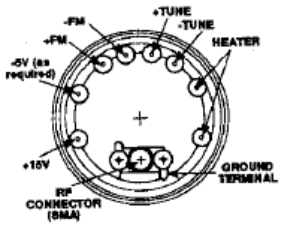
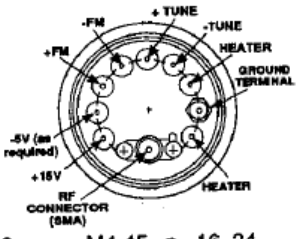
Octave Band YIG-Tuned Oscillators

Features

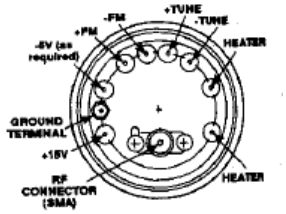
- **Full 1.0 to 18 GHz Coverage**
- **Rugged Hermetic Packaging**
- **Reliable Thin Film Construction**
- **± 0.05% to ±0.2% Tuning Linearity**
- **0° to 65 °C, Temperature Range**



A-45, B-45, C-45, C-38, p. 16–2



M4-45, p. 16–24



M3-45, M3-60, p. 16–24

DESCRIPTION

Avantek Octave Band Series YIG-tuned fundamental transistor oscillators are compact and lightweight and are cost-effective for commercial instrument applications.

They are built using the same Avantek thin-film construction and hermetic packaging that has proven itself ultimately reliable under severe military and aerospace environmental conditions.

This family of oscillators is designed for wideband applications in receivers and instruments where tuning linearity and spectral purity are crucial.

They make ideal local oscillators for frequency-agile receivers and spectrum analyzers and are excellent as signal sources for microwave sweep generators and synthesizers.

The tuning curves (I_{tuning} vs. F_{out}) for this series of YTO's are linear and will deviate from the ideal straight line only ± 0,05% to ± 0,2% (typically).

The power output remains flat within ± 1.5dB to ± 3.0dB over the entire tuning range

These oscillators have compatible tuning port characteristics of 20 MHz/mA and 5 kHz bandwidth up to 12.4 GHz.

This helps to simplify the design of multiband equipment and minimizes the number of current drives necessary.

All Octave Band Series oscillators have a low inductance FM tuning in addition to the main tuning coil.

This coil is in close proximity to the YIG sphere and is used to fine-tune the oscillator frequency, to phase lock the YTO or to frequency modulate the output signal.

The sensitivity of this port is much less than that of the main tuning coil, but it has a much wider 3 dB bandwidth and permits input modulation or control signals to deviate the output frequency by as much as 15 to 100 MHz at a rate up to 1 MHz

ELECTRICAL AND PERFORMANCE SPECIFICATIONS

Guaranteed specifications at 0° to +65°C Case Temperature (Unless Otherwise Noted)

Model No.	**AV-7104**	**AV-7203**	**AV-7204**	**AV-7224**
Frequency Range, Min.	1 - 2.2 GHz	2 - 4 GHz	2 - 4 GHz	2 - 4 GHz
Power Output into 50 ohm load, Min. at 25°C	40mW/+16dBm	25mW/+14 dBm	40mW/+16dBm	100mW/+20 dBm
Power Output Variation vs. Frequency, Max.	3.0 dB	3.0 dB	3.0 dB	3.0 dB
Operating Case Temperature Range	0°C to +65°C	0°C to +65°C	0°C to +65°C	0°C to +65°C
Frequency Drift Over Operating Temperature. Max.	10 MHz	10 MHz	10 MHz	10 MHz
Pulling Figure (12dB Return Loss). Typ.	0.1 MHz	0.5 MHz	0.5 MHz	0.5 MHz
Pushing Figure, +15 VDC Supply. Typ.	0.5 MHz/V	0.5 MHz/V	0.5 MHz/V	0.1 MHz/V
-5 VDC Supply, Typ.	N/A	N/A	N/A	1.5 MHz/V
Magnetic Susceptibility @ 60 Hz Typ.	70KHz/Gauss	70KHz/Gauss	70KHz/Gauss	70KHz/Gauss
2nd Harmonic, @ 25°C, Min.	-15 dBc	-12 dBc	-20 dBc	-12 dBc
3rd Harmonic, @ 25°C. Min.	-20 dBc	-20 dBc	-20 dBc	-12 dBc
Spurious Output, Min.	-60 dBc	-60 dBc	-60 dBc	-60 dBc
Main Tuning Port Characteristics				
Sensitivity	20±1 MHz/ma	20±1 MHz/mA	20±1 MHz/mA	20±1 MHz/mA
3 dB Bandwidth. Typ.	5KHz	5KHz	5KHz	5KHz
Linearity, Typ	±0.1%	±0.05%	±0.05%	±0.05%
Hysteresis, Typ.	1.7 MHz	3 MHz	3 MHz	3 MHz
Input impedance @ 1KHz, Typ.	10 ohm in series with 95 mH	10 ohm in series with 95 mH	10 ohm in series with 95 mH	10 ohm in series with 95 mH
FM Port Characteristics				
Sensitivity, Typ.	310 KHz/mA	310 KHz/mA	310 KHz/mA	310 KHz/mA
3 dB Bandwidth, Typ.	800 KHz	800 KHz	800 KHz	800 KHz
Deviation at 3 dB Bandwidth, Max	15 MHz	20 MHz	20 MHz	20 MHz
Input impedance @ 1KHz, Typ	1 ohm in series with 1.7 µH	1 ohm in series with 1.7 µH	1 ohm in series with 1.7 µH	1 ohm in series with 1.7 µH
DC Circuit Power, Max.				
+15 ±0.5V	150 mA	100 mA	90 mA	150 mA
-5 ±0.1V	-	-	+Vc@ 35 mA **(*)**	60 mA
YIG Heater Power				
Input Voltage Range	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC
Power @ 25°C, Max.	1.5 watts	1.5 watts	1.5 watts	1.5 watts
Power @ 0°C, Max.	2.0 watts	2.0 watts	2.0 watts	2.0 watts
Weight, Max.	10 oz.	10 oz.	10 oz.	10 oz.
Case Style	A-45	A-45	B-45	C-45

(*) Terminal VC requires a linear voltage ramp proportional to frequency.
The voltage at 2 GHz is factory selected within the range +7 to +13 Volts and the voltage at 4 GHz is +15 Volts

Model No.	AV-7403	AV-7453	AV-7443	AV-77011	AV-7871
Frequency Range, Min.	4 - 8 GHz	4 - 8 GHz	4 - 8 GHz	7 - 11 GHz	8 – 12.4 GHz
Power Output into 50 ohm load, Min. at 25°C	20mW/+13dBm	50mW/+17 dBm	100mW/+20dBm	60mW/+17.8 dBm	30mW/+14.8 dBm
Power Output Variation vs. Frequency, Max.	6.0 dB	6.0 dB	6.0 dB	6.0 dB	6.0 dB
Operating Case Temperature Range	0° to +65°C	0° to +65°C	0° to +65°C	0° to +65°C	0° to +65°C
Freq. Drift Over Operating Temperature. Max.	20 MHz	20 MHz	20 MHz	25 MHz	25 MHz
Pulling Figure (12dB Return Loss). Typ.	2 MHz	0.5 MHz	0.2 MHz	0.5 MHz	5 MHz
Pushing Figure, +15 VDC Supply. Typ.	0.5 MHz/V	0.1 MHz/V	0.1 MHz/V	0.1 MHz/V	0.1 MHz/V
-5 VDC Supply, Typ.	1.5 MHz/V	1.5 MHz/V	2.0 MHz/V	N/A	N/A
Magnetic Susceptibility @ 60 Hz Typ.	70KHz/Gauss	70KHz/Gauss	70KHz/Gauss	50KHz/Gauss	50KHz/Gauss
2nd Harmonic, @ 25°C, Min.	-12 dBc	-12 dBc	-12 dBc	-12 dBc	-12 dBc
3rd Harmonic, @ 25°C. Min.	-20 dBc	-20 dBc	-20 dBc	-15 dBc	-20 dBc
Spurious Output, Min.	-60 dBc	-60 dBc	-60 dBc	-60 dBc	-60 dBc
Main Tuning Port Characteristics					
Sensitivity	20±1 MHz/ma	20±1 MHz/mA	20±1 MHz/mA	20±1 MHz/mA	20±1 MHz/mA
3 dB Bandwidth. Typ.	5KHz	5KHz	5KHz	5KHz	5KHz
Linearity, Typ	±0.05%	±0.05%	±0.05%	±0.01%	±0.01%
Hysteresis, Typ.	6 MHz	6 MHz	6 MHz	6 MHz	6 MHz
Input impedance @ 1KHz, Typ.	10 ohm in series with 95 mH	10 ohm in series with 95 mH	10 ohm in series with 95 mH	9 ohm in series with 60 mH	9 ohm in series with 60 mH
FM Port Characteristics					
Sensitivity, Typ.	310 KHz/mA	310 KHz/mA	310 KHz/mA	450 KHz/mA	450 KHz/mA
3 dB Bandwidth, Typ.	800 KHz	800 KHz	800 KHz	400 KHz	400 KHz
Deviation at 3 dB Bandwidth, Max	40 MHz	40 MHz	40 MHz	70 MHz	40 MHz
Input impedance @ 1KHz, Typ	1 ohm in series with 1.7 µH	1 ohm in series with 1.7 µH	1 ohm in series with 1.7 µH	0.5 ohm in series with 2 µH	0.5 ohm in series with 2 µH
DC Circuit Power, Max.					
+15 ±0.5V	40 mA	150 mA	200 mA	-	-
-5 ±0.1V	40 mA	60 mA	60 mA	-	-
+15 +0.5/-3.5V	-	-	-	300mA	125 mA
YIG Heater Power					
Input Voltage Range	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC
Power @ 25°C, Max.	1.5 watts	1.5 watts	1.5 watts	1.5 watts	1.5 watts
Power @ 0°C, Max.	2.0 watts	2.0 watts	2.0 watts	2.0 watts	2.0 watts
Weight, Max.	10 oz.	10 oz.	10 oz.	12 oz.	12 oz.
Case Style	C-38	C-38	C-45	M4-45	M4-45

Model No.	AV-7872	AV-7873	AV-71241	AV-71251	AV-71261
Frequency Range, Min.	8 – 12.4 GHz	8 – 12.4 GHz	12 - 18 GHz	12 - 18 GHz	12 - 18 GHz
Power Output into 50 ohm load, Min. at 25°C	60mW/+17.8 dBm	100mW/+20 dBm	20mW/+13dBm	40mW/+16 dBm	80mW/+19 dBm
Power Output Variation vs. Frequency, Max.	6.0 dB	6.0 dB	6.0 dB	6.0 dB	6.0 dB
Operating Case Temperature Range	0° to +65°C	0° to +65°C	0° to +65°C	0° to +65°C	0° to +65°C
Freq. Drift Over Operating Temperature. Max.	25 MHz	25 MHz	40 MHz	40 MHz	40 MHz
Pulling Figure (12dB Return Loss). Typ.	1 MHz	1 MHz	5 MHz	1 MHz	0.5 MHz
Pushing Figure, +15 VDC Supply. Typ.	0.1 MHz/V	0.1 MHz/V	0.1 MHz/V	0.1 MHz/V	0.1 MHz/V
-5 VDC Supply, Typ.	N/A	N/A	N/A	N/A	N/A
Magnetic Susceptibility @ 60 Hz Typ.	50KHz/Gauss	50KHz/Gauss	50KHz/Gauss	50KHz/Gauss	50KHz/Gauss
2nd Harmonic, @ 25°C, Min.	-12 dBc	-12 dBc	-12 dBc	-12 dBc	-12 dBc
3rd Harmonic, @ 25°C. Min.	-20 dBc	-20 dBc	-	-	-
Spurious Output, Min.	-60 dBc	-60 dBc	-60 dBc	-60 dBc	-60 dBc
Main Tuning Port Characteristics					
Sensitivity	20±1 MHz/ma	20±1 MHz/mA	18±1 MHz/mA	18±1 MHz/mA	18±1 MHz/mA
3 dB Bandwidth. Typ.	5KHz	5KHz	5KHz	5KHz	5KHz
Linearity, Typ	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Hysteresis, Typ.	6 MHz	6 MHz	9 MHz	9 MHz	9 MHz
Input impedance @ 1KHz, Typ.	9 ohm in series with 60 mH	9 ohm in series with 60 mH	6 ohm in series with 73 mH	6 ohm in series with 73 mH	6 ohm in series with 73 mH
FM Port Characteristics					
Sensitivity, Typ.	450 KHz/mA	450 KHz/mA	450 KHz/mA	450 KHz/mA	450 KHz/mA
3 dB Bandwidth, Typ.	400 KHz	400 KHz	1 MHz	1 MHz	1 MHz
Deviation at 3 dB Bandwidth, Max	40 MHz	40 MHz	70 MHz	70 MHz	70 MHz
Input impedance @ 1KHz, Typ	0.5 ohm in series with 2 µH	0.5 ohm in series with 2 µH	0.5 ohm in series with 2.3 µH	0.5 ohm in series with 2.3 µH	0.5 ohm in series with 2.3 µH
DC Circuit Power, Max. +15 +0.5/-3.5V	250 mA	250 mA	125 mA	150 mA	200 mA
YIG Heater Power					
Input Voltage Range	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC	20 to 28 VDC
Power @ 25°C, Max.	1.5 watts	1.5 watts	1.5 watts	1.5 watts	1.5 watts
Power @ 0°C, Max.	2.0 watts	2.0 watts	2.0 watts	2.0 watts	2.0 watts
Weight, Max.	12 oz.	12 oz.	17 oz.	17 oz.	17 oz.
Case Style	M4-45	M4-45	M3-45	M3-60	M3-60