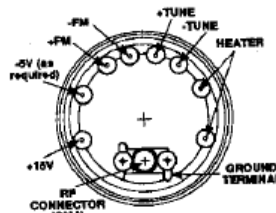




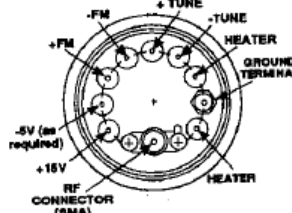
Octave Band YIG-Tuned Oscillators

Features

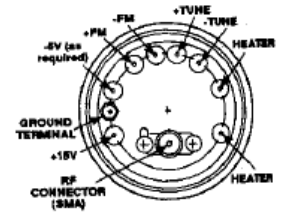
- Full 1.0 to 18 GHz Coverage
- Rugged Hermetic Packaging
- Reliable Thin Film Construction
- $\pm 0.05\%$ to $\pm 0.2\%$ Tuning Linearity
- 0° to 65°C , Temperature Range



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 (f_{tuning} vs. f_{out}) for this series of YTO's are linear and will deviate from the ideal straight line only $\pm 0.05\%$ to $\pm 0.2\%$ (typically).

The power output remains flat within $\pm 1.5\text{dB}$ to $\pm 3.0\text{dB}$ 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 $+65^\circ\text{C}$ 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 $+65^\circ\text{C}$ | 0°C to $+65^\circ\text{C}$ | 0°C to $+65^\circ\text{C}$ | 0°C to $+65^\circ\text{C}$ |
| 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 | $\pm 0.1\%$ | $\pm 0.05\%$ | $\pm 0.05\%$ | $\pm 0.05\%$ |
| 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 $\pm 0.5\text{V}$ | 150 mA | 100 mA | 90 mA | 150 mA |
| -5 $\pm 0.1\text{V}$ | - | - | +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 | | | | | |
| YIG Heater Power | 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 |