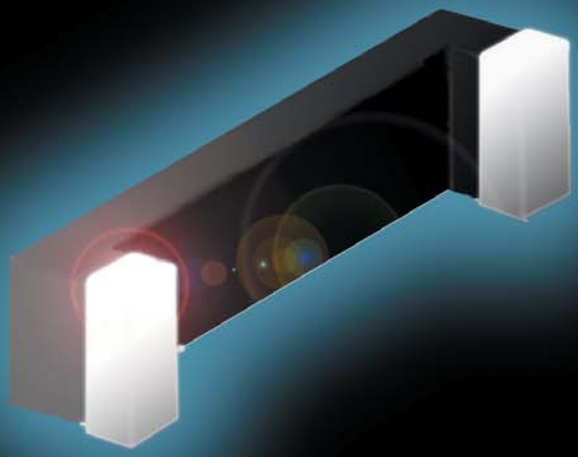
Ferrite cores for RFID transponders



FERROXCUBE
A YAGEO COMPANY

Introduction

Transponders are electronic devices capable of sending short RF messages upon request. These messages are commonly used to identify something where the transponder is attached, but can be used to send data as well. The term transponder comes from TRANSmitter/resPONDER.

There are many different types of transponders, depending on the final use of the transponder, and on the operating frequency. Low Frequency Magnetic Communication (below 500 kHz) commonly uses ferrite cores to increase the performance (and distance range) of the transponder.

Ferroxcube provides a wide range of ferrite cores fitting many of the existing market requirements, as well as years of experience in designing custom shapes for specific needs. New materials have been developed improving temperature stability and reaching higher permeability values. In addition, advanced features like metallized contacts or tighter tolerances on mechanical and electrical parameters are feasible.

Newly developed materials include 4B2 and 4B4 improving the temperature stability and robustness of the complete system thanks to their high density structure. Also 3B7 has been optimized for the transponder shapes.

Ferroxcube materials cover a wide range of needs, from temperature stability with α_F as low as 1 (from –40 to 85 °C) to high Q factor with tg δ/μ lower than 100×10^{-6} at 500 kHz. They are available in Nickel Zinc (4B1, 4B2, 4B4) high resistivity and Manganese Zinc (3C90, 3B7).

Special features

PVD metallized terminals on request.
Best adhesion ferrite-metallization-PCB.
High accuracy layer thickness and size of the footprint.
Low height metallization provides optimum Q factor.

Tightest length tolerance.
Absolute tolerance down to ± 0.1 mm.
Minimizes the spread in electrical properties.

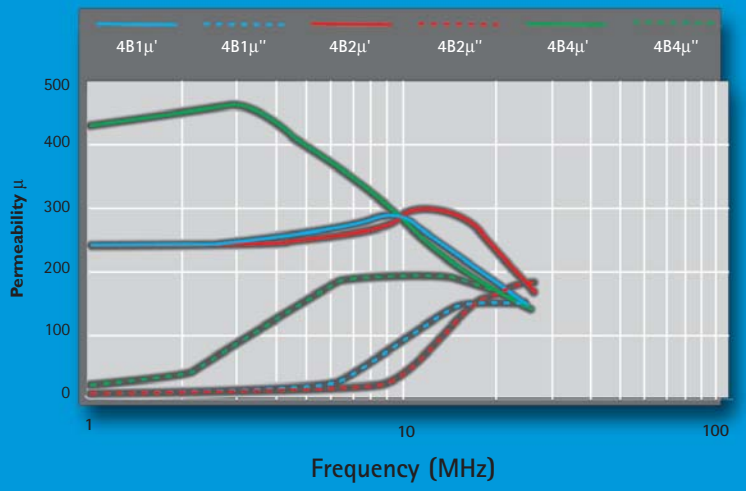
Advanced features

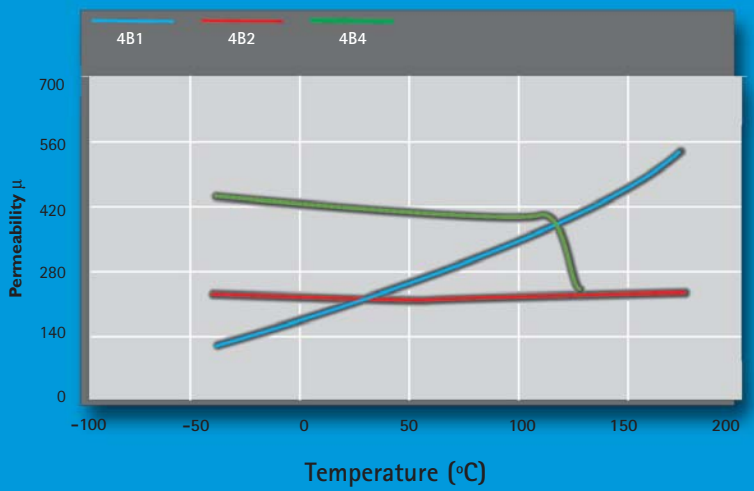
Diameter tolerance down to ±0.015 mm on ground rods.
Length tolerance down to ±0.2 mm on rods.
Inductance sorting out in groups of ± 1%.
Minimum rod diameter down to 0.3 mm.
Parylene-C coating on rods and other shapes.
Metallized terminals in Silver Palladium for SMD products.
Custom shapes available on request.

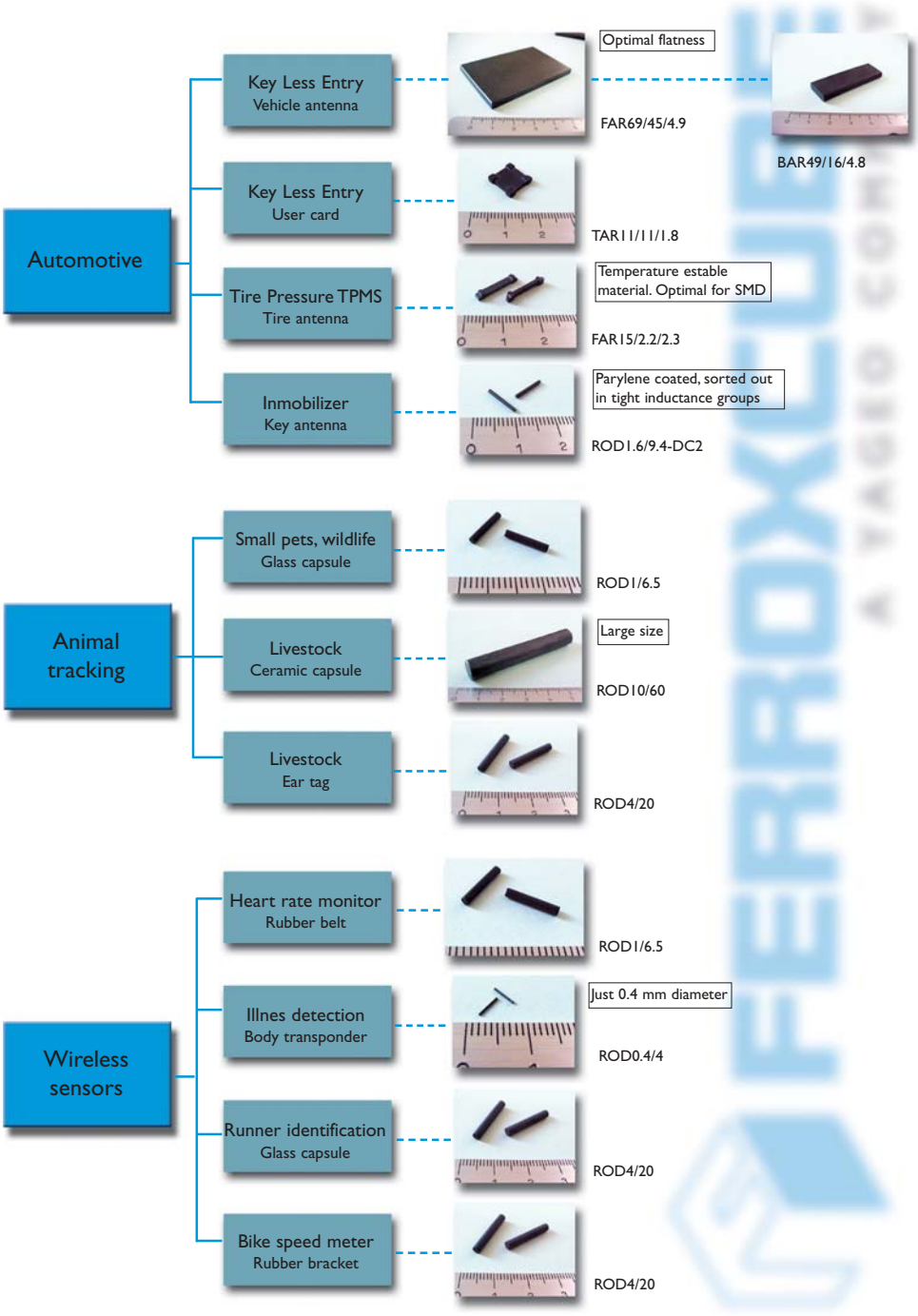
NiZn materials for high freq uncoated cores

		4B1	4B2*	4B4*
μ_i	25 °C; ≤10 kHz; 1mT	250 ± 20%	250 ± 20%	450 ± 20%
α_F (K^{-1})	-40 to 85 °C; ≤10 kHz; 1mT	≈25 x 10^{-6}	≈1 x 10^{-6}	≈0 x 10^{-6}
tg δ/μ_i	25 °C; 3 MHz; 1mT	<300 x 10^{-6}	<300 x 10^{-6}	<1000 x 10^{-6}
T_c (°C)		>250	>335	>115

* New!!







MnZn materials for high Q applications

		3C90	3B7
μ_i	25 °C; ≤10 kHz; 1mT	2300 ± 20%	2300 ± 20%
α_F (K^{-1})	20 to 70 °C; ≤10 kHz; 1mT	≈5 x 10^{-6}	<(0±0.6)x10^{-6}
tg δ/μ_i	25 °C; 500 kHz; 1mT	<100 x 10^{-6}	<100 x 10^{-6}
T_c (°C)		>220	>220