



VOLTAGE CONTROLLED OSCILLATORS

HCMOS, 0° TO 70°C

FULL SIZE D.I.L.
 M3306
 L3306
 M3321, M3322
 L3321, L3322
 M3331, M3332
 L3331, L3332
 M3341, M3342
 L3341, L3342

HALF SIZE D.I.L.
 H3306
 H3321, H3322
 H3331, H3332
 H3341, H3342



Tristate, 3.3V Thru-Hole/Gull Wing 3 MHz to 125 MHz

Tristate VCXOs Thru-Hole, 3.3V

The 3.3 volt thru hole VCXO models are also available in tristate. They are available for the first time in a variety of off-the-shelf models, in full size (M) and half size (H) packages. These models are recommended for new equipment designs that operate at 3.3V to minimize current, power, and heat dissipation. Many combinations of pull, control voltage and center frequency deviation are available, to accommodate a wide variety of filtering and driving circuitry. The tristate function facilitates diagnostic bed-of-nails ATE testing, or choice of clock speed under software control.

These 3.3V VCXOs generate an HCMOS/TTL frequency output which is controlled by an input control voltage. The end-point voltage/frequency parameters are defined, as is the center frequency.

CAPTURE RANGE

The Frequency-Capture range is equal to the (Center-Frequency ± the 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.**

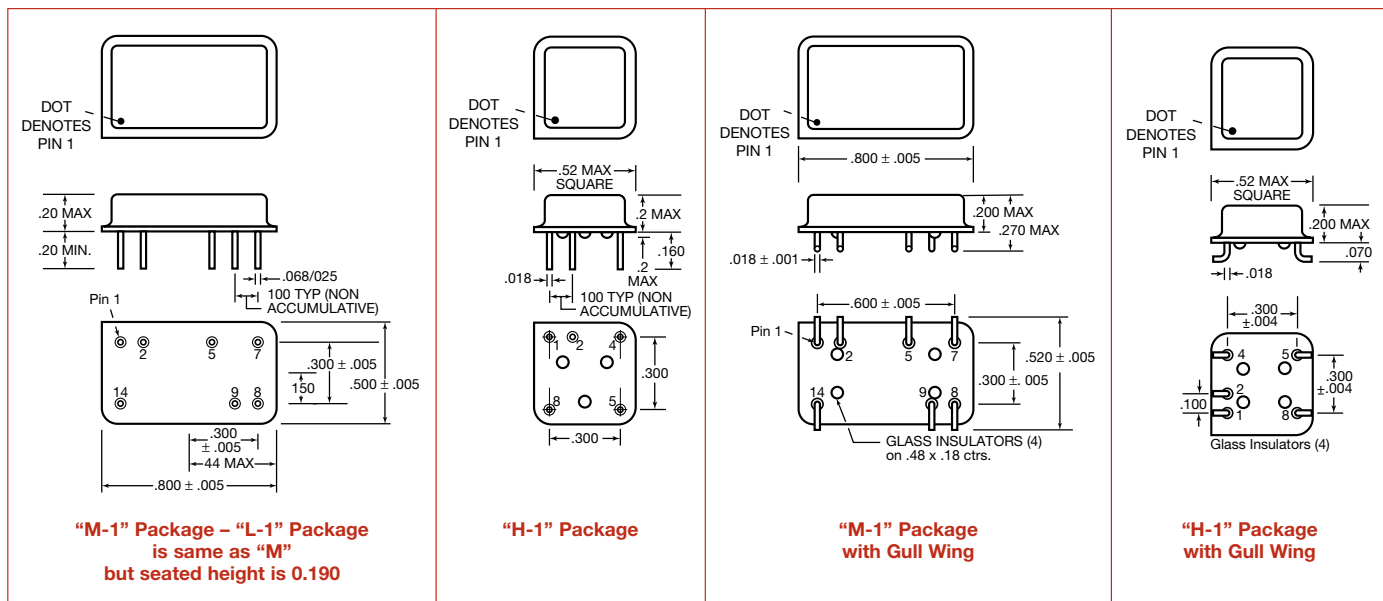
CONNECTIONS

Full Size	
Pin 1.	Not used
Pin 2.	Control Voltage, V_C
Pin 5.	Tristate
Pin 7.	Ground & Case
Pin 8.	Output
Pin 9.	Not used
Pin 14.	+3.3V, V_{DD}

Half Size	
Pin 1.	Control Voltage, V_C
Pin 2.	Tristate
Pin 4.	Ground & Case
Pin 5.	Output
Pin 8.	+3.3V, V_{DD}

FEATURES

- Tristate is standard
- Jitter is specified
- Frequency from 3 MHz to 125 MHz
- Capture-range is fully defined, under all conditions
- Start-up time less than 5 ms.
- Half size or full size DIL package
- Choice of thru-hole or gull wing



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Center Frequency is Between Two Voltages

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
3306	0 to 3.0	± 150 min	± 150	—	± 30, typ ± 50, max

Center Frequency is at 1.5V with ±50 ppm stability

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
3321	0.5 to 2.5	± 75 to 150	± 75	1.5	± 30, typ
3322	0.5 to 2.5	± 100 to 200	± 100	1.5	± 50, max

Center Frequency is at 2.5V with ±25 ppm stability

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
3331	0.5 to 2.5	± 75 to 150	± 75	2.5	± 20, typ
3332	0.5 to 2.5	± 100 to 200	± 100	2.5	± 25, max

Center Frequency is at 1.5V with ±20 ppm stability

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
3341	0.5 to 2.5	± 75 to 150	± 75	1.5	± 15, typ
3342	0.5 to 2.5	± 100 to 200	± 100	1.5	± 20, max

DESCRIPTIONS

M3306, H3306, L3306	±150 ppm, min. deviation when using 0 to 3 control-voltage
M3321, H3321, L3321	±75 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±50 ppm stability
M3322, H3322, L3322	±100 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±50 ppm stability
M3331, H3331, L3331	±75 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±25 ppm stability
M3332, H3332, L3332	±100 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±25 ppm stability
M3341, H3341, L3341	±75 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±20 ppm stability
M3342, H3342, L3342	±100 ppm capture when using using 0.5 to 2.5V control-voltage and 1.5V center with ±20 ppm stability

SPECIFICATIONS

Temperature

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

Frequency Stability

$V_C = 1.5V$ ±25 or ±50 ppm, max.
 as shown in model specification

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

Input Current

1 KHz to 10 MHz	8	14	ma
10.1 to 25 MHz	15	20	ma
25.1 to 50 MHz	20	30	ma
50.1 to 75 MHz	25	35	ma
75.1 to 125 MHz	30	40	ma

Output Levels

"0" Level, sinking 16 ma 0.4 volts
 "1" Level, sourcing 8 ma $V_{DD} - 0.4$ 0.5 volts

Rise and Fall Times

CMOS, 15 pf, 20 to 80% (<60 MHz)	3.0	4	ns
CMOS, 30 pf, 20 to 80% (<60 MHz)	4.0	5	ns
CMOS, 50 pf, 20 to 80% (<60 MHz)	6.0	8	ns
CMOS, 15 pf, 20 to 80% (>60 MHz)	2.0	2.5	ns
CMOS, 30 pf, 20 to 80% (>60 MHz)	3.0	4.5	ns

Symmetry

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

Input Requirements for Pin 1:

"1": On - Pin 1 may float
 or 2.4V min., sourcing 400 microamp
 "0": Tristate -
 Pin 1 requires 0.4V, sinking 400 microamp.

Control Voltage Bandwidth	15	150	KHz
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Jitter

Jitter is less than 80 ps peak-peak, when measured by Tektronix 11801B Digital Storage Oscilloscope with SD-22 Sampling head in Color Statistics mode.

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

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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

MECHANICAL SPECIFICATIONS

Gross Leak – Each unit checked in 125°C fluoro-carbon

Case – Ceramic with glass hermetic seal, sealed in 420°C furnace

Pads – 60 microinch of gold over nickel

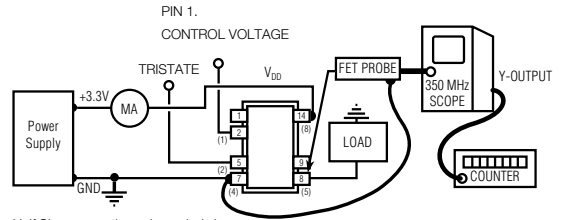
Marking – Print is permanent white ink

Resistance to Solvents – MIL STD 202, Method 215

AGING

3 to 5 ppm, first year, typ.

1 ppm per year thereafter, typ.



Half Size connections shown in ()

To adapt Fet probe to receptacle use Tektronix Part #103-0164-00

To connect output to scope use Tektronix Part #131-0258-00 (receptacle)

ALL OSCILLATORS HAVE INTERNAL BYPASS CAPACITORS

TEST CIRCUIT

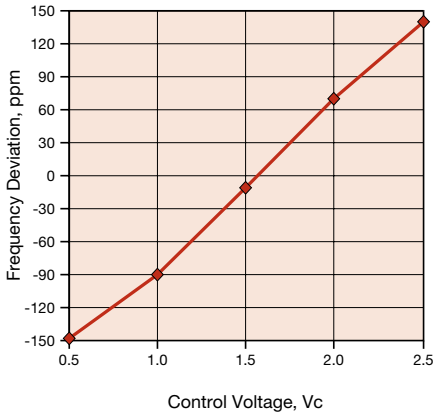


Fig. 1 Deviation vs. Control Voltage for M3322-14.912M

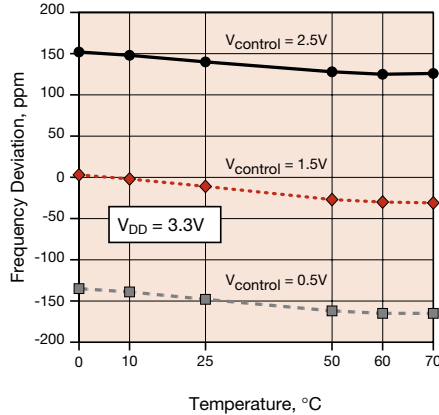


Fig. 2 Frequency Stability vs. Temperature for M3322-14.912M

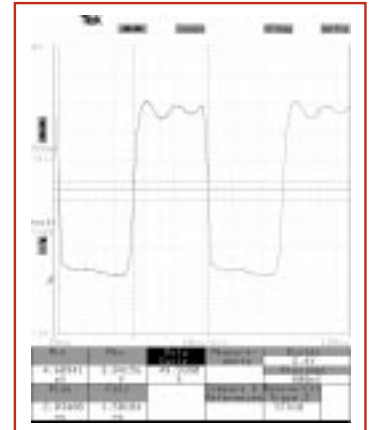


Fig. 3 H3223-19.44M, without load

HOW TO ORDER

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

M 3342 - 19.44M G

“M” is full size DIL
 “H” is half size DIL
 “L” is low height, full size DIL

“3342” is model type

“19.44 M” frequency in MHz

Add “G” for gullwing