

## High-Performance Analog Array (#3438)

*A large-scale field-programmable analog array for rapidly prototyping analog systems and an arbitrary analog waveform generator*

Georgia Tech inventors have developed a large-scale field-programmable analog array (FPAA) for rapidly prototyping analog systems and an arbitrary analog waveform generator. The large-scale FPAA includes a floating-gate transistor array and a plurality of computational analog blocks (CABs), which may be adapted to set bias voltages for operational transconductance amplifiers (OTAs), adjust corner frequencies on the capacitively coupled current conveyors, set multiplier coefficients in vector-matrix multipliers, and a variety of other operations. The floating-gate transistors may be used as switch elements, programmable resistor elements, precision current sources, and programmable transistors. Accordingly, the floating-gate transistors within the array allow on-chip programming of the characteristics of the computational elements, while still maintaining compact CABs. The arbitrary analog waveform generator may include programmable floating-gate MOS transistors for use as analog memory cells to store samples of the waveforms. The device does not require a new fabrication run, which saves months of development time.

### Benefits/Advantages

- Higher bandwidth circuits
- Retains reconfigurability
- High performance
- Small
- Timely

### Potential Commercial Applications

- High-performance analog signal processing systems

### Background/Context for This Invention

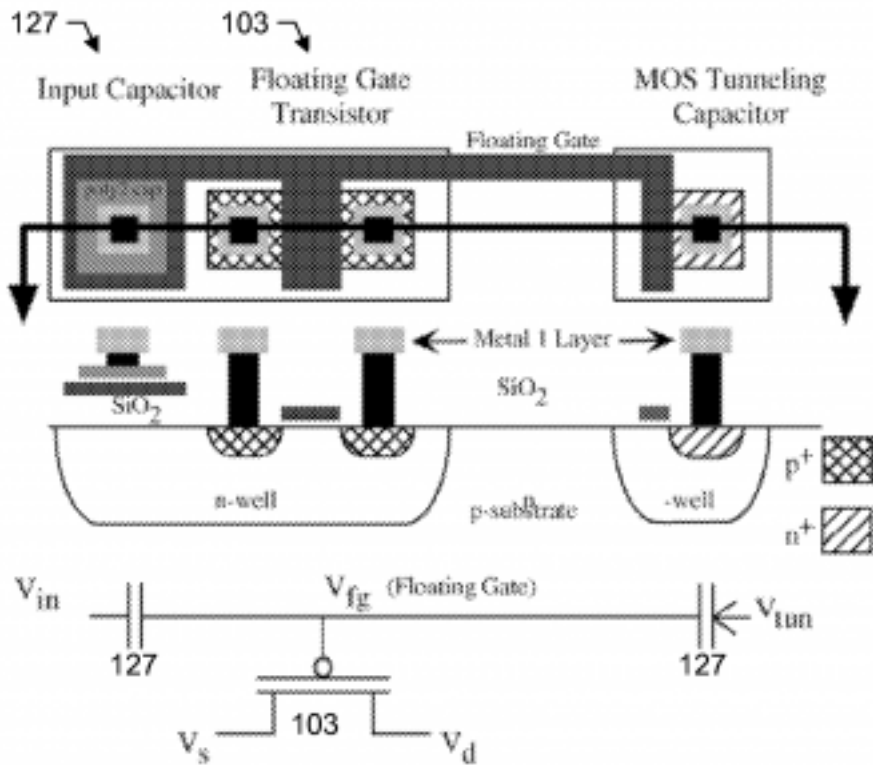
Even in today's world of digital electronics, it is often desirable, or even necessary to use and process analog signals. For example, most audio files, while typically stored in digital form such as MP3s and compact disks, must be converted to an analog signal in order to be heard through a speaker. Additionally, many other types of equipment depend on analog signals. Often it is desirable to process the analog signals, and it may even be desirable to store the analog signals electronically. Currently, circuits used for analog processing and storage have a long development cycle and are typically large. It would be useful to create analog circuitry that allows for flexible analog design in a compact package.

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**FIG. 4A**

**FIG. 4B**

**FIG. 4C**

For more information about this technology, please visit:

<https://industry.gatech.edu/technology/high-performance-analog-array>