

ABSTRACT OF THE DISCLOSURE

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TITLE OF INVENTION: ANTIFUSE ELEMENT AND METHOD FOR MANUFACTURING THE SAME

The present invention relates to an antifuse element, in particular an antifuse element having an antifuse layer formed between interconnection layers, and the manufacturing method. Conventionally, an antifuse layer was formed after an aperture was formed through an interlayer insulating film; which resulted in a thinner film thickness at the corner formed by inner wall surface of the aperture and lower electrode layer. As it is very difficult to control the film thickness of the thinnest part to a specific value, control of the insulation breakdown voltage in "off" state was difficult.

The present invention makes it easy to control the insulation breakdown voltage, at the same time suppresses the dispersion. The present invention also enables to control the polarity of the current/voltage characteristics, suppresses the leakage current, and avoids deterioration of the reliability in "on" state. The invented antifuse layer has a flat shape of an even thickness, and is comprised of a complexed film of amorphous silicon film, silicon nitride film and silicon oxide film. The antifuse electrode layer is of a titanium nitride, the film thickness of which is thicker than the invasion length of a fuse link into electrode layers. The step coverage of upper electrode layer is set to be higher than 80%, through control of the film thickness of the electrodes separating insulation film and the tapered shape of aperture in antifuse region.

Figure 1.