Position Sensors for Brushless DC
Hall Switches and Angle Sensors for Highest Energy Efficiency

The market for electric motors is becoming increasingly dominated by brushless DC (BLDC) motors. These motors provide major advantages compared to conventional brushed motors: greater efficiency, longer life cycles, compact design, higher power density, less noise and improved reliability.

Powerful feedback sensors are required to sense the rotor position for efficient control. Our new generation of Hall Switches and angle sensors provide energy efficient and powerful motor control.

**Block Commutation**

![Diagram of Block Commutation](image)

**Benefits**

**Hall Switches**
- Reduction of system power consumption
- Reduced system size
- Removal of protection devices
- Reliable system operation
- Increased motor efficiency

**Angle Sensors**
- Highest efficiency due to precise position sensing
- Suitable for highly dynamic systems
- Failsafe sensor operation – self check
- Small form factor

**Application Fields of BLDC Motors**
- Pumps
- Fans
- Power & garden tools
- E-Bikes & scooter
- Power closing systems
- Home appliances
- Air conditioning systems
- Medical equipment

**Sensors**
- 3 Hall Switches

**Benefits**
- Easy implementation
- Significant efficiency improvement over brushed
- Failsafe operation
- Long lifetime
- Instant start-up

**Field Oriented Control**

![Diagram of Field Oriented Control](image)

**Sensor Implementation**
- One Angle Sensor
- End of shaft magnet

**Benefits**
- Highest efficiency
- Small form factor
- Continuous torque control
- Ripple free, silent operation
- Instant start-up
- Wear free operation

www.infineon.com/hall-switches
www.infineon.com/angle-sensors
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Hall Switches Key Features
- Small current consumption (1.6mA)
- 3.0V up to 32V operating supply voltage
- Reverse polarity protection (-18V)
- Active error compensation
- High ESD performance up to 7kV HBM
- Small SMD package SOT23
- Leaded package

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>ATV</th>
<th>Industrial</th>
<th>Package</th>
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<td>TLI4961-1M</td>
<td>2mT Latch</td>
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Angle Sensors Key Features
- Integrated MR (magneto resistive) technology
- Supply voltage 3.3 or 5.0V
- On chip temperature
- Integrated angle calculation and calibration
- Multiple interfaces for easy implementation
- Wide temperature range -40 to +150°C
- 8-pin SMD package (PG-DSO-8)

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<tr>
<td>TLE5009 Family</td>
<td>GMR Angle Sensor with analog output of sine-/cos-bridges</td>
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<tr>
<td>TLE5109 Family</td>
<td>AMR Angle Sensor with analog output of sine-/cos-bridges</td>
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<tr>
<td>TLE5012B Family</td>
<td>GMR Angle Sensor with integrated angle calculation and multiple selectable digital interfaces</td>
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