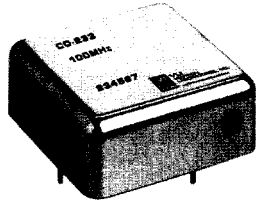


Sinewave Crystal Oscillators

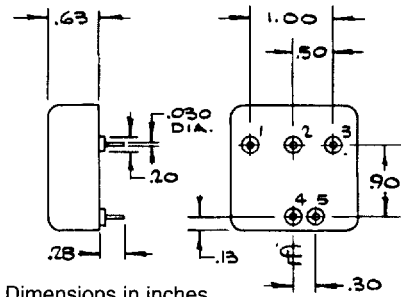
CO-233, CO-233H



Features

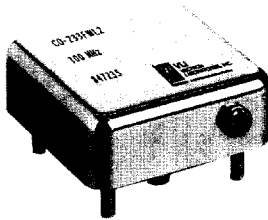
- Frequencies from 4 MHz to 300 MHz
- PCB Mount Design
- Low Phase Noise Option Available
- +13 dBm output available

CO-233H



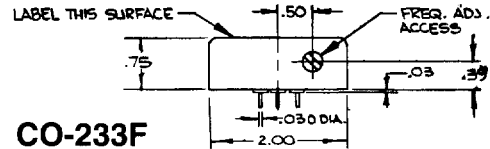
Note: Dimensions in inches

CO-233F, CO-233FW

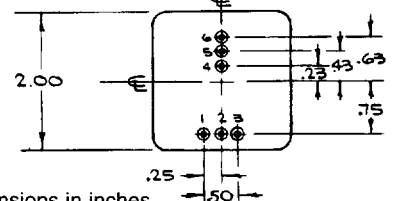


Features

- Frequencies from 4 MHz to 500 MHz
- PCB Mount Design (CO-233F)
- SMA connector option (CO-233FW)
- Low Phase Noise Option Available

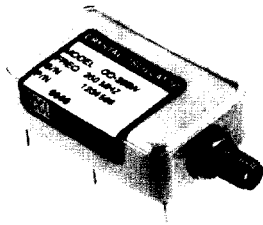


CO-233F



Note: Dimensions in inches

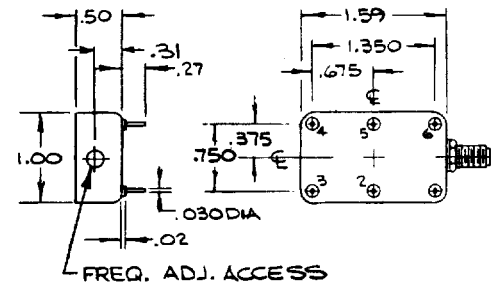
CO-285W/CO-285P



Features

- Frequencies from 4 MHz to 500 MHz
- PCB Mount Design
- Reduced Size
- Low Phase Noise Option Available
- Pin only version available (CO-285P)

CO-285W

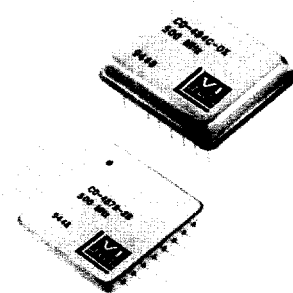


CO-285P

Delete SMA: output pin is on center line between pins 1 and 6. RF return is on Pin 6.

Note: Dimensions in inches

CO-484/487

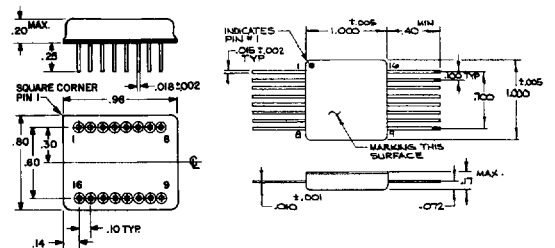


Features

- Frequencies from 4 MHz to 500 MHz
- Miniature Hybrid Design
- 16 pin double DIP or 16 Pin Flatpack
- +13 dBm output available

CO-484

CO-487

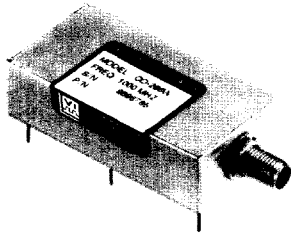


E option, connect 5-30 pf capacitor from pin 5 to pin 8.

Note: Dimensions in inches

Sinewave Crystal Oscillators

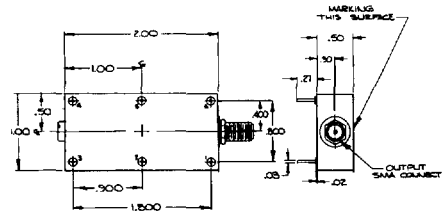
CO-286W/286P



Features

- Frequencies from 500.1 MHz to 1.3 GHz
- PCB Mount Design
- Reduced Size
- Low Phase Noise Option Available
- Pin Only Version Available (CO-286P)

CO-286W

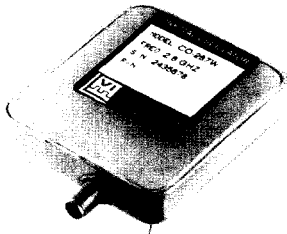


CO-286P:

Delete SMA; output pin is on center line between pins 1 and 6. RF return is on Pin 6.

Note: Dimensions in inches

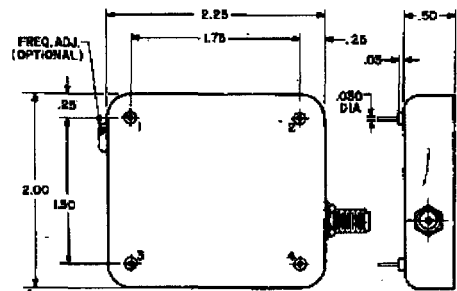
CO-287W



Features

- Frequencies from 1.31 GHz to 2.6 GHz
- PCB Mount Design
- Low Phase Noise Option Available

CO-287W



Note: Dimensions in inches

SPECIFICATIONS

Series	4 MHz to 500 MHz			500.1 MHz to 2.6 GHz																																						
	Basic Line CO-233 (H, F, FW)	Reduced Size Line CO-285W (SMA) CO-285P (pcb mt.)	Miniature Hybrid CO-484 (DIP) CO-487 (Flatpack)	Reduced Size Line CO-286W (SMA) CO-286P (pcb mt.)	Very High Freq. CO-287W																																					
Frequency	4 MHz to 500 MHz	4 MHz to 500 MHz	4 MHz to 500 MHz	500.1 MHz to 1.3 GHz	1.31 GHz to 2.6 GHz																																					
Output	Standard: 0.5 Vrms/50Ω (+7 dBm) Option R: 1 Vrms/50Ω (+13 dBm) High level option: 1 watt (+30 dBm) available in 2" x 3" x 0.75" package			Standard: 0.5 Vrms/50Ω (+7 dBm) Option R: 1.0 Vrms/50Ω (+13 dBm) High output option: +20 dBm/50Ω to 1.3 GHz																																						
Supply	+15 Vdc ±5% (Any supply in 12-24 Vdc range optional; supply less than +15 Vdc subject to reduced output level)			+15 Vdc ±5%																																						
Accuracy (at 25°C)	Standard: ±10 ppm *Option T: ±1 ppm	Standard: ±10 ppm *Option T: ±1 ppm	CO-484A: ±50 ppm CO-484C: ±25 ppm CO-484D: ±15 ppm CO-484B: ±10 ppm *CO-484E: ±1 ppm *Set via external capacitor	Standard: ±10 ppm *Option T: ±1 ppm *Tuning adjust settable to ±1 ppm																																						
Temperature Stability	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-287W) Option 3: 0°C to +50°C: ±3 ppm (not available in CO-484, CO-487, CO-287W)			Option 5: 0°C to +50°C: ±5 ppm Option 6: 0°C to +50°C: ±10 ppm																																						
Aging Rate (after 30 days)	Standard: 3 ppm first year, < 2 ppm per year thereafter Option Y: 2 ppm first year, < 1 ppm per year thereafter		3 ppm first year < 2 ppm per year thereafter	Standard: 3 ppm first year, < 2 ppm per year thereafter Option Y: 2 ppm first year, < 1 ppm per year thereafter																																						
Phase Noise (typical 4-100 MHz)	<table border="1"> <thead> <tr> <th>Offset from Carrier</th> <th>Standard</th> <th>*Option L1</th> <th>**Option L2</th> </tr> </thead> <tbody> <tr> <td>100 Hz</td> <td>-100 dBc/Hz</td> <td>-115 dBc/Hz</td> <td>-120 dBc/Hz</td> </tr> <tr> <td>1 kHz</td> <td>-125 dBc/Hz</td> <td>-140 dBc/Hz</td> <td>-145 dBc/Hz</td> </tr> <tr> <td>10 kHz</td> <td>-140 dBc/Hz</td> <td>-150 dBc/Hz</td> <td>-160 dBc/Hz</td> </tr> <tr> <td>50 kHz</td> <td>-145 dBc/Hz</td> <td>-155 dBc/Hz</td> <td>-160 dBc/Hz</td> </tr> </tbody> </table> <p>Noise degrades by 6 dB per octave above 100 MHz *L1 Option is not available in CO-484, CO-487 **L2 Option is available only in CO-233FW and is limited to 200 MHz; above 100 MHz, output of CO-233FWL2 is restricted to +7 dBm.</p>			Offset from Carrier	Standard	*Option L1	**Option L2	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	<table border="1"> <thead> <tr> <th>Phase Noise (typical at 500 MHz)</th> <th>Offset from carrier</th> <th>Standard</th> <th>Option L1</th> </tr> </thead> <tbody> <tr> <td rowspan="4"></td> <td>100 Hz</td> <td>-88 dBc/Hz</td> <td>-103 dBc/Hz</td> </tr> <tr> <td>1 kHz</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>		Phase Noise (typical at 500 MHz)	Offset from carrier	Standard	Option L1		100 Hz	-88 dBc/Hz	-103 dBc/Hz	1 kHz	-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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