

- bending, vibration, mechanical shock, ... have no impact on magnetic performance
- flexible in shape
- very small volume
- low weight
- allow cost optimized system solutions



Today nearly every modern car has a remote key for opening, closing the car and starting the engine. More and more cars, especially the upper class, are equipped with a passive keyless entry / passive keyless go system. Main part of this system is an ID device (chip card ...) which is the interface to the car. With this card in the pocket, the car door opens by simply touching the door handle and the engine starts by pushing a button. The most common frequency for the communication from car to card is 125 kHz. Besides the ID card, a LF driver and a LF antenna system in the car are required.

Outside antennas have to cover the exterior areas and interior antennas are necessary for safe recognition of the identification device. Common designs are air coils and ferrite antennas. Having long experience on development and fabrication of different LF antennas, VACUUMSCHMELZE GmbH & Co KG recently developed antennas also for this application. Instead of a massive ferrite block few ultra thin layers (20 µm each layer) of amorphous metallic tape known as VITROVAC® are the heart of the antenna (patent pending). Antennas are available as flexible, semi flexible (on a stabilizing support) or rigid (in a case) design.

Some advantages of these antennas in comparison to existing solutions are:

- **Smaller height and less weight of antenna (typ. 6 mm / 30 g depending on casing requirement and design)**
- **Very high resistance against mechanical shocks**
- **Due to flexible design, easy integration into other components - the magnetic performance of the antenna is not influenced by bending**
- **Small temperature dependence of basic properties**
- **In summary flex antennas allow cost optimized system solutions**

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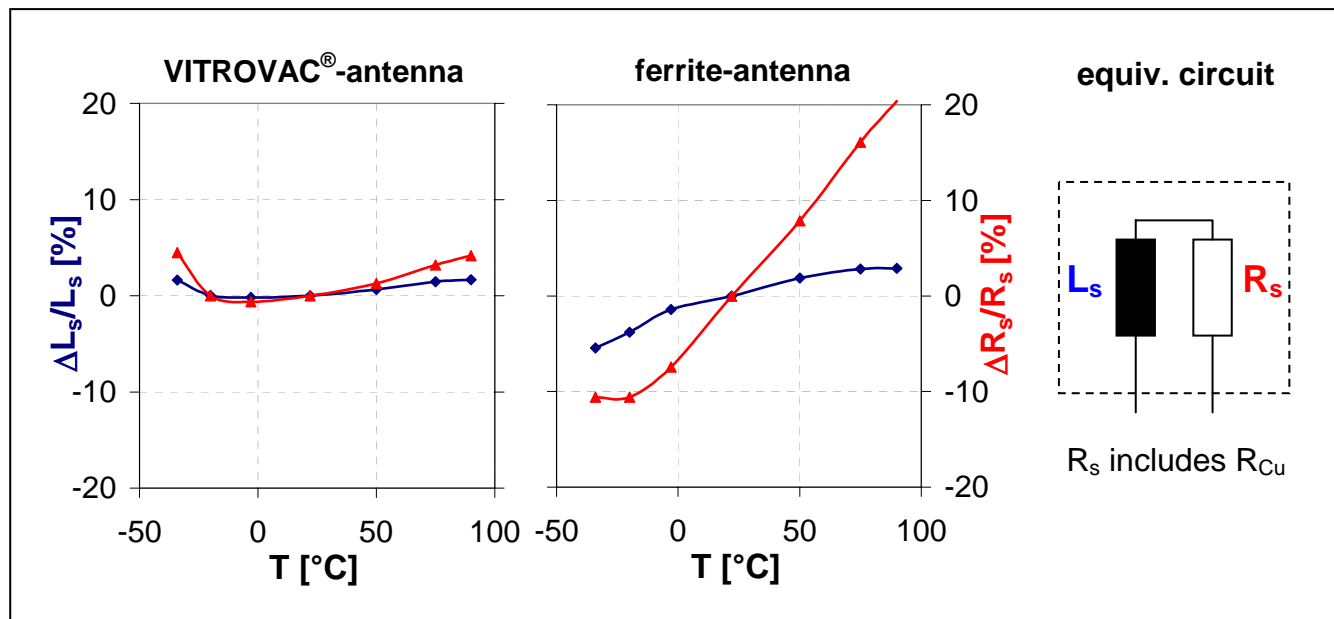
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Range of electrical, magnetic (at 125 kHz) and mechanical parameters:

- size (depending on working range and space):
length 50 – 300 mm, width 17-20 mm, minimum thickness 4 mm
- magnetic flux (determines working range): 0.1 – 10 μWb (typ. 1 μWb)
- Q-factor: 15 – 25
- electrical limits: typ. 100 V_{eff} (up to 1000 V_{eff} possible), several A_{eff}
- transmission power: variable in a wide range, typ. 10 – 100 W (pulsed)
- inductance L_s : variable in a wide range, typ. 0.05 – 1 mH
- linear (!) temperature coefficient of inductance: + 0.05 – 0.08 %/K
- working temperature: -40° - 85°C
- integrated connector or pig tail possible
- customized package available

Typical temperature behaviour of VITROVAC[®] antenna vs. Ferrite antenna

(both PU-moulded; blue curves L_s -change, red curves R_s -change relative to room temperature):



Prototypes are available on request – please consider our checklist!

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Checklist for antennas

- System frequency: /kHz
- Q-value (min for antenna):
- Maximum current Ipp (antenna):/A
- Maximum voltage Upp (antenna):/U
- Inductance incl. tolerance:/μH ±%
- Dimensions (length x width x height):x.....x.....mm
- connectors:
 - integrated connector: type:
 - pigtail type: length/mm
- Design:
 - flexible semiflexible rigid
- Outside antenna IP
- Interior antenna IP
- Temperature range: °C
- Price target: EUR/pc
- Demand: pcs/a
- SOP: month/year
- Remarks:

Contact :

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