

**LVPECL UHF CLOCK (XO)**  
**SD-A29KXXX Series (3.3 Volt)**  
**SD-B29KXXX Series (2.5 Volt)**

### Description

The **SD-X29KXXX Series** of quartz crystal oscillators provides ultra high frequency with LVPECL complementary outputs. The outputs can be Tri-stated for test automation or combining multiple clocks. The device is based on low noise analog harmonic multiplication for higher frequencies, and packaged in a miniature, low profile leadless ceramic SMD package with 6 gold plated pads.

### Applications and Features

- Wide frequency range – 38.0MHz to 640.000MHz
- Fiber Channel; 10 GbE; Infiniband; Network Processors; SOHO Routing
- High Reliability - NEL HALT/HASS qualified for crystal oscillator start-up conditions
- Low Phase Noise, Low Jitter
- High shock resistance, to 1000g
- Ultra High Frequency
- Tight frequency stability -  $\pm 20$  ppm overall available
- Grounded lid and internal by-pass capacitor reduce EMI
- RoHS Compliant, Lead Free Construction

| Creating a Part Number         |                 |                              |                                         |
|--------------------------------|-----------------|------------------------------|-----------------------------------------|
| <b>SD - X 29K X X X - FREQ</b> |                 |                              |                                         |
| <u>Package Code</u>            |                 |                              | <u>Overall Frequency Stability, ppm</u> |
| SD                             | 6 pad 5x7mm SMD |                              | E $\pm 20$                              |
|                                |                 |                              | F $\pm 25$                              |
|                                |                 |                              | G $\pm 50$                              |
|                                |                 |                              | H $\pm 100$                             |
|                                |                 |                              | 9 Customer specific                     |
| <u>Input Voltage</u>           |                 |                              |                                         |
| A                              | 3.3V $\pm 5\%$  |                              |                                         |
| B                              | 2.5V $\pm 5\%$  |                              |                                         |
| <u>Enable Option</u>           |                 | <u>Temperature Range, °C</u> |                                         |
| H                              | Enable High     | A                            | 0 to 50                                 |
| L                              | Enable Low      | B                            | 0 to 70                                 |
|                                |                 | C                            | -20 to 70                               |
|                                |                 | D                            | -40 to 85                               |
|                                |                 | 9                            | Customer specific                       |



SD-X29KXXX Series Continued  
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## Absolute Maximum Ratings

| Parameter                   | Symbol  | Value       | Unit |
|-----------------------------|---------|-------------|------|
| Operating Temperature Range | To      | -40 to +85  | °C   |
| Storage Temperature Range   | Tst     | -50 to +90  | °C   |
| Supply Voltage              | Vcc     | -0.5 to 4.5 | V    |
| Enable/Disable Voltage      | Ven/dis | 0 to Vcc    | V    |

## Electrical Parameters

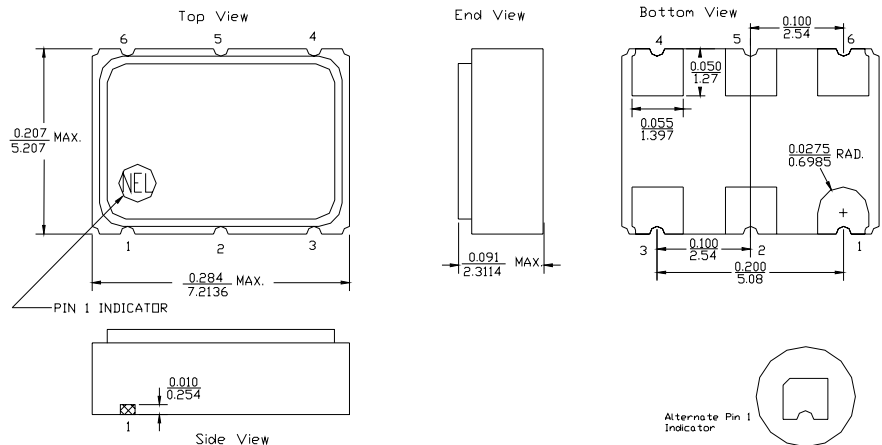
| Parameter                                             | Symb                       | Conditions, Note                                                                                  | MIN                                                                                | TYP                                        | MAX            | Unit   |
|-------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|----------------|--------|
| Nominal Frequency                                     | Fo                         |                                                                                                   | 38                                                                                 |                                            | 640            | MHz    |
| Supply Voltage                                        | Vcc                        | Code A<br>Code B                                                                                  | 3.135<br>2.375                                                                     | 3.3<br>2.5                                 | 3.465<br>2.625 | V      |
| Supply current                                        | Icc                        |                                                                                                   |                                                                                    | 80                                         | 100            | mA     |
| Output Logic Type                                     |                            |                                                                                                   |                                                                                    | LVPECL                                     |                |        |
| Load                                                  |                            | Output to Vcc-2V, or<br>Thevenin Equivalent                                                       |                                                                                    | 50                                         |                | Ohm    |
| Output Levels                                         | Voh<br>Vol                 | overall                                                                                           | Vcc-1.025<br>Vcc-1.620                                                             |                                            |                | V      |
| Duty Cycle (Symmetry)                                 |                            | At 50% of output voltage<br>swing                                                                 | 45/55                                                                              | 50/50                                      | 55/45          | %      |
| Rise/Fall Time                                        | Tr/Tf                      | 20 to 80, 80 to 20 %                                                                              |                                                                                    | 0.5                                        | 0.7            | ns     |
| Jitter                                                | Integrated                 | J                                                                                                 | Integrated from Phase<br>Noise, 12 KHz to 20<br>MHz, RMS                           | 0.3                                        |                | ps     |
|                                                       | Wavecrest<br>characterized | Random<br>period,                                                                                 | <320 M<br>>320 M                                                                   | 2.5<br>2.5                                 |                | ps     |
|                                                       |                            | Accumul.,<br>pk-to-pk                                                                             | <320 M<br>>320 M                                                                   | 30<br>43                                   |                | ps     |
|                                                       |                            | Deterministic                                                                                     | <320 M<br>>320 M                                                                   | 6<br>18                                    |                | ps     |
| Sub-harmonics                                         |                            |                                                                                                   | <320 M<br>>320 M                                                                   | -50<br>-35                                 |                | dBc    |
| Phase Noise                                           | f(Δf)                      | 212.5 MHz<br>@ 10 Hz<br>@ 100 Hz<br>@ 1 KHz<br>@ 10KHz<br>@ 100KHz<br>@ >1MHz                     |                                                                                    | -65<br>-95<br>-125<br>-140<br>-145<br>-148 |                | dBc/Hz |
| Frequency Stability                                   | ΔF/F                       | Overall, including initial<br>calibration, temperature,<br>aging 10 years, shock and<br>vibration | See "Creating a Part Number"<br>Not all combinations available,<br>consult factory |                                            |                | ppm    |
| Enable High Option<br>Pin 2 Enabled<br>Pin 2 Disabled |                            | CMOS logic 1 or N/C<br>CMOS logic 0                                                               | 0.7 Vcc<br>0                                                                       |                                            | Vcc<br>0.3 Vcc | V      |
| Enable Low Option<br>Pin 2 Disabled<br>Pin 2 Enabled  |                            | CMOS logic 1 or N/C<br>CMOS logic 0                                                               | 0.7 Vcc<br>0                                                                       |                                            | Vcc<br>0.3 Vcc | V      |

Rev. B

## SD-X29KXXX Series Continued LVPECL UHF CLOCK (XO)

### Electrical Connection

| Pin | Connection       |
|-----|------------------|
| 1   | Enable/Disable   |
| 2   | N.C.             |
| 3   | $V_{EE}$ /Ground |
| 4   | Output           |
| 5   | /Output          |
| 6   | $V_{CC}$         |

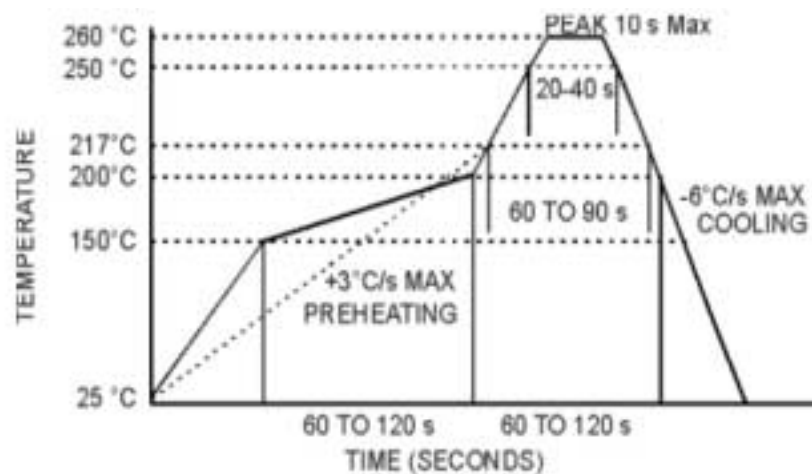


ALL DIMENSIONS:  $\frac{\text{IN}}{\text{mm}}$   
All tolerances are  $\pm 0.005$  inches ( $\pm 0.127$  mm) unless otherwise specified.

## Environmental and Mechanical Characteristics

|                       |                                                           |
|-----------------------|-----------------------------------------------------------|
| Operating temp. range | see part # table                                          |
| Mechanical Shock      | Per MIL-STD-202, Method 213, Cond. E                      |
| Thermal Shock         | Per MIL-STD-883, Method 1011, Cond. A                     |
| Vibration             | Per MIL-STD-883, Method 2007, Cond. A                     |
| Hermetic Seal         | Leak rate less than $1 \times 10^{-8}$ atm.cc/s of helium |
| Soldering conditions  | See MAX reflow profile below                              |

### Maximum Reflow Profile



**FREQUENCY  
CONTROLS, INC.**