

NON-VOLATILE MEMORY USING PYRAMIDAL NANOCRYSTALS AS ELECTRON STORAGE ELEMENTS

ABSTRACT

A non-volatile memory device includes a floating gate with pyramidal-shaped silicon nanocrystals as electron storage elements. Electrons tunnel from the pyramidal-shaped silicon nanocrystals through a gate oxide layer to a control gate of the non-volatile memory device. The pyramidal shape of each silicon nanocrystal concentrates an electrical field at its peak to facilitate electron tunneling. This allows an erase process to occur at a lower tunneling voltage and shorter tunneling time than that of prior art devices.

Fig. 6