



VOLTAGE CONTROLLED OSCILLATORS

HCMOS, 0° TO 70°C

SURFACE MOUNT
R3306,
R3320, R3330

Surface Mount Tristate VCXOs, 3.3V

Surface mount VCXOs with tristate are available for the first time at 3.3 volts, and in a variety of off-the-shelf models. They are recommended for new wireless and telecom designs that operate at 3.3 volt to minimize current, power, and heat dissipation. Three combinations of pull, control voltage and center frequency deviation accommodate a wide variety of filtering and driving circuitry. For greater pull, the 5V VCXOs should be used.

These VCXOs have excellent linearity. This permits advanced phase locked loops which demand the tight control of frequency-to-voltage sensitivity ($\Delta f/\Delta V$), over full deviation and temperature ranges.

The multi-layer gold-ceramic package ushers in a new generation of surface mount oscillators. Measuring only 5.2 x 7.7 x 1.9 mm, they significantly reduce PCB real estate, reducing cost and saving space which can be used for adding value-functions.

Tristate enhances automatic board testing, and allows several VCXOs to be wire-or'd, so that a choice of more than one oscillator frequency can easily be made.

SMD Tristate 3.3V, VCXO

3 MHz to 55 MHz

These 3.3V SMD VCXOs generate an HCMOS frequency output which is controlled by the input control voltage. The end-point frequency/voltage parameters and the center frequency voltage range are defined in the specifications.

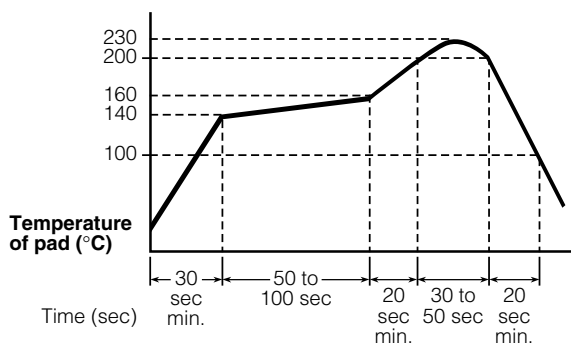
Frequency Deviation = deviation of frequency from the nominal frequency.

CAPTURE RANGE

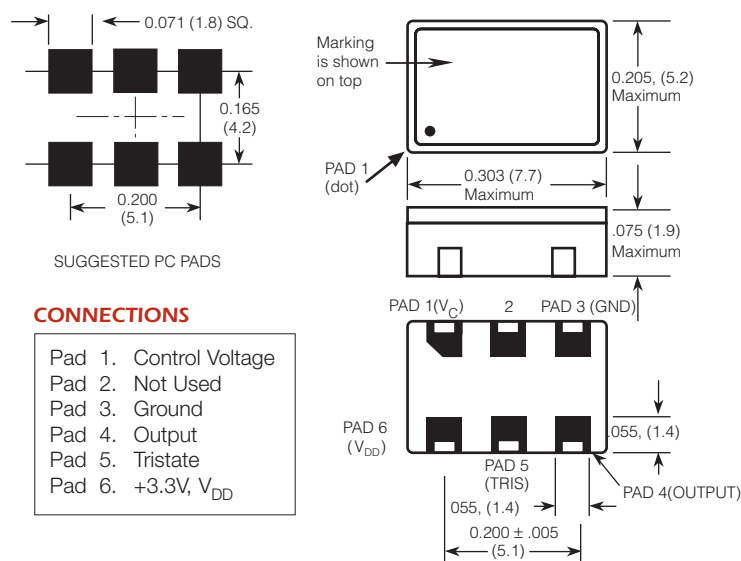
The Frequency-Capture range is equal to the (Nominal Center-Frequency \pm Frequency Deviation), because every MF VCXO is ATE-tested to meet the Frequency-Deviation over the temperature range. **Frequency Capture specification includes all effects of temperature and supply voltage. It is not necessary to make additional capture allowances.**

FEATURES

- Small size VCXO: 5.2 x 7.7 x 1.9 mm
- Frequency from 3 MHz to 50 MHz
- 50 ppm and 75 ppm guaranteed pull ranges
- Start-up time less than 5 ms.
- Typical jitter is 8.3 ps RMS
- Excellent linearity
- Every VCXO is tested over temperature range 0 to 70°C
- Tristate with "0" input on pad 5



Recommended Reflow Soldering Profile



Millimeters are shown in ().

"R-1" Package



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Center Frequency is Between Two Voltages with ±50 ppm stability

| MODEL | Marking Letter ID | Control Voltage (Volts) | Guaranteed Frequency Deviation (ppm) | Control Capture Range (ppm) | Center Voltage at Center Frequency | Frequency Stability (ppm) |
|-------|-------------------|-------------------------|--------------------------------------|-----------------------------|------------------------------------|---------------------------|
| R3306 | VW | 0 to 3.0 | ± 50 min | ± 50 | – | ± 30, typ |

Center Frequency is at 1.5V with ±50 ppm stability

| MODEL | Marking Letter ID | Control Voltage (Volts) | Frequency Deviation (ppm) | Guaranteed Capture Range (ppm) | Control Voltage at Center Frequency | Center Frequency Stability (ppm) |
|-------|-------------------|-------------------------|---------------------------|--------------------------------|-------------------------------------|----------------------------------|
| R3320 | VX | 0.5 to 2.5 | ± 50 to 150 | ± 50 | 1.5 | ± 30, typ |

Center Frequency is at 1.5V with ±25 ppm stability

| MODEL | Marking Letter ID | Control Voltage (Volts) | Frequency Deviation (ppm) | Guaranteed Capture Range (ppm) | Control Voltage at Center Frequency | Center Frequency Stability (ppm) |
|-------|-------------------|-------------------------|---------------------------|--------------------------------|-------------------------------------|----------------------------------|
| R3330 | VY | 0.5 to 2.5 | ± 50 to 150 | ± 50 | 1.5 | ± 15, typ |

DESCRIPTIONS

| | |
|-------|---|
| R3306 | ±50 ppm, min. deviation when using 0 to 3.0V rail-to-rail control-voltage |
| R3320 | ±50 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±50 ppm stability |
| R3330 | ±50 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±25 ppm stability |

FREQUENCY STABILITY

Frequency stability vs. Temperature (0 to 70°C) is typically better than ±20 ppm. Since the deviation of each oscillator is tested and guaranteed over the whole operating temperature range, it is not necessary to make additional capture allowances. All oscillators will capture frequencies with the full minimum values of the deviation under all conditions.

QUALITY

Each VCXO is computer-tested at three temperatures to guarantee full compliance to the specification.

SPECIFICATIONS

Temperature

Operating 0 to 70°C
Storage –55 to +125°C

Frequency Stability

±15, 30 or 50 ppm, max.

| | MIN. | TYP | MAX | UNITS |
|---|------|-----|-----|-------|
| Input Voltage, V_{DD} | 3.0 | 3.3 | 3.6 | volts |

Input Current

| | | | |
|--------------------|-----|-----|----|
| 3 M to 10 MHz | 2.0 | 3.5 | ma |
| 10.1 to 20 MHz | 3.0 | 4.0 | ma |
| 20.1 to 30 MHz | 5.0 | 6.0 | ma |
| 30.1 MHz and above | 7.0 | 8.0 | ma |

Output Levels

| | | |
|----------------------------------|------------|-------|
| "0" Level, sinking 16 ma | 0.4 | volts |
| "1" Level CMOS, sourcing 8 ma | $V_{DD}-4$ | volts |

Rise and Fall Times

| | | | |
|----------------------------|-----|---|----|
| CMOS, 15 pf, 20 to 80% | 3.0 | 4 | ns |
| CMOS, 30 pf, 20 to 80%) | 4.0 | 5 | ns |
| CMOS, 50 pf, 20 to 80%) | 6.0 | 8 | ns |

Symmetry

| | | | |
|----------------------|-------|-------|---------|
| CMOS, @ 50% V_{DD} | 48/52 | 45/55 | percent |
|----------------------|-------|-------|---------|

Input Impedance,

| | | | |
|------------------------|-----|------|-------|
| Pad 1, Control Voltage | 100 | 1000 | Kohms |
|------------------------|-----|------|-------|

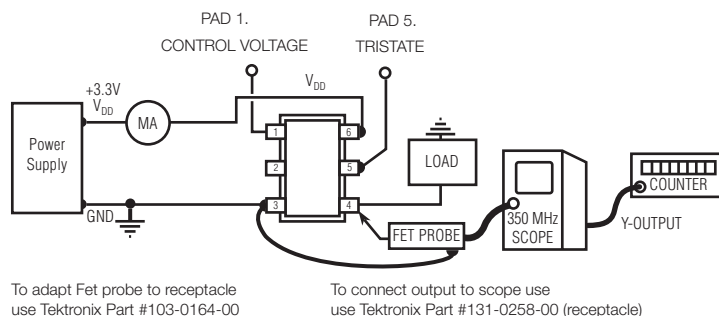
Tristate

"1" Output is On - Pin 5 may float or 2.4V min, sourcing 400µa
"0" Output is disabled, tristate, high impedance -
Pin 5 requires 0.4V, sinking 400µa

| | | | |
|----------------------------------|----|----|-----|
| Control Voltage Bandwidth | 15 | 75 | KHz |
|----------------------------------|----|----|-----|

AGING

3 ppm, first year, typ.
1 ppm per year thereafter, typ.



TEST CIRCUIT

MF ELECTRONICS

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PACKAGING AND ENVIRONMENTAL INFORMATION

SURFACE MOUNT "R"

R packages are hermetically sealed metal-ceramic packages.
 For hand-soldering, the temperature of the iron should not exceed 400°C.

ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle – Not to exceed ± 5 ppm change when exposed to 2 hours maximum at each temperature from 0 to 120°C, with 25°C reference

Shock – 1000 G's, 0.35 ms, 1/2 sine wave, 3 shocks in each plane

Vibration – 10-2000 Hz of .06" d.a. or 20 G's, whichever is less

Humidity – Resistant to 85° R.H. at 85°C

TABLE 1

| Model | Marking Letter ID |
|-------|-------------------|
| R3306 | VW |
| R3320 | VX |
| R3330 | VY |

TAPE AND REEL

Tape and Reel– 16mm, EIA compliant

MECHANICAL SPECIFICATIONS

Gross Leak
 Each unit checked in 125°C flurocarbon

Case
 Ceramic with metal lid

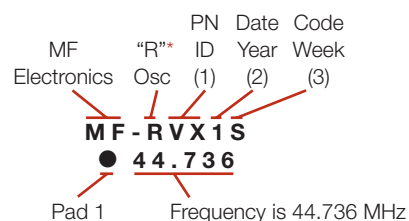
Pads
 60 microinch of gold over nickel

Marking
 Print is permanent black ink.

Resistance to Solvents
 MIL STD 202, Method 215

MARKING SPECIFICATION

The format for the marking is:



NOTES

- (1) One or two letters are used to identify the model. See Table 1.
- (2) Number in date code is year. In example, "1" is 2001.
- (3) Letter in date code is one two-week period. Year is divided into 26 two-week intervals. Each two-week interval is represented by one letter of the alphabet, in sequence.

* When Marking Letter ID is two letters, the "R" is deleted.

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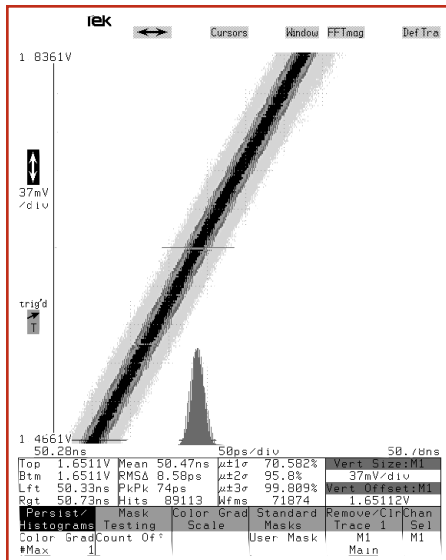


Fig. 1 R3320-20M

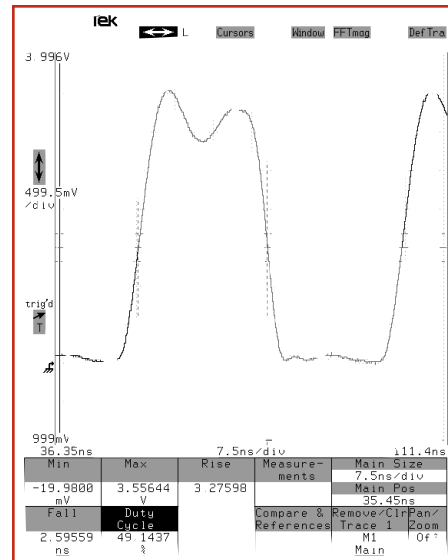


Fig. 2 R3320-19.44M
 with 25 pf load

DEVIATION vs CONTROL VOLTAGE
 FOR R3330-27M, TYPICAL

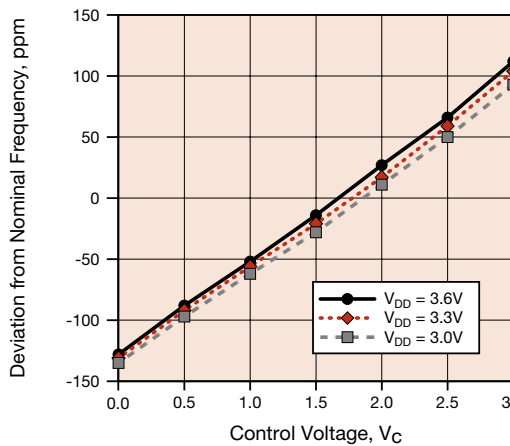


Fig. 3 Deviation vs. Control Voltage
 at 0°C

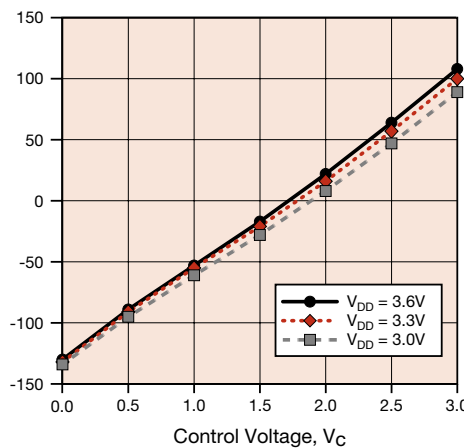


Fig. 4 Deviation vs. Control Voltage
 at 25°C

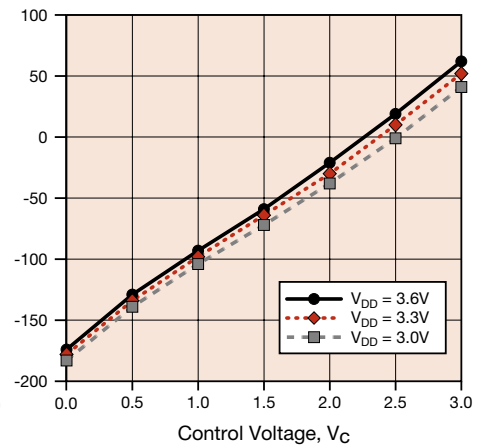


Fig. 5 Deviation vs. Control Voltage
 at 70°C

HOW TO ORDER

For Part Number, put package type before model number, and add frequency in MHz, for example:

R 3320 - 44.736M

↑ ↑ ↑

SMD "R" package "3320" is model type "44.736 M" frequency in MHz

MF ELECTRONICS