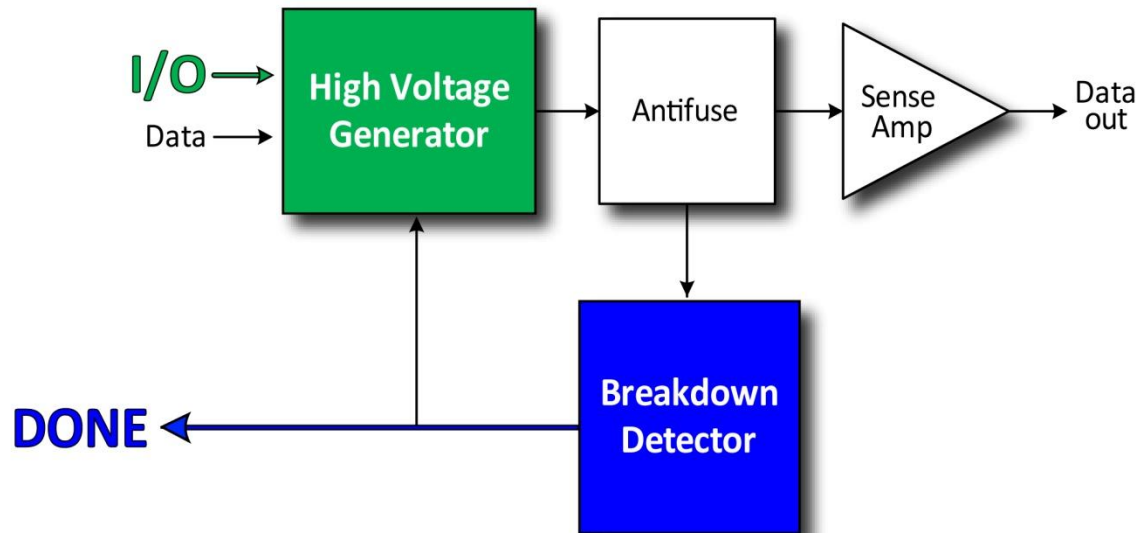


## Unique Patented SmartBit™ Cell



### Technology Description

Novocell's memory architecture features a unique patented SmartBit™ Cell which features dynamic programming of the bit cell. This design architecture represents the core Novocell technology and is not based on a 1T or 2T bit cell structure. This unique bit cell design enables Novocell's NovoBlox OTP (one-time programmable) and 2nTP (multi-time write antifuse) memory to be the only OTP with no external charge pump and a DONE signal that indicates completed programming. The High Voltage Generator and Breakdown Detector features of the SmartBit provide these advantages.

### Benefits

#### High Voltage Generator

- No external charge pump
- No extra programming pin
- Contains HV across antifuse - no stress to surrounding circuitry

#### Breakdown Detector

- Senses hard breakdown
- Eliminates tail bits
- Fab and Process independent

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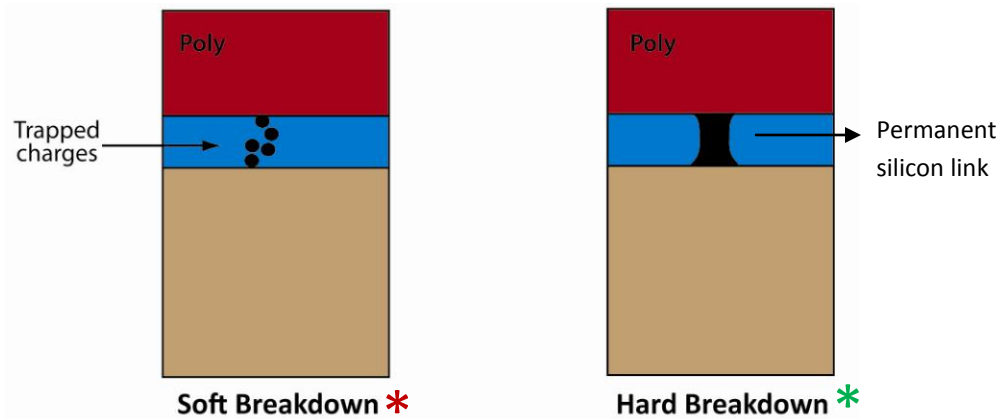
www.novocellsemi.com – info@novocellsemi.com

January 2011

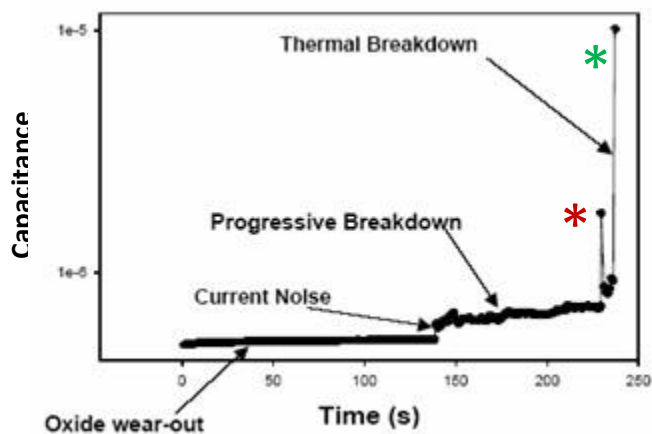
## Defining Soft and Hard Breakdown

**Soft Breakdown** describes the stage at which leakage current is significantly increased, but the oxide is not permanently broken down and a permanent leakage path is not created. This stage is most often achieved by *static* programming.

**Hard Breakdown** is an irreversible catastrophic breakdown of an oxide which creates a permanent conduction path. Novocell uses *dynamic* programming to guarantee that hard breakdown is achieved with every programmed bit.



## High Yield and High Reliability Gate to Channel Short



Felice Crupi, Robin Degraeve, Guido Groeseneken, Tanya Nigam, and Herman E. Maes, On the Properties of the Gate and Substrate Current after Soft Breakdown in Ultrathin Oxide Layers, *November 11, 1998*

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