



FEATURES

- ✓ 135mW steady state power
- ✓ 350mW start-up power
- ✓ -125dBc/Hz @ 10Hz phase noise
- ✓ 0.5ppb/g acceleration sensitivity
- ✓ 20x20mm package

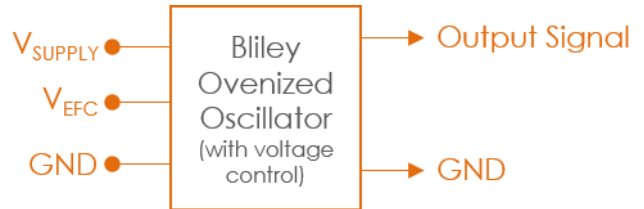
Low Power Oscillator

#blileytakesyoufurther

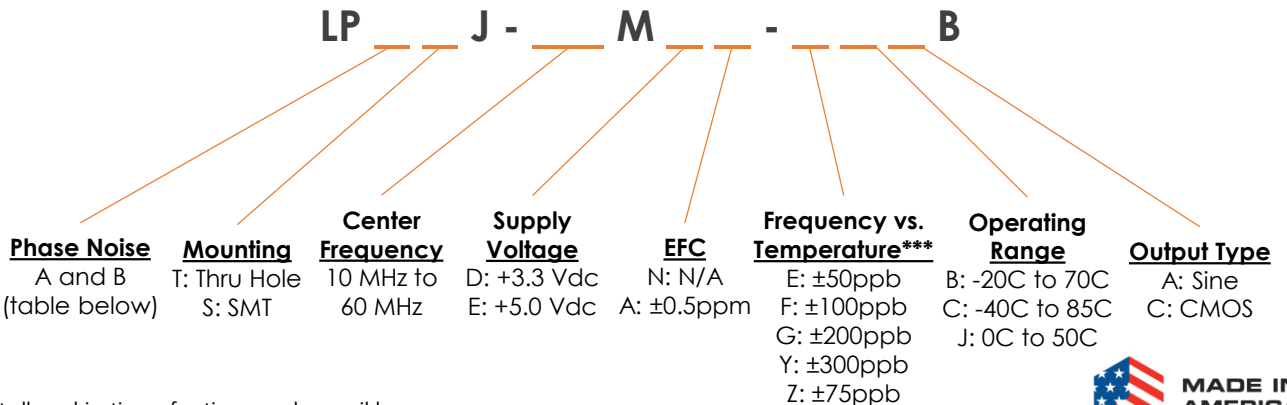
Description

The 20x20 Low Power Crystal Oscillator Series offers excellent frequency versus temperature in a compact package for applications where size and power are a concern. The LP series achieves low startup power while maintaining a fast warm up of less than one minute.

Block Diagram



Part Number Configuration



*Not all combinations of options may be possible
 **Other options may be available

***See Table on page 3 for stability availability



Performance Specifications

| Parameter | Conditions | Values | | | Unit |
|------------------------------|---------------------------------------|----------------------------|-----|--------------|------|
| | | MIN | TYP | MAX | |
| Frequency Range | | 10 | | 60 | MHz |
| Initial Tolerance | 10-35MHz 36-60MHz | | | ±100 ±200 | ppb |
| Warm Up Time | To initial tolerance | | | 1 | Min |
| Frequency Stability | | | | | |
| vs. Temperature | See Options*** (Max) (Fmax-Fmin)/2 | ±50, ±75, ±100, ±200, ±300 | | | ppb |
| vs. Load | ± 5% Δ in Load | ±25 | | | ppb |
| vs. Supply Voltage | ± 5% Δ in supply | ±25 | | | ppb |
| ADEV (Short Term Stability) | T = 1 second (10MHz) | 8E-12 | | | |
| Aging | | | | | |
| 1 st Year | After 30 Days Operation | ±100 | | | ppb |
| 20 Years | | ±500 | | | ppb |
| Supply Voltage (Vdd) | Option D | 3.13 | 3.3 | 3.47 | Vdc |
| | Option E | 4.75 | 5 | 5.25 | Vdc |
| Power Dissipation | | | | | |
| Start Up | @ +25°C | 350 | | | mW |
| Steady State | @ +25°C, 3.3Vdc | 135 | | | mW |
| Steady State | @ +25°C, 5Vdc | 180 | | | mW |
| Electronic Frequency Control | | | | | |
| Voltage Range | | 0 | | Vdd | Vdc |
| Center Voltage | ±10% | Vdd/2 | | | Vdc |
| Frequency Range | See Options (Min) | ±0.5 | | | ppm |
| Slope | | positive | | | |
| Input Impedance | | 100 | | | kΩ |
| Linearity | | 10 | | | % |

*Values typical of 10MHz units

***See Table on page 3 for stability availability

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Performance Specifications

| Parameter | Conditions | Values | | | Unit |
|-----------------------------------|------------|---------|-----|-----|------|
| | | MIN | TYP | MAX | |
| Output Characteristics (CMOS) | | MIN | TYP | MAX | |
| High Output Level | Logic "1" | 90% Vdd | | | Vdc |
| Low Output Level | Logic "0" | 10% Vdd | | | Vdc |
| Rise/Fall Time | | | 10 | | nSec |
| Duty Cycle | | 45 | 50 | 55 | % |
| Load | | | 15 | | pF |
| Output Characteristics (Sinusoid) | | MIN | TYP | MAX | |
| Output Level | | | 9.0 | | dBm |
| Harmonics | | | | -30 | dBc |
| Load | | 45 | 50 | 55 | Ω |

Temperature Stability Table

| | Temp Range | ±50 | ±75 | ±100 | ±200 | ±300 | | Temp Range | ±50 | ±75 | ±100 | ±200 | ±300 |
|--------------|------------|-----|-----|------|------|------|--------------|------------|-----|-----|------|------|------|
| | | | | | | | | | | | | | |
| 10 to 35 MHz | 0~50C | X | X | X | X | X | 36 to 60 MHz | 0~50C | N/A | X | X | X | X |
| | -20~70C | X | X | X | X | X | | -20~70C | N/A | N/A | X | X | X |
| | -40~85C | N/A | X | X | X | X | | -40~85C | N/A | N/A | N/A | X | X |

Performance Specifications

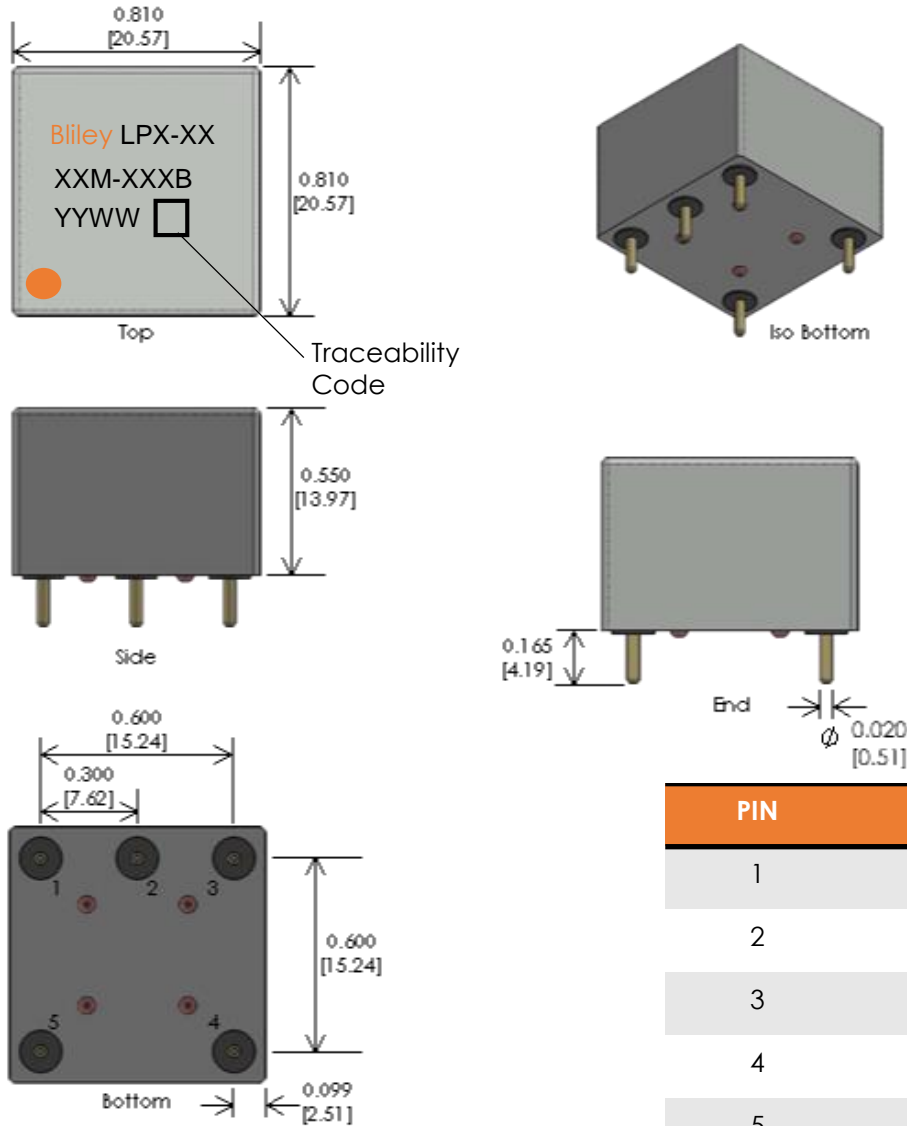
| Parameter | Conditions | | Values | | Unit | |
|------------------------|-----------------|--------|--------|------|------|--------|
| Phase Noise (Sinusoid) | | | TYP | TYP | | |
| Phase Noise (10 MHz) | Tested at +25°C | Option | A | B | | |
| | | | 10Hz | -125 | -120 | dBc/Hz |
| | | | 100Hz | -152 | -150 | dBc/Hz |
| | | | 1kHz | -162 | -158 | dBc/Hz |
| | | | 10kHz | -165 | -162 | dBc/Hz |
| | | | 100kHz | -168 | -165 | dBc/Hz |
| Phase Noise (60 MHz) | Tested at +25°C | Option | A | B | | |
| | | | 10Hz | -95 | -90 | dBc/Hz |
| | | | 100Hz | -125 | -120 | dBc/Hz |
| | | | 1kHz | -152 | -150 | dBc/Hz |
| | | | 10kHz | -162 | -158 | dBc/Hz |
| | | | 100kHz | -165 | -162 | dBc/Hz |
| Phase Noise (CMOS) | | | TYP | TYP | | |
| Phase Noise (10 MHz) | Tested at +25°C | Option | A | B | | |
| | | | 10Hz | -125 | -120 | dBc/Hz |
| | | | 100Hz | -148 | -145 | dBc/Hz |
| | | | 1kHz | -152 | -150 | dBc/Hz |
| | | | 10kHz | -155 | -150 | dBc/Hz |
| | | | 100kHz | -160 | -155 | dBc/Hz |
| Phase Noise (60 MHz) | Tested at +25°C | Option | A | B | | |
| | | | 10Hz | -95 | -90 | dBc/Hz |
| | | | 100Hz | -125 | -120 | dBc/Hz |
| | | | 1kHz | -148 | -145 | dBc/Hz |
| | | | 10kHz | -152 | -150 | dBc/Hz |
| | | | 100kHz | -155 | -150 | dBc/Hz |

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Environmental Compliance

| Parameter | Conditions | Values | | | Unit |
|-----------------------------|--|---------|-----|-----|-------|
| | | MIN | TYP | MAX | |
| Environmental & Reliability | | MIN | TYP | MAX | |
| Operating Temperature | Option B | -20 | | +70 | °C |
| | Option C | -40 | | +85 | °C |
| | Option J | 0 | | +50 | °C |
| Storage Temperature | | -55 | | +95 | °C |
| Seal | MIL-STD-202 Method 112 Test Condition D | | | | |
| Shock | MIL-STD-202 Method 213, Test Condition C | Survive | | | |
| Sinusoidal Vibration | MIL-STD-202 Method 204, Test Condition A | Survive | | | |
| Random Vibration | MIL-STD-202 Method 214, Test Condition 1B 15min | Survive | | | |
| MTTF | Calculated using MIL-HDBK-217 | 153,300 | | | Hrs |
| Acceleration Sensitivity | 10MHz output Vibration profile: 0.001G ² /Hz 10Hz to 2kHz | | 0.5 | | ppb/g |

Physical Specifications – Through Hole



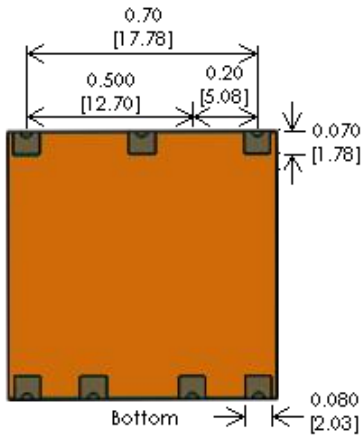
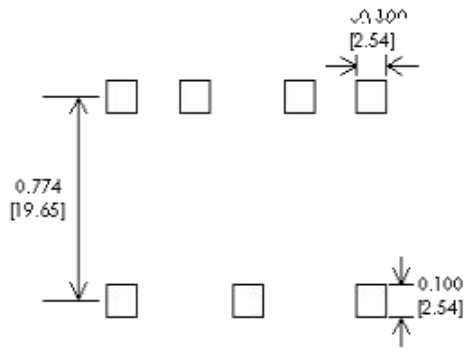
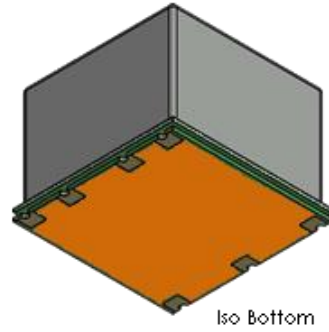
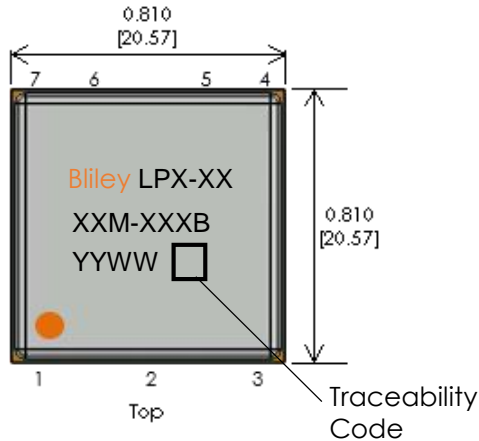
| PIN | FUNCTION |
|-----|----------------|
| 1 | Supply Voltage |
| 2 | N.C. |
| 3 | EFC/N.C. |
| 4 | RF Output |
| 5 | Ground |

Tolerances (mm) .X = ± 0.5, .XX = ±0.2 unless otherwise specified

Notes:
 • Non-RoHS available upon request

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Physical Specifications – Surface Mount



| PIN | FUNCTION |
|-------|----------------|
| 1 | Supply Voltage |
| 2,5,6 | N.C. |
| 3 | EFC/N.C. |
| 4 | RF Output |
| 7 | Ground |

Tolerances (mm) .X = ± 0.5, .XX = ± 0.2 unless otherwise specified

Notes:
 • Non-RoHS available upon request