Billions of Connections, One Solution

Skyworks has been enabling wireless connectivity for over a decade. However, given growing consumer demand for wireless ubiquity and the desire for anytime, anywhere access, there are billions of connections yet to be made.

With our high-performance analog semiconductors, Skyworks is linking people, places, and things across a growing number of markets and applications — bringing everyone closer to vital information wherever it is needed.

Skyworks is a global company with engineering, marketing, operations, sales and support facilities located throughout Asia, Europe and North America. For more information, please visit Skyworks’ website at www.skyworksinc.com.

A Leader in Advanced Technical Ceramics

Skyworks Solutions, through its wholly-owned subsidiary Trans-Tech, is an industry leader in technical ceramics. With over 60 years of experience, we offer a complete line of high quality, low-cost ceramic-based materials for a number of RF and microwave markets including wireless communications, infrastructure, military, cable television and broadband access. Our tightly controlled processes—from raw materials to forming, firing, finishing, assembly and test—produce the highest quality and the most consistently reproducible components available today for both low and high volume requirements. Our portfolio includes dielectric resonators and coaxial transmission line elements for dielectric resonator oscillator (DRO) and voltage-controlled oscillator (VCO) applications, ceramic bandpass filters, ferrite and garnet material for circulators/isolators, and advanced materials in technical powders or ingot form.

Dielectric and Magnetic Materials

About

Dielectric microwave materials are commonly assigned a loss tangent to permit an estimate of signal losses. However, ceramic dielectric resonators (DRs) operate at a specific frequency, in a specified geometry, which allow direct measurement and specification of Qu, the unloaded quality factor. Qu is a fundamental resonator parameter which is particularly appropriate (and more useful than loss tangent) for filter and oscillator applications.

Ceramics do not age perceptibly. Any change in the resonant frequency of a DR over time can be attributed to change in the measurement cavity or measurement technique. Ceramics don’t absorb moisture noticeably, but moisture condensation on the surface of the DR can affect Qu. The Qu will recover when the moisture is driven off, for example, by self-heating of the DR in a transmitter filter.

The Qu of ceramic resonators can be degraded by finger oils, pencil marking, tape, and a host of other contaminants. Cleanliness is important.
Dielectric and Magnetic Materials

Ceramics chip easily when they contact hard surfaces. Most tiny chips will not affect the electrical performance. Surface roughness is not particularly important either. There are no currents in a ceramic dielectric resonator, only stored energy in the form of fields.

Ceramics conduct heat much slower than metals. A large enough temperature gradient through a ceramic part can cause failure due to differential expansion. We call this thermal shock. Sudden application of heat on one side of a thick ceramic part invites fracture.

Adhesives used to mount DRs must be chosen carefully. Adhesives will always degrade a DR’s Qυ, but Skyworks has developed bonding systems to minimize Qυ loss while guaranteeing bond strength.

Dielectric Portfolio

Skyworks offers a broad range of ceramic materials which are not characterized for resonator applications, but for bulk, miscellaneous shapes, or substrates. For custom sizes and shapes, please contact us at rfceramics@skyworksinc.com.

Microwave Magnetic and Dielectric Materials for Ferrite Devices

We offer a wide range of materials, shapes and sizes that can be selected to optimize customers’ specifications. Because we design and manufacture from raw materials to finished parts, we can ensure the quality and reproducibility of our products in small to very high volume applications.

Features
- Wide variety of materials
- Wide range of shapes and sizes, including ferrite/dielectric assemblies
- High quality and reproducibility

Benefits
- Performance tailored for frequency and power level
- Reduced insertion loss
- Reduced intermodulation distortion (IMD)

Applications
For below resonance applications, our ferrite garnets and spinels offer a wide range of 4 πMs covering various frequencies. We also offer special garnets for power handling or very wide temperature ranges by substituting holmium or gadolinium, respectively, addressing ranges from about 1 to 40 GHz.

For above resonance applications, our garnets are available with narrow line widths and a wide range of magnetization, covering the range of 200 MHz to 3 GHz.
Dielectric and Magnetic Materials

General Characteristics

- Magnetic and dielectric losses are the subject of continuous improvement, and we offer the lowest possible values for any given composition.

- Our manufacturing processing and microstructure have been optimized to give the lowest possible intermodulation contribution from the ferrite material.

- We offer a range of dielectric materials for ferrite/dielectric composite assemblies, the most useful lying in the range 16 to 50 dielectric constant. Other special dielectrics are available. Applications include dielectric impedance transformers and tuning pieces.

- Our precision machining allows very tight tolerancing for precise device assembly.

For more information about all of our technical ceramic solutions, please visit us at www.skyworksinc.com/technicalceramics.