



XE41 - 200 Series (HC/ACMOS), 5 V

High Reliability Hybrid Microcircuit Crystal Oscillators

(Similar to M55310/37)

Features

- **Drop in replacement for a 5x7mm COTS Oscillator**
- Ruggedized 4 Point Crystal Mount
- Tristate Output Option
- Radiation Tolerant to 10K Rads
- Low Profile Surface Mount, 0.165" Max. Height
- Low Phase Noise
- Hermetically Sealed, Ceramic Package
- ECCN: EAR99

Applications

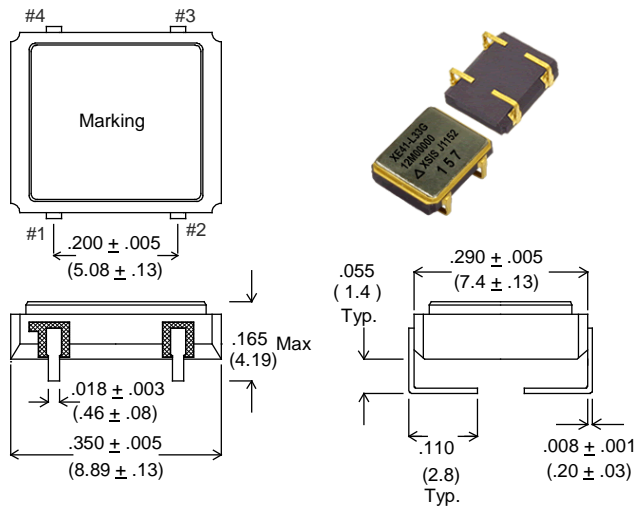
- High Shock & Vibration Applications
- Navigation Systems
- Aerospace Instrumentation
- Benign Space Applications
- Gun Launched Munitions

Package Specifications & Outline:

- Package : Ceramic 90% AL₂O₃
- Seal: Hermetic – Resistance Welded
- Weight: 0.5 Gms typical, 0.6 Gms Max.
- Thermal Resistance, Junction to Case (θ_{JC}): 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

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

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

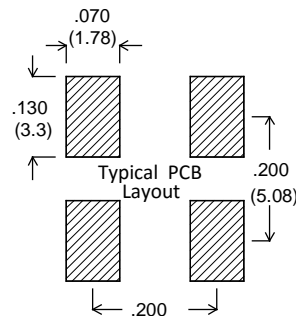


Dimensions: Inches (mm)

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

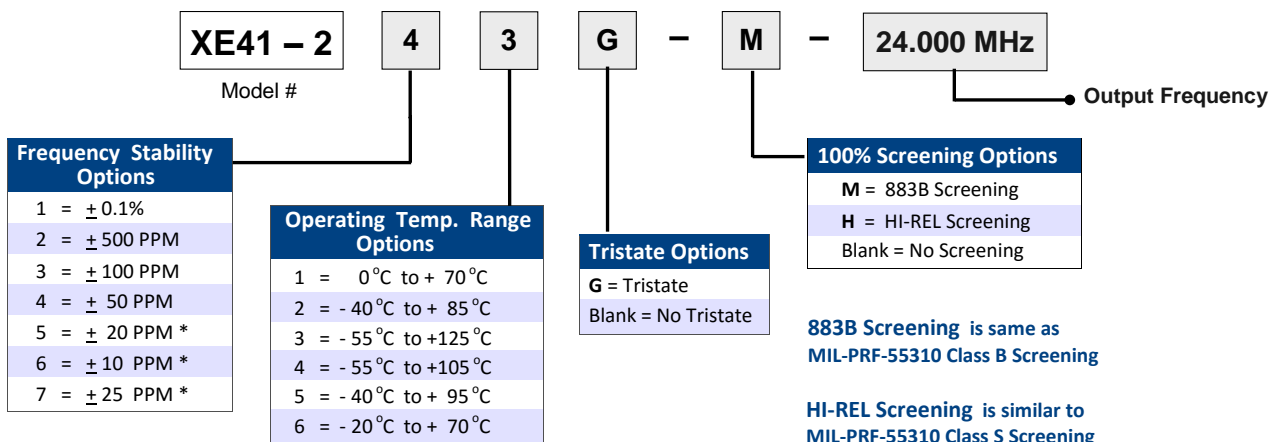
E/D (Enable/Disable) Input: A "Low" level at the input disables the Output into a high impedance state.

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



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

P/N EXAMPLE: XE41 - 243G - M - 24.000 MHz = 5.0 V HC/ACMOS, ± 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. 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. |
| Output Waveform | Square Wave, HC/ACMOS Compatible |
| Output Duty Cycle (at 50% Output Level) | < 40 MHz 55/45% Max. ≥ 40 MHz 60/40% Max. |
| Output High Level | 0.9 Vdd Min. |
| Output Low Level | 0.1 Vdd Max. |
| Output Load | 10K // 15 pF 50 pF Max. for <50 MH |
| Rise & Fall Times (Typical Load) | < 30 MHz 6 nS Max. ≥ 30 MHz 3 nS Max. (10% to 90% Output Levels) |
| Enable/Disable (E/D) | E/D Input ≥ 3.5V or Open : Normal Output 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 or call us at 913-631-0448.



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Packaging:

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

Thermal Characteristics:

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

Junction to Ambient (Device floating in free air) Thermal Constant (θ_{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 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:

XE41-200 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 |

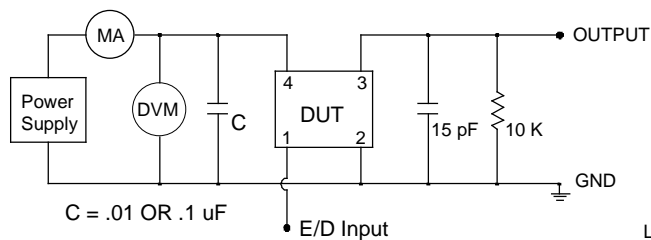


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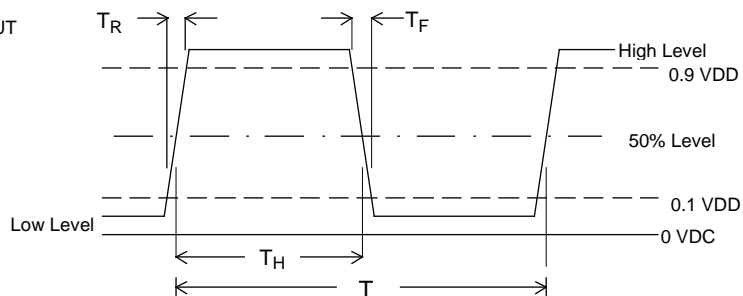
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HCMOS Test Circuit



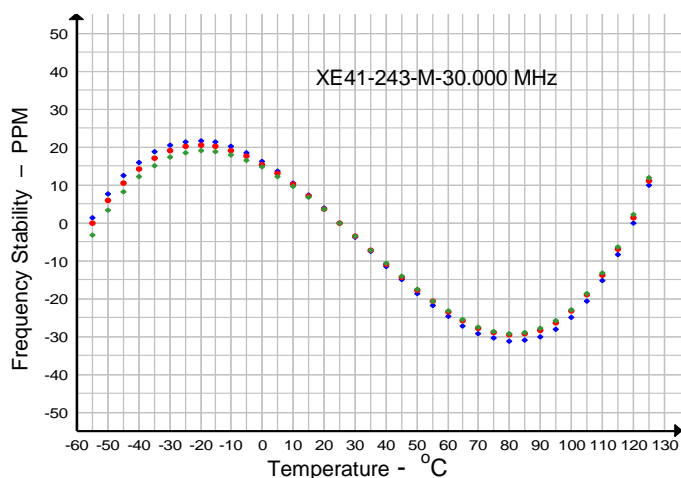
E/D (Enable/Disable) Input has an internal pull-up resistor. It can be left floating or connected to Vdd.

HCMOS Output Waveform

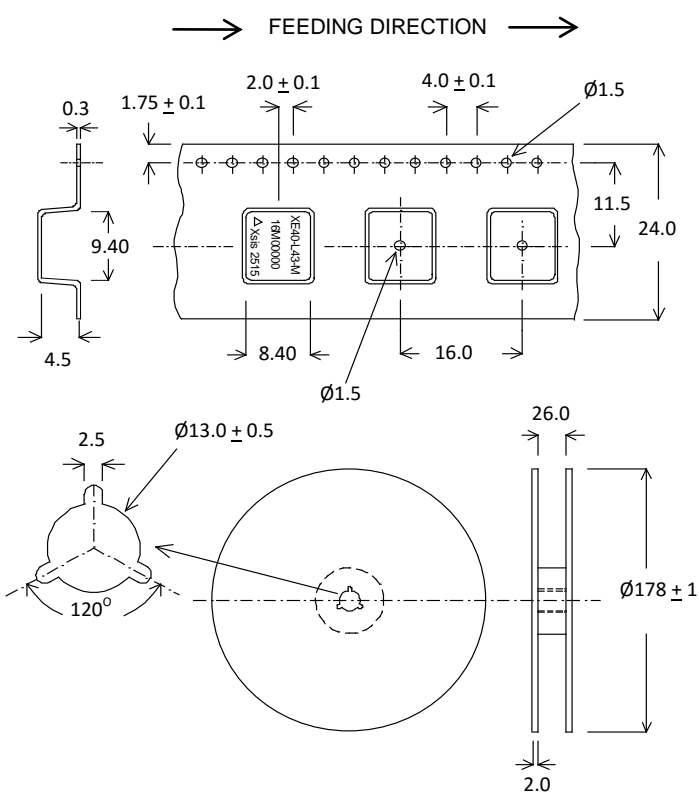


$$\text{Symmetry} = \frac{T_H}{T} \times 100 \%$$

Typical Freq. Stability Vs. Temperature

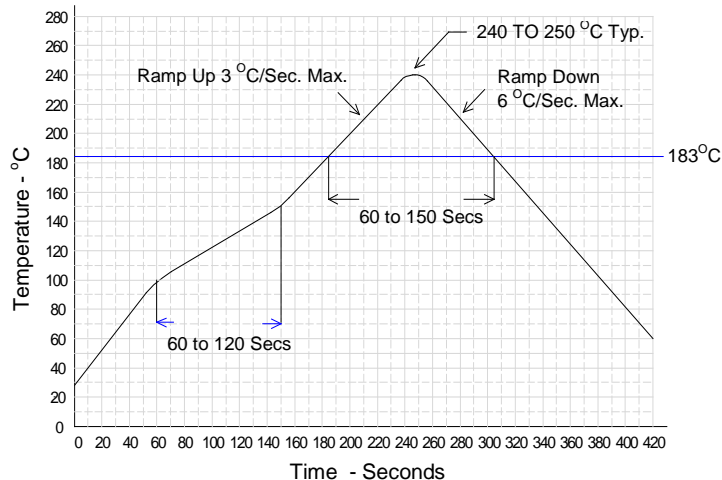


Tape & Reel Information



Dimensions are in mm.

Typical Solder Reflow Profile



Tape is EIA-481-A Compliant.