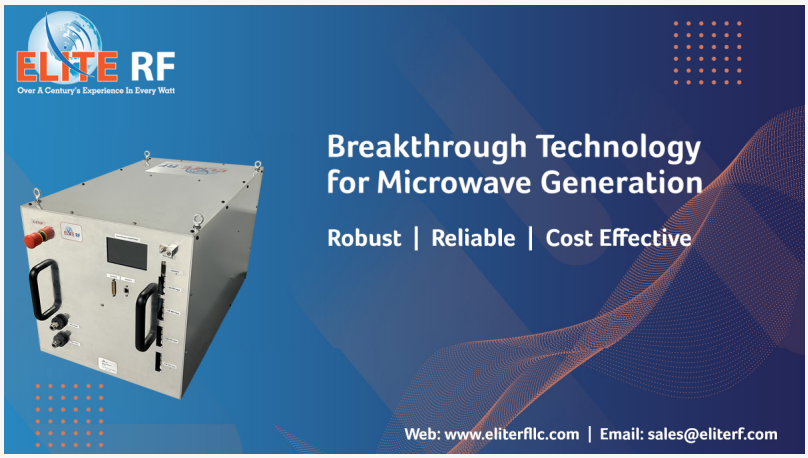
Elite RF introduces high power 2.45 GHz industrial Microwave Generators

The innovation in semiconductor based transistors is pushing the envelope of high power microwave generation technology



Solid-State Microwave Generator

CHICAGO, IL, USA, April 10, 2024 /EINPresswire.com/ -- Microwaves, a form of electromagnetic radiation traveling at the speed of light, encompass a frequency range from 300MHz (megahertz) to 300GHz (gigahertz). These high-power microwaves find extensive usage in various industrial applications, such as generating plasma for lab grown diamonds and semiconductor coating, mass drying, nuclear fusion, directed energy weapons, biological waste disposal, RF ablation, linear particle accelerators, microwave assisted chemistry, sterilization, and more. Traditionally, vacuum tube-based magnetrons are mounted in these systems for microwave generation. Analyzing the shortcomings of this old technology that makes these processes inefficient, a Chicago based company Elite RF has designed and launched its highly efficient and compact 6kW solid-state microwave generators using Gallium Nitride (GaN) transistors for 2.45GHz applications. With this core piece of technology, the company has the capabilities to scale these higher power systems up to 100kW.

As a global leader in the field, Elite RF specializes in designing and manufacturing high-power RF solutions for medical, defense, aerospace, big science, EMC test, research, industrial and commercial applications. From lower frequencies to 40GHz, the company offers a wide range of standard and customized RF amplifiers and microwave generators, that are highly valued by its clientele for their reliability and performance. They have built a solid reputation as the friendliest and most collaborative company in the RF amplifier industry. By actively listening to their customers, they provide custom-made solutions at competitive prices. Magnetron users globally are evaluating and adopting the now available solid-state options for upgrading their unreliable old systems. Elite RF's microwave generators have in-built redundancy and offer the following advantages over traditional magnetrons.

Lifetime and Durability: Elite RF's microwave systems are designed to last more than 10 years or over 100,000 hours, significantly longer than magnetrons. They also consistently maintain their power throughout their long lifespan, in contrast to magnetrons, which have a lifespan of 15,000 hours and lose about 30% of their power over time.

Signal Purity and Heating Uniformity: These systems are designed to provide precise control on frequency and power of the generated microwaves that has a direct impact on the overall process and final product quality. Tube-based magnetron generates noisy microwave signals of varying frequencies and power levels, resulting in increased reflection and decreased system efficiency. In contrast, solid state offers precise power that can eliminate the problem of hot and cold spots, leading to better heating uniformity.

Customization: Unlike its counterparts, these solid-state microwave generators have embedded high speed microprocessors. This enables Elite RF's engineers to write custom software suites tailored to customers' unique needs enabling additional controls and safety for the end user than what is available today.

Electricity Consumption: Solid state systems have the capability to adjust the coupling of the microwave energy to the load, ensuring maximum energy transfer and lower power needs. This leads to higher energy efficiency compared to magnetron systems, which lack the ability to adapt energy use in the same way.

Field Replaceable and Zero Real Time Process Failure: These microwave generators are designed on a building block design approach. There are multiple RF amplifiers in the system. If an RF amplifier fails in the live process, the system is designed to increase the output power of all other functioning amplifiers to achieve the desired power within microseconds. The operator can easily swap the faulty amplifier with a new one before starting the new batch. All these advantages help maintain the total cost of ownership of solid-state microwaves much lower than magnetrons when compared over a 3-to-5-year period.

Pulsed Mode: Solid state technology enables high-speed pulsed mode operation, providing significant benefits in certain applications such as drying and plasma generation. The technology also allows for a higher level of precision, performance, reliability and savings in electricity costs for running these generators. Elite RF engineers have designed microwave generators that deliver microsecond pulses of high power and can be customized for nanosecond pulse widths.

Safety: Safety is of paramount importance in any industrial operation. While magnetrons run on high dangerous voltage, solid-state systems run on lower voltage and have more safety locks enabled via software. An E-stop button for emergencies allowing swift shutdown of the system, and remote connections are available to synchronize the E-stop function with other parts of the system.

No Warm-ups or Cool-downs: Tube based magnetrons take several minutes to warm up and

reach higher power levels, while solid-state reaches peak power directly at system start.

With its powerful technology, Elite RF is designing more high-power microwave generators in other ISM bands of 433MHz and 915MHz. It boasts a plethora of features for system monitoring, auto adjustment of power, operational control with RS-232 and Modbus, and more, making it a standout choice for microwave generation in industry. Explore the full capabilities of the system at www.eliterfllc.com or reach out to sales@eliterf.com for more information.

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