

## GHS Series

### Graphene Hall Effect Magnetic Field Sensors



Packaged sensor

#### Features:

- Extremely high sensitivity
- Very wide magnetic field range
- Unrivalled temperature range
- Extremely low power operation
- Ultra-low noise performance
- Exceptionally high measurement resolution

#### Description:

Paragraf's GHS series delivers the unique properties of graphene into magnetic field sensing applications. Utilising the inherently low noise characteristics of this two-dimensional material, the GHS series delivers outstanding field resolution without signal conditioning, whilst introducing new properties such as a negligible planar Hall effect and all-round robustness leading to unsurpassed operational temperatures and magnetic field ranges.

The GHS Series of analogue sensors is designed to provide very high-performance measurement, sensing and control for scientific research, healthcare, aerospace, industrial and automotive applications. This includes for example:

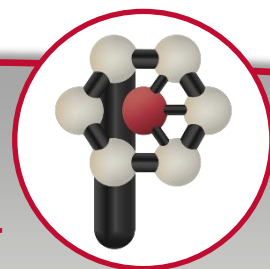
- Precision magnetic field measurement
- Accurate field gradient mapping and alignment
- High sensitivity current and power measurement
- High precision position, rotation and speed sensing
- Low power continuous monitoring

#### Benefits:

The GHS sensor series delivers to an extraordinary range of application demands. Paragraf can tailor the sensors to meet custom application requirements. Benefits to be exploited include:

- Operation under extremes of temperature  $< 1.5\text{ K}$  to  $> 423\text{ K}$
- Resolution of incredibly small ( $< \mu\text{T}$ ) magnetic field changes over large field ranges ( $> 9\text{ T}$ )
- Operation down to  $10\text{ nA}$ , saving power and representing a tiny  $5\text{ pW}$  heat dissipation
- Negligible planar Hall effect, aiding precise instrument positioning w.r.t. field direction
- Highly robust, enabling a tolerance to supply voltages  $> 200\text{ V}$

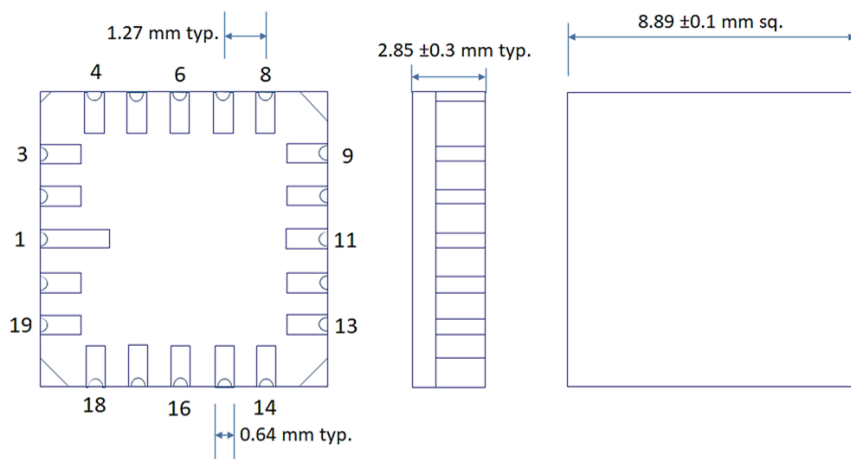
To discuss specific requirements, contact [hallsensors@paragraf.com](mailto:hallsensors@paragraf.com)



## Performance Characteristics: GHS-02AT-LCC20

Parameter	Symbol	Value (typical)	Unit	Notes
Open Circuit Sensitivity @25 °C	S	1400	V/AT	Increases with reducing temperature
Spectral Noise Density	SD	0.8	$\mu\text{T}/\sqrt{\text{Hz}}$	Measured at 10-100 kHz, 2 V peak, 0.5 T
Linearity of Hall Voltage	F <sub>L</sub>	0.5	%	-1 to 1 T
Planar Hall Effect	H <sub>PL</sub>	<10	$\mu\text{V}$	I=I <sub>N</sub> , 0.7 T
Operating Temperature	T <sub>op</sub>	-40 <T <sub>op</sub> < +80	°C	Performance guaranteed within this range. Operation at 1.5 K demonstrated
Maximum recommended field	B <sub>max</sub>	+/- 2T	T	Performance guaranteed within this range. Operation to > 9 T demonstrated
Open Circuit Hall Voltage	V <sub>H</sub>	140	mV	I=I <sub>N</sub> and B=1 T
Offset Voltage	V <sub>RO</sub>	8	mV	Typ. offset voltage I=I <sub>N</sub> and B=0 T
		0.6	mV	Min. offset voltage at I=I <sub>N</sub> and B=0 T
		34	mV	Max. offset voltage at I=I <sub>N</sub> and B=0 T
Temp. coeff. offset voltage V <sub>RO</sub>	V <sub>ROdmax</sub>	<40	$\mu\text{V}/\text{K}$	Measured between 20-30 °C
Nominal Supply Current	I <sub>N</sub>	0.1	mA	Device can be operated down to I=10 nA
Maximum Supply Voltage	V <sub>max</sub>	25	V	
Maximum Supply Current	I <sub>max</sub>	1	mA	
Supply Side Internal Resistance	R <sub>IN</sub>	25	k $\Omega$	B=0 T
Hall Side Internal Resistance	R <sub>OUT</sub>	25	k $\Omega$	B=0 T

## Packaging Information: 20-pin LCC Ni-free package



	Pin	Notes
V <sub>IN+</sub>	1 or 11	Input voltage (V <sub>IN</sub> ) can be supplied with either polarity
V <sub>IN-</sub>	11 or 1	
V <sub>H+</sub>	6 or 16	Hall voltage (V <sub>H</sub> ) polarity will depend on V <sub>IN</sub> polarity and field polarity
V <sub>H-</sub>	16 or 6	

To discuss specific requirements, contact [hallsensors@paragraf.com](mailto:hallsensors@paragraf.com)

