Automotive applications of TMR Magnetic Sensor technology

Magnetic sensors are used in vehicle detection, traffic management solutions, and automotive navigation applications. The high sensitivity, small size, and low power consumption of MTJ sensors makes them ideal for unobtrusive use in vehicle and traffic monitoring.

1. TMR sensor for vehicle detector

A magnetic vehicle detector is used to track a ferromagnetic object's movement by measuring change of geomagnetic field. The magnetic induction lines of geomagnetic field are distorted by the presence of a ferromagnetic object. The magnetic vehicle detector can sense this distortion of the geomagnetic field to determine whether or not ferromagnetic objects at nearby. Generally, automobiles, motorcycles, bicycles, trains, or ships and most other vessels and vehicles are composed of ferromagnetic materials in sufficient quantity to produce a strong distortion of the geomagnetic field, and their presence can be detected using MTJ magnetic sensors.

A MTJ magnetic vehicle detector is a kind of intelligent traffic data collection tool can use the geomagnetic field rather than an active sense coil. It can collect, analyze vehicle data in order to control crossing red lights, monitor vehicle speed, and monitor traffic flow. Because an MTJ sensor is small, low power, and can detect the geomagnetic field, they are ideal for the traffic application as they require no trenching for a large in-road sense coil. As networking technology becomes more ubiquitous I traffic applications, networked sensors will become more common. Because of their small size and low power, MTJ sensors are ideal for retrofitting old road surfaces of for embedding in new construction.

2. GPS navigation & monitoring system of highway

GPS vehicle tracking has become increasingly. There are a variety of business and consumer applications ranging from transportation to law enforcement to teen driving. Unfortunately, there are times when GPS is inaccurate or just not available. In these cases, it is helpful to use other means, to determine direction, which when coupled with speed can provide an estimate of position. This supplementary method is often referred to as “dead reckoning.” An eCompass with high sensitivity can provide this information.
The Earth is a giant magnet, and the geomagnetic field intensity of earth surface is about 0.5Oe. The geomagnetic field parallel to the Earth's surface points generally north. MTJ sensors can be combined in a small semiconductor package to accurately sense the direction of the geomagnetic field. The high sensitivity, low power consumption, and small size make these sensors very attractive for eCompass which can be used to assist GPS tracking applications.