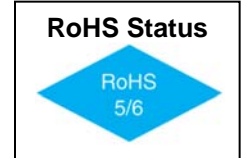


M2000 series
H2000 series
VCXO 5.0V
Full/Half size, Thru-hole, HCMOS/TTL



Features

- Frequency from 1 MHz to 175 MHz
- Start-up time is less than 5ms



Applications

- xDSL customer premise equipment
- Cable modems
- ATM/SONET/SDH

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range	F		1		175	MHz	
Frequency Stability	$\Delta F/F$	Operating Temperature at 25°C	± 20	± 25	± 50	ppm	
Aging		First Year After First Year		3 1		ppm ppm/yr	
Operating Temperature	T		0°		+70°	°C	
Supply Voltage	Vcc		4.5	5.0	5.5	V	
Supply Current	Icc			30	45	mA	
Output Levels		"0" Level, sinking 16mA "1" Level, sourcing 10mA	$V_{DD}-0.4$		0.4	V	
Rise & Fall Times		From 0.4 to (V _{DD} -0.4) V (Above 35 MHz)		2.5	4 2	ns	
Input Impedance		Control voltage	15	1000		KOhm	
Start-up Time	T _s				5	ms	
Symmetry		@ V _{DD} /2			45/55	%	
Control Voltage Bandwidth			15	150		KHz	



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Environmental and Mechanical Conditions

Parameter	Specification
Shock	1000 Gs, 0.35 ms, 1/2 sine wave, 3 shocks in each plane
Vibration	10-2000 Hz of .06" d.a. or 20 Gs, whichever is less
Humidity	Resistant to 85° R.H. at 85°C
Gross Leak	Each unit checked in 125°C fluorocarbon
Fine Leak	Mass spectrometer leak rate less than 2 X 10 ⁻⁸ atm, 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 plate
Case	Stainless steel, type 304
Marking	Printing is black epoxy ink or laser marked
Resistance to Solvents	MIL STD 202, Method 215

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)
2001	0.3 to 10.0	± 175 min	± 175	2.5 to 5.0	± 30, typ ± 50, max
2002	0.3 to 4.0	± 75 min	± 75	1.3 to 2.3	
2003	0.3 to 10.0	± 175 to 300	± 175	2.5 to 5.0	
2004	0.3 to 4.0	± 125 min	± 125	1.3 to 2.3	
2005	1.0 to 4.0	± 75 to 300	± 75	1.8 to 3.0	
2006	0 to 5.0	± 150 min	± 150	—	
2007	0.5 to 4.5	± 125 to 250	± 125	1.8 to 3	

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)
2021	0.5 to 4.5	± 75 to 150	± 75	2.5	± 30, typ ± 50, max
2022	0.5 to 4.5	± 100 to 200	± 100	2.5	
2023	0.5 to 4.5	± 150 to 300	± 150	2.5	

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)
2031	0.5 to 4.5	± 75 to 150	± 75	2.5	± 20, typ ± 25, max
2032	0.5 to 4.5	± 100 to 200	± 100	2.5	
2033	0.5 to 4.5	± 150 to 300	± 150	2.5	

DESCRIPTIONS

M2001, H2001	±175 ppm, min. deviation when using 0.3 to 10V control-voltage
M2002, H2002	±75 ppm, min. deviation when using 0.3 to 4.0V control-voltage
M2003, H2003	±175 ppm to ±300 ppm deviation when using 0.3 to 10V control-voltage
M2004, H2004	±125 ppm min. deviation when using 0.3 to 4.0V control-voltage
M2005, H2005	±75 ppm to ±300 ppm deviation when using 1.0 to 4.0V control-voltage, for use where the control voltage is 1 volt off both rails
M2006, H2006	±150 ppm, min. deviation when using 0 to 5.0V rail-to-rail control-voltage
M2007, H2007	±125 ppm to ±250 ppm deviation when using 0.5 to 4.5V control-voltage
M2021, H2021	±75 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±50 ppm stability
M2022, H2022	±100 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±50 ppm stability
M2023, H2023	±150 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±50 ppm stability
M2031, H2031	±75 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±25 ppm stability
M2032, H2032	±100 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±25 ppm stability
M2033, H2033	±150 ppm capture when using using 0.5 to 4.5V control-voltage and 2.5V center with ±25 ppm stability



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Full size (M)	Half size (H)	
Pin 1	Pin 1	Control Voltage
Pin 7	Pin 4	Ground & Case
Pin 8	Pin 5	Output
Pin 14	Pin 8	+5.0V, V _{DD}

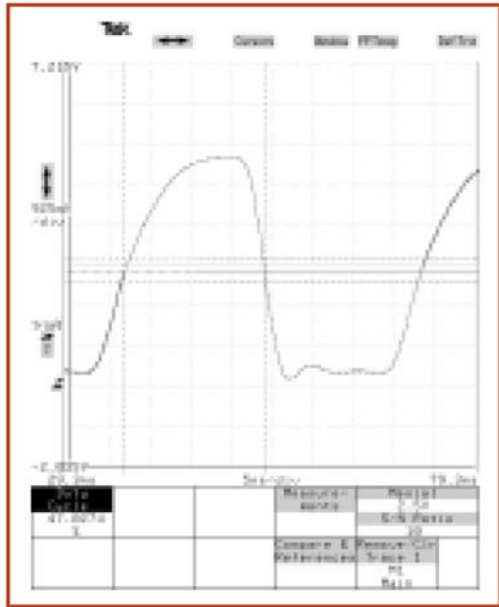
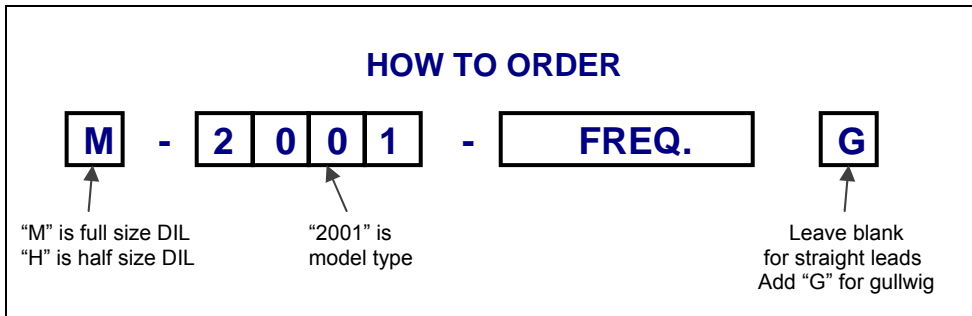
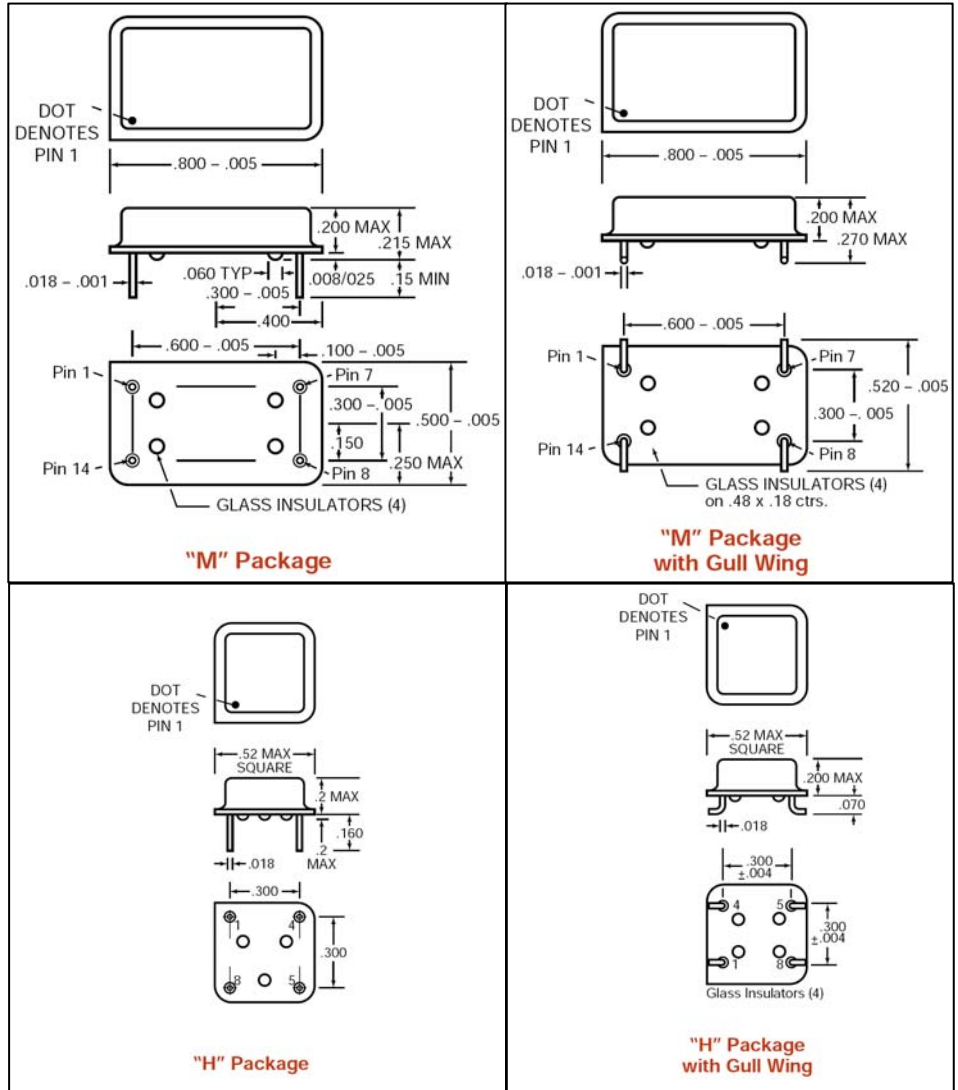


Fig. 1 M2001-27M
with 33 pf load



FREQUENCY VS. CONTROL VOLTAGE FOR TYPICAL DEVICES

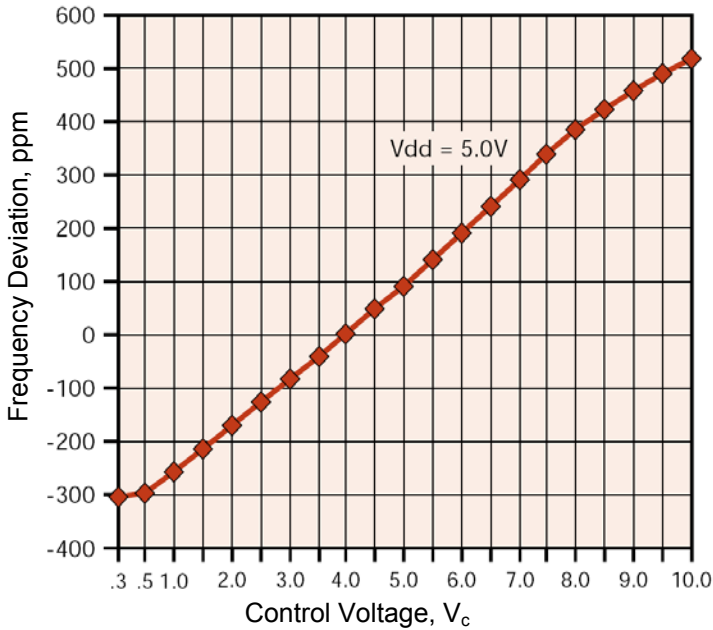


Fig. 2 M2001-40M

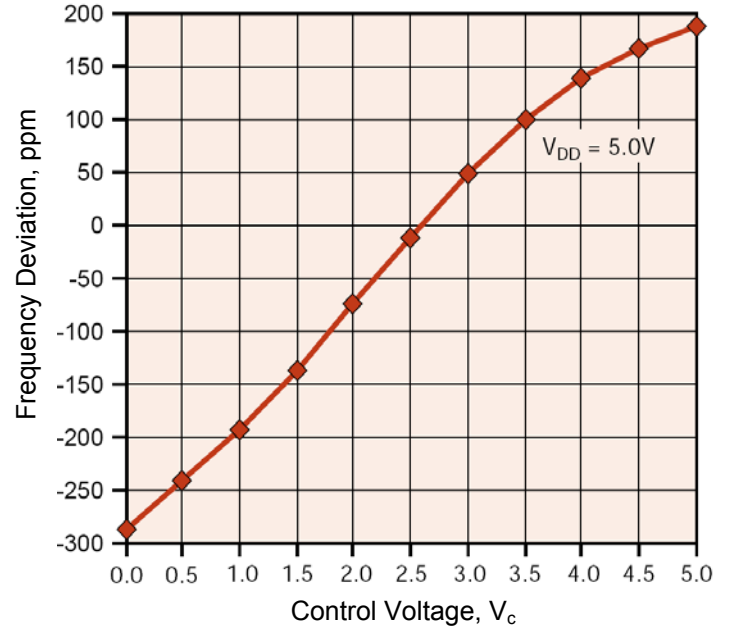


Fig. 6 M2023-19.44

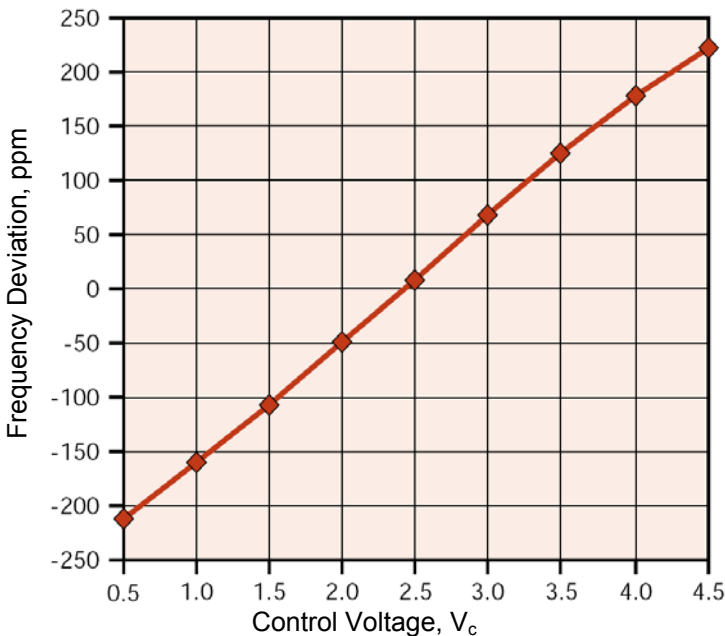


Fig. 4 M2007-16.777216M

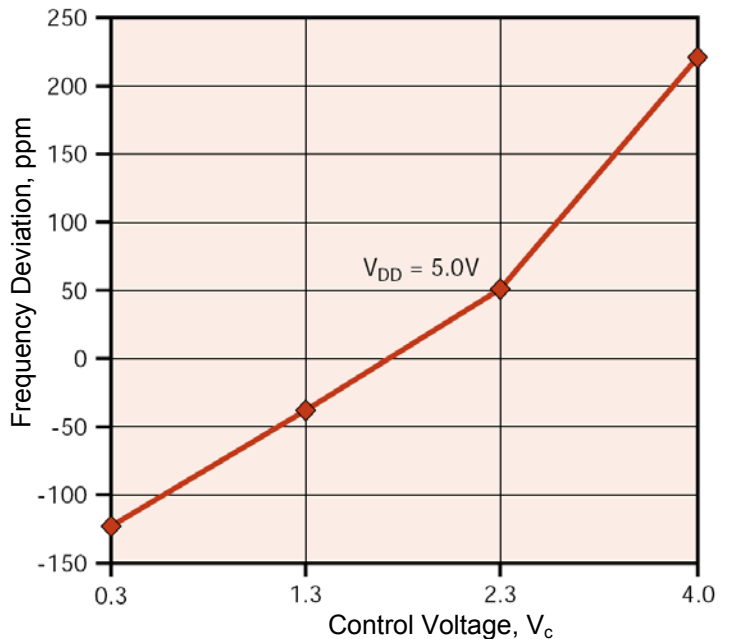


Fig. 3 M2002-12.352