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 wide variety of materials available for antenna applications. These include our entire suite of dielectric materials (D-125, D-73XX, D-9000 and the MCT series), as well as hexagonal ferrites for high frequency magneto-dielectric antennas. We can also deliver an enhanced Co₂Z material when higher Q values for the 300–700 MHz range are required.

Specialty Materials

Dielectrics

Materials
- D-125
- D-73XX
- D-88XX
- D-9000
- MCT Series

Advantages
- Best miniaturization factor
- Good combination of miniaturization factor and Q
- Good Q (low loss)
- Permittivities extend to above RF
- Best above 1 GHz
- Long production history

Magnetics (Magneto-Dielectric)

Materials
- Z-Phase Hexaferrites (Ba₃MII₂Fe₂₄O₄₁) where MII = Mn, Mg, Zn, Co, Ni or Cu
- Y Type Hexaferrites (Ba₂MII₁₂Fe₁₂O₂₂) where MII = Mn, Mg, Zn, Co, Ni or Cu
- Enhanced Co₂Z: (TTZ-500 materials)
- Submicron to 100 mesh (powder form) or sintered

Advantages
- Good miniaturizing factors = (μ*ε)₁/₂
- Reducing field concentration
- Better impedance match (μ/ε = 1)
- Better in 100 MHz – 1 GHz range
- Good efficiency and bandwidth
Hexagonal Ferrites

Applications
Antenna, absorber, transformer and inductor applications for military and commercial markets

Features
- \((\text{Zn,Co})_2Z\) (TTZ-100)
  - Designed for 100 MHz antenna applications
- \(\text{Co}_2Z:K\) (TTZ-500)
  - Highest frequency resonance of any Z-phase material in the market
  - Designed for 500 MHz antenna applications
- \((\text{Sr-Co}_2\text{Y})\) (TTZ-1000)
  - Designed for up to 1 GHz antenna applications
- TT2-133
  - Optimized for 13.56 MHz medical RFID frequency

TTZ-100 and TTZ-500
The TTZ-100 is a composition based on the Z-type hexagonal ferrite material with permeability \((\mu') >13\) and a magnetic Q factor \((Q) (\mu'\mu'') >30\) (at 100 MHz) that is specifically designed for antenna applications around 100 MHz. The TTZ-100 may be supplied either in powder form with custom particle sizes, or as a sintered ceramic product with dimensions up to 4 x 4 inch squares.

The TTZ-500 is a composition based on the Z-type hexagonal ferrite material with permeability \((\mu') >7\) and a magnetic Q \((\mu'\mu'') >15\) (at 500 MHz) that is specifically designed for antenna applications around 500 MHz. The TTZ-500 may be supplied either in powder form with custom particle sizes, or as a sintered ceramic product in shapes with dimensions up to 4 x 4 inch squares.

Blends of the TTZ-100 and TTZ-500 are also available for applications in the intermediate frequency range. Although the TTZ-500 may be used for applications up to 800 MHz, the magnetic Q decreases with frequency. For applications below 100 MHz, the TT1 and TT2 series of spinels would be most suitable.

TTZ-1000
TTZ-1000 is a composition designed to provide greater magnetic Q at frequencies up to 1 GHz \((Q > 20)\).

TTZ-1000 is specifically designed for military and aircraft antenna applications with a high miniaturization factor and large bandwidth.
Antenna Solutions / Specialty Materials

Microwave Absorbers

We offer a number of oxide-based materials available for RF absorbers over a range of frequencies and temperatures. These materials are available as formed and fired ceramics, powders suitable for plasma spraying, as well as powders suitable for blending with polymeric materials.

**Spinels**

- **TT2-111R**: Suitable for broadband absorption below 500 MHz
- **Ferrite 50**: Suitable for broadband absorption from 800 MHz to 12 GHz
- **Custom Ferrites**: Narrow band materials for applications below 2 GHz

**Hexagonal Ferrites**

- **Co2Z**: Excellent absorber in the 1–5 GHz range
- **Substituted M Type Ferrites**: 
  \[ \text{BaFe}_{12-2x} \text{M_{II}} \text{Ti}_x \text{O}_{19} \] (M_{II} = Mn or Co)
  Select frequency bands in the 10–50 GHz range
- **Custom Hexagonal Compositions Available**
  - **Y Type**: \( \text{Ba}_2 \text{M}_{II} \text{Fe}_{12} \text{O}_{19} \)
  - **Z Type**: \( \text{Ba}_3 \text{M}_{II} \text{Fe}_{24} \text{O}_{41} \)
  - **W Type**: \( \text{BaM}_{II} \text{Fe}_{16} \text{O}_{27} \)
  - M_{II} = Mn, Mg, Zn, Co, Ni or Cu

**Hexagonal Ferrite-based Absorbers**

- Broadband absorption due to high-loss resonance peaks
- Can adjust resonant frequency (range of absorption frequencies) with different chemistry
  - Co2Z (1–10 GHz)
  - \( \text{BaFe}_{11} \text{Mn}_{1.5} \text{Ti}_{1.5} \text{O}_{19} \) M phase (>10 GHz)

**High Temperature Dielectric Absorber**

- **Now available**

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**Contact Us**

Find out how we can work together to provide you with high-performance solutions designed to meet your particular specifications by contacting us at rfceramics@skyworksinc.com

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