

EGHKX01P05

Cryo high magnetic field sensor
on 200 mm PCB



Description

The EGHKX01P05 assembly with EGHSX01Q02 graphene Hall sensor (GHS-X01) on cryo-rated flexible 200 mm PCB is designed for use at cryogenic temperatures down to mK to measure high magnetic fields up to 30 Tesla and beyond. This assembly has been designed to allow experts in cryogenic electronics to easily and reliably connect to the GHS without requiring a QFN socket. The GHS-X01 can be operated by the Paragraf Multi Sensor Test unit (MiST) with a 9-way D-sub male connector, or it may be used with other data acquisition units. Please contact Paragraf for advice on connecting in specific applications.

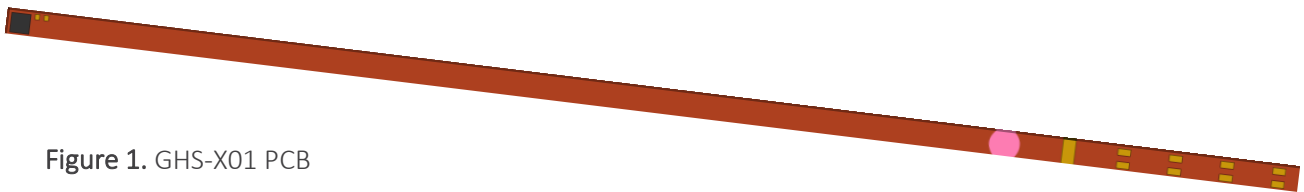


Figure 1. GHS-X01 PCB

Performance characteristics

Ambient temperature = 300 K, unless otherwise specified. $I_N = 200 \mu\text{A}$.

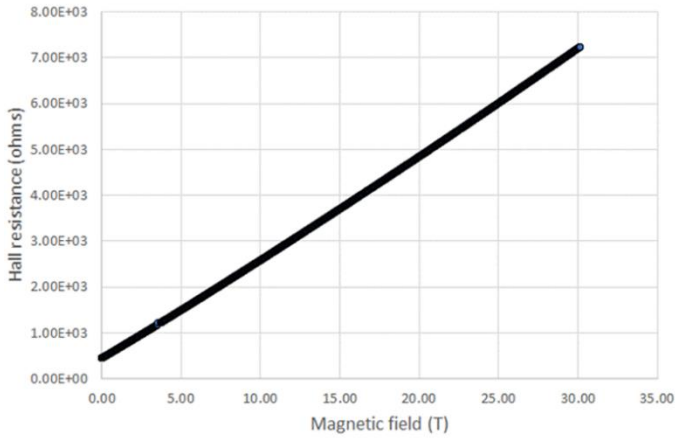
Parameter	Test conditions/notes	Min	Typical	Max	Units
Measurable field range	(Estimated – testing ongoing)			± 30 (300)	T (kG)
Magnetic equivalent noise	1 T field at 1 Hz, $I = I_N$			200	$\mu\text{T}/\text{VHz}$
Magnetic equivalent thermal noise floor	Freq > Corner frequency		0.3		$\mu\text{T}/\text{VHz}$
Sensitivity	At ambient temperature	100 (10)		200 (20)	V/A.T (mV/A.G)
Linearity of Hall voltage	$I = I_N$, at 300 K, ± 1 T at 4 K, ± 1 T		0.2 1		%
Internal resistance	Between pads A+ and A-, and between pads B+ and B-, at field $B = 0$ T			3	k Ω
Ohmic Offset	$B = 0$ T		30	50	Ω
Temperature coefficient of offset	$I = I_N$ at ambient temperature		0.1		Ω/K
Temperature coefficient of sensitivity	$I = I_N$ at ambient temperature		0.2		%/K

* Specifications may change at extreme low temperatures.

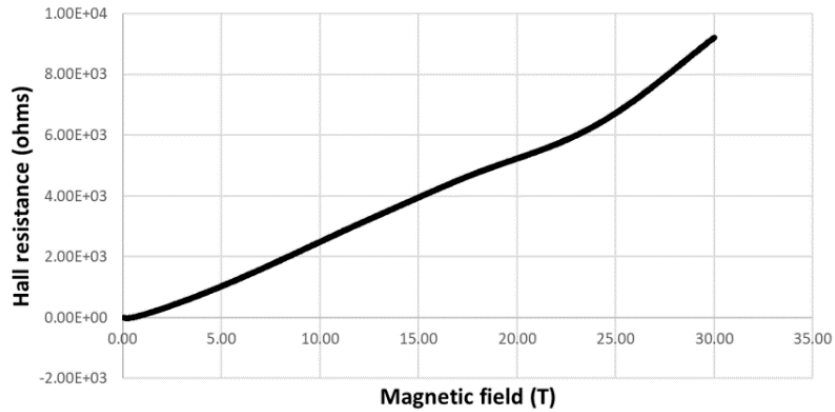


Typical performance graphs

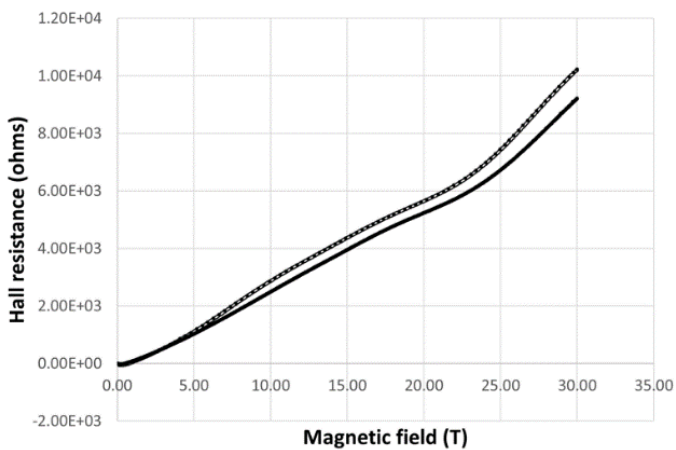
Typical Hall resistance to 30 T at 300 K



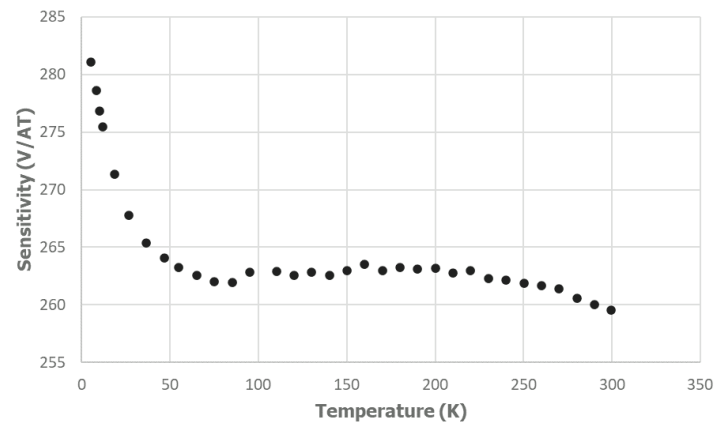
Typical Hall resistance to 30 T at 4 K



Typical Hall resistance to 30 T at 4 K vs at 1.5 K



Typical sensitivity to 300 K



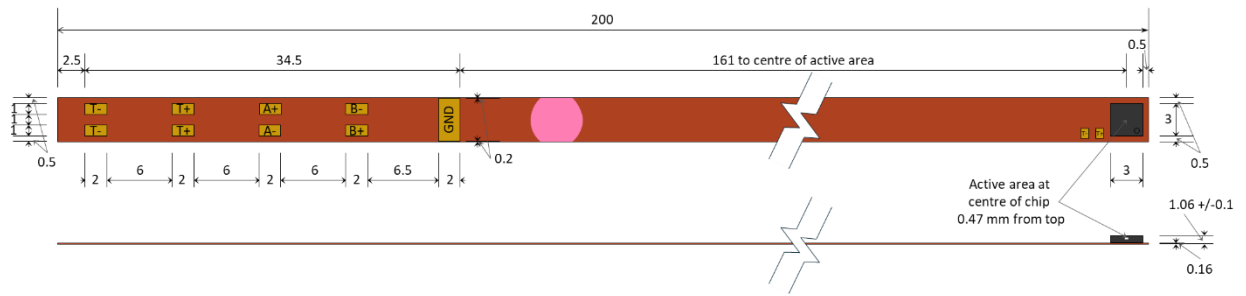
Operating ratings

A higher current supply will give a larger voltage output for a given sensitivity and field, based on V/AT sensitivity. A typical drive current value is 0.2 mA (200 μ A).

Parameter	Min	Max	Units
Supply voltage	-24	+24	V
Supply current	-5	+5	mA
Operating temperature *	0.004	350	K
Storage temperature	230	350	K



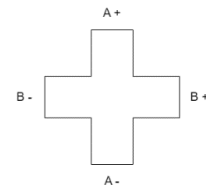
Physical specification and pad assignments



ALL DIMENSIONS IN MM

Note: Please refer to the datasheet for the EGHSX01Q02 graphene Hall sensor for complete sensor information. The package is an 8-pin Ni-free ceramic QFN.

Pad	DESCRIPTION
A+	Hall Sensor Channel A+ pins 1/2
B+	Hall Sensor Channel B+ pins 7/8
A-	Hall Sensor Channel A- pins 5/6
B-	Hall Sensor Channel B- pins 3/4
T+	Unused – available for customer use
T-	Unused – available for customer use
GND	Ground connection for PCB



A and B can be used as V_{IN} (input) or V_H (output) interchangeably. Polarity of each pair can also be flipped interchangeably.

PCB information


Note: bend radius values are theoretical and have not been tested. At cryogenic temperatures, the PCB must be a fixed installation, with no flexing.

PART	PARAMETER	VALUE
Standard PCB	Material	Polyimide SF202 copper clad laminate (flexible)
	Bend radius (fixed installation)	2.4 mm
	Bend radius (occasional flexing in ambient temperatures)	34.5 mm



Disposal

WEEE Regulation Requirement

Symbol	Description
	Do not dispose of this part as general waste.

Disposal of the EGHKX01P05 PCB requires a separate collection for waste electric and electronic equipment (WEEE). Check local regulations regarding WEEE and if needed contact a WEEE waste removal firm or return to Paragraf for disposal.

Disclaimer

Please refer to the Terms of Sale in relation to purchase, storage, maintenance and use of this part. These can be found on Paragraf Limited's website at www.paragraf.com.

This data sheet is provided for general guidance only and does not expand or otherwise alter any Paragraf Ltd warranty set out in the Terms of Sale. For the avoidance of doubt, no additional obligations or liabilities shall arise from Paragraf providing this data sheet.

Intended Use

Paragraf Limited's EGHKX01P05 is intended to be used to measure magnetic fields in a dry and clean working environment. The part is NOT designed for any of the following environments:

- Non-industrial or non-research environments
- Outdoors
- Wet conditions
- Explosive or combustible atmospheres.

The part must only be operated by trained and competent personnel and a risk assessment should be carried out before undertaking any work.



⚠ CAUTION**CAUTION: RISK OF ELECTROSTATIC HAZARD TO EQUIPMENT.**

- Electrostatic discharge (ESD) can cause permanent damage to the part and connected equipment. Standard ESD precautions should be implemented and maintained when using this part.

⚠ WARNING**WARNING: RISK OF INJURY TO USER.**

- Do not operate outside the specified operating conditions.
- Any use outside the intended applications is not permitted.
- Any use not specified by Paragraf requires approval by Paragraf Limited.
- Paragraf Limited takes no responsibility for damage caused by incorrect use of this part.
- Do not use the part if it is damaged. If you suspect any fault that cannot be rectified, contact Paragraf Limited.

Revision History

REVISION NUMBER	DATE OF FIRST RELEASE	DETAILS
V 1.0	20/11/2024	Doc-2194 Version 1.0
V 1.1	20/11/2024	Minor format update
V 1.2	20/11/2024	Update to colour label

For further information on how to order accessories and additional units, please contact us:



store.paragraf.com

Paragraf Ltd

7-8 West Newlands

Somersham, Huntingdon

Cambridgeshire PE28 3EB, UK

Company number: 09889431



sales@paragraf.com

