
- Gun Launched Munitions



Dimensions: Inches (mm)

### Package Specifications & Outline:

- Package : Ceramic 90% AL<sub>2</sub> O<sub>3</sub>
- Seal: Hermetic – Resistance Welded
- Weight: 0.5 Gms typical, 0.6 Gms Max.
- Thermal Resistance, Junction to Case (θ<sub>JC</sub>): 30 °C / Watt
- Solder Reflow, Temp./Time: 260 °C, 10 Secs. Max.
- Lead Material & Finish: Kovar, 50 to 80 μ inches gold over 100 to 250 μ inches Nickel

| LEAD# | FUNCTION       |
|-------|----------------|
| 1     | E/D (Optional) |
| 2     | GND/CASE       |
| 3     | OUTPUT         |
| 4     | VDD            |

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

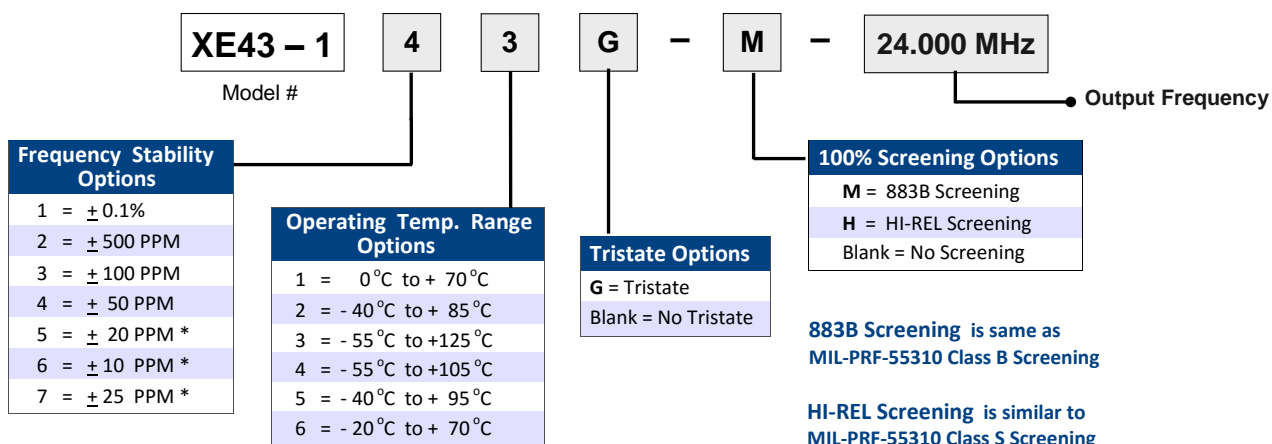
E/D Input has internal pull-up. It can be left floating or connected to Vdd.

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

Contact Xsis Electronics at [xisis@xisis.com](mailto:xisis@xisis.com) for any special requirements.

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

**P/N EXAMPLE: XE43 - 143G - M - 24.000 MHz = 5.0 V TTL, ± 50 PPM over -55 °C to +125 °C, Tristate Output, 883B Screening and 24.000 MHz**



**883B Screening is same as MIL-PRF-55310 Class B Screening**

**HI-REL Screening is similar to MIL-PRF-55310 Class S Screening**

\* Frequency Stability Options 5, 6 & 7 are not available for all operating temperature ranges.



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**Electrical Specifications:**

| Parameter                              | Specification Limits   |
|--|--|
| Output Frequency Range                 | 450 KHz - 100 MHz  |
| Frequency Accuracy at +25 °C           | ± 15 PPM   |
| Frequency Stability Vs Temperature     | See Ordering Information on Page 1   |
| Operating Temperature Range            | See Ordering Information on Page 1   |
| Supply Voltage (Vdd)                   | + 5 VDC ± 10%  |
| Input Current (no Load )               | 450 KHz - < 5 MHz 10 mA Max.<br>5 MHz - < 20 MHz 20 mA Max.<br>20 MHz - < 40 MHz 30 mA Max.<br>40 MHz - < 60 MHz 40 mA Max.<br>60 MHz - 100 MHz 60 mA Max. |
| Output Waveform                        | Square Wave, TTL Compatible  |
| Output Duty Cycle                      | 60/40% Max.<br>( at 1.4V Output Level )  |
| Output High Level                      | 2.5 V Min.   |
| Output Low Level                       | 0.5 V Max.   |
| Output Load                            | TTL, 10 Loads Max.<br>50 pF Max. for <50 MHz   |
| Rise & Fall Times ( Typical Load )     | < 30 MHz 6 nS Max.<br>≥ 30 MHz 3 nS Max.<br>( 0.8 to 2.0V Output Levels)   |
| Enable/Disable ( E/D)                  | E/D Input ≥ 3.5V or Open : Normal Output<br>E/D Input ≤ 0.8V: High Impedance   |
| Start-Up Time                          | 5 mS Max.  |
| Phase Jitter ( 10 KHz - 20 MHz Integ.) | 0.35 pS rms Typical  |
| Freq. Stability Vs Supply Voltage      | ± 4 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  |
| Storage Temperature                    | -65 °C to +125 °C  |

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



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**Low Profile "Thru-hole mount" Package**

**Packaging:**

Standard packaging is in ESD protective enclosed tray. Tape & Reel packaging is available at additional cost.

**Thermal Characteristics:**

Junction to case Thermal Constant ( $\theta_{JC}$ ): 30 °C / Watt

Junction to Ambient ( Device floating in free air) Thermal Constant ( $\theta_{JA}$ ): 128 °C / Watt

**Hi-Rel Screening:**

When HI-REL option is selected, Xsis Oscillators are subjected to 100% screening similar to Class "S" screening in accordance with MIL-PRF-55310. Refer to [www.xsis.com](http://www.xsis.com) for additional details about HI-REL screening.

**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:**

XE43-100 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  |

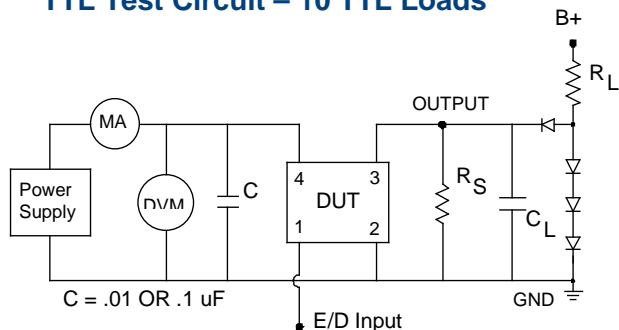


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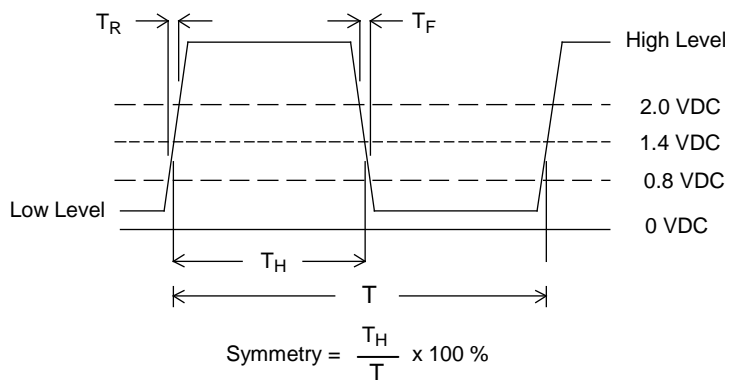
### TTL Test Circuit – 10 TTL Loads



$C_L = 20 \text{ PF}$ , Includes Probe Capacitance  
 $R_L = 270 \text{ Ohms}$ ;  $R_S = 6 \text{ K Ohms}$   
 All Diodes are 1N4148 or Equivalent

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

### TTL Output Waveform



### Typical Freq. Stability Vs. Temperature

