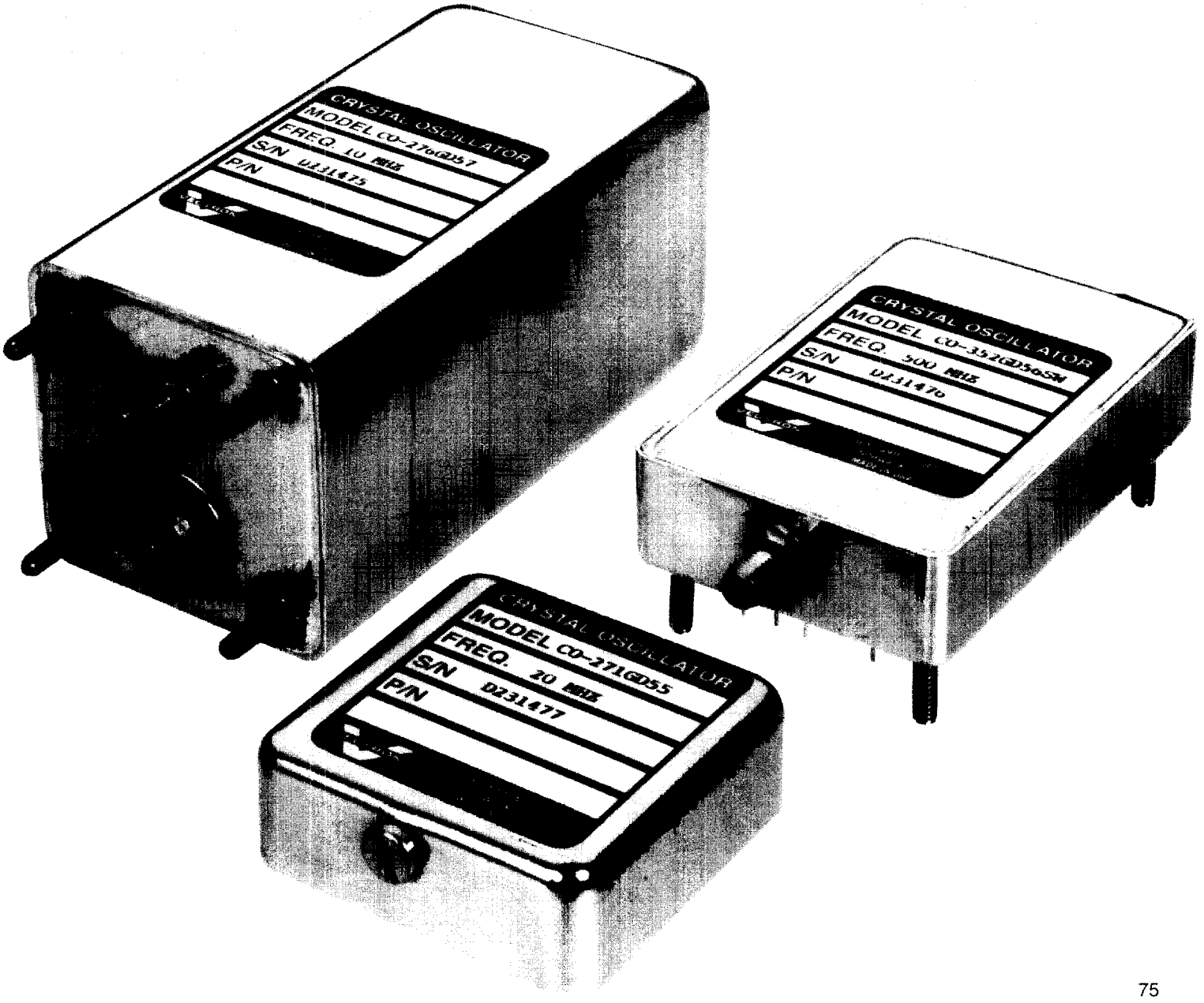
Linear VCXOs Voltage Controlled Crystal Oscillators

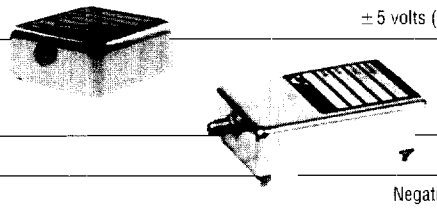
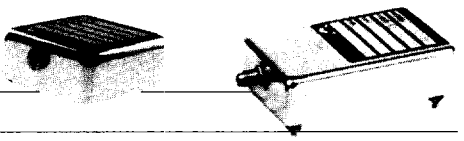
(See pages 71-74 for narrow deviation phase locking models and pages 79-82 for very wide deviation VCOs)

FEATURES

- Center Frequency to 600 MHz
- Wide Frequency Deviation (to ±2500 PPM)
- High Degree of Linearity (to ±1%)
- Temperature Compensated Models (TC/VCXOs)
- Oven Controlled Models (OC/VCXOs)



VCXOs, TC/VCXOs...to 600 MHz

	BASIC VCXOs		TEMPERATURE COMPENSATED (TC/VCXOs)	
	CO-271	**CO-275**	**CO-351**	**CO-352**
CENTER FREQUENCY	to 23 MHz	**CO-275:** 23.1-100 MHz **CO-275H:** 100.1-600 MHz (Models differ in pin pattern)	to 20 MHz	20.1-500 MHz
MODULATION CHARACTERISTICS Deviation	±.001% to ±.25%. Model numbers for ±.01%, ±.03%, ±.1%, and ±.25% are shown in the stability section below (for deviation exceeding ±.25%, consider a Vectron non-crystal VCO or custom VCXO).			
Control Voltage	±5 volts (higher or lower sensitivity, or unipolar control, available)			
Linearity	 "**N**": ±5% (smooth monotonic "**A**": ±3% characteristic with "**B**": ±1% no discontinuities) 			
Modulation Input Z	>50 kΩ			
Transfer Function	Negative (increasing control voltage decreases frequency)			
Modulation Rate	0 to 10 kHz, demodulated signal is flat to ±1 dB. (Modulation input network can be broadened to provide a 100 kHz 3 dB response, but as a result of the crystal characteristic, the demodulated signal may exhibit amplitude variation of 5 to 15 dB above 20 kHz).			

STABILITY (at f_0)

	(Temperature Range **B**) 0°C to +50°C		(Temperature Range **D**) −20°C to +70°C		(Temperature Range **F**) −55°C to +85°C		(Temperature Range **B**) 0°C to +50°C		(Temperature Range **D**) −20°C to +70°C		(Temperature Range **F**) −55°C to +85°C	
	Code	Stability	Code	Stability	Code	Stability	Code	Stability	Code	Stability	Code	Stability
±.01% deviation (**G**)	**GB35** **GB15**	±.003% ±.001%	**GD55** **GD35**	±.005% ±.003%	**GF55**	±.005%	**GB36** **GB57**	±.0003% ±.00005%	**GD56** **GD16**	±.0005% ±.0001%	**GF25** **GF56**	±.002% ±.0005%
±.03% deviation (**H**)	**HB55** **HB25**	±.005% ±.002%	**HD14** **HD55**	±.01% ±.005%	**HF14**	±.01%	**HB15** **HB56**	±.001% ±.0005%	**HD15** **HD56**	±.001% ±.0005%	**HF55** **HF25**	±.005% ±.002%
±.1% deviation (**L**)	**LB14** **LB35**	±.01% ±.003%	**LD24** **LD14**	±.02% ±.01%	**LF34**	±.03%	**LB25** **LB15**	±.002% ±.001%	**LD55** **LD25**	±.005% ±.002%	**LF14** **LF55**	±.01% ±.005%
±.25% deviation (**K**)	**KB34** **KB14**	±.03% ±.01%	**KD54** **KD34**	±.05% ±.03%	**KF13**	±.1%	**KB14** **KB35**	±.01% ±.003%	**KD24** **KD14**	±.02% ±.01%	**KF34** **KF24**	±.03% ±.02%

OUTPUT / SUPPLY Standard Level	>1 Vrms into 1000Ω	>0.5 Vrms into 50 Ω(+7 dBm)	>1 Vrms into 1000Ω	>0.5 Vrms into 50Ω (+7 dBm)
Standard Supply	15 Vdc ±5%	15 Vdc ±5%	15 Vdc ±5%	15 Vdc ±5%

Optional

OUTPUT LEVEL	SUPPLY ±5%	Available Frequency Range
Option "**R**": +13 dBm into 50Ω	15 Vdc	*3.5 MHz to 500 MHz (600 MHz for CO-275H)
Other sine options: 0 dBm to +13 dBm/50Ω	12-28 Vdc	*3.5 MHz to 500 MHz (600 MHz for CO-275H)
Options "**J**": TTL	15 Vdc and 5 Vdc	*3.5 MHz to 100 MHz
Other logic options: TTL	12-28 Vdc and 5 Vdc	*3.5 MHz to 100 MHz
ECL	12-28 Vdc and −5.2 Vdc	20 MHz to 200 MHz
CMOS	12-15 Vdc	On special order
HCMOS	12-28 Vdc and 5 Vdc	On special order

* Lower frequencies on special order

Harmonics and Sub-harmonics (Sinewave)	>20 dB below output. If internal multiplier is used (generally applies to CO-275 and CO-352 Series), subharmonics are also −20 dBc. Improved harmonic/ sub-harmonic attenuation available.			
Current	<30 mA	30-70 mA depending upon frequency	<30 mA	30-70 mA depending upon frequency
FREQUENCY ADJUST	Screwdriver adjustment permits setting center frequency; range is approximately 10% of deviation, but no less than ±.001%			
MECHANICAL Size (See drawings on page 78)	2" x 2" x 3/4" (51 x 51 x 19 mm) 2" x 2 1/4" x 3/4" for SW option	2" x 3" x 3/4" (51 x 77 x 19 mm) (reduced size available)	2" x 2" x 3/4" (51 x 51 x 19 mm) 2" x 2 1/4" x 3/4" for SW option	2" x 3" x 3/4" (51 x 77 x 19 mm)
Base—standard	pins for pcb mount	pins for pcb mount	pins for pcb mount	pins for pcb mount and studs
—optional	"**W**": SMA, pins, and mounting studs on base "**SW**": SMA on side, pins on base (studs optional) (SMC connector available)	"**W**": SMA, pins, and mounting studs on base "**SW**": SMA on side, pins and studs on base (SMC connector available)	"**W**": SMA, pins, and mounting studs on base "**SW**": SMA on side, pins on base (studs optional) (SMC connector available)	(rf output connector option recommended above 200 MHz) "**SW**": SMA on side, pins and studs on base (SMC connector available)

HOW TO SPECIFY

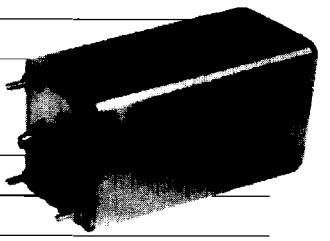
[ ] [ ] [ ] [ ] **at** [ ]

- Basic Series (e.g. CO-271)
- Deviation/Stability Code (e.g. GB15)
- Linearity (**N**, **A** or **B**)
- Frequency
- *Any lettered option (**R**, **J**, **W**, **SW**, **U**, **X**)

*Leave blank if not desired

OVEN CONTROLLED (OC/VCXOs)

	CO-272	CO-276
CENTER FREQUENCY	to 23 MHz	23.1-500 MHz
MODULATION CHARACTERISTICS Deviation	±.001% to ±.25%. Model numbers for ±.01%, ±.03%, ±.1%, and ±.25% are shown in the stability section below(for deviation exceeding ±.25%, consider a Vectron non-crystal VCO or custom VCXO).	
Control Voltage	±5 volts (higher or lower sensitivity, or unipolar control, available)	
Linearity	"N": ±5% (smooth monotonic "A": ±3% characteristic with "B": ±1% no discontinuities)	
Modulation Input Z	>50 kΩ	
Transfer Function	Negative (increasing control voltage decreases frequency)	
Modulation Rate	0 to 10 kHz, demodulated signal is flat to ±1 dB. (Modulation input network can be broadened to provide a 100 kHz 3 dB response, but as a result of the crystal characteristic, the demodulated signal may exhibit amplitude variation of 5 to 15 dB above 20 kHz).	



STABILITY (at f_0)

	(Temperature Range **B**) 0°C to +50°C		(Temperature Range **D**) −20°C to +70°C		(Temperature Range **F**) −55°C to +85°C	
	Code	Stability	Code	Stability	Code	Stability
±.01% deviation (**G**)	**GB37**	±.00003%	**GD57**	±.00005%	**GF16**	±.0001%
±.03% deviation (**H**)	**HB16**	±.0001%	**HD26**	±.0002%	**HF56**	±.0005%
±.1% deviation (**L**)	**LB36**	±.0003%	**LD56**	±.0005%	**LF15**	±.001%
±.25% deviation (**K**)	**KB15**	±.001%	**KD35**	±.003%	**KF55**	±.005%

OUTPUT / SUPPLY Standard Level	>1 Vrms into 1000Ω	>0.5 Vrms into 50Ω (+7 dBm)
Standard Supply	24 Vdc ±5%	24 Vdc ±5%

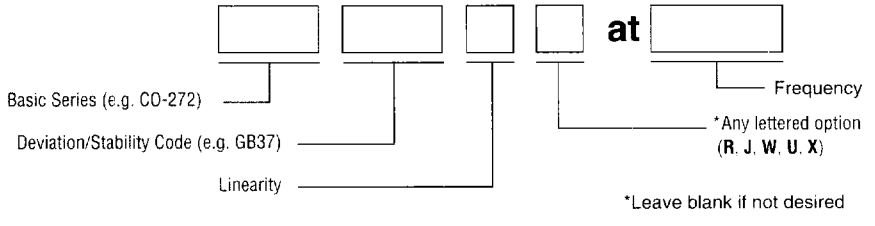
Optional

	OUTPUT LEVEL	SUPPLY ±5%	Available Frequency Range
Option "R":	+13 dBm into 50Ω	24 Vdc	*3.5 MHz to 500 MHz
Other sine options:	0 dBm to +13 dBm/50Ω	12-28 Vdc	*3.5 MHz to 500 MHz
Options "J":	TTL	24 Vdc and 5 Vdc	*700 kHz to 100 MHz
Other logic options:	TTL	12-28 Vdc and 5 Vdc	*700 kHz to 100 MHz
	ECL	12-28 Vdc and −5.2 Vdc	20 MHz to 200 MHz
	CMOS	12-15 Vdc	On special order
	HCMOS	12-28 Vdc and 5 Vdc	On special order

*Lower frequencies on special order

Harmonics and Sub-harmonics (Sinewave)	>20 dB below output. If internal multiplier is used (generally applies to CO-276 Series), subharmonics are also −20 dBc. Improved harmonic/ sub-harmonic attenuation available.
Current	<6 watts at turn-on (8 watts below −20°C) <3 watts stabilized at 25°C
FREQUENCY ADJUST	Screwdriver adjustment permits setting center frequency; range is approximately 10% of deviation, but no less than ±.001%
MECHANICAL Size	2" x 2" x 4" (51 x 51 x 102 mm) / 2" x 2" x 4" (51 x 51 x 102 mm) Contact factory for outline and pin connection drawings
Base—standard	octal plug-in, studs / SMC, solder header, studs
—optional	**"W"**: SMA, solder header, studs **"U"**: SMC, solder header, studs **"X"**: BNC, solder header, studs (contact factory for pin functions) / **"W"**: SMA, solder header, studs **"X"**: BNC, solder header, studs (contact factory for pin functions)

HOW TO SPECIFY



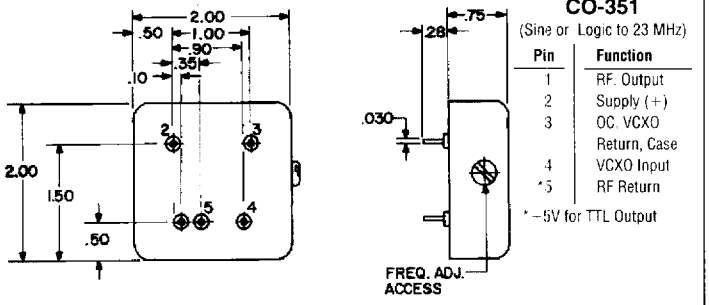
OUTLINE/INSTALLATION DRAWINGS

CO-271
CO-351

(Sine or Logic to 23 MHz)

Pin	Function
1	RF Output
2	Supply (+)
3	OC VCXO
	Return, Case
4	VCXO Input
*5	RF Return

*–5V for TTL Output

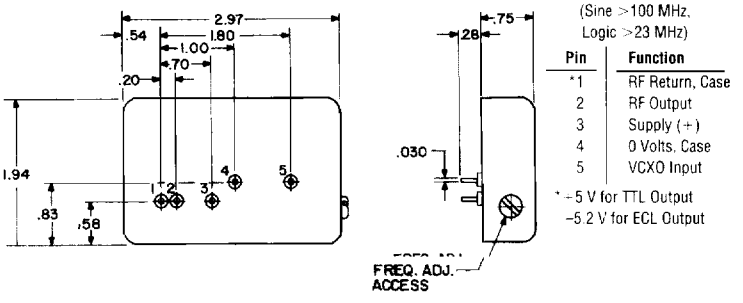


CO-275H

(Sine >100 MHz, Logic >23 MHz)

Pin	Function
*1	RF Return, Case
2	RF Output
3	Supply (+)
4	0 Volts, Case
5	VCXO Input

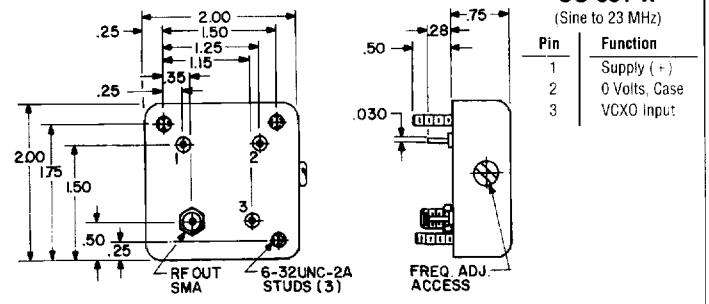
* +5 V for TTL Output
–5.2 V for ECL Output



CO-271 W
CO-351 W

(Sine to 23 MHz)

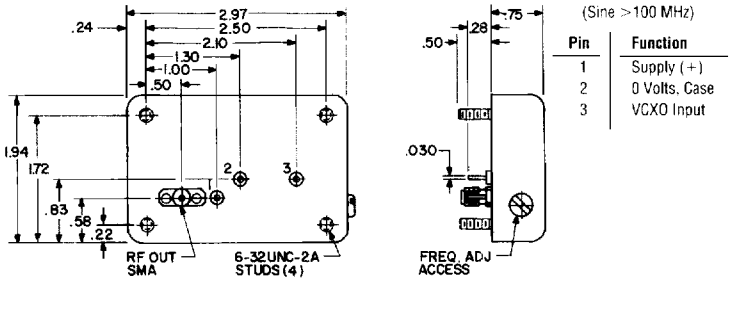
Pin	Function
1	Supply (+)
2	0 Volts, Case
3	VCXO Input



CO-275HW

(Sine >100 MHz)

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

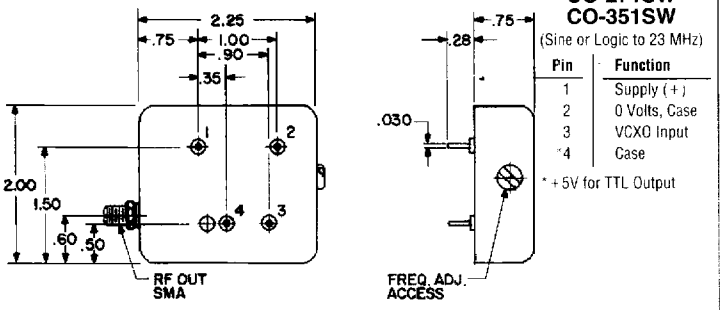


CO-271SW
CO-351SW

(Sine or Logic to 23 MHz)

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

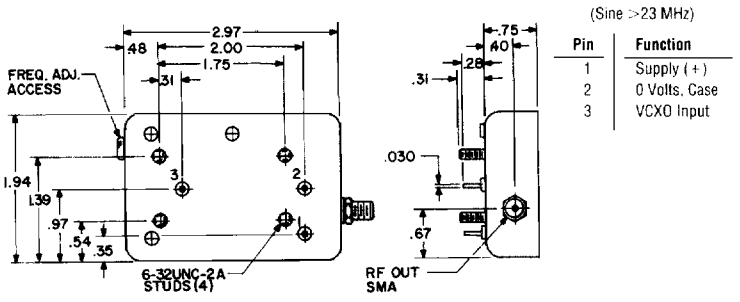
* +5V for TTL Output



CO-275SW

(Sine >23 MHz)

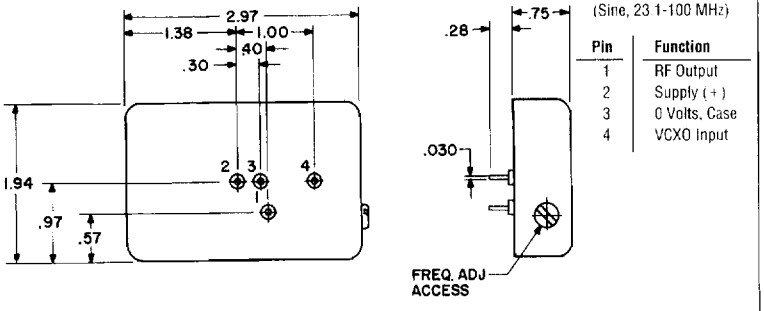
Pin	Function
1	Supply (+)
2	0 Volts, Case
3	VCXO Input



CO-275

(Sine, 23.1-100 MHz)

Pin	Function
1	RF Output
2	Supply (+)
3	0 Volts, Case
4	VCXO Input

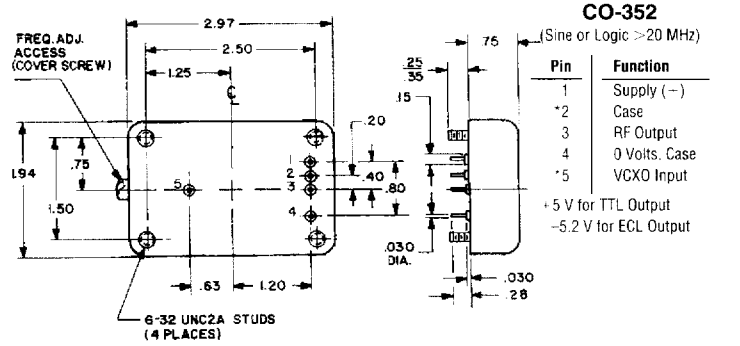


CO-352

(Sine or Logic >20 MHz)

Pin	Function
1	Supply (–)
*2	Case
3	RF Output
4	0 Volts, Case
*5	VCXO Input

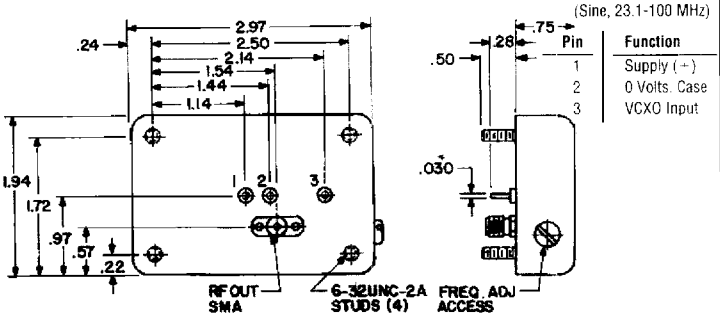
+5 V for TTL Output
–5.2 V for ECL Output



CO-275W

(Sine, 23.1-100 MHz)

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

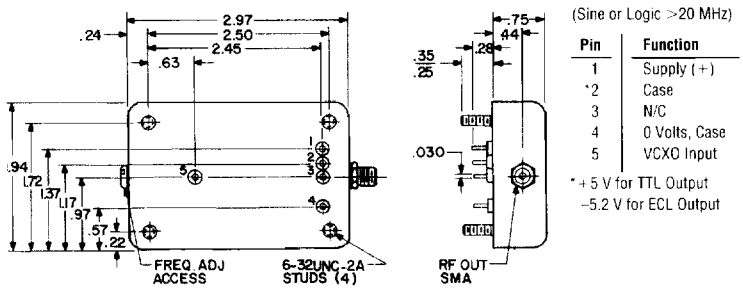


CO-352SW

(Sine or Logic >20 MHz)

Pin	Function
1	Supply (+)
*2	Case
3	N/C
4	0 Volts, Case
5	VCXO Input

* +5 V for TTL Output
–5.2 V for ECL Output



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