Allegro™ MicroSystems uses the latest integrated circuit technology in combination with the century-old Hall effect to produce Hall-effect ICs. These are contactless, magnetically activated switches and sensor ICs with the potential to simplify and improve electrical and mechanical systems.

Low-Cost Simplified Switching

Simplified switching is a Hall sensor IC strong point. Hall-effect IC switches combine Hall voltage generators, signal amplifiers, Schmitt trigger circuits, and transistor output circuits on a single integrated circuit chip. The output is clean, fast, and switched without bounce (an inherent problem with mechanical switches). A Hall-effect switch typically operates at up to a 100 kHz repetition rate, and costs less than many common electromechanical switches.

Efficient, Effective, Low-Cost Linear Sensor ICs

The linear Hall-effect sensor IC detects the motion, position, or change in field strength of an electromagnet, a permanent magnet, or a ferromagnetic material with an applied magnetic bias. Energy consumption is very low. The output is linear and temperature-stable. The sensor IC frequency response is flat up to approximately 25 kHz.

A Hall-effect sensor IC is more efficient and effective than inductive or optoelectronic sensors, and at a lower cost.

Sensitive Circuits for Rugged Service

The Hall-effect sensor IC is virtually immune to environmental contaminants and is suitable for use under severe service conditions. The circuit is very sensitive and provides reliable, repetitive operation in close-tolerance applications.

Applications

Applications for Hall-effect ICs include use in ignition systems, speed controls, security systems, alignment controls, micrometers, mechanical limit switches, computers, printers, disk drives, keyboards, machine tools, key switches, and pushbutton switches. They are also used as tachometer pickups, current limit switches, position detectors, selector switches, current sensors, linear potentiometers, rotary encoders, and brushless DC motor commutators.

The Hall Effect: How Does It Work?

The basic Hall element is a small sheet of semiconductor material, referred to as the Hall element, or active area, represented in figure 1.

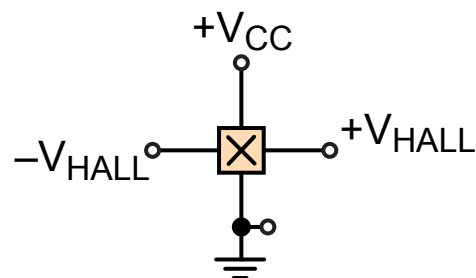A constant voltage source, as shown in figure 2, forces a

Figure 1. Schematic representation of the active area of a Hall-effect device, with the Hall element represented by the component marked with an X.

Abbreviated Contents