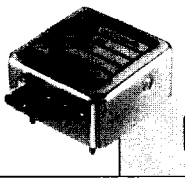
Low Profile Chassis Mount OCXOs

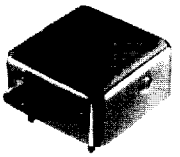
FEATURES:

- Low Profile to 400 MHz
- Low Phase Noise
- Superior Aging Characteristics



	CO-711W SERIES *(AT Cut Crystal)*	CO-718SW SERIES *(SC/IT Cut Crystal)*
FREQUENCY	5 MHz and 10 MHz standard. Other frequencies available in 4-25 MHz range with sine output and in 65 kHz-17 MHz range with logic output. See Series CO-724W for 25-400 MHz and CO-725W for 25-200 MHz.	
STABILITY Temperature (Temp. Range **A**) +15°C to +35°C:	CO-71 □ **A38W:** $\pm 3 \times 10^{-8}$ CO-71 □ **A59W:** $\pm 5 \times 10^{-9}$ **CO-71 □ **A29W:** $\pm 2 \times 10^{-9}$	**CO-718SA28W:** $\pm 2 \times 10^{-8}$ **CO-718SA39W:** $\pm 3 \times 10^{-9}$ ****CO-718SA19W:** $\pm 1 \times 10^{-9}$
(Temp. Range **B**) 0°C to +50°C:	CO-71 □ **B58W:** $\pm 5 \times 10^{-8}$ CO-71 □ **B18W:** $\pm 1 \times 10^{-8}$ **CO-71 □ **B59W:** $\pm 5 \times 10^{-9}$	**CO-718SB38W:** $\pm 3 \times 10^{-8}$ **CO-718SB59W:** $\pm 5 \times 10^{-9}$ ****CO-718SB29W:** $\pm 2 \times 10^{-9}$
(Temp. Range **D**) −20°C to +70°C:	CO-71 □ **D17W:** $\pm 1 \times 10^{-7}$ CO-71 □ **D38W:** $\pm 3 \times 10^{-8}$ **CO-71 □ **D28W:** $\pm 2 \times 10^{-8}$	**CO-718SD58W:** $\pm 5 \times 10^{-8}$ **CO-718SD18W:** $\pm 1 \times 10^{-8}$ ****CO-718SD59W:** $\pm 5 \times 10^{-9}$
(Temp. Range **G**) −55°C to +75°C:	CO-71 □ **G27W:** $\pm 2 \times 10^{-7}$ CO-71 □ **G58W:** $\pm 5 \times 10^{-8}$ **CO-71 □ **G38W:** $\pm 3 \times 10^{-8}$	**CO-718SG17W:** $\pm 1 \times 10^{-7}$ **CO-718SG38W:** $\pm 3 \times 10^{-8}$ ****CO-718SG28W:** $\pm 2 \times 10^{-8}$
(Temp. Range **F**) −55°C to +35°C:	*Not available with L2 option **Uses TO-8 Crystal	***CO-718SF27W:** $\pm 2 \times 10^{-7}$ ***CO-718SF58W:** $\pm 5 \times 10^{-8}$ *:CO-718SF38W: $\pm 3 \times 10^{-8}$
Aging Rate	**4:** 1×10^{-8}/day (2×10^{-6}/year) **5:** 5×10^{-9}/day (1.5×10^{-6}/year) **6:** 3×10^{-9}/day (1×10^{-6}/year) **7:** 1×10^{-9}/day (3×10^{-7}/year)	5×10^{-10}/day (1×10^{-7}/year) (5×10^{-8}/year optional at some frequencies; 2×10^{-8}/year optional at 5 MHz)
Supply (±5%)	5×10^{-9} per percent, 7×10^{-9} per percent for Option N with TO-8: 2×10^{-9} per percent	2×10^{-9} per percent with TO-8: 5×10^{-10} per percent
Short Term (Allan Variance)	5×10^{-11} per second	1×10^{-11} per second
Warm-up (Restabilization) (frequency relative to that two hours after turn-on following 24 hour off-time at +25°C)	1×10^{-6}: 6 minutes 1×10^{-7}: 9 minutes 3×10^{-8}: 12 minutes 1×10^{-8}: 30 minutes faster warm-up with increased turn-on power	Turn-on Power: Standard / 6W (optional) / *7.5W ("Q" option) 1×10^{-6}: 4 minutes / 2 minutes / 1 minute 1×10^{-7}: 7 minutes / 4 minutes / 1½ minutes 3×10^{-8}: 10 minutes / 7 minutes / —— 1×10^{-8}: 15 minutes / 10 minutes / 2½ minutes (If the maximum operating temperature exceeds 70°C warm-up time will increase somewhat.) *Available with sinewave output 5-20 MHz, N/A with L2 option, 15V minimum
OUTPUT / SUPPLY Output	Output: Standard: >0.5 Vrms into 50Ω (+7 dBm); >1.0 Vrms into 50Ω (+13 dBm) with L2 Low Noise option. Optional: Logic output. Contact factory. Supply: * +15 Vdc ±5% * Any voltage in 12-24 Vdc range optional; supply below 15 Vdc results in reduced output level and some degradation of phase noise for L2 option.	
Harmonics (Sinewave output)	20 dB below desired output. If internal multiplication is used, subharmonics are also −20 dBc. Harmonics and subharmonic attenuation can be improved on special order.	
Input Power	4 watts at turn-on; less than 2 watts stabilized at +25°C. Higher power required for temperature beyond −20/+70°C and lower power needed for 0/50°C. Lower power option available.	
PHASE NOISE (typical) (Sinewave output, 4-12 MHz)	Offset / Standard / *Option L2 10 Hz: −105 dBc/Hz / −120 dBc/Hz 100 Hz: −135 dBc/Hz / −145 dBc/Hz 1 kHz: −145 dBc/Hz / −160 dBc/Hz 10 kHz: −148 dBc/Hz / −165 dBc/Hz 50 kHz: −150 dBc/Hz / −165 dBc/Hz *10 MHz lower frequency limit, Contact Factory for lower frequencies.	Offset / Standard / *Option L2 10 Hz: −115 dBc/Hz / −130 dBc/Hz 100 Hz: −140 dBc/Hz / −155 dBc/Hz 1 kHz: −145 dBc/Hz / −163 dBc/Hz 10 kHz: −148 dBc/Hz / −166 dBc/Hz 50 kHz: −150 dBc/Hz / −168 dBc/Hz *4 MHz lower frequency limit, Contact Factory for lower frequencies.
FREQUENCY ADJUSTMENT Mechanical	Range for 10 years of crystal aging settable to 1×10^{-8}	Range for 10 years of crystal aging settable to 5×10^{-9}
Option "V"; Electronic Tuning	3×10^{-7} for 0 to 6V control voltage	1×10^{-7} for 0 to 6V control voltage
MECHANICAL Size (See page 59)	2" x 2" x 1" (51 x 51 x 25.4 mm); Reduced height available.	
Configuration	SMA output connector and pins on side, studs on base. (SMB adn SMC connectors available)	
ENVIRONMENTAL	See general environmental specifications on page 98.	
HOW TO ORDER	See page 59	

Size Reduced Chassis Mount VHF OCXOs (25-400 MHz)



FEATURES:

- **Low Profile to 400 MHz**
- **Low Phase Noise**
- **Superior Aging Characteristics**

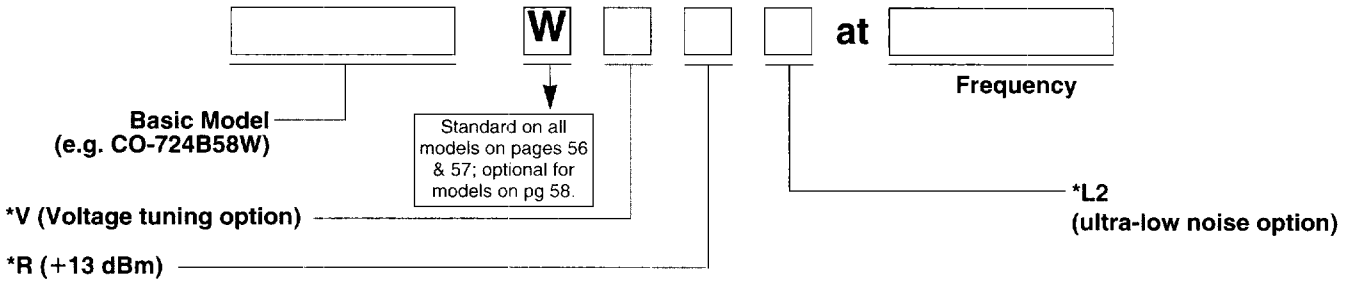
Size Reduced Series	*Lowest Noise, Highest Frequency* — CO-724W SERIES *(AT Cut Crystal)*	*Lowest Noise, Highest Frequency* — CO-724SW SERIES *(SC/IT Cut Crystal)*	*Highest Stability (to 5 x 10^{-10}/day)* — CO-725W SERIES *(AT Cut Crystal)*	*Highest Stability (to 5 x 10^{-10}/day)* — CO-725SW SERIES *(SC/IT Cut Crystal)*
FREQUENCY (for frequencies <25 MHz see page 56)	Any frequency in 25-400 MHz range		Any frequency in 25-200 MHz range	
STABILITY Temperature (Temp. Range **A**) +15°C to +35°C:	**CO-724A38W:** ±3 x 10^{-8} ***CO-724A18W:** ±1 x 10^{-8}	**CO-724SA18W:** ±1 x 10^{-8} ***CO-724SA39W:** ±3 x 10^{-9}	**CO-725A38W:** ±3 x 10^{-8} **CO-725A59W:** ±5 x 10^{-9}	**CO-725SA18W:** ±1 x 10^{-8} **CO-725SA39W:** ±3 x 10^{-9}
(Temp. Range **B**) 0°C to +50°C:	**CO-724B58W:** ±5 x 10^{-8} ***CO-724B28W:** ±2 x 10^{-8}	**CO-724SB28W:** ±2 x 10^{-8} ***CO-724SB59W:** ±5 x 10^{-9}	**CO-725B58W:** ±5 x 10^{-8} **CO-725B18W:** ±1 x 10^{-8}	**CO-725SB28W:** ±2 x 10^{-8} **CO-725SB59W:** ±5 x 10^{-9}
(Temp. Range **D**) −20°C to +70°C:	**CO-724D17W:** ±1 x 10^{-7} ***CO-724D58W:** ±5 x 10^{-8}	**CO-724SD58W:** ±5 x 10^{-8} ***CO-724SD18W:** ±1 x 10^{-8}	**CO-725D17W:** ±1 x 10^{-7} **CO-725D38W:** ±3 x 10^{-8}	**CO-725SD58W:** ±5 x 10^{-8} **CO-725SD18W:** ±1 x 10^{-8}
(Temp. Range **G**) −55°C to +75°C:	**CO-724G37W:** ±3 x 10^{-7} ***CO-724G17W:** ±1 x 10^{-7}	**CO-724SG17W:** ±1 x 10^{-7} ***CO-724SG38W:** ±3 x 10^{-8}	**CO-725G37W:** ±3 x 10^{-7} ***CO-725G58W:** ±5 x 10^{-8}	**CO-725SG17W:** ±1 x 10^{-7} ***CO-725SG38W:** ±3 x 10^{-8}
(Temp. Range **F**) −55°C to +85°C:	*Not available with L2 option	**CO-724SF27W:** ±2 x 10^{-7} ***CO-724SF58W:** ±5 x 10^{-8}	*Not available with L2 option	***CO-725SF27W:** ±2 x 10^{-7} ***CO-725SF58W:** ±5 x 10^{-8}
Aging Rate	Standard: 1 x 10^{-8}/day, 2 x 10^{-6}/year Optional: 5 x 10^{-9}/day, 1 x 10^{-6}/year	2 x 10^{-9}/day, 5 x 10^{-7}/year	1 x 10^{-9}/day, 3 x 10^{-7}/year	**5 x 10^{-10}/day, 1 x 10^{-7}/year **Optional 1 x 10^{-10}/day to 150 MHz.
Supply ±5%	5 x 10^{-9} per percent	2 x 10^{-9} per percent	5 x 10^{-9} per percent	2 x 10^{-9} per percent
Short Term (Allan Variance)	5 x 10^{-11} per second	2 x 10^{-11} per second	5 x 10^{-11} per second	1 x 10^{-11} per second
OUTPUT / SUPPLY	**Output** / **Supply ±5%** Standard: >0.5 Vrms into 50Ω (+7 dBm) — *+15 Vdc Optional: >0.7 Vrms into 50Ω (+10 dBm) — *+15 Vdc Optional: ECL (to 400 MHz) — *+15 Vdc & −5.2 Vdc *Any voltage in 12-24 Vdc range optional; supply below 15 Vdc results in reduced output level and some degradation of phase noise for L2 option.		**Output** / **Supply ±5%** Standard: >0.5 Vrms into 50Ω (+7 dBm) — *+15 Vdc Option "R": >1.0 Vrms into 50Ω (+13 dBm) (N/A above 125 MHz) — *+15 Vdc Optional: ECL (to 200 MHz) — *+15 Vdc & −5.2 Vdc *Any voltage in 12-24 Vdc range optional; supply below 15 Vdc results in reduced output level and some degradation of phase noise for L2 option.	
Harmonics and Subharmonics (sine output)	>20 dB below desired output. If internal multiplication is used typically above 70 MHz, subharmonics are also −20 dBc.		>35 dB below output. Further reduction available. Crystal frequency is typically in the 8-12.5 MHz range	
Input Power	<4.5 watts at turn-on; <2.5 watts stabilized at +25°C (higher power for temperature beyond −20/+70°C, lower power for 0/+50°C)		<4.5 watts at turn-on; <2.5 watts stabilized at +25°C (higher power for temperature beyond −20/+70°C, lower power for 0/+50°C)	
FREQUENCY ADJUSTMENT Mechanical	Multi-turn screwdriver adjust, settable to <1 x 10^{-8} nominal. (settable to 5 x 10^{-9} with CO-724SW)		Multi-turn screwdriver adjust, settable to <1 x 10^{-8} nominal. (settable to 5 x 10^{-9} with CO-725SW)	
Electrical Option "V"	5 x 10^{-7} for 0 to 6V control voltage	2 x 10^{-7} for 0 to 6V control voltage	3 x 10^{-7} for 0 to 6V control voltage	1 x 10^{-7} for 0 to 6V control voltage
MECHANICAL (see pg. 59) Reduced height available — **Size**	2" x 2" x 1" (51 x 51 x 25.4 mm) to 150 MHz 2" x 2" x 1¼" (51 x 51 x 32 mm) above 150 MHz		2" x 2" x 1¼" (51 x 51 x 32 mm)	
Base	SMA output connector and terminals on side, mounting studs on base. (SMB and SMC connectors available)		SMA output connector and terminals on side, mounting studs on base. (SMB and SMC connectors available)	
PHASE NOISE (typical) **Phase Noise** typical with sine output in 75-125 MHz range	Offset from Carrier / Standard / Ultra Low Noise Option (L2)* 100 Hz: −115 dBc/Hz / −130 dBc/Hz 1 kHz: −130 dBc/Hz / −145 dBc/Hz 10 kHz: −140 dBc/Hz / −155 dBc/Hz 50 kHz: −145 dBc/Hz / −157 dBc/Hz *Available to 200 MHz		Offset from Carrier / Standard / Ultra Low Noise Option (L2) 100 Hz: −105 dBc/Hz / −120 dBc/Hz 1 kHz: −115 dBc/Hz / −135 dBc/Hz 10 kHz: −120 dBc/Hz / −140 dBc/Hz 50 kHz: −125 dBc/Hz / −140 dBc/Hz	
ENVIRONMENTAL	See general environmental specifications on page 98.			
HOW TO ORDER	See page 59.			

FEATURES:

- **Best temperature Stability in a Miniature Chassis Mount Oscillator**
- **Best Aging Characteristics**

	CO-700 SERIES *(AT Cut Crystal)*	CO-705S SERIES *(SC/IT Cut Crystal)*
FREQUENCY	5 MHz and 10 MHz standard. Other frequencies available in 4-25 MHz range.	
STABILITY Temperature		
(Temp. Range **A**) +15°C to +35°C:	**CO-70** ☐ **A59:** ±5 x 10^{-9} ***CO-70** ☐ **A19:** ±1 x 10^{-9}	**CO-705SA39:** ±3 x 10^{-9} ***CO-705SA51B:** ±5 x 10^{-10}
(Temp. Range **B**) 0°C to +50°C:	**CO-70** ☐ **B18:** ±1 x 10^{-8} ***CO-70** ☐ **B29:** ±2 x 10^{-9}	**CO-705SB59:** ±5 x 10^{-9} ***CO-705SB19:** ±1 x 10^{-9}
(Temp. Range **D**) –20°C to +70°C:	**CO-70** ☐ **D38:** ±3 x 10^{-8} ***CO-70** ☐ **D59:** ±5 x 10^{-9}	**CO-705SD18:** ±1 x 10^{-8} ***CO-705SD39:** ±3 x 10^{-9}
(Temp. Range **G**) –55°C to +75°C:	**CO-70** ☐ **G58:** ±5 x 10^{-8} ***CO-70** ☐ **G18:** ±1 x 10^{-8}	**CO-705SG28:** ±2 x 10^{-9} ***CO-705SG58:** ±5 x 10^{-9}
(Temp. Range **F**) –55°C to +85°C:	*Not available with Option **N** #Not available with Option **L2**	***#CO-705SF38:** ±3 x 10^{-9} ***#CO-705SF18:** ±1 x 10^{-8}
Aging Rate	**1:** 1 x 10^{-9}/day (2 x 10^{-6}/year) **2:** 5 x 10^{-9}/day (1.5 x 10^{-6}/year) **3:** 3 x 10^{-9}/day (1 x 10^{-6}/year) **4:** 1 x 10^{-9}/day (3 x 10^{-7}/year)	5 x 10^{-10}/day (1 x 10^{-7}/year) 5 x 10^{-9}/year optional at some frequencies 2 x 10^{-9}/year optional at 5 MHz
Supply (±5%)	5 x 10^{-10}/percent (5 x 10^{-9}/percent for Option N)	3 x 10^{-10}/percent (3 x 10^{-9}/percent for Option N)
Short Term (Allan Variance)	3 x 10^{-11} per second	5 x 10^{-12} per second
Warm-up (Restabilization) (frequency relative to that two hours after turn-on following 24 hour off-time at +25°C)	1 x 10^{-6}: 7 minutes 1 x 10^{-7}: 10 minutes 3 x 10^{-8}: 15 minutes 1 x 10^{-8}: 30 minutes faster warm-up with increased turn-on power	Turn-on Power: 5W (standard) 15W (optional) 1 x 10^{-8}: 6 minutes, 2 minutes 1 x 10^{-7}: 9 minutes, 3 minutes 3 x 10^{-9}: 12 minutes, 4 minutes 1 x 10^{-9}: 15 minutes, 5 minutes (If maximum operating temperature exceeds 70°C warm-up time will increase somewhat.)
OUTPUT / SUPPLY Output	**Output** / **Supply ±5%** Standard: >1 Vrms into 50Ω (+13 dBm) / *+15 Vdc Option "**J**": **HCMOS/TTL / *+15 Vdc & +5 Vdc Option "**N**": **HCMOS/TTL / +5 Vdc only * Any voltage in 12-24 Vdc range optional; supply below 15 Vdc results in reduced output level and some degradation of phase noise. ** Drives 3 TTL loads, 10 LSTTL loads or HCMOS; output is from HCMOS gate	
Harmonics (Sinewave output)	20 dB below desired output. If internal multiplication is used, subharmonics are also –20 dBc. Harmonics and subharmonic attenuation can be improved on special order.	
Input Power	<5 watts at turn-on (higher power for temperature beyond –20/+70°C); <2 watts stabilized at +25°C	
PHASE NOISE (typical) (Sinewave output, 4-12 MHz)	Offset / Standard / Option **L2** 10 Hz: –105 dBc/Hz / –120 dBc/Hz 100 Hz: –135 dBc/Hz / –145 dBc/Hz 1 kHz: –145 dBc/Hz / –160 dBc/Hz 10 kHz: –148 dBc/Hz / –165 dBc/Hz 50 kHz: –150 dBc/Hz / –165 dBc/Hz	Offset / Standard / Option **L2** 10 Hz: –115 dBc/Hz / –130 dBc/Hz 100 Hz: –140 dBc/Hz / –155 dBc/Hz 1 kHz: –145 dBc/Hz / –163 dBc/Hz 10 kHz: –148 dBc/Hz / –166 dBc/Hz 50 kHz: –150 dBc/Hz / –168 dBc/Hz
FREQUENCY ADJUSTMENT Mechanical	Range for 10 years of crystal aging settable to 1 x 10^{-8}	Range for 10 years of crystal aging settable to 5 x 10^{-9}
Option "V"; Electronic Tuning	3 x 10^{-7} for 0 to 6V control voltage	1 x 10^{-7} for 0 to 6V control voltage
MECHANICAL Size (See page 59)	1.5" x 1.5" x 2.0" (38 x 38 x 51 mm)	
Base	7 pin solder header and mounting studs Option "**W**": SMA output connector (available with sinewave output)	
ENVIRONMENTAL	See general environmental specifications on page 98.	
HOW TO ORDER	See page 59	

HOW TO ORDER



***Leave blank if option not desired**

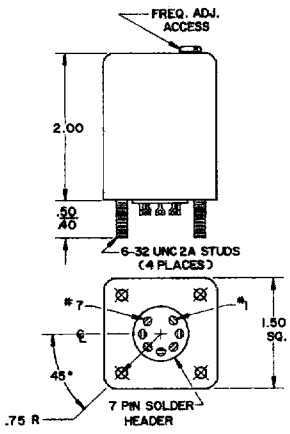
For example, a CO-725SD18WVRL2 at 100 MHz is a 2" x 2" x 1¼" oscillator with 5 x 10^{-10}/day aging, temperature stability of ±1 x 10^{-8} over −20°C to +70°C, includes voltage control capability, with +13dBm/50Ω output, a +15 Vdc supply and has an SMA RF connector.

If none of our standard models with coded options meets your specific needs, please detail the difference from our closest standard model (e.g. CO-725SD18WVRL2 at 100 MHz except +18 Vdc supply)

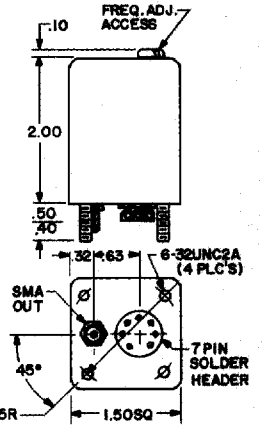
OUTLINE DRAWINGS

CO-700/CO-705S Series

Standard (solder header)



Option W (rf output connector)



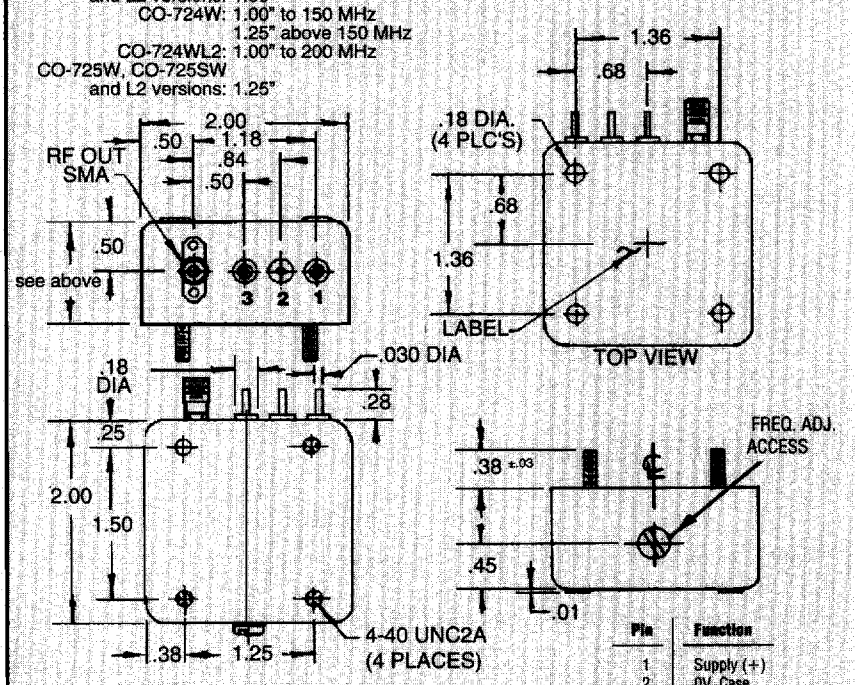
Pin	Function
1	RF Output (N/C with Option W)
*2	Case
3	0 Volts, Case
4	Supply (+)
5	RF Return, Case
**6	VCXO Input
**7	VCXO Supply

* For option J, connect the +5 Vdc supply to pin 2. For HCMOS/TTL with a supply of +5 Vdc only, connect the 5 Vdc to both pins 2 and 4.

** Only for units with electronic tuning; otherwise, these are No Connection. For fine tuning adjustment with the "V" option, connect the ends of a 20KΩ wirewound potentiometer to pins 7 and 3 and the wiper arm to pin 6.

CO-711W, CO-718SW, CO-724W, CO-725W, CO-725SW and L2 option versions

CO-711W, CO-718SW and L2 versions: 1.00"
CO-724W: 1.00" to 150 MHz
1.25" above 150 MHz
CO-724WL2: 1.00" to 200 MHz
CO-725W, CO-725SW and L2 versions: 1.25"



Pin	Function
1	Supply (+)
2	0V, Case
*3	VCXO Input

NOTE: Model CO-724WL2 requires the use of an insulated (non-metallic) tuning tool for frequency adjustment.

* Only with electronic tuning option; otherwise, pin is No Connection. For fine tuning adjustment with the "V" option, connect one end of a 20kΩ wirewound potentiometer to a stable reference voltage, the other end to 0V, Case and wiper arm to VCXO input.

Markings do not appear on oscillators; they are for reference only. Dimensions are in inches. Case dimension tolerances are ± .02"

Immediate need? Please call. (203) 853-4433
Let our staff of application engineers assist you in placing your order.