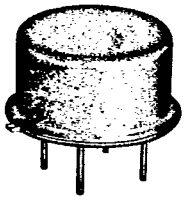
T-50-15

VCO-117
Voltage Controlled Oscillator
300-600 MHz



DESCRIPTION

The VCO-117 Voltage Controlled Oscillator* combines film circuit technology with a custom, stable high-Q varactor design. A unique, low-noise bipolar transistor and a proprietary output coupling circuit are utilized to provide flat power output, wide tuning range and low FM noise.

Good linearity and low tuning voltage lend these devices to straightforward circuit application while the low internal power dissipation allows continuous operation over the full military temperature range.

Mechanically, these encapsulated oscillators have the usual Vari-L attention to design for application in demanding environments.

*U.S. Patent #4621241, Canadian Patent #1267941, E.P.O. Patent Pending.

GUARANTEED MINIMUM PERFORMANCE DATA

Test Condition:	
D.C. Power	+ 15V @ 16 mA, max.
Tuning Range	300-600 MHz min.
Power Output	+ 10 dBm
Frequency Pushing	2.0 MHz/V max., (15 ± 1 Volt)
Frequency Pulling	12 MHz peak to peak max. through all phases, 12 dB load return loss
Modulation Sensitivity	8.0 MHz/V min.
Harmonics	10 dBc min.
Frequency Drift	−.05 MHz/° C max.
Temperature Range	0 to +70° C

ABSOLUTE MAXIMUM RATINGS

Maximum DC Supply Voltage, +20V
Maximum DC Tuning Voltage, +20V
Minimum DC Tuning Voltage, 0V

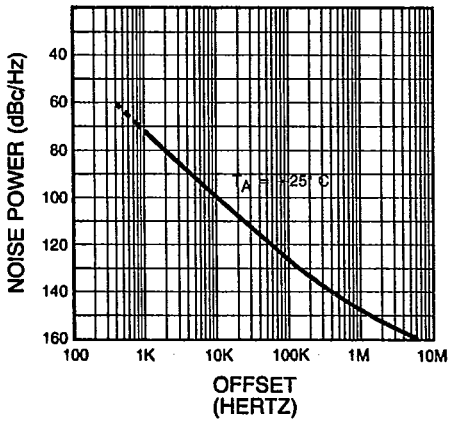
TYPICAL PERFORMANCE

Linear Tuning Range	300-600 MHz
Control Voltage	1 to 18 Volts
Modulation Sensitivity	17 MHz/V
Power Supply	+ 15V at 14.5 mA
Power Output	+ 13 dBm
FM Noise:	
100 KHz Offset	125 dBC/Hz.
1 MHz Offset	145 dBC/Hz.
Harmonics	15 dBC
Frequency Pushing	1.5 MHz/V (15 ± 1 Volt)
Frequency Drift	−0.03 MHz/° C
Power Flatness:	
0 to +70° C	± .75 dB

3 dB Modulation Bandwidth:
Zg = 50 Ω, 5.0 MHz
Zg = 600 Ω, 1.25 MHz

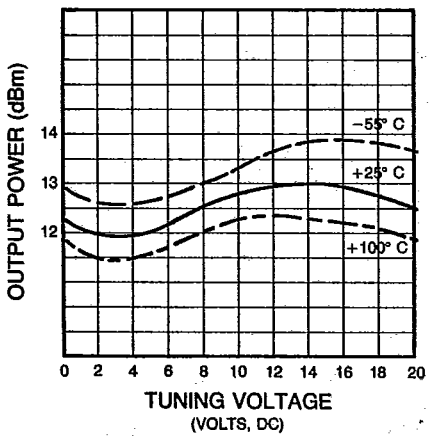
Higher Modulation Bandwidth available on special order.

TYPICAL
PHASE NOISE vs. OFFSET (1), (2)

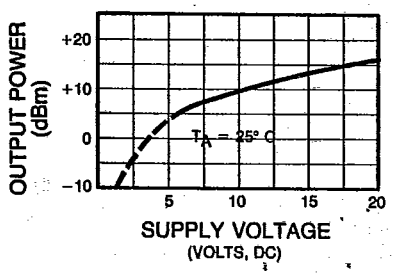


(1) Phase Noise at temperature extremes degrades less than 6 dB from the 25° C values.
(2) Typical Phase Noise was measured with tuning voltage source impedance at 50 Ohms.
Phase Noise will typically degrade 2-3 dB if the source impedance is increased to 600 Ohms.

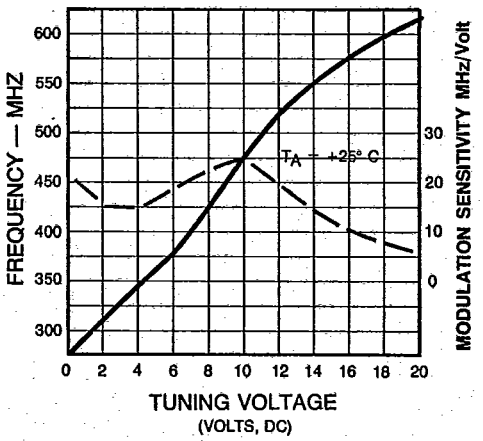
TYPICAL
OUTPUT POWER vs TUNING VOLTAGE



TYPICAL
OUTPUT POWER vs. SUPPLY VOLTAGE



TYPICAL
FREQUENCY/MODULATION SENSITIVITY vs. TUNING VOLTAGE



LIMITED WARRANTY

Vari-L Company, Inc. warrants its products against defects in parts and workmanship for a period of one year.

7/90

ENVIRONMENTAL CONDITIONS

Guaranteed Environmental Performance:

All units are designed to meet their specifications after exposure to any or all of the following tests per MIL-STD-202E.

Exposure	Method	Test Condition
Thermal Shock	107D	B
Altitude	105C	G
H.F. Vibration	204C	D
Mechanical Shock	213B	C
Random Vibration (15 minutes per axis)	214	11F
Solderability	208C	
Terminal Strength	211A	C
Resistance to Soldering Heat	210A	B

These devices are designed to the intent of Mil Standard 883.

Mil Standard 883 screening available at additional cost.

TO-8 OUTLINE:

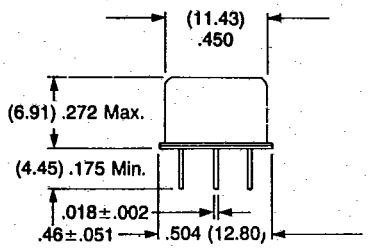
Material:

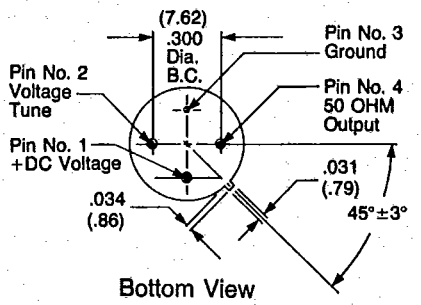
Header: Kovar per ASTM Standard F-15-68 (Chemical Composition per MIL-STD-1276, Type K).
Cover: Nickel 200 per ASTM B162-58T.
Leads: Kovar, Chemical Composition per MIL-STD-1276, Type K.
Seals: Glass

Finish:

Header and Leads — Gold plated per MIL-G45204, Type III, Grade A, over electroless Nickel per MIL-C-26074, Class I, (0.00001" thickness).

Note: Tolerances are ± 0.005" unless otherwise noted.





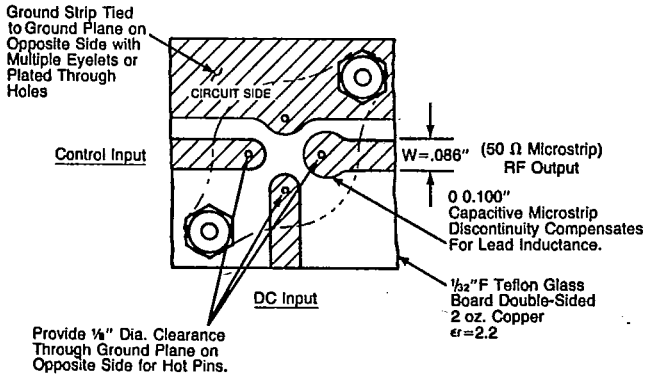
Bottom View

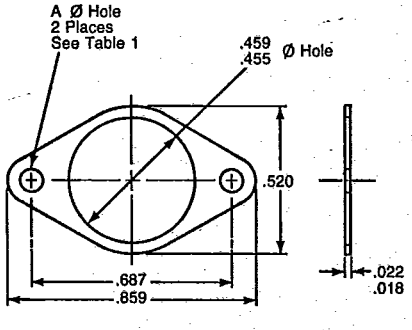
TO-8 VCO MOUNTING

Mounting instructions to achieve optimum RF grounding and associated output flatness for VARI-L VCOs.

To achieve maximum performance and to realize the inherent stability provided in each unit, it is very important to assure good RF grounding between the case and the ground plate. The entire bottom surface of the case should make good contact with ground.

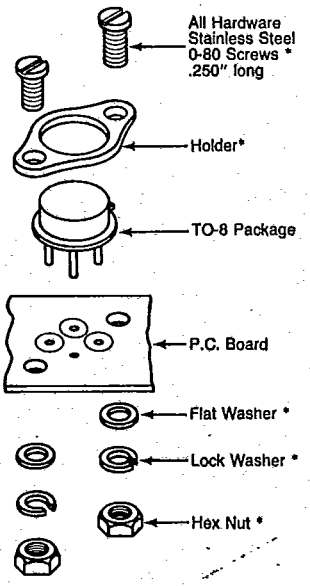
Use VARI-L Mounting Kit, SA-456, as shown *prior to soldering leads into the PC board* to prevent seal damage.





Note 1: Unless Otherwise Specified:
Material: Plate, Corrosion Resistant Steel, 300 Series Per Fed-STD-66.
Finish: Passivate Per MIL-S-5002.

Note 2: Tolerances are ± 0.005" unless otherwise noted.



*Denotes Hardware Included in SA-456 Mounting Kit
All Hardware Stainless Steel

7/90

ALTERNATIVE PACKAGES

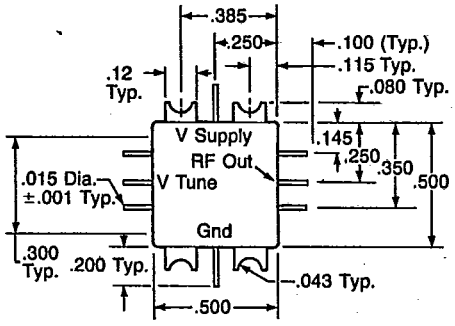
SURFACE MOUNT OUTLINE:

Material:

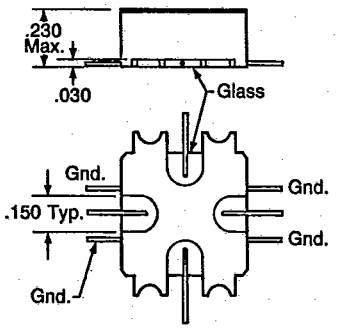
Package: Kovar per ASTM Standard F-15-68 (Chemical Composition per MIL-STD-1276, Type K).
Leads: Kovar, Chemical Composition per MIL-STD-1276, Type K.
Seals: Glass.

Finish:

Header and Leads — Gold plated per MIL-G45204, Type III, Grade A, over electroless Nickel per MIL-C-26074, Class I, (0.00001" thickness).



Top View



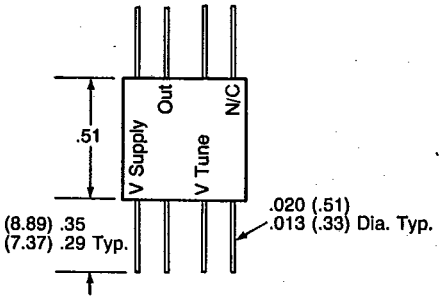
FLATPAK OUTLINE:

Material:

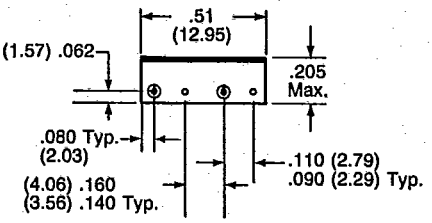
Package: Kovar per ASTM Standard F-15-68 (Chemical Composition per MIL-STD-1276, Type K).
Leads: Kovar, Chemical Composition per MIL-STD-1276, Type K.
Seals: Glass.

Finish:

Header and Leads — Gold plated per MIL-G45204, Type III, Grade A, over electroless Nickel per MIL-C-26074, Class I, (0.00001" thickness).



Top View



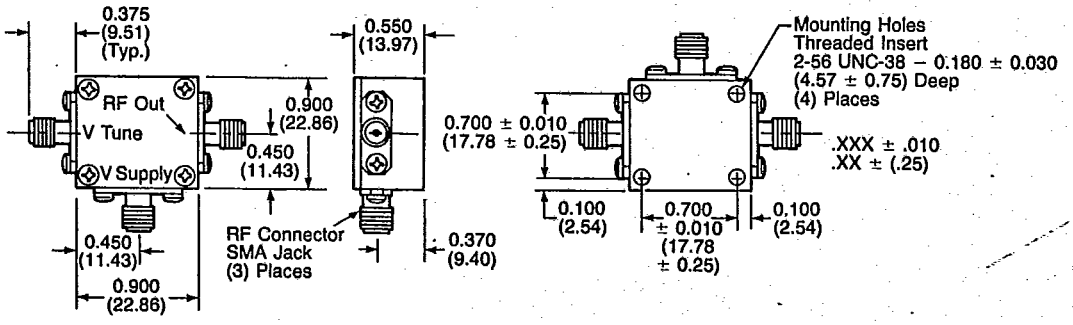
SMA CONNECTOR OUTLINE:

Material:

Housing: Aluminum 6061-T6.
Note: This Housing is not hermetically sealed. However, the Hybrid Oscillator within the package is hermetically sealed.

Finish:

.0004 Inch Minimum Bright Nickel per QQ-N-290, Class I, Grade F, Form SB.
Connectors: SMA Stainless Steel.



Top View