SENSOR SOLUTIONS

Designed for Applications In:

» AUTOMOTIVE   » INDUSTRIAL   » MEDICAL   » CONSUMER
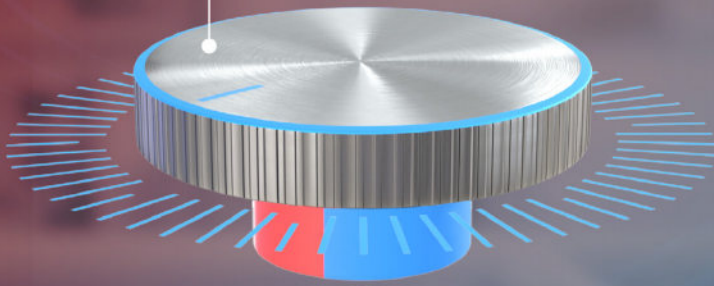
POSITION SENSING

MPS
MA600
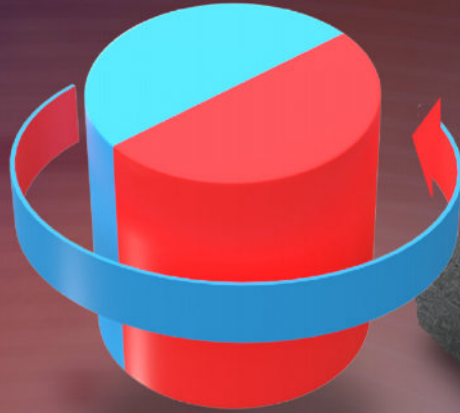
HMI

CURRENT SENSING

MPS

MPS

mps
MonolithicPower.com

VCC

Quality Assurance & Reliability Commitment

The MPS Quality Assurance organization develops, coordinates, and champions strategic quality initiatives throughout MPS Inc., its foundries, and subcontractors. Its mission is to enable MPS to design, develop, manufacture, and deliver products to our customers with world-class quality and reliability that meet and exceed our customers' expectations.

MPS and Its Supplier Quality Systems and Certificates:

- ISO9001:2008 (MPS)
- EU RoHS/HF/REACH Compliant (MPS)
- Sony Green Partner (MPS & Suppliers)
- TS16949 (Suppliers)
- ISO14001 (Suppliers)
- Current Sensor UL Certification # CA-11398-UL

Product Quality:

- Automotive Products Qualified per AEC-Q100 Standard
- Standard Products Qualified per JEDEC and Military Standards
- Reliability Failure Rate <10FIT
- Product Quality Level <1.0ppm

Quality Control and Monitoring:

- On-Site Foundry and Assembly Teams for Real-Time Actions
- Quarterly Supplier Quality Review and Annual Supplier Audit
- Short-Term Reliability Monitor Test – Daily
- Long-Term Reliability Monitor Test – Monthly
- Real-Time Engineering Actions on Monitor Failure
- Quarterly Reliability Monitor Reports

In This Guide

MagAlpha Position Sensors

Advantages of MagAlpha Angle Sensors:

» Instantaneous, Absolute Angle Sensing
» High Resolution
» Low INL as Low as 0.5° (0.1°) over Temp and Reflow
» High Bandwidth Up to 21kHz
» Factory Calibration Eliminates In-System Calibration
» Ideal for Battery-Powered Applications: <0.5µA Idle Current
» Smallest Footprint: UTQFN-14 (2mmx2mmx0.6mm)
» Flexible Sensor Location: End-of-Shaft (On-Axis) or Side-Shaft (Off-Axis)

MagAlpha sensors utilize an array of Hall plates that are sampled successively at very high speeds in such a way that the signal phase represents the angle to be measured. The "phase-to-digital" SpinAxis™ technique captures the angle instantaneously every 1µs without the need for traditional analog-to-digital conversion or arc tangent calculation. This means that the sensor is able to operate across a wider magnetic field range (typically 30mT to 150mT), giving greater flexibility and tolerance for magnet positioning.

The fast Hall sampling and subsequent digital conditioning result in very low latency, from Hall array sampling to the data availability at the sensor output. The typical latency is between 1µs to 8µs at a constant rotation speed, depending on the part number, allowing MagAlpha sensors to operate in systems with high rotation speeds, or in systems that require fast position control loops. Rotation speeds from 0rpm to more than 100,000rpm are possible.

Side-Shaft Capability

MagAlpha sensors support both end-of-shaft and side-of-shaft topologies. In end-of-shaft, the sensor is placed directly below the magnet connected to the rotating shaft. This topology offers the best performance, but is not always mechanically convenient because the end of a rotating shaft may not be accessible. For example, in a motor, it may be hidden by the shaft bearing, or driving into a gearbox.

Side-shaft topology allows the magnet to be placed to the side of a ring magnet, mounted on the rotating shaft. This is advantageous for many designs, as the ring can be located anywhere on the shaft, which allows the sensor to be embedded more easily within the motor or product casing. MagAlpha sensors include dedicated bias trimming registers for side-shaft applications. When the sensor is placed in a side-shaft configuration, the unique bias trimming enables the sensor to measure irregular magnetic fields and output a linear response across the full angle range without in-system calibration (see **Figure 1**).
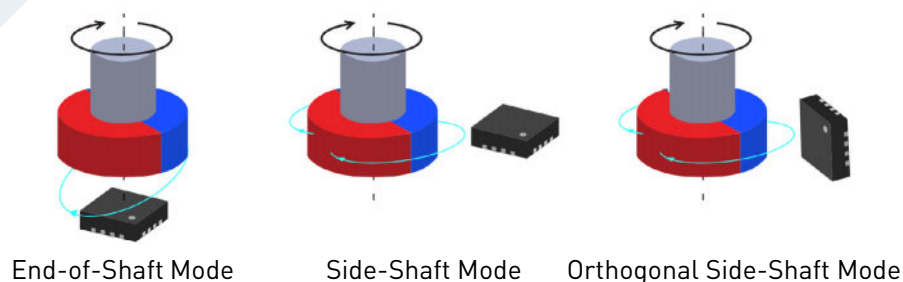

End-of-Shaft Mode   Side-Shaft Mode   Orthogonal Side-Shaft Mode

Figure 1: Magnet and Sensor Positioning

Current Sensors

Advantages of MPS Current Sensors:

» Complete Isolated Current Sensor in a Small SOIC-8 (5mmx6.2mm) Package
» Single IC Is Simple and Cost-Effective to Design In
» Ultra-Small QFN-12 (3mmx3mm) for Non-Isolated Applications
» Wide Current-Sensing Range from ±5A to ±50A, AC or DC
» Low Conductor Resistance for Low Power Loss: 0.9mΩ
» ±2.5% Accuracy over Temp, Factory-Trimmed
» Immune to Stray Magnetic Fields via Differential Sensing
» No Magnetic Hysteresis
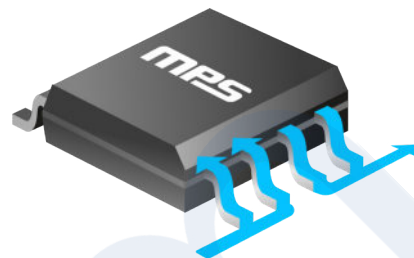
MPS current sensors integrate galvanic isolation, high-voltage continuous operation, and high-current sensing into a small, industry-standard SOIC-8 package. Our current sensors utilize an array of differential, linear Hall sensors that pick up the target induced magnetic field from the primary conductor while rejecting unwanted stray fields. This makes our current sensors ideal for use in magnetically noisy environments. In addition, the low resistance of the integrated conductor results in improved efficiency and reduced power loss compared to a traditional shunt resistor solution.

The low-resistance primary conductor allows current to flow near the sensor IC. The current generates a magnetic field, which is sensed at two different points by the integrated Hall sensors. The magnetic field difference between these two points is converted into a ratiometric voltage proportional to the applied current (see **Figure 2**). MPS's unique spinning current technique provides a low offset that remains stable across a wide temperature range.
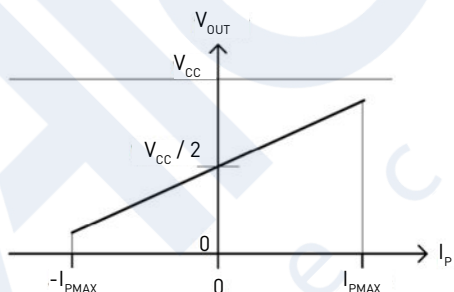
Figure 2: Output Voltage Proportional to Primary Current

The primary conducting leads are electrically isolated from the sensor leads on the secondary side, producing a sensor with a high isolation voltage and working voltage (see **Figure 3**). This makes our current sensors ideal for high-side current sensing without the need for expensive, large-footprint optical or inductive isolation alternatives.
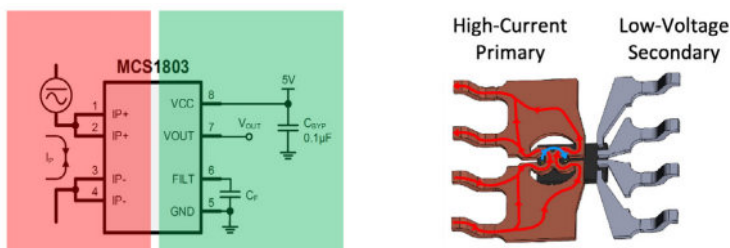
Figure 3: High-Voltage Isolation in Standard SOIC Package

Sensors for Motor Position/Speed Control and Current Sensors

Door Handle Position

HVAC Vents

Wipers

Air Intake

Headlight Level Adjust

Electronic Braking System

Tailgate Lift

Exhaust Control

Window Position

Seat Position

Mirror Angle

Infotainment / Car System Controls

Power Steering / Autonomous Driving
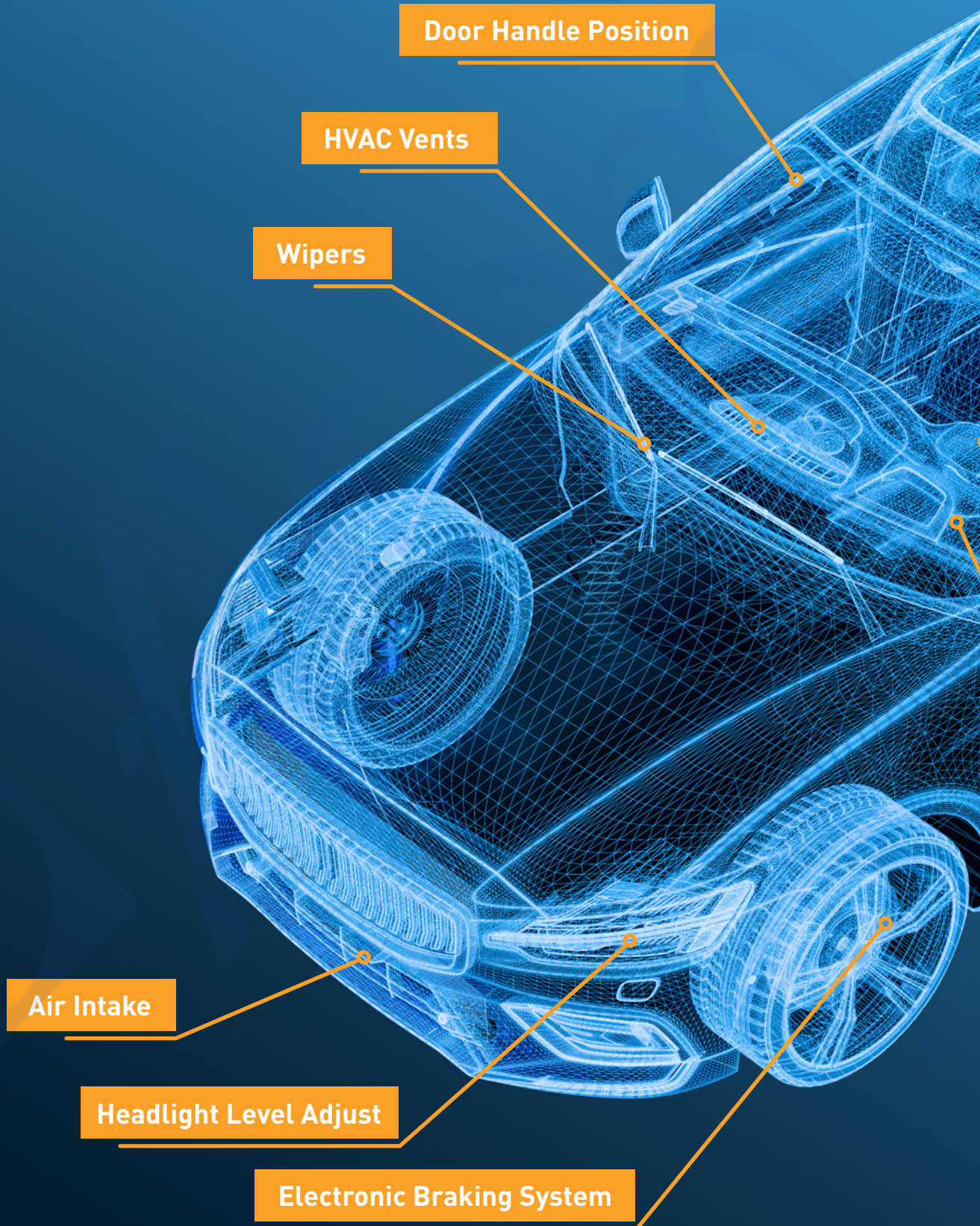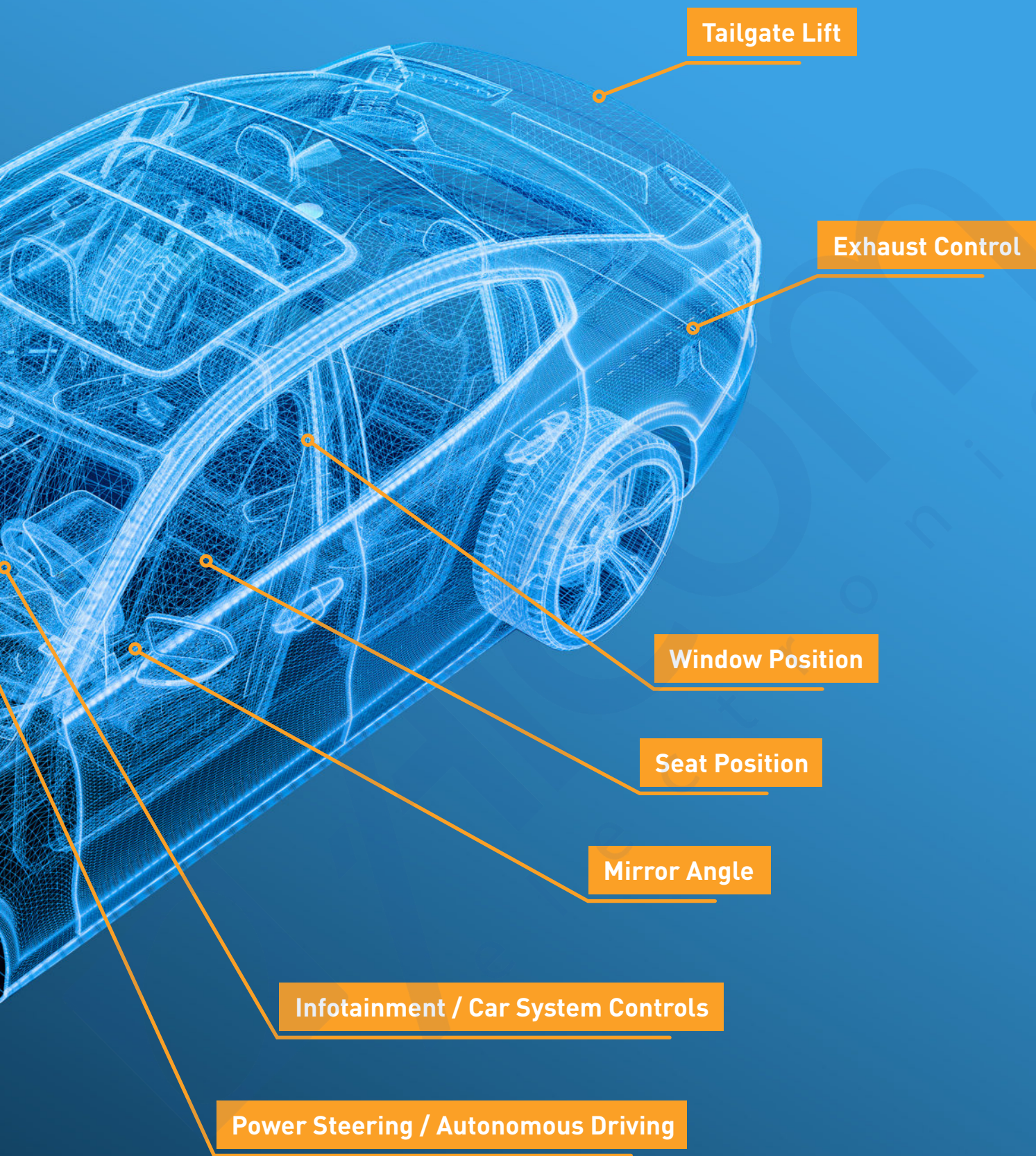
Body Electronics

» **Retracting Door Handles**
» **Tailgate Lifters**
» **Suspension Sensors**
» **Wiper Motors**
» **Spoiler Actuation**

Power Management

» **Precision, High-Current Sensing and Control:**
  - Wallbox Chargers
  - Qi Chargers
  - Power Monitoring Systems

Thermal Management

» Fluid Pumps
» Air-Grill Shutters
» Cooling Fan Modules

Interior Cabin Control and Car Audio

» Contactless Infotainment Consoles
» Audio Amplifier Current Sensing
» Contactless Gearshift Control
» Seat Position Motor Control
» Sunroof Motor Control

Power Steering

Replace Optical Sensors in Automotive Power-Assisted Steering (PAS)

MAQ430 and MAQ473

- » Motion Control and Position Sensing
- » Cost-Effective, Contactless Alternative to Optical Sensing
- » AEC-Q100 Grade 1 Qualified
- » Wide Operating Temperature Range: -40°C to +150°C

Simple to Use:
- » No Calibration
- » Simple Field Diagnostics
  - - Magnet Presence and Distance Detection

Driver Input

Sensors

Speed or Rotary Switch Input

Torque Sensor

Motor Gearbox

EPAS ECU

Motor Demand

Torque at input pinion is the sum of the motor output and driver input
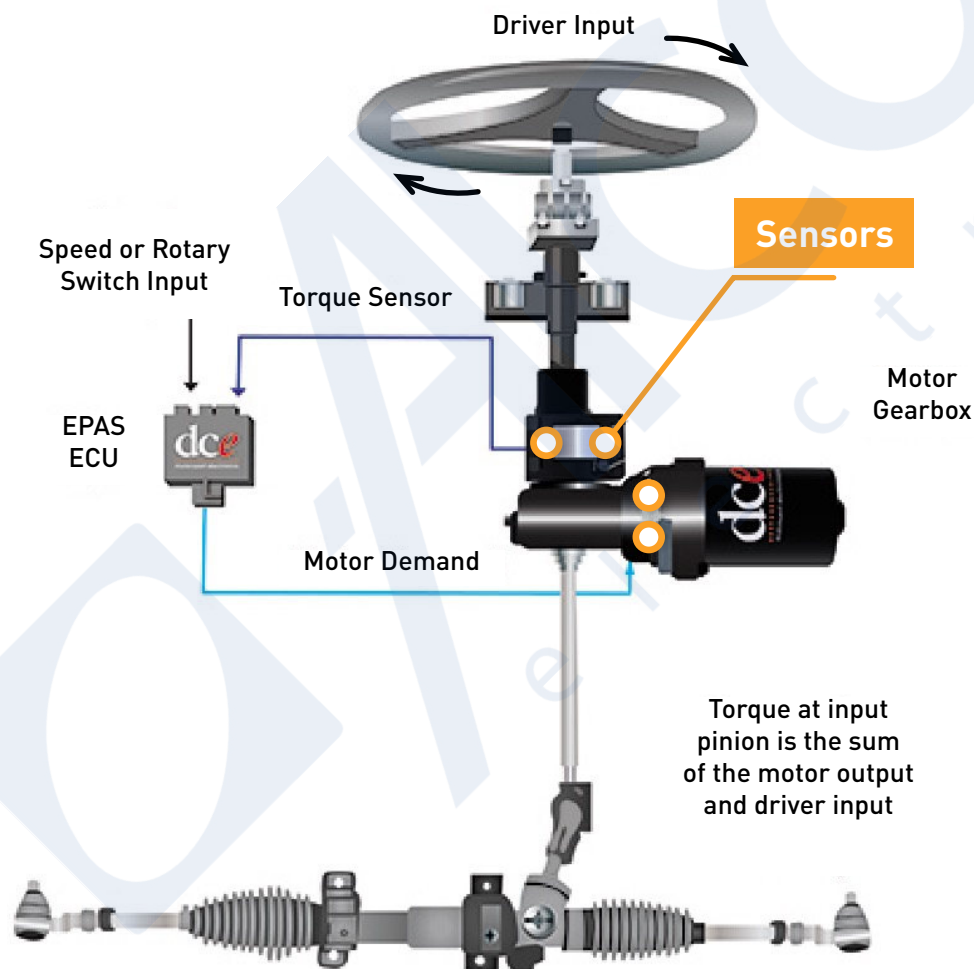
AUTOMOTIVE PRODUCT SELECTOR GUIDE

MagAlpha™ Magnetic Position Sensors

Part Number	±3σ Resolution	Interface	Supply Voltage (V)	Supply Current (mA)	Sensing Range (mT)	Cutoff Frequency (Hz)	Latency at Constant Speed (µs)	Magnetic Field Detection	Temperature Range (°C)	Wettable Flanks	Package	Notes
S MAQ600	14.5-bit	SPI, ABZ, PWM, UVW, SSI	3 to 3.6	7	20 to 200	21000	0	–	-40 to +125	✓	QFN-16 (3x3)	High-accuracy and BW, 0.5° (0.1°) INL, no speed error (zero latency)
MAQ430	12-bit	SPI, UVW, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	✓	-40 to +150	✓	QFN-16 (3x3)	Automotive angle sensor
MAQ470	12-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	✓	-40 to +150	✓	QFN-16 (3x3)	Automotive angle sensor
MAQ473	10-bit to 14-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	23 to 6k	8	✓	-40 to +150	✓	QFN-16 (3x3)	Automotive angle sensor, programmable filter
S MAQ800	8-bit to 12.5-bit	SPI, SSI	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	✓	-40 to +125	✓	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output
S MAQ820	9-bit to 13-bit	SPI, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	✓	-40 to +125	✓	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output
S MAQ850	8-bit to 12.5-bit	SPI, PWM	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	✓	-40 to +125	✓	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output

Coreless Integrated Current Sensors

Part Number	Current Range (A)	V_{CC} (V)	Over-Temp Accuracy	Temperature Range (°C)	Isolation Voltage (V_{RMS})	Working Voltage (V_{RMS})	Bandwidth (kHz)	Over-Current Detection	Primary Conductor Resistance (mΩ)	UL Certification	Package	Notes
S MCQ1806	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	3000	500	100	–	0.9	✓	SOIC-8	AEC-Q100, 5A to 50A range, analog output, immune to external magnetic fields
S MCQ1823	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	100	–	120	✓	0.6	✓	QFN-12 (3x3)	AEC-Q100, bidirectional and unidirectional sensing, analog output, immune to external magnetic fields

MagVector™ 3D Magnetic Position Sensors

Part Number	Data Length	Interface	Supply Voltage (V)	Supply Current (mA)	Sensing Range (mT)	Conversion Time (µs)	Temperature Range (°C)	Package	Notes
S MVQ300	12-bit	I²C, SPI	3.3	10nA to 2.5	±125 or ±250	40	-40 to +125	TSOT23-6	3D magnetic sensor, digital component output, selectable operation mode

N - New Product   S - Sampling Product

INDUSTRIAL BUILDING & FACTORY AUTOMATION

Safety & Security

- » **Access Control**
- » **Automated Doors**
- » **Smart Door Locks**
- » **Elevators and Escalators**
- » **Fire Prevention**

Sensor Solutions
Q1 2023

Power Management

» Solar Inverters
» Power Monitoring
» Power Access
» Light Monitoring

Thermal Management

» Cooling
» Fluid Pumps
» Valve Control

Climate & Energy Efficiency

- » **Shutters and Blinds**
- » **HVAC – Compressors, Blowers, Flow Control**
- » **Climate Control – Thermostat**

Product Highlight

Smart Shades

MA732, MA330, MA735, MA736, MA782

- » Motor Commutation and/or Position Feedback
- » Provides Absolute Feedback
- » Operates with a Low-Cost Magnet
- » Works with All Types of Motors
- » Can Be Operated at Side-Shaft or End-of-Shaft Locations
- » Ideal for Space-Constrained Applications
  - – MA735, MA736, MA782: UTQFN (2mmx2mm) Package
- » MA782 Is Ideal for Battery-Powered Applications
  - – Includes Wake-Up on Angle Detection
  - – 0.5µA Standby Current

Sensor

Industrial Automation
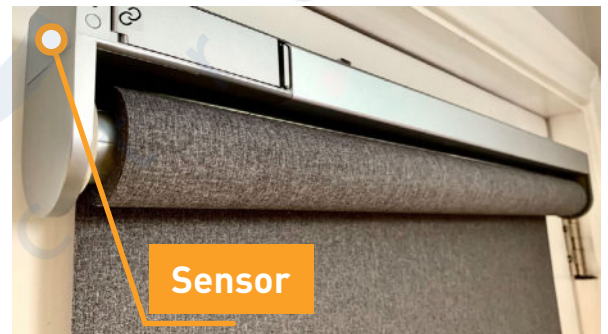
Product Highlight

Precision Robotic Joint Control

MA600

» 0.5º INL over Temp
» <0.1º INL after User Calibration with On-Chip 32-Point Lookup Table
» 11-Bit to 15-Bit Low Latency Resolution
» 21kHz Bandwidth
» Zero Latency to Minimize Speed Errors
» No Calibration Required

Cost-Effective Solution for Managing:
» High-Speed Torque
» Position
» Speed Control

Sensors

MEDICAL TECHNOLOGY

Lab Automation
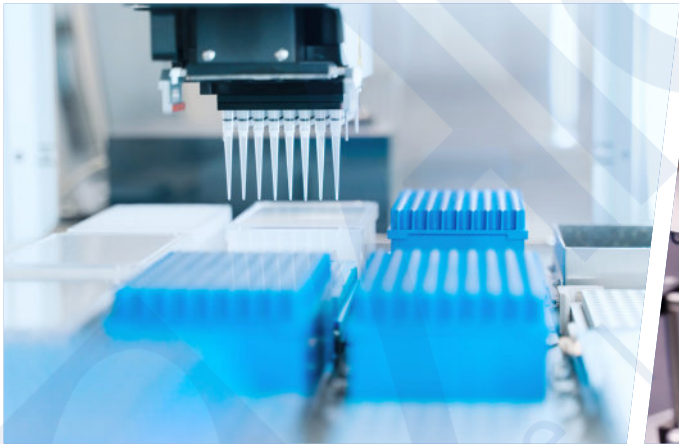
» **Robot Control**
» **Probe Processing**
» **Pump Motor Control**

Surgical Robotics

» **Automated and Remote Surgical Robots**
» **Dental Processing**

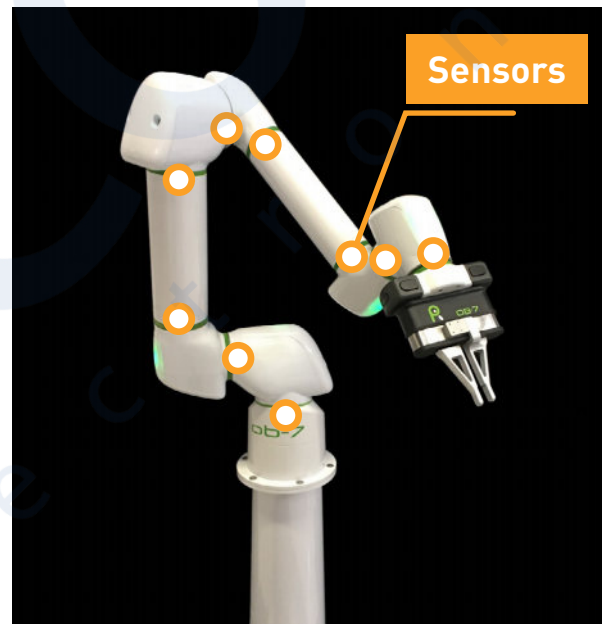## Surgical Robotics

MA600

» 0.5º INL over Temp
» <0.1º INL after User Calibration with On-Chip 32-Point Lookup Table
» 11-Bit to 15-Bit Low Latency Resolution
» 21kHz Bandwidth
» Zero Latency to Minimize Speed Errors
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Cost-Effective Solution for Managing:
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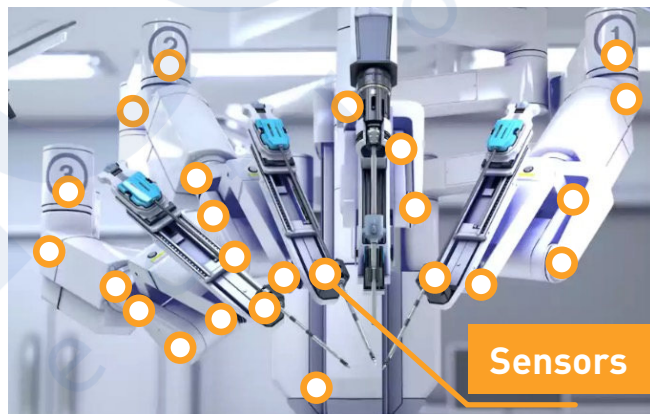
Sensors

Automated Motorized Equipment

» **Ventilators and Respirators**
» **Insulin and Fluid Pumps**
» **Medical Beds**

Product Highlight

Hospital Beds

MA732, MA735, MA736

» Hospital Bed Comfort Controls and Locomotion Assist Motors
» Absolute Position Feedback Control
» 14-Bit Resolution
» Ideal for Space-Constrained Applications
  - MA735, MA736: UTQFN (2mmx2mm) Package

Flexible Interface:
» SPI for Digital Angle Readout and Configuration
» Incremental 12-Bit ABZ Quad Encoder with Programmable PPT from 1 to 1024
» 14-Bit PWM

Sensors
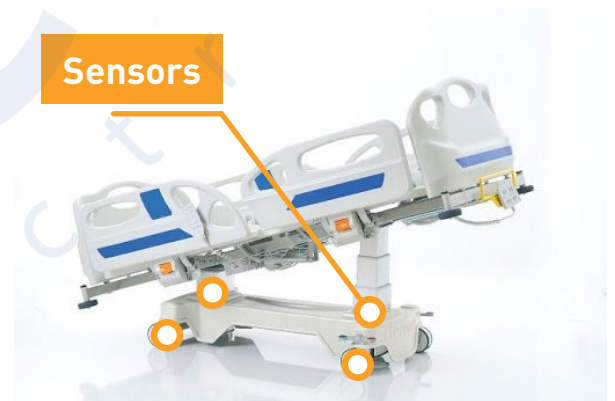
CONSUMER PRODUCTS

Mobile Phones & Laptop Computers

- » Foldable Mobile Flip-Phone Angle Management
- » Foldable Tablet Angle Sensing
- » Precision Open/Close Angle Management

No-Bezel Laptops and Foldable Phones

MA782

- » Smallest Open/Close Detection Solution
- » Helps Minimize or Eliminate Bezel
- » Can Be Placed in the Folding Axis
- » Smallest UTQFN (2mmx2mm) Package
- » Lowest Power: <0.5µA Standby Current
- » Wake-On-Change Angle Detection
- » Very Small (<1mmx1mm) Magnet
- » Provides Absolute Angle Output

Battery-Powered Hand Tools

Power Tool BLDC Motor: Replace 3 Hall Switches with 1 MagAlpha

MA102

- » Eliminate Mechanical Alignment with Stator
- » Better Phase Alignment = Higher Torque and Improved Efficiency
- » Reduce Part Count by Up to 70%
- » Reduce PCB Size by Up to 70%
- » Increase Mechanical Flexibility
- » UVW Output Means No Firmware Change
- » Wide -40°C to +125°C Operating Temp Range

Hall Elements | MA102

Before   After

Reduce PCB Size by Up to 70%
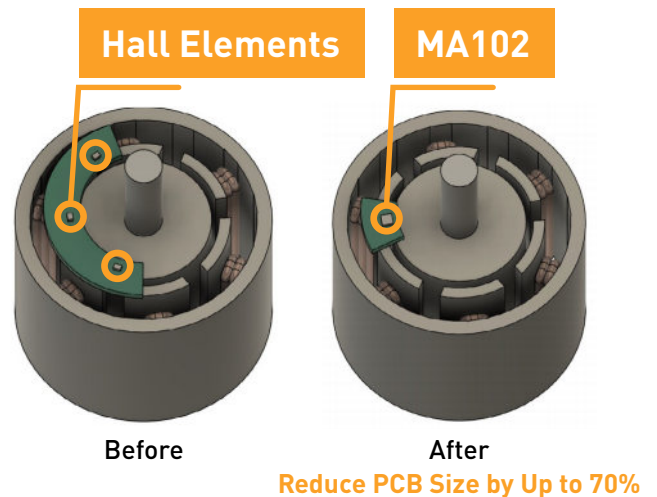
E-Bikes & Scooters

» **BLDC Motors – Smaller, Lighter, Increased Reliability**

» **Enables Highest Power Density**

» **Provides Absolute Angle, Position, and Torque**

Flexible Interface:

» **SPI Commutation for UVW Commutation**

» **ABZ Speed Control**

Product Highlight

E-Bike Ultra-Small BLDC Motors

MA302

» Speed, Torque, and Absolute Position Control

» Smallest QFN (3mmx3mm) Package

» No Customer Calibration Required

» Factory Calibrated

» On-Chip Non-Volatile Memory (NVM)

» Wide -40°C to +125°C Operating Temp Range

» Flexible Interface

- SPI for Digital Angle Readout and Sensor Configuration
- ABZ/UVW for Motor Control, Commutation, and Incremental Output
- No Firmware Changes Required when Replacing Optical Encoders; ABZ Output is Compatible with Optical Outputs
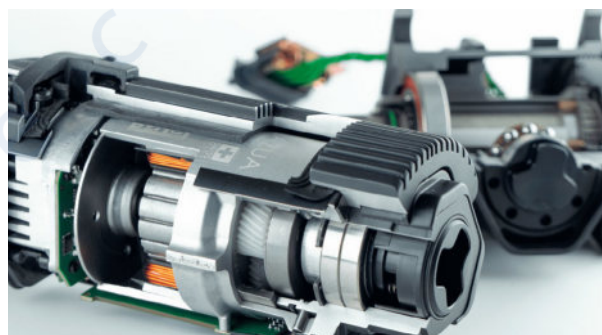
COMPREHENSIVE PRODUCT SELECTOR GUIDE

CORELESS INTEGRATED CURRENT SENSORS

	Part Number	Current Range (A)	V_{CC} (V)	Over-Temperature Accuracy	Temperature Range (°C)	Isolation Voltage (V_{RMS})	Working Voltage (V_{RMS})	Bandwidth (kHz)	Over-Current Detection	Primary Conductor Resistance (mΩ)	UL Certification	Package	Notes
S	MCS1805	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	3000	500	120	✓	0.9	Pending	SOIC-8	Coreless, 5A to 50A range, analog output, immune to external magnetic fields
N	MCS1806	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	3000	500	100	-	0.9	✓	SOIC-8	Coreless, 5A to 50A range, analog output, immune to external magnetic fields
N	MCQ1806	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	3000	500	100	-	0.9	✓	SOIC-8	AECQ-100, coreless, 5A to 50A range, analog output, immune to external magnetic fields
N	MCS1823	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	100	N/A	120	✓	0.6	✓	QFN-12 (3x3)	Bidirectional and unidirectional sensing, analog output, immune to external magnetic fields
S	MCQ1823	±5, ±10, ±20, ±30, ±40, ±50	3.3, 5	2.5%	-40 to +125	100	N/A	120	✓	0.6	✓	QFN-12 (3x3)	AEC-Q100, 5A to 50A range, analog output, immune to external magnetic fields
	MCS1800	±12.5, ±25	3.3	3%	-40 to +125	1000	200	100	-	1.2	-	SOIC-8	Analog output, immune to external magnetic fields
	MCS1801	±12.5, ±25	5	3%	-40 to +125	1000	200	100	-	1.2	-	SOIC-8	Analog output, immune to external magnetic fields
	MCS1802	±5, ±10, ±20, ±30, ±40, ±50	3.3	2.5%	-40 to +125	2200	250	100	-	0.9	✓	SOIC-8	Analog output, immune to external magnetic fields
	MCS1803	±5, ±10, ±20, ±30, ±40, ±50	5	2.5%	-40 to +125	2200	250	100	-	0.9	✓	SOIC-8	Analog output, immune to external magnetic fields

N - New Product   S - Sampling Product

Sensor Solutions
Q1 2023

POSITION SENSOR MAGNETS

Part Number	Magnetization	Geometry	Material	OD (mm)	ID (mm)	Height (mm)	Air Gap Min (mm)	Air Gap Max (mm)	Radial Tolerance (mm)	Notes
MAG10-2C-30.25	Diametrical	Cylinder	NdFeB, Grade N35SH	3	-	2.5	0	2	0.1	-
MAG10-2C-40.25	Diametrical	Cylinder	NdFeB, Grade N35SH	4	-	2.5	0	2.6	0.2	Standard-size, cost-effective
MAG10-2C-50.25	Diametrical	Cylinder	NdFeB, Grade N35SH	5	-	2.5	0	3.1	0.2	Standard-size, cost-effective
MAG10-2C-60.25	Diametrical	Cylinder	NdFeB, Grade N35SH	6	-	2.5	0	3.6	0.3	-
MAG10-2C-80.25	Diametrical	Cylinder	NdFeB, Grade N35SH	8	-	2.5	0	4.5	0.4	-
MAG10-2R-50.12.25	Diametrical	Ring	NdFeB, Grade N35SH	5	1.25	2.5	1	1.4	0.4	Accurate application
MAG10-2R-60.15.25	Diametrical	Ring	NdFeB, Grade N35SH	6	1.5	2.5	1.3	1.6	0.6	Accurate application
MAG10-2R-80.20.25	Diametrical	Ring	NdFeB, Grade N35SH	8	2	2.5	2	2.5	0.8	Accurate application
MAG10-2B-40.25	Axial	Half-Cylinder	NdFeB, Grade N35SH	4	-	2.5	0	2.1	<0.1	Low field emission
MAG10-2B-50.25	Axial	Half-Cylinder	NdFeB, Grade N35SH	5	-	2.5	0	2.7	<0.1	Low field emission
MAG10-2B-60.25	Axial	Half-Cylinder	NdFeB, Grade N35SH	6	-	2.5	0	3.2	<0.1	Low field emission
MAG10-2B-80.25	Axial	Half-Cylinder	NdFeB, Grade N35SH	8	-	2.5	0	4.2	0.1	Low field emission

MagVector™ 3D Magnetic Position Sensors

Part Number	Data Length	Interface	Supply Voltage (V)	Supply Current (mA)	Sensing Range (mT)	Conversion Time (µs)	Temperature Range (°C)	Package	Notes
S **MV300**	12-bit	I²C, SPI	3.3	10nA to 2.5	±125 or ±250	40	-40 to +125	TSOT23-6	3D magnetic sensor, digital component output, selectable operation mode

N - New Product   **S** - Sampling Product

MagAlpha™ Magnetic Position Sensors

Part Number	±3σ Resolution	Interface	Supply Voltage (V)	Supply Current (mA)	Sensing Range (mT)	Cutoff Frequency (Hz)	Latency at Constant Speed (µs)	Temperature Range (°C)	Package	Notes
MA102	12-bit	SPI, UVW	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	-40 to +125	QFN-16 (3x3)	Motor commutation angle sensor, UVW multi-pole pair, differential outputs
MA302	12-bit	SPI, UVW, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	-40 to +125	QFN-16 (3x3)	Motor commutation angle sensor, 12-bit SPI output, ABZ & UVW incremental outputs
MA310	12-bit	SPI, UVW, ABZ	3 to 3.6	11.7	15+ (No Upper Limit)	93	8	-40 to +125	QFN-16 (3x3)	Motor commutation angle sensor, 12-bit SPI output, low magnetic field
MA330	10-bit to 14-bit	SPI, UVW, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	23 to 6k	8	-40 to +125	QFN-16 (3x3)	Motor commutation angle sensor, up to 14-bit SPI output, programmable filter
MA702	12-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	-40 to +125	QFN-16 (3x3)	12-bit SPI output, ABZ incremental & PWM outputs
MA704	10-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	2970	8	-40 to +125	QFN-16 (3x3)	12-bit SPI output, high BW, ABZ incremental & PWM outputs
MA710	12-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	15+ (No Upper Limit)	93	8	-40 to +125	QFN-16 (3x3)	12-bit SPI output, low magnetic field, ABZ incremental & PWM outputs
MA730	14-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	40+ (No Upper Limit)	23	8	-40 to +125	QFN-16 (3x3)	14-bit SPI output, ABZ incremental & PWM outputs
MA732	10-bit to 14-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	23 to 6k	8	-40 to +125	QFN-16 (3x3)	Programmable filter, ABZ incremental & PWM outputs
MA734	8-bit to 12.5-bit	SPI	3 to 3.6	11	30+ (No Upper Limit)	95, 380, 95000	3	-40 to +125	QFN-16 (3x3)	Programmable filter, low latency
Ⓝ MA735	9-bit to 13-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	40+ (No Upper Limit)	23 to 6k	8	-40 to +125	UTQFN-14 (2x2)	Ultra-small footprint, programmable filter, ABZ incremental & PWM outputs
Ⓝ MA736	8-bit to 12.5-bit	SPI	3 to 3.6	11	30+ (No Upper Limit)	95, 380, 95000	3	-40 to +125	UTQFN-14 (2x2)	Ultra-small footprint, programmable filter, low latency
MA800	8-bit	SPI, SSI	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for HMI applications
MA820	8-bit	SPI, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for HMI applications
MA850	8-bit	SPI, PWM	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for HMI applications
Ⓝ MA600	15-bit	SPI, ABZ, PWM, UVW, SSI	3 to 3.6	7	10 to 150	21000	0	-40 to +125	QFN-16 (3x3)	High accuracy & BW, 0.5° (0.1°) INL, no speed error (zero latency)
Ⓝ MAQ600	15-bit	SPI, ABZ, PWM, UVW, SSI	3 to 3.6	7	10 to 150	21000	0	-40 to +125	QFN-16 (3x3)	High accuracy & BW, 0.5° (0.1°) INL, no speed error (zero latency), wettable flanks

Ⓝ - New Product　　Ⓢ - Sampling Product

MagAlpha™ Magnetic Position Sensors

Part Number	±3σ Resolution	Interface	Supply Voltage (V)	Supply Current (mA)	Sensing Range (mT)	Cutoff Frequency (Hz)	Latency at Constant Speed (µs)	Temperature Range (°C)	Package	Notes
MA780	8-bit to 12-bit	SPI	3 to 3.6	0.5µA to 10	30+ (No Upper Limit)	5 to 160k	4 to 4000	-40 to +125	QFN-16 (3x3)	Optimized for low-power, integrated wake-up and IRQ
MA782	8-bit to 12-bit	SPI	3 to 3.6	0.5µA to 10	30+ (No Upper Limit)	5 to 160k	4 to 4000	-40 to +125	UTQFN-14 (2x2)	Ultra-small footprint, integrated wake-up and IRQ
MAQ430	12-bit	SPI, UVW, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	-40 to +150	QFN-16 (3x3)	Automotive angle sensor, wettable flanks
MAQ470	12-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	390	8	-40 to +150	QFN-16 (3x3)	Automotive angle sensor, wettable flanks
MAQ473	10-bit to 14-bit	SPI, SSI, PWM, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	23 to 6k	8	-40 to +150	QFN-16 (3x3)	Automotive angle sensor, programmable filter, wettable flanks
(S) **MAQ800**	8-bit to 12.5-bit	SPI, SSI	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output, wettable flanks
(S) **MAQ820**	9-bit to 13-bit	SPI, ABZ	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output, wettable flanks
(S) **MAQ850**	8-bit to 12.5-bit	SPI, PWM	3 to 3.6	11.7	30+ (No Upper Limit)	90	4000	-40 to +125	QFN-16 (3x3)	Optimized for automotive HMI applications, SSI output, wettable flanks

N - New Product   **S** - Sampling Product