

OA Type

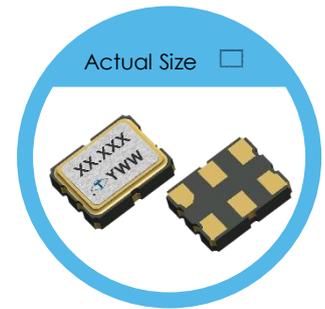
3.2 x 2.5 mm SMD Differential Output Crystal Oscillator

FEATURES

- Conforms to AEC-Q100/AEC-Q200
- Industry Standard 3.2 x 2.5 x 0.9mm Hermetically Sealed Ceramic Package
- Low Jitter Performance: Typical 0.15pS RMS from 12kHz - 20MHz
- Fundamental/3rd Overtone Crystal Design
- Output Frequency up to 220MHz
- Tri-State Enable/Disable

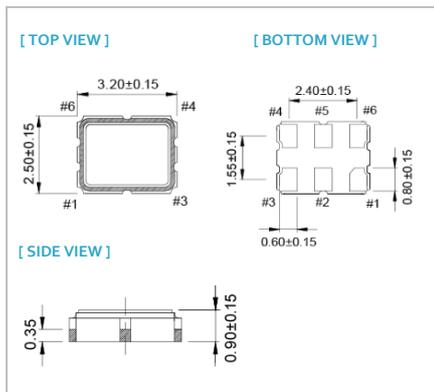
TYPICAL APPLICATION

- 10Gbit Ethernet, Fiber Channel, Storage Area Network, SONET
- Enterprise Servers, Reference Clocks for ADC and DAC, Telecom

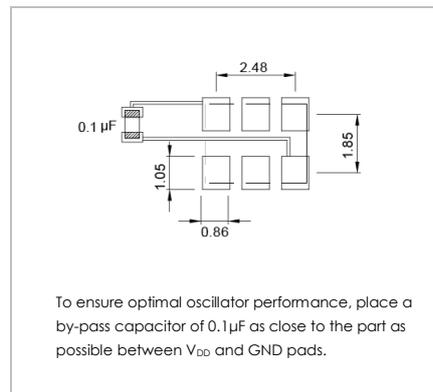


RoHS Compliant

DIMENSION (mm)



SOLDER PAD LAYOUT (mm)



PIN FUNCTION (mm)

| PIN# | FUNCTION |
|------|-----------------|
| 1 | Tri-State/NC |
| 2 | NC/Tri-State |
| 3 | GND |
| 4 | Output |
| 5 | Comp. Output |
| 6 | V _{DD} |

ELECTRICAL SPECIFICATION

| Parameter | LVPECL | | | | Unit | Test Condition | |
|---|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|---|
| | 3.3V | | 2.5V | | | | |
| | Min. | Max. | Min. | Max. | | | |
| Supply Voltage Variation (V _{DD}) | V _{DD} - 10% | V _{DD} + 10% | V _{DD} - 5% | V _{DD} + 5% | V | | |
| Frequency Range | 13.5 | 220 | 13.5 | 220 | MHz | | |
| Standard Frequency | 100, 125, 156.25 | | | | MHz | Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position. | |
| Power Current Consumption | | 55 | | 55 | mA | | |
| Output Level | Output High | 2.215 | 2.42 | 1.415 | 1.64 | V | |
| | Output Low | 1.49 | 1.68 | 0.69 | 0.88 | V | |
| Transition Time | Rise Time | | 0.6 | | 0.6 | nSec | Transition times are measured between 20% and 80% |
| | Fall Time | | 0.6 | | 0.6 | nSec | |
| Duty Cycle | 45 | 55 | 45 | 55 | % | | |
| Startup Time | | 10 | | 10 | mSec | | |
| Tri-State | Enable | 0.7 x V _{DD} | | 0.7 x V _{DD} | | V | |
| | Disable | | 0.3 x V _{DD} | | 0.3 x V _{DD} | V | |
| Stand by Current | | 10 | | 10 | mA | | |
| Output Loading | 50Ω, V _{DD} - 2V | | | | | | |
| RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V | 13.5MHz~80MHz | | 1 | | 1 | pSec | |
| | 80MHz~220MHz | | 0.3 | | 0.3 | pSec | |
| Aging (@ 25°C, First Year) | | ±3 | | ±3 | ppm | | |
| Storage Temp. Range | -55 | 125 | -55 | 125 | °C | | |
| Phase Noise | Typ. | Max. | Typ. | Max. | | | |
| At V _{DD} =3.3V, f _{out} =156.25MHz | 10kHz offset | -143 | | -145 | | dBc/Hz | |
| | 100kHz offset | -151 | | -154 | | dBc/Hz | |
| | 1MHz offset | -155 | | -155 | | dBc/Hz | |

Note: not all combination of options are available. Other specifications may be available upon request.

Specifications subject to change without notice.

| Parameter | LVDS | | | | | | Unit | Test Condition | |
|---|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|---|
| | 3.3V | | 2.5V | | 1.8V | | | | |
| | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| Supply Voltage Variation (V _{DD}) | V _{DD} - 10% | V _{DD} + 10% | V _{DD} - 5% | V _{DD} + 5% | V _{DD} - 5% | V _{DD} + 5% | V | | |
| Frequency Range | 13.5 | 220 | 13.5 | 220 | 13.5 | 220 | MHz | | |
| Standard Frequency | 100, 125, 156.25 | | | | | | MHz | Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position. | |
| Power Current Consumption | | 35 | | 30 | | 20 | mA | | |
| Output Level | Differential Output (V _{OD} , OUT-OUTN) | 0.24 | 0.45 | 0.24 | 0.45 | 0.24 | 0.45 | V | |
| | Output High | | 1.6 | | 1.6 | | 1.6 | V | |
| | Output Low | 0.9 | | 0.9 | | 0.9 | | V | |
| Transition Time | Rise Time | | 0.3 | | 0.3 | | 0.5 | nSec | Transition times are measured between 20% and 80% |
| | Fall Time | | 0.3 | | 0.3 | | 0.5 | nSec | |
| Duty Cycle | | 45 | 55 | 45 | 55 | 45 | 55 | % | |
| Startup Time | | | 5 | | 5 | | 10 | mSec | |
| Tri-State | Enable | 0.7 x V _{DD} | | 0.7 x V _{DD} | | 0.7 x V _{DD} | | V | |
| | Disable | | 0.3 x V _{DD} | | 0.3 x V _{DD} | | 0.3 x V _{DD} | V | |
| Stand by Current | | 10 | | 10 | | 10 | µA | | |
| Output Loading | 100Ω (Between OUT & OUTN) | | | | | | Ω | | |
| RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V | | 0.3 | | 0.3 | | 0.3 | pSec | | |
| Aging (@ 25°C, First Year) | | ±3 | | ±3 | | ±3 | ppm | | |
| Storage Temp. Range | | -55 | 125 | -55 | 125 | -55 | 125 | °C | |
| Phase Noise | | Typ. | Max. | Typ. | Max. | Typ. | Max. | | |
| At V _{DD} =3.3V, f _{out} =156.25MHz | 10kHz offset | -145 | | -145 | | -142 | | dBc/Hz | |
| | 100kHz offset | -153 | | -153 | | -150 | | dBc/Hz | |
| | 1MHz offset | -155 | | -155 | | -153 | | dBc/Hz | |

| Parameter | HCSL | | | | | | Unit | Test Condition | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|---|
| | 3.3V | | 2.5V | | 1.8V | | | | |
| | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| Supply Voltage Variation (V _{DD}) | V _{DD} - 10% | V _{DD} + 10% | V _{DD} - 5% | V _{DD} + 5% | V _{DD} - 5% | V _{DD} + 5% | V | | |
| Frequency Range | 100 | 135 | 100 | 135 | 100 | 135 | MHz | | |
| Standard Frequency | 100, 125, 156.25 | | | | | | MHz | Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position. | |
| Power Current Consumption | | 42 | | 42 | | 30 | mA | | |
| Output Level | Output High | 0.6 | 0.9 | 0.6 | 0.9 | 0.55 | 1.0 | V | |
| | Output Low | -0.15 | 0.15 | -0.15 | 0.15 | -0.15 | 0.15 | V | |
| Transition Time | Rise Time | | 0.6 | | 0.6 | | 0.6 | nSec | Transition times are measured between 20% and 80% |
| | Fall Time | | 0.6 | | 0.6 | | 0.6 | nSec | |
| Duty Cycle | | 45 | 55 | 45 | 55 | 45 | 55 | % | |
| Startup Time | | | 10 | | 10 | | 10 | mSec | |
| Tri-State | Enable | 0.7 x V _{DD} | | 0.7 x V _{DD} | | 0.7 x V _{DD} | | V | |
| | Disable | | 0.3 x V _{DD} | | 0.3 x V _{DD} | | 0.3 x V _{DD} | V | |
| Stand by Current | | 10 | | 10 | | 10 | µA | | |
| Output Loading | 50 to GND | | | | | | Ω | | |
| RMS Phase Jitter Integrated 12 kHz~20 MHz @ 3.3V | | 0.3 | | 0.3 | | 0.3 | pSec | | |
| Aging (@ 25°C, First Year) | | ±3 | | ±3 | | ±3 | ppm | | |
| Storage Temp. Range | | -55 | 125 | -55 | 125 | -55 | 125 | °C | |
| Phase Noise | | Typ. | Max. | Typ. | Max. | Typ. | Max. | | |
| At V _{DD} =3.3V, f _{out} =156.25MHz | 10kHz offset | -145 | | -145 | | -142 | | dBc/Hz | |
| | 100kHz offset | -153 | | -153 | | -150 | | dBc/Hz | |
| | 1MHz offset | -155 | | -155 | | -153 | | dBc/Hz | |

FREQ. STABILITY vs. TEMP. RANGE

| Temp.(°C) | ppm | | |
|------------|-----|-----|-----|
| | | ±25 | ±50 |
| -20 ~ +70 | | ○ | ○ |
| -40 ~ +85 | | ○ | ○ |
| -40 ~ +105 | | X | ○ |
| -40 ~ +125 | | X | △ |

○: Available △:Conditional x: Not Available
 Inclusive of calibration @ 25°C, operating temperature range,input Voltage variation,load variation,aging (1st year),shock,and vibration

Note: not all combination of options are available. Other specifications may be available upon request.

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