VOLTAGE CONTROLLED OSCILLATORS

HCMOS Logic, -40° to +85°C

FULL SIZE D.I.L.
M6001 thru M6007
L6001 thru L6007
M6021 thru M6023
L6021 thru L6023

HALF SIZE D.I.L.
H6001 thru H6007
H6021 thru H6023

Thru-Hole/Gull Wing, 5V

1 MHz to 125 MHz

Extended Temp Thru-Hole VCXOs, 5V

Industrial temperature (-40°C to 85°C) thru-hole 5V VCXOs are available in a variety of off-the-shelf models. Versions in full size (M) and half size (H) cans are offered as standard designs. These models are recommended for new equipment in exacting environments that operate at 5 volt. Five volt operation permits extreme combinations of pull, control voltage and center frequency deviation, enabling the VCXO to accommodate a wide variety of filtering and driving circuitry. Standard VCXOs are hermetically sealed in full size (M) or half size (H), DIL packages.

The many standard designs described here have center frequency stability of ±50 ppm, and frequency capture range to ±175 ppm. These oscillators have excellent long-term reliability, loading characteristics, and superior startup performance. All VCXOs are tested and guaranteed over the full operating temperature.

These 5V VCXOs generate an HCMOS frequency output which is controlled by an input voltage. The end-point frequency/voltage parameters are defined, as is the center frequency.

CAPTURE RANGE

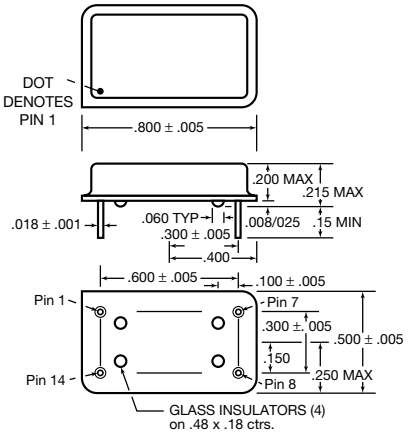
The Frequency-Capture range is equal to the (Center-Frequency ± the Frequency Deviation), because every MF VCXO is ATE-tested to meet the Frequency-Deviation over the temperature range.***Frequency Capture specification includes all effects of temperature and supply voltage. It is not necessary to make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

FEATURES

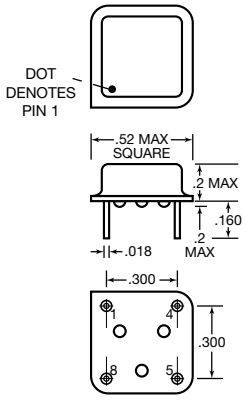
- Frequency from 1 MHz to 125 MHz
- Capture-range is fully defined, under all conditions
- Start-up time less than 5 ms.
- Low profile package available above 60 MHz
- Typical jitter is less than 15 ps RMS
- Choice of thru-hole or gull wing

CONNECTIONS

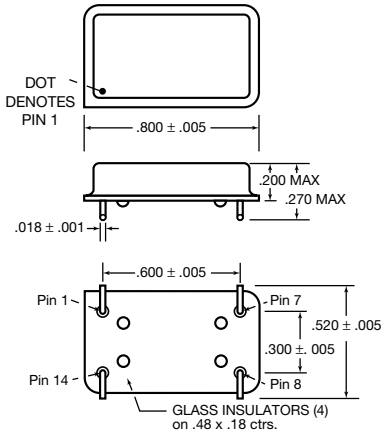
Full Size	Half Size	
Pin 1.	Pin 1.	Control Voltage, V_C
Pin 7.	Pin 4.	Ground & Case
Pin 8.	Pin 5.	Output
Pin 14.	Pin 8.	+5 Volts, V_{DD}



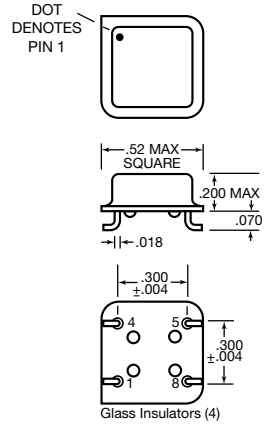
"M" Package – "L" Package is same as "M" but seated height is 0.190



"H" Package



"M" Package with Gull Wing



"H" Package with Gull Wing

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VOLTAGE CONTROLLED OSCILLATORS
HCMOS Logic, -40° to +85°C
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H6001 thru H6007
H6021 thru H6023

Center Frequency is Between Two Voltages with ±50 ppm stability

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
6001	0.3 to 10.0	± 175 min	± 175	2.5 to 5.0	± 40, typ ± 50, max
6002	0.3 to 4.0	± 75 min	± 75	1.3 to 2.3	
6003	0.3 to 10.0	± 175 to 300	± 175	2.5 to 5.0	
6004	0.3 to 4.0	± 125 min	± 125	1.3 to 2.3	
6005	1.0 to 4.0	± 75 to 300	± 75	1.8 to 3.0	
6006	0 to 5.0	± 150 min	± 150	—	
6007	0.5 to 4.5	± 125 to 250	± 125	1.8 to 3.0	

Center Frequency is at 2.5V with ±50 ppm stability

MODEL	Control Voltage (Volts)	Frequency Deviation (ppm)	Guaranteed Capture Range (ppm)	Control Voltage at Center Frequency	Center Frequency Stability (ppm)
6021	0.5 to 4.5	± 75 to 150	± 75	2.5	± 30, typ ± 50, max
6022	0.5 to 4.5	± 100 to 200	± 100	2.5	
6023	0.5 to 4.5	± 150 to 300	± 150	2.5	

DESCRIPTIONS

M6001, H6001, L6001	±175 ppm, min. deviation when using 0.3 to 10V control-voltage
M6002, H6002, L6002	±75 ppm, min. deviation when using 0.3 to 4.0V control-voltage
M6003, H6003, L6003	±175 ppm to ±300 ppm deviation when using 0.3 to 10V control-voltage
M6004, H6004, L6004	±125 ppm deviation when using 0.3 to 4.0V control-voltage
M6005, H6005, L6005	±75 ppm to ±300 ppm deviation when using 1.0 to 4.0 control-voltage, for use where the control voltage is 1 volt off both rails
M6006, H6006, L6006	±150 ppm, min. deviation when using 0 to 5.0 control-voltage
M6007, H6007, L6007	±125 ppm to ±250 ppm deviation when using 0.5 to 4.5 control-voltage
M6021, H6021, L6021	±75 ppm capture when using 0.5 to 4.5V control-voltage and 2.5V center with 50 ppm stability
M6022, H6022, L6022	±100 ppm capture when using 0.5 to 4.5V control-voltage and 2.5V center with 50 ppm stability
M6023, H6023, L6023	±150 ppm capture when using 0.5 to 4.5V control-voltage and 2.5V center with 50 ppm stability

FREQUENCY STABILITY
Frequency stability vs. Temperature is typically beter than ±40 ppm for -40 to +85°C. 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.

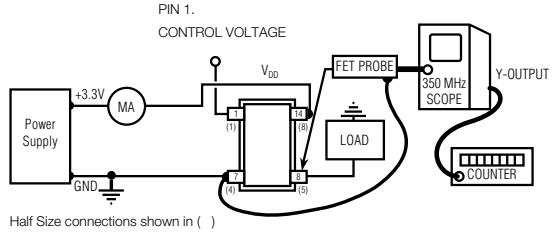
SPECIFICATIONS

Temperature
Operating -40 to +85°C
Storage –55 to +125°C

Frequency Stability
V_C = 2.5V ±50 ppm, max.

	MIN.	TYP	MAX	UNITS
Input Voltage	4.5	5.0	5.5	volts
Input Current		30	45	ma
Output Levels (HCMOS)				
"0" Level, sinking 16 ma.			0.4	volts
"1" Level, sourcing 10 ma.	V_{DD} -.4			volts
Rise and Fall Times, HCMOS				
From 0.4 to (V_{DD}-.4) V		2.5	4	ns
(Above 35 MHz)			2	ns
Symmetry				
At V_{DD}/2	.		45/55	percent
Input Impedance,				
Pin 5., Control Voltage	15	1000		Kohms
Control Voltage Bandwidth	15	150		KHz

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



Half Size connections shown in ( )

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

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

ALL OSCILLATORS HAVE INTERNAL BYPASS CAPACITORS

TEST CIRCUIT

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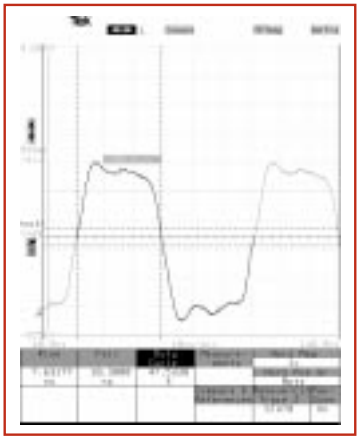

Fig. 1 M6022-16.384M, with 50 pf load

MECHANICAL SPECIFICATIONS

Gross Leak – Each unit checked in 125°C flurocarbon

Fine Leak – Mass spectrometer leak rate less than 2 X 10^{-8} atmos, cc/sec of helium

Pins – Kovar, nickel plated with 60/40 solder coat

Bend Test – Will withstand two bends of 90° from reference

Header – Steel, with nickel platel

Case – Stainless steel, type 304

Marking – Printing is black epoxy ink

Resistance to Solvents – MIL STD 202, Method 215

AGING

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

M6022-16.384M, TYPICAL

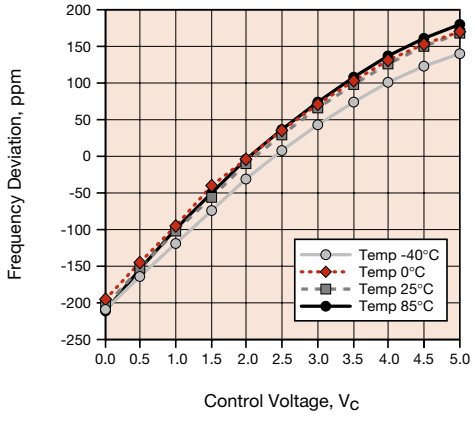

Fig. 2 Frequency vs. Control Voltage

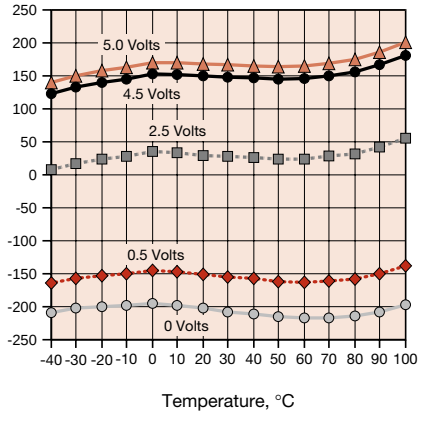

Fig. 3 Frequency vs. Temperature

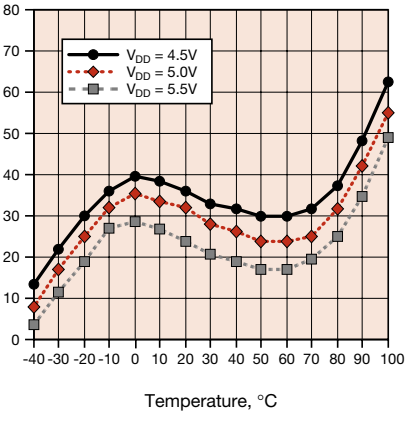

Fig. 4 Frequency vs. Temperature @ 2.5V Control Voltage

HOW TO ORDER

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

M 6001-12.352M G

- "M" is full size DIL, "H" is half size DIL, "L" is low height, full size DIL
- "6001" is model type
- "12.352 M" frequency in MHz
- Add "G" for gullwing

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