

Sinewave 50 Hz-2.6 GHz

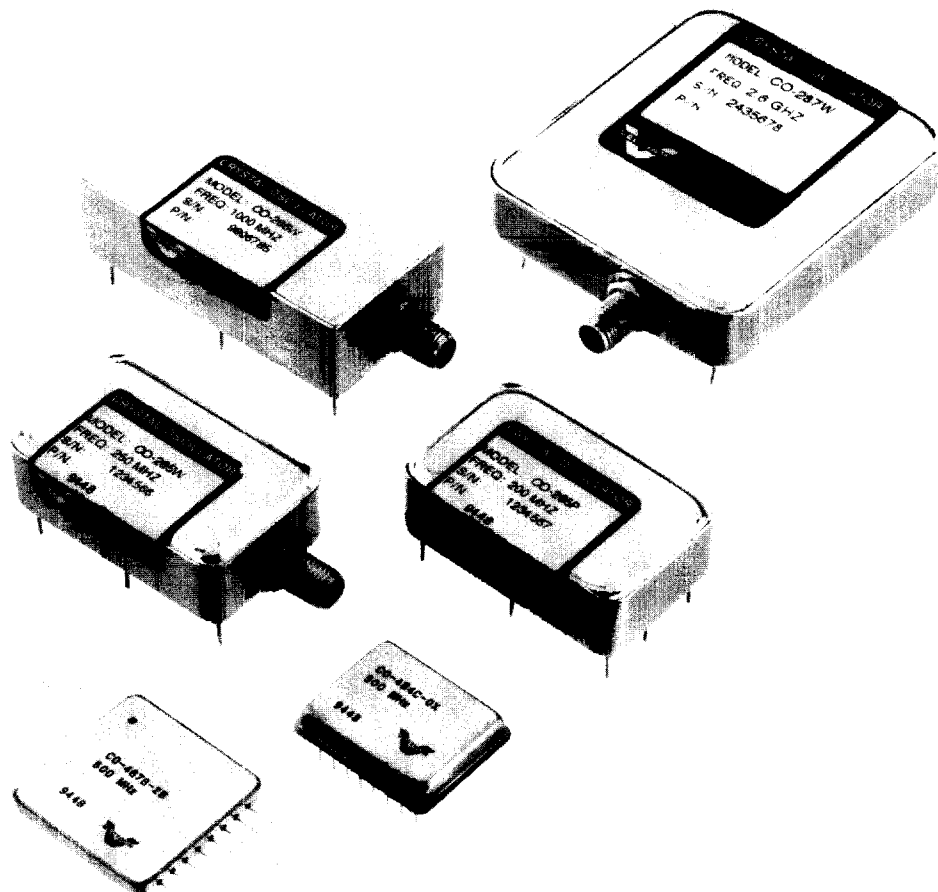
VECTRON

Crystal Oscillators






(Moderate Stability)

FEATURES


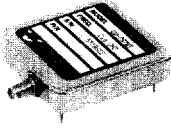



- Frequency from 50 Hz to 2.6 GHz
- Stability to 1×10^{-6}
- Low phase noise
- PC board, hybrid DIP and chassis mount models



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		4 MHz to 500 MHz (see next page for higher and lower frequency models)			
					
		 <i>Hybrid</i>	<i>PCB Mount</i>	<i>Connector Type</i>	<i>High Power</i>
		CO-484 16 pin Double DIP CO-487 Flatpack	CO-233, CO-233H, CO-233F, CO-285P) (See configuration section below)	CO-233FW CO-285W	CO-284W
FREQUENCY		4 MHz to 500 MHz			
OUTPUT	Level	Standard: >0.5 Vrms into 50Ω (+7 dBm) *Option R: >1 Vrms into 50Ω (+13 dBm) *Not available above 100 MHz in CO-233FW with L2 option			>1 Watt/50Ω (+30 dBm) (above +70°C level derates to +27 dBm minimum) lower output levels optional
	Harmonics and sub-harmonics	>20 dB below desired output. If internal multiplier is used (generally above 100 MHz), subharmonics are also -20 dBc. -30 dBc and -40 dBc optional, except for models CO-484R above 200 MHz, CO-233 and CO-233H.			
	Phase Noise	Offset from Carrier	Standard	*Option L1	**Option L2
	(typical to 100 MHz)	100 Hz	-100 dBc/Hz	-115 dBc/Hz	-120 dBc/Hz
		1 kHz	-125 dBc/Hz	-140 dBc/Hz	-145 dBc/Hz
		10 kHz	-140 dBc/Hz	-150 dBc/Hz	-160 dBc/Hz
		50 kHz	-145 dBc/Hz	-155 dBc/Hz	-160 dBc/Hz
		Noise degrades by 6 dB per octave above 100 MHz. * L1 Option is available in all models except CO-484, CO-487 or CO-284W ** L2 Option is available only in CO-233FW and is limited to 200 MHz; above 100 MHz output of CO-233FWL2 is restricted to +7dBm.			
STABILITY	Initial Accuracy (at 25°C)	A: ± 50 ppm C: ± 25 ppm D: ± 15 ppm B: ± 10 ppm E: ± 1 ppm set via external capacitor	± 10 ppm "T" option: tuning with ± 1 ppm settability		± 10 ppm "T" option: tuning with ± 1 ppm settability
	Temperature	Standard: 0°C to +70°C: ± 25 ppm Option 1: -55°C to +85°C: ± 50 ppm Option 2: -55°C to +125°C: ± 50 ppm (Not available in CO-284W) Option 3: 0°C to +50°C: ± 3 ppm (Not available in CO-484, CO-487, or CO-284W) Option 5: 0°C to +50°C: ± 5 ppm Option 6: 0°C to +50°C: ± 10 ppm For higher stability, see sections describing Vectron TXCOs and oven-controlled types.			
	Aging	3 ppm first year 2 ppm per year thereafter	Standard: 5 ppm first year, 3 ppm per year thereafter Option Y: 2 ppm first year, 1 ppm per year thereafter		Standard: 5 ppm first year 3 ppm per year thereafter Option Y: 2 ppm first year 1 ppm per year thereafter
SUPPLY	Voltage	+15 Vdc ± 5% (Any supply in +12-24 Vdc range optional; supply less than +15 Vdc subject to reduced output level)			+15 Vdc ± 5% (+18-24 Vdc optional with output level 3 dB below standard) Supply voltage below +15 Vdc results in reduced level
	Current	15-40 mA, depending upon frequency			100-300 mA, depending upon frequency
MECHANICAL	Size	0.8" x 1.0" x 0.20" (20.3 x 25.4 x 5.1 mm) flatpack: 1" x 1" x 0.17"	CO-233, CO-233H: 1 1/2" x 1 1/2" x 5/8" (38 x 38 x 16 mm) CO-233F: 2" x 2" x 3/4" (51 x 51 x 19 mm) CO-285P: 1.0" x 1.6" x 0.5" (25.4 x 40.7 x 12.7 mm)	CO-233FW: 2" x 2" x 3/4" (51 x 51 x 19 mm) CO-285W: 1.0" x 1.6" x 0.5" (25.4 x 40.7 x 12.7 mm)	2" x 3" x 3/4" (51 x 76 x 19 mm)
	Configuration (see drawings on page 28)	CO-484: 0.8" x 1.0" x 0.2" (20.3 x 25.4 x 5.1 mm) 16 pin Double DIP CO-487: 1" x 1" x 0.17" (25.4 x 25.4 x 4.3 mm) 16 pin Flatpack	CO-233: (4-149 MHz) pcb mount CO-233H: (150-300 MHz) pcb mount CO-233F: (4-500 MHz) pcb mount CO-285P: pcb mount without SMA connector	CO-233FW: (4-500 MHz) SMA connector, terminals and studs on base. For SMC, replace "W" with "U". For BNC, replace "W" with "X". CO-285W: SMA on side; Terminals on base	SMA and EMI filter capacitor on side surface; mounting studs on base, For SMC, replace "W" with "U" For BNC, replace "W" with "X"
ENVIRONMENTAL		See general environmental specifications on page 93.			
OPTIONS		Screen testing of CO-484 per chart on page 15 Other stability characteristics and other mechanical configurations Voltage frequency control (VCXO); see page 71.			
HOW TO ORDER		See page 28			

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		500.1 MHz to 2.6 GHz		(4-500 MHz on prior page)	50 Hz to 4 MHz																												
																																	
		 CO-286W, CO-286P	 CO-287W		CO-281																												
FREQUENCY		500.1 MHz to 1.3 GHz			50 Hz to 4 MHz																												
OUTPUT	Level	Standard: >0.5 Vrms/50Ω (+7 dBm) Option R: >1.0 Vrms/50Ω (+13 dBm) High output: ≥ +20 dBm/50Ω in 2" x 3" x 3/4" package			Standard: >1 Vrms/1kΩ *Option R: >1 Vrms/50Ω (+13 dBm) High output option: ≥ +20 dBm/50Ω (above 20 kHz)																												
	Harmonics and Sub-harmonics	-20 dBc standard -30 dBc and -40 dBc optional			-30 dBc standard -40 dBc optional																												
	Phase Noise (typical at 500 MHz)	<table border="1"> <thead> <tr> <th>Offset from Carrier</th> <th>Standard</th> <th>Option L1</th> </tr> </thead> <tbody> <tr> <td>100 Hz</td> <td>-88 dBc/Hz</td> <td>-103 dBc/Hz</td> </tr> <tr> <td>1kHz</td> <td>-113 dBc/Hz</td> <td>-128 dBc/Hz</td> </tr> <tr> <td>10 kHz</td> <td>-128 dBc/Hz</td> <td>-138 dBc/Hz</td> </tr> <tr> <td>50 kHz</td> <td>-133 dBc/Hz</td> <td>-143 dBc/Hz</td> </tr> </tbody> </table> <p>Noise degrades by 6 dB per octave above 500 MHz.</p>		Offset from Carrier	Standard	Option L1	100 Hz	-88 dBc/Hz	-103 dBc/Hz	1kHz	-113 dBc/Hz	-128 dBc/Hz	10 kHz	-128 dBc/Hz	-138 dBc/Hz	50 kHz	-133 dBc/Hz	-143 dBc/Hz															
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	Current	< 80 mA			< 20 mA (< 40 mA for +13 dBm out)																												
MECHANICAL	Size	CO-286W(P): 1" x 2" x 0.6" (25.4 x 51 x 15.3 mm) High output option: 2" x 3" x 3/4" (51 x 76 x 19 mm)			2" x 2" x 3/4" (51 x 51 x 19 mm) Reduced size models available																												
	Configuration (see drawings on page 28)	CO-286W: SMA on 1" x 0.6" side terminals on base CO-286P: pcb mount without rf output connector High output opt.: SMA and terminals on 2" x 3/4" side; studs on base.			Pins for printed circuit board mount Option "W" SMA connector, solder header and studs on base Option "U" SMC connector, solder header and studs on base Option "X" BNC connector, solder header and studs on base																												
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