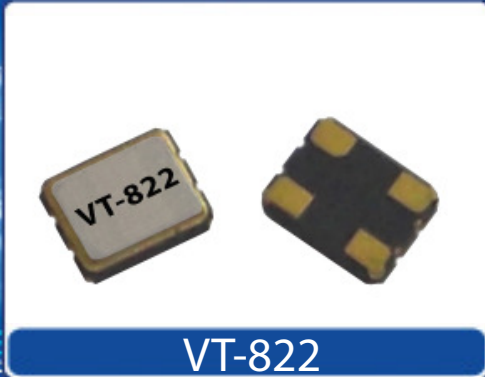



Helping Customers Innovate, Improve & Grow



Description

Vectron's VT-822 Temperature Compensated Crystal Oscillator (TCXO) is a quartz stabilized, CMOS output, analog temperature compensated oscillator, operating off either a 2.5 or 3.3 volt supply, in a hermetically sealed 3.2x2.5 mm ceramic package.

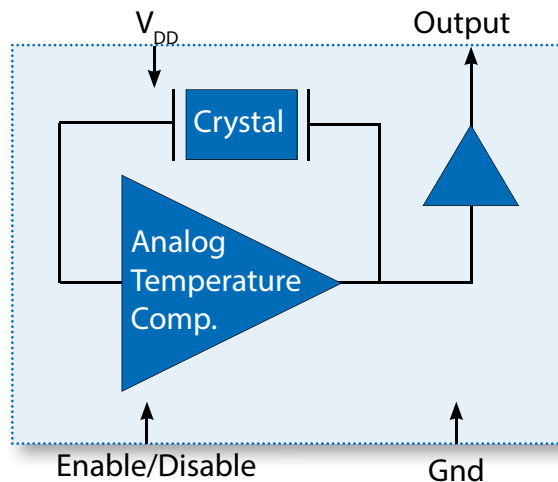
Features

- CMOS Output
- Output Frequencies to 54 MHz
- Enable Disable Function
- Fundamental Crystal Design
- Hermetically Sealed Ceramic SMD package
- Product is compliant to RoHS directive  and fully compatible with lead free assembly

Applications

- WiMAX, Wi-Fi, Wi-LAN
- Wireless Communications
- Base Stations
- Point to point radios
- Broadband Access
- Test Equipment
- Handsets
- Networking

Block Diagram



Specifications

| Table 1. Electrical Performance | | | | | |
|--|----------------------|-------------------------------|-------------------------------------|--------------------|--------------------|
| Parameter | Symbol | Min. | Typ | Max | Units |
| Output Frequency | f_o | 4 | | 54 | MHz |
| Supply Voltage, ¹ (Ordering Option) | V_{DD} | +2.5 or +3.3 | | | V |
| Supply Current, to 19.999 MHz 20.001 - 55.000MHz | I_{DD} | | | 3.0 7.0 | mA |
| Operating Temperature, (Ordering Option) | T_{OP} | -20/70 or -40/85 | | | °C |
| STABILITY | | | | | |
| Stability Over T_{OP} , (Ordering Option) | | ±2.0, ±2.5, ±5.0 | | | ppm |
| Initial Accuracy ² | | | | ±2.0 | ppm |
| Power Supply Stability | | | | ±0.2 | ppm |
| Load Stability | | | | ±0.2 | ppm |
| Aging | | | | ±1.0 | ppm/1st yr |
| OUTPUT | | | | | |
| Output Level ³ | V_{OH} V_{OL} | $0.9 \cdot V_{DD}$ | | $0.1 \cdot V_{DD}$ | V |
| Output Drive | I_{OH} I_{OL} | 4 | | -4 | mA mA |
| Output Load | | | | 15pF | |
| Output Rise and Fall Time | | | | 5 | ns |
| Duty Cycle | | 45 | | 55 | % |
| Phase Noise ⁴ , 10.000MHz 10Hz 100Hz 1kHz 10kHz 100kHz | | | -75 -111 -141 -152 -156 | | dBc/Hz |
| Jitter ⁵ | | | 2.1 20.0 | | ps rms ps pk-pk |
| Start-Up Time | | | | 2 | ms |
| ENABLE/DISABLE | | | | | |
| Output Enabled | | $0.7 \cdot V_{DD}$ or open | | | V |
| Output Disabled | | | | $0.3 \cdot V_{DD}$ | V |
| Package Size | | 3.2 x 2.5 | | | |

1. The VT-822 power supply pin should be filtered, eg, a 10uF, 0.1 and 0.01uf capacitor
2. Initial accuracy is guaranteed sixty minutes after a 260C reflow.
3. The Output is DC coupled.
4. Measured at room ambient temperature using an Agilent E5052 Signal Source Analyzer
5. Jitter is measured is a Wavecrest SIA3300C, 90K samples

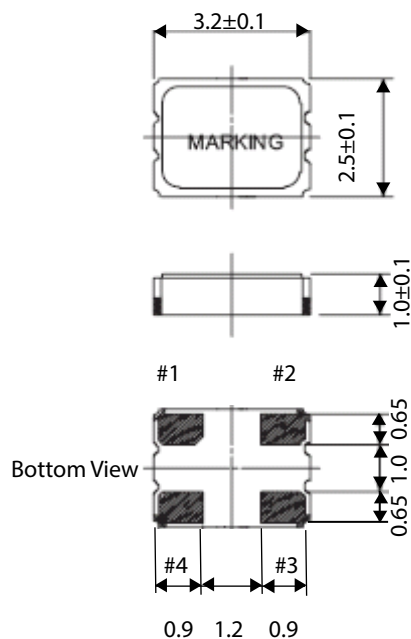
Outline Drawing and Recommended Layout

Table 2. Pinout

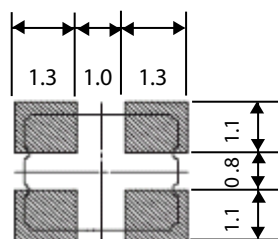
| Pin # | Symbol | Function |
|-------|----------|---------------------------|
| 1 | E/D | Enable/Disable |
| 2 | GND | Electrical and Lid Ground |
| 3 | f_o | Output Frequency |
| 4 | V_{DD} | Supply Voltage |

Table 3. Enable Disable Function

| Pin 1 | Pin 3 Output |
|-------|----------------|
| High | Clock Output |
| Open | Clock Output |
| Low | High Impedance |



Dimensions are in mm



Marking

V XXMXXX

.YYWWC

V=Vectron

XXMXXX = Frequency

YY = Year

WW = Week

C = Manufacturing Location

Maximum Ratings

Absolute Maximum Ratings and Handling Precautions

Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied or any other excess of conditions represented in the operational sections of this data sheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability.

Although ESD protection circuitry has been designed into the VT-822, proper precautions should be taken when handling and mounting, Vectron employs a Human Body Model and Charged Device Model for ESD susceptibility testing and design evaluation.

ESD thresholds are dependent on the circuit parameters used to define the model. Although no industry standard has been adopted for the CDM a standard resistance of 1.5kOhms and capacitance of 100pF is widely used and therefore can be used for comparison purposes.

Table 4. Maximum Ratings

| Parameter | Symbol | Rating | Unit |
|---------------------------|-------------|----------|------|
| Storage Temperature | T_{STORE} | -40/125 | °C |
| Supply Voltage | V_{DD} | -0.3/4 | V |
| Enable Disable Voltage | E/D | V_{DD} | V |
| ESD, Human Body Model | HBM | 1500 | V |
| ESD, Charged Device Model | CDM | 1000 | V |

| Table 5. Environmental Compliance | |
|-----------------------------------|--|
| Parameter | Condition |
| Mechanical Shock | MIL-STD-883 Method 2002 |
| Mechanical Vibration | MIL-STD-883 Method 2007 |
| Temperature Cycle | MIL-STD-883 Method 1010 |
| Solderability | MIL-STD-883 Method 2003 |
| Fine and Gross Leak | MIL-STD-883 Method 1014 |
| Resistance to Solvents | MIL-STD-883 Method 2015 |
| Moisture Sensitivity Level | MSL1 |
| Contact Pads | Gold (0.3um min - 1.0um max) over Nickel |
| Weight | 26 mg |

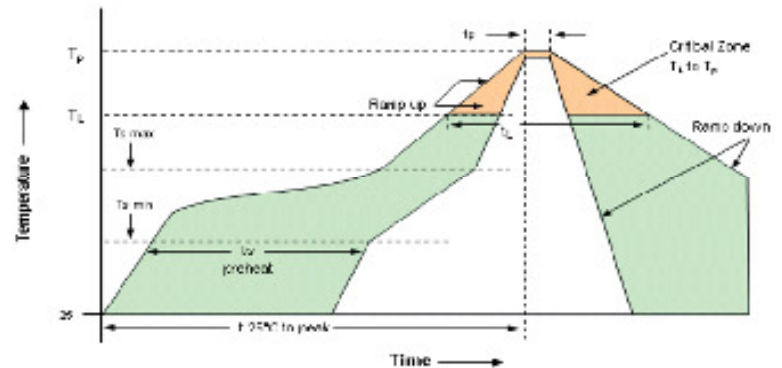
IR Compliance

Suggested IR Profile

Devices are built using lead free epoxy and can be subjected to standard lead free IR reflow conditions shown in Table 5. Contact pads are gold over nickel and lower maximum temperatures can also be used, such as 220C.

| Table 6. Reflow Profile | | |
|--------------------------|-------------|-------------|
| Parameter | Symbol | Value |
| PreHeat Time | t_s | 200 sec Max |
| Ramp Up | R_{UP} | 3°C/sec Max |
| Time above 217°C | t_L | 150 sec Max |
| Time to Peak Temperature | t_{AMB-P} | 480 sec Max |
| Time at 260°C | t_P | 30 sec Max |
| Time at 240°C | t_{P2} | 60 sec Max |
| Ramp down | R_{DN} | 6°C/sec Max |

Solderprofile:



Tape and Reel

| Table 7 . Tape Dimensions | | | | | | Reel Dimensions (mm) | | | | | | | |
|---------------------------|-----|-----|-----|-----|-----|----------------------|-----|-----|-----|-----|-----|-----|------------|
| Tape Dimensions (mm) | | | | | | Reel Dimensions (mm) | | | | | | | |
| Dimension | W | F | Do | Po | P1 | A | B | C | D | N | W1 | W2 | # Per Reel |
| Tolerance | Typ | Typ | Typ | Typ | Typ | Typ | Min | Typ | Min | Min | Typ | Max | |
| VT-822 | 8 | 3.5 | 1.5 | 4 | 4 | 178 | 2 | 13 | 21 | 60 | 10 | 14 | 3000 |

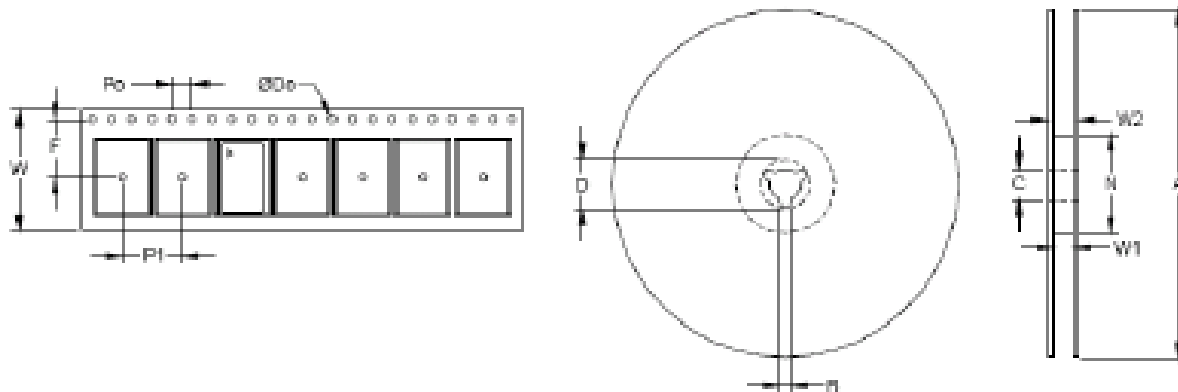


Table 8. Standard Frequencies (MHz)

| | | | | | | | | | |
|---------|--------|-----------|-----------|------------|--------|--------|---------|---------|---------|
| 8.1920 | 10.000 | 10.250 | 12.000 | 12.800 | 13.000 | 14.000 | 14.7456 | 15.360 | 15.000 |
| 16.000 | 16.376 | 16.366667 | 16.367667 | 16.3677673 | 16.368 | 16.369 | 16.736 | 16.800 | 19.200 |
| 19.6608 | 19.680 | 19.680 | 20.000 | 22.000 | 25.000 | 26.000 | 27.000 | 27.4560 | 30.4000 |
| 30.720 | 38.400 | 40.000 | 45.000 | 50.000 | 52.000 | | | | |

Ordering Information

VT-822- E A E - 256 0- xxMxxxxxxxXX

Product

TCXO

Package

3.2x2.5 mm Ceramic

Voltage Options

E: +3.3 Vdc ±5%

H: +2.5 Vdc ±5%

Output

A: CMOS

Temp Range

J: -20/70°C

E: -40/85°C

Packaging

TR: Tape and Reel

blank: Cut Tape / non Tape and Reel quantities

_SNPB: Tin lead solder dipped

Frequency in MHz

Tuning

0: Fixed, No tuning

Stability

206: ±2.0ppm

256: ±2.5ppm

506: ±5.0ppm

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

Example:

VT-822-EAE-2060-24M5760000TR

VT-822-EAE-2060-24M5760000

VT-822-EAE-2060-24M5760000_SNPB

Tape and Reel

Cut Tape

Tin lead solder dipped

Revision History

| Revision Date | Approved | Description |
|----------------|----------|--|
| Aug 10, 2018 | FB | Update logo and contact information, add "SNPB" ordering option |
| May 25, 2019 | FB | Update logo and contact information, change "SNPB" ordering option to "SNPB" |
| April 30, 2020 | FB | Add tape and reel ordering option |

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