

HfO₂-based FeRAM memories

ADVANCED NON-VOLATILE MEMORIES

+ WHAT IS FeRAM?

Memories are electronic components used for the temporary storage of data. There are two main categories of memories, stand-alone (e.g. USB key) and embedded memories. Nowadays, embedded solutions are gaining much interest and non-volatile memories appear as the prime choice. In fact, their ability to retain data, even when deprived of power supply, make them critical for many applications.

There are different categories of non-volatile memories. One of them is FeRAM —Ferroelectric Random Access Memory. FeRAMs provide key advantages:

- Low consumption: 10fJ/bit
- Fast and low voltage: <100ns and <3V
- High endurance: Up to 10¹⁵ cycles

+ APPLICATIONS

CEA-Leti can help industrial partners replace current, standard non-volatile memories with FeRAMs for several applications, including:

- Security and smart cards
- Edge AI

In the longer term, CEA-Leti can also help the following business segments migrate to FeRAMs:

- ICT
- Consumer and industrial goods
- Automotive

+ WHAT'S NEW?

Current FeRAMs are based on PZT material. However, these technologies have two drawbacks:

1. PZT contains lead—a material prohibited by European regulations
2. They are hardly extensive or scalable

To make sure FeRAMs operate at their full potential, CEA-Leti introduced a new material called HfO_2 —hafnium oxide. HfO_2 is changing the FeRAM paradigm by offering:

- Excellent CMOS compatibility
- Flexibility vs. perovskite materials
- Easy integration into a 3D-stacked capacitor

+ WHAT'S NEXT?

CEA-Leti's team has recently demonstrated 16kbit FeRAM functional arrays in 130nm and is now working towards a demonstrator using 28FDSOI technology. The goal is to have this demonstration achieved by end of 2022.

EUROPEAN PROJECT

3eFERRO



INTERESTED IN THIS TECHNOLOGY?

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