Abstract

The present paper illustrates the modelling and simulation of an Electrically Erasable
Programmable Read-Only-Memory (EEPROM) using COMSOL Multiphysics. The inbuilt stationary study computes the current voltage response of the device for both charged and uncharged cases of the floating gate. It is also illustrated herewith how time dependent studies on COMSOL Multiphysics are used to simulate the transient voltage pulses input at the control gate. It is also worth mentioning that EEPROM uses a FLOTOX (Floating Gate Tunnelling Oxide) device, which enables the pulses applied at the control gate to tunnel between the floating gate and the semiconductor material, thereby allowing storing or erasing a data. A write-erase cycle is performed, where the negative charges initially stored on the floating gate is subsequently removed by applying a high drain voltage and zero gate voltage. The model described here in the present paper is a single cell of an EEPROM, which has the capability to store only a single bit of data. As an extended version of this paper, many such cells can be connected together by using "enabling word lines" to simulate a large array of EEPROM. COMSOL Multiphysics provides us with a spice electrical circuit module which facilitates the connection of individual cells through nodes and terminals.

References

Index Terms

Computer Science  
Circuit And Systems

Keywords

Electrically Erasable Memory (EEPROM)  
Comsol Multiphysics  
Flotox ((Floating Gate Tunnelling Oxide))