yig Oscillator

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YIG oscillators exploit the principle of magnetic resonance to generate a clean low phase noise microwave signal over broad tuning ranges. A single crystal YIG sphere will experience magnetic resonance and behave similar to a tank circuit when the sphere is positioned in the air gap of a simple electromagnet. Figure 1A shows the most basic YIG oscillator circuit, a YIG sphere inside a coupling loop. The resonant frequency of the tank is a linear function of the current applied to the electromagnet. The intrinsic L, C and R values of the tank depend on the physical properties of the YIG sphere and the wire loop used to couple energy to it. The resulting resonance has a very high unloaded Q. At 10 GHz the unloaded Q is >8000Historically as YIG oscillators move up in frequency towards 20 GHz the active device had to be changed from a bipolar transistor to Field Effect Transistor, (FET). This typically degrades phase noise performance by 10 to 15dB. Teledyne Microwave’s new series of YIG oscillators extend state of the art bipolar type low phase noise performance all the way up to the 20 GHz frequency range. An example is the FS2637 which is housed in a 1.25” x 1.25” x 0.94” package, (see figure 2B). This device has a typical 100 KHz offset phase noise of -128dBc/Hz across the entire 8 to 18 GHz frequency range. (Maximum phase noise is -123dBc/Hz, see figure 3 for details) These same phase noise specifications are also guaranteed for the FS2678 which covers the 12 to 20 GHz frequency band. Also Read: YIG Oscillator, RF Oscillator, Harmonic Oscillator, Crystal Oscillator Circuit, Frequency Oscillator, Transistor Oscillator, Electronic Oscillator, Quartz Oscillator, Microwave Oscillator, Quartz Crystal Oscillator, Yig Filter