

Magnetic sensor

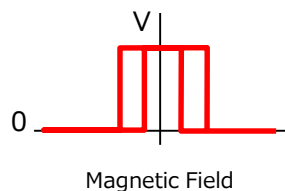
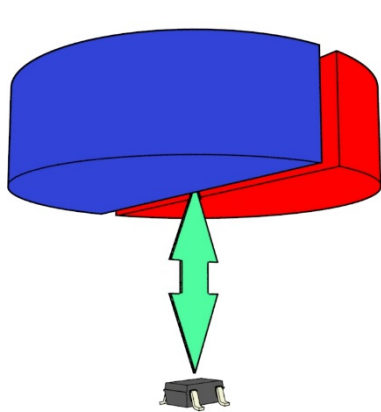
Variety

Open/close , rotation and position detection, etc., there a wide variety.

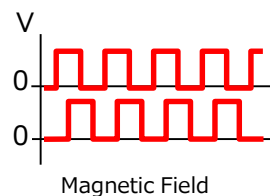
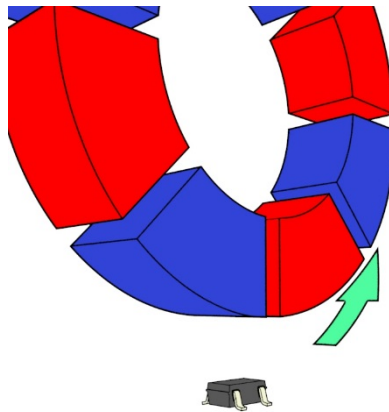
High performance

It has high sensitivity, small dispersion in the characteristics, good temperature characteristic and low current consumption.

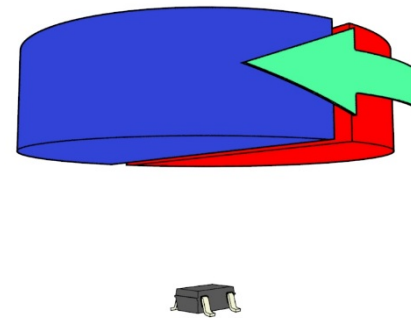
Switch



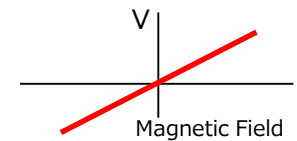
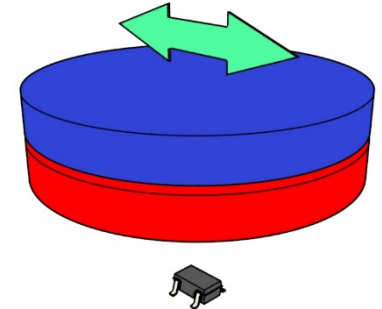
Latch



Rotation angle

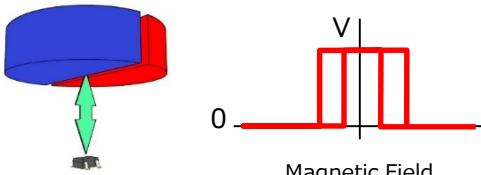
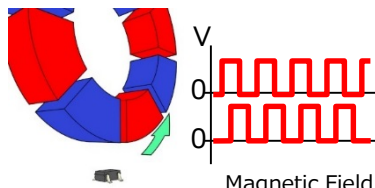
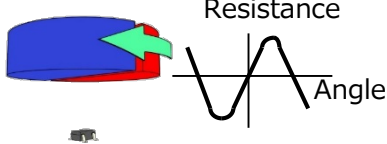
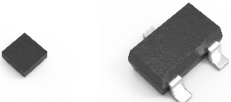
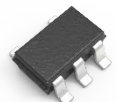
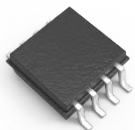


Linear position



Variety

ALPS

Type	Digital output						Analog output		
	Switching			Single phase	Dual phase	Single phase	Dual phase		
P/N	HGDE/HGDF		HGDVST	HGDFPA	HGPFPT	HGPRDT	HGARA		
									
Photo									
Supply voltage	1.6-3.6V 4.5-5.5V		3-30V	4.5-5.5V	4.5-5.5V	3-30V	1.5-5.5V	~5.5V	
Output	Single polarity/ Single output	Dual polarity/ Single output	Dual output/ Dual output	Single polarity/ Single output	Dual polarity/ Single output	Latch	Encoder	Liner	SIN/COS
Operating magnetic field	2mT		2mT	0.6mT	+/-1mT	+/-1mT	-	-	
Operating temp.(°C)	-40 ~ +85		-40 ~ +140	-40 ~ +85	-40 ~ +85	-40 ~ +140		-40 ~ +105	
Features	SMT			Snap-in DIP		Magnetizing pitch free	±30° range	0~360°	

Magnetic sensor

Analog output type



Product Line

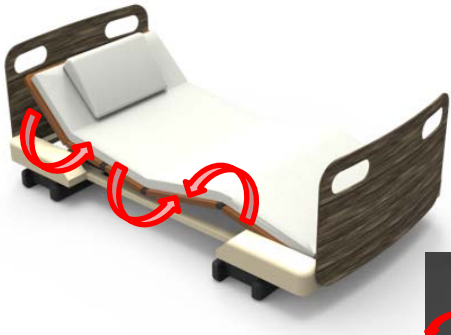
Part number	Photo	Type	Size	Drive voltage	Average current consumption	Bridge resistance
HGARAM001A		Linear	2.0×1.5×0.625mm	1.5 to 5.5V	0.3mA (3V applied voltage, Duty 100%)	-
HGARAP001A		Angle (Sin/Cos)	2.95×4.0×1.1mm	5.5V max.	- 	1.75kΩ
HGARAN008A		Angle (Sin/Cos)	1.8×1.05×0.65mm	5.5V max.	- 	5kΩ

Analog output type : Applications

HGAR Series

Healthcare

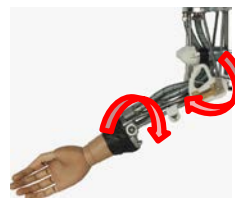
Nursing Bed



Wheelchair



Artificial arm



Prosthetic foot



Automotive

Steering Angle



Shifter



Mobile

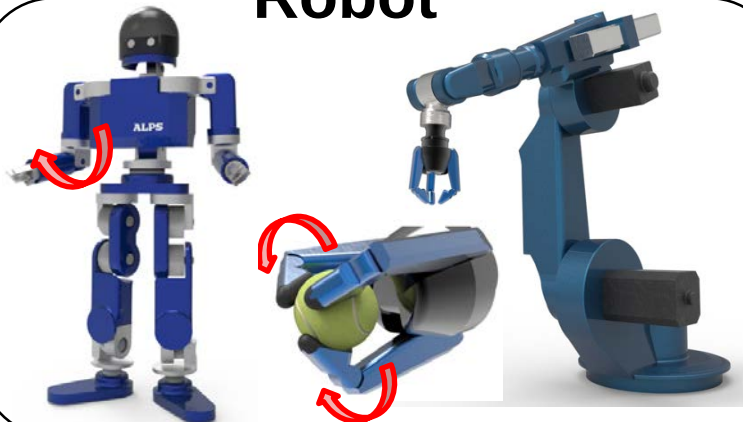
Smart Phone/
Smart Watch



Note PC



Robot



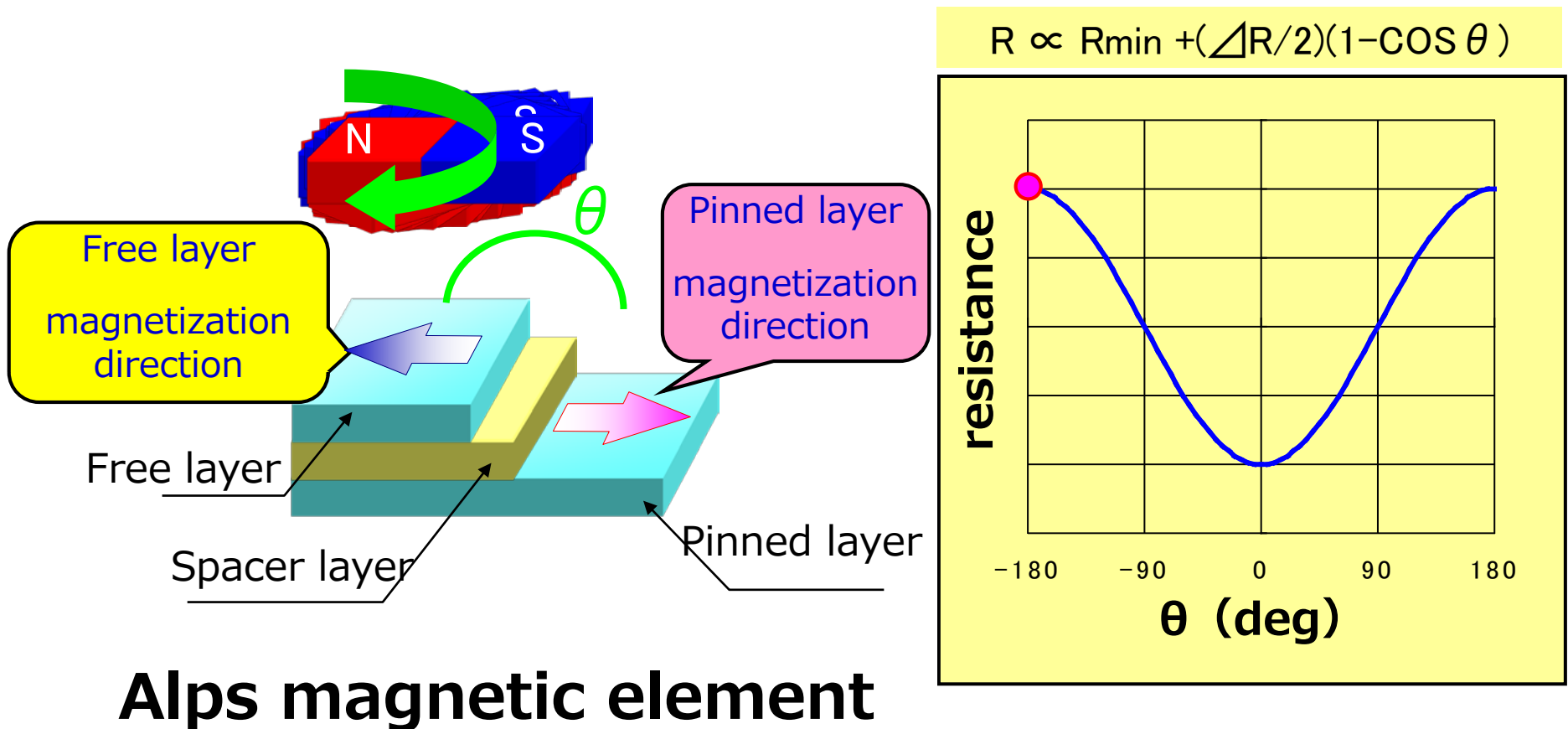
Home Appliance



Analog output type

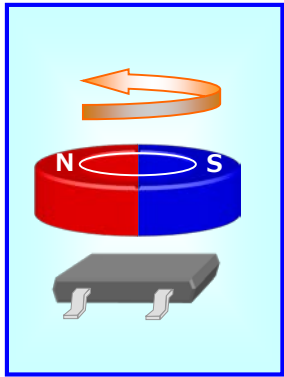
■ Operating principle (animation)

- Free layer direction to follow the magnetic field. Pinned layer does not move.
- Resistance value changes in the relative angle of the free and pinned layers.
- Consequently, it can detect the direction of the magnet from the resistance value.

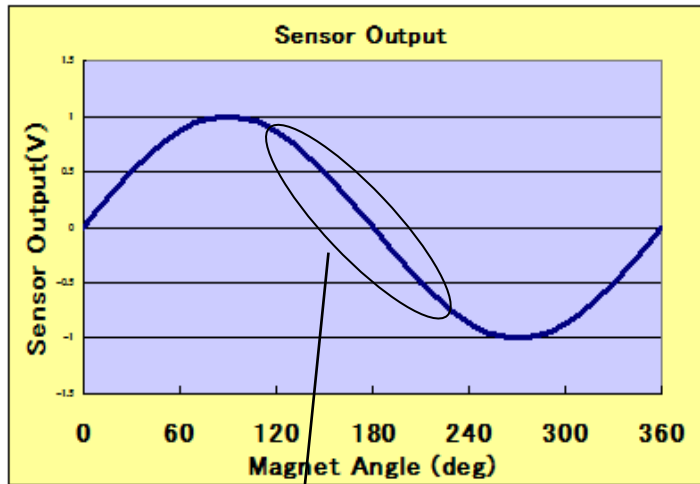


Alps magnetic element

Analog angle detection sensor

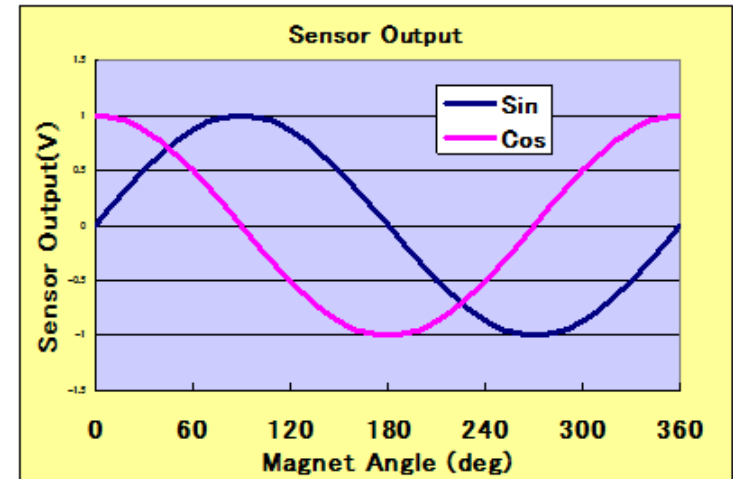


Single phase type

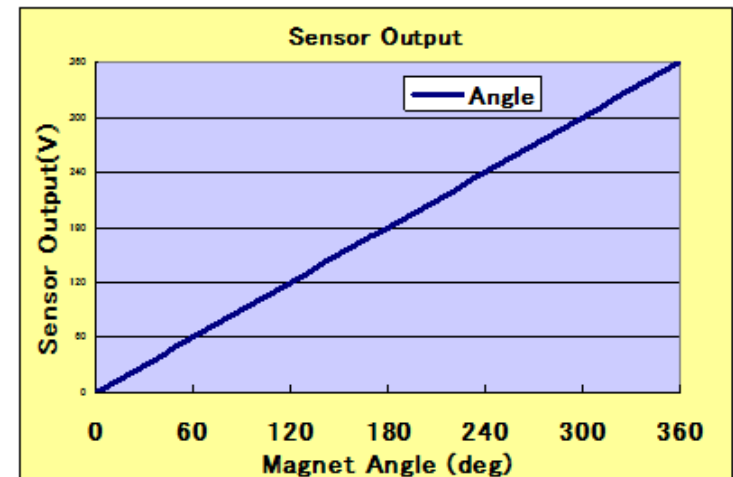


Using a liner region
($\pm 30^\circ$ range)

Dual phase type



↓ Sin/Cos (ATAN) calculation



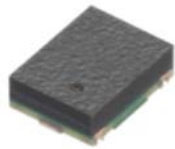
Depending on the detection angle range, it is possible proposed one-phase or two-phase sensor system.

Magnetic sensor

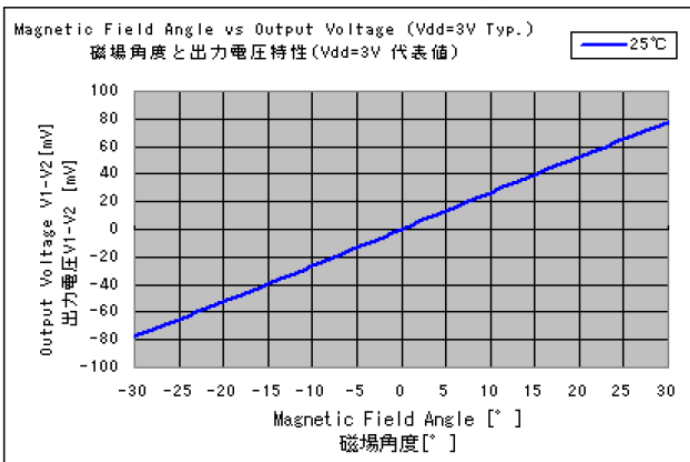
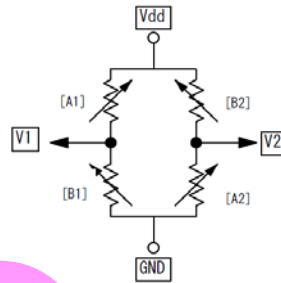
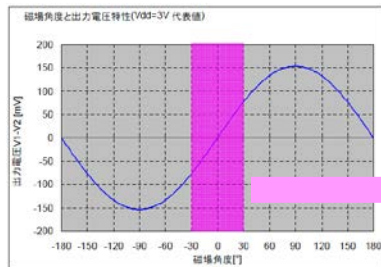
Analog output Single output type

Analog output sensor suitable for the position detection and high-accuracy absolute angle detection.

HGARAM001A Linear type



2.0×1.5×0.625 mm



Features

- Analog output sensor suitable for the position detection
- Linear type

Specifications

Parameters	Specifications
Size	2.0×1.5×0.625 [mm]
Supply Voltage	1.5 ~ 5.5 [V]
Operating Temp	-40 to +115 [deg.C]
Current consumption	0.3mA (VDD3V、Duty 100%)
Output voltage Typ.	±75mV (VDD3V, rotation±30°)

Applications

Mobile

Smartphone, Note PC, Smart watch

Home Appliance

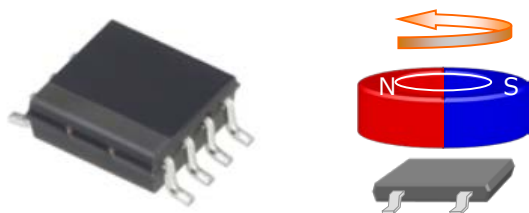
Refrigerator, washing machine, air conditioner

Magnetic sensor Analog output SIN/COS dual phase output type

ALPS

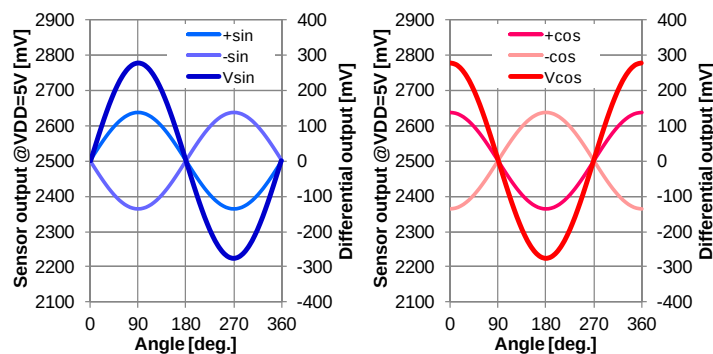
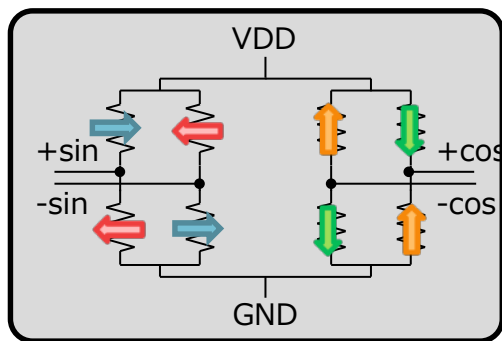
HGARAP001A

Angle(Sin/Cos) type



2.95×4.0×1.1 mm

Package type: MSOP-8



Around 550mVpp @VDD=5V

Features

- 2 directions & 2 full bridges
- Analog Output (+sin, -sin, +cos, -cos)
- MSOP-8 package

Specifications

Parameters	Specifications
Size	2.95 x 4.0 x 1.3 [mm]
Supply Voltage	up to 5.5 [V]
Operating Temp	-40 to +105 [deg.C]
Operating magnetic field	20 to 60 [mT] *
Each Element Resistance	typ. 3.5kOhm @RT
Bridge Resistance	typ. 1.75kOhm @RT
Thermal Characteristics (TCR)	max. 1600ppm/deg.C
Thermal Characteristics (TCΔR)	min. -3900ppm/deg.C

Applications

Healthcare

Nursing Bed, Wheelchair, Artificial arm, Prosthetic etc.

Robot

Automotive

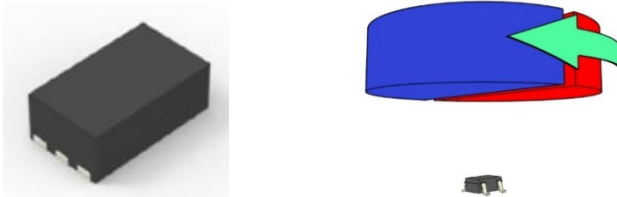
Steering Angle, Shifter



Magnetic sensor Analog output SIN/COS dual phase output type

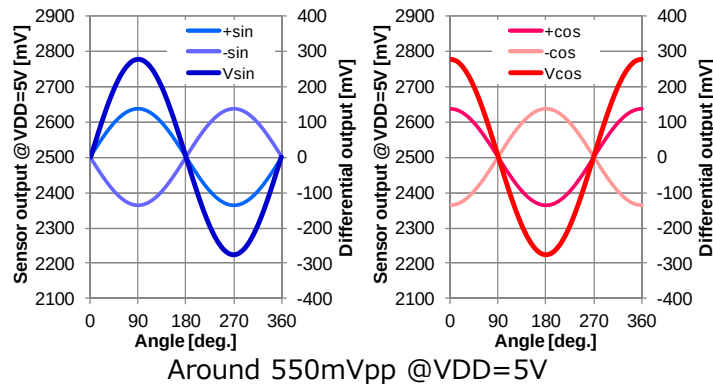
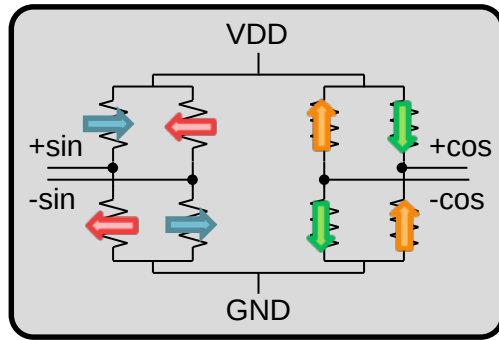
HGARAN008A

Angle(Sin/Cos)



1.8×1.05×0.65 mm

Package type: DFN1810



Features

- Dual phase output & 2 full-bridges (+sin, -sin, +cos, -cos)
- Small package, DFN1810
- Low current consumption, 5kΩ bridge resistance
- High layout flexibility

Specifications

Parameters	Spec
Dimensions	1.8 x 1.05 x 0.65 [mm]
Supply voltage	up to 5.5 [V]
Operating temperature range	-40 to +105 [deg.C]
Operating magnetic field range	20 to 60 [mT]
Element resistance	typ. 10kOhm @RT
Bridge resistance	typ. 5kOhm @RT
Thermal Characteristics (TCR)	max. 1600ppm/deg.C
Thermal Characteristics (TCΔR)	min. -3900ppm/deg.C

Applications

Healthcare

Nursing Bed, Wheelchair, Artificial arm, Prosthetic etc.

Robot

Automotive

Steering Angle, Shifter



https://www.alps.com/prod/info/J/HTML/Sensor/Magnetic/HGAR/HGAR_list.html

Product Line

Part number	Photo	Type	Size	Drive voltage	Average current consumption	Bridge resistance
HGARAM001A		Linear	2.0×1.5×0.625mm	1.5 to 5.5V	0.3mA (3V applied voltage, Duty 100%)	-
HGARAP001A		Angle (Sin/Cos)	2.95×4.0×1.1mm	5.5V max.	-	1.75kΩ
HGARAN008A		Angle (Sin/Cos)	1.8×1.05×0.65mm	5.5V max.	-	5kΩ

ALPS VIDEOS

https://www.youtube.com/watch?v=AQKoO0X_wJM

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