

DESCRIPTION:

Hall Probe L for F3A Magnetic Transducers with the naked Si chip is a very thin (0.5mm) and long (42mm) single-chip fully integrated 3-axis Hall-Probe.

The L Hall probe is designed with the goal to enable measurements where the probe's Magnetic Field Sensitive Volume (MFSV) needs to be placed very close to the object under test, or to allow measurements of the magnetic field in the object cavities or in the small air gaps. For these applications, the L Hall probe was designed in the way that the MFSV is located at the distance of 200µm from the probe front edge.

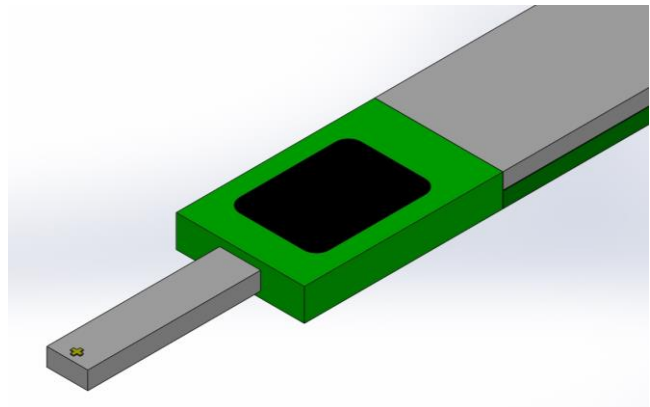
The Hall Probe L for F3A Magnetic Transducers contains a CMOS integrated circuit, which incorporates three groups of mutually orthogonal Hall elements, biasing circuits, amplifiers, and a temperature sensor. The integrated Hall elements occupy very small area (150 x 150µm), which provides very high spatial resolution of the probe. The CMOS IC technology enables very high precision in the fabrication of the vertical and horizontal Hall elements, which gives high angular accuracy (calibrated orthogonality error <0.1°) of the three measurement axis of the probe. The on-chip application of the spinning-current technique in the biasing of the Hall elements suppresses the planar Hall effect. The on-chip signal pre-processing enables a very high frequency bandwidth (DC to 25 kHz) of the probe; and on-chip signal amplification provides high output signals of the Hall probe.

The sensor chip is embedded in the probe package and connected to the CaH cable.

The outputs of the Hall Probe are high-level analog voltages proportional with each of the measured components (Bx, By, Bz) of a magnetic flux density and a voltage proportional with the probe temperature.

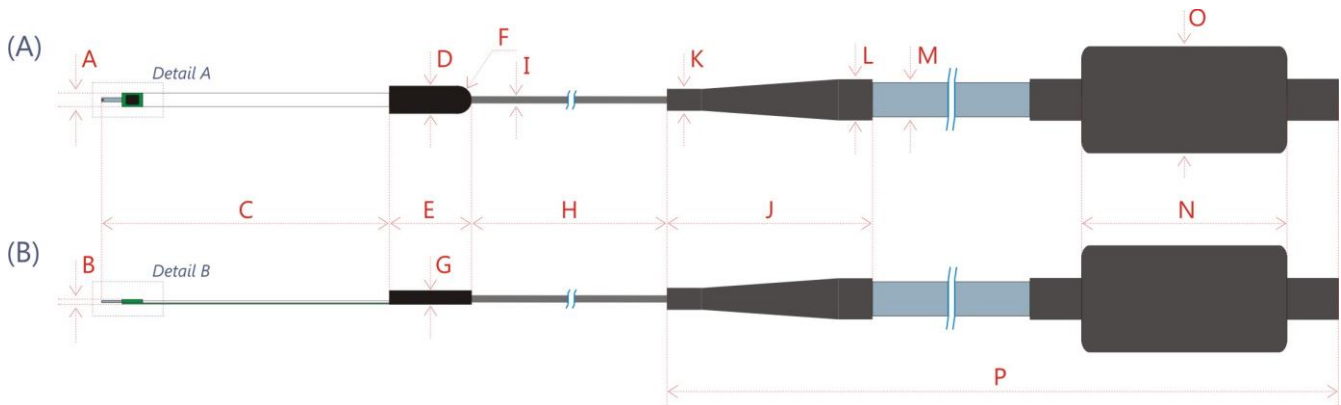
KEY FEATURES:

- **The L Hall probe with the naked Si chip is very thin (0.5mm) and long (42mm) probe package particularly devised in the way that the Magnetic Field Sensitive Volume (MFSV) is located at the distance of 200µm from the probe front edge**
- **Fully integrated CMOS 3-axis (Bx, By, Bz) Hall Probe, of which one, two or three channels are used**
- **Very high spatial resolution (By: 0.03 x 0.005 x 0.03mm³; Bx and Bz: 0.15 x 0.01 x 0.15 mm³)**
- **High angular accuracy (orthogonality error less than 0.1°)**
- **High frequency bandwidth (from DC up to 25kHz)**
- **Virtually no planar Hall Effect**
- **Negligible inductive loops on the Probe**
- **Integrated temperature sensor on the probe for temperature compensation**
- **The Hall Probe L for F3A Magnetic Transducers is consisting part (Module H) of the F3A Magnetic Field Transducer, Digital Teslameter and Magnetic Field Mapper**
- **Suitable for as 3-axis (03, XYZ), 2-axis (XY, XZ, YZ) and as 1-axis (0X, 0Y, 0Z) Hall Probe**
- **Available also as a separate unit for OEM customers**

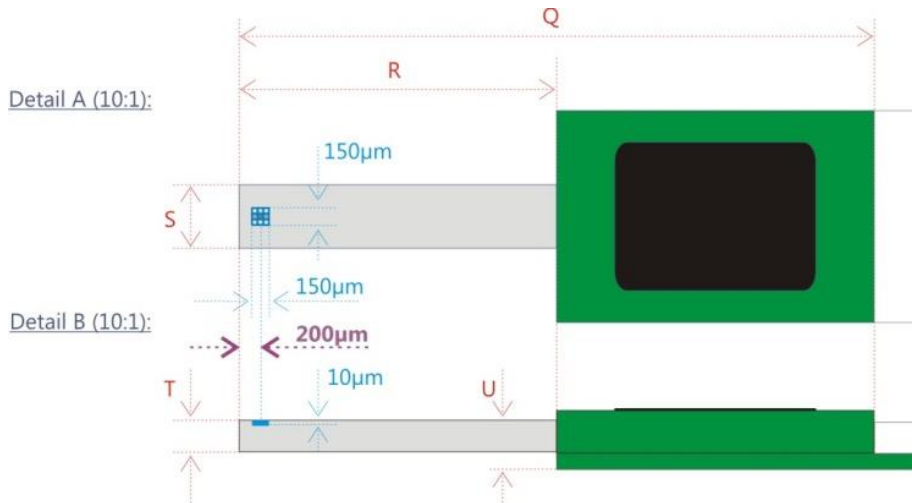


PROBE DIMENSIONS AND CHARACTERISTICS:

Hall probe and Cable dimensions:



Close-up of the Probe tip:



Hall Probe		Cable (CaH)		Hall sensor positioning	
Dimension	mm	Dimension	mm	Dimension	mm
A	2.0 +0.1/-0.0	H	50 ± 1	Q	5.8 ± 0.2
B	0.5 +0.1/-0.05	I	Ø1.1 ± 0.2	R	2.8 ± 0.2
C	42.3 ± 0.2	J	35 ± 3	S	0.64 +0.02/-0.00
D	4.0 ± 0.1	K	Ø3.3 ± 0.3	T	0.28 +0.01/-0.00
E	12.0 ± 0.2	L	Ø5.8 ± 0.3	U	0.40 ± 0.05
F	R2.0 ± 0.1	M	Ø5.0 ± 0.2		
G	2.0 ± 0.1	N	30 ± 1		
		O	Ø16.5 ± 0.5		
		P	X ± 1%(X)		

Figure 1: Dimensions of the L Hall probe and Cable (Module H): (A) TOP View; (B) LEFT SIDE View.

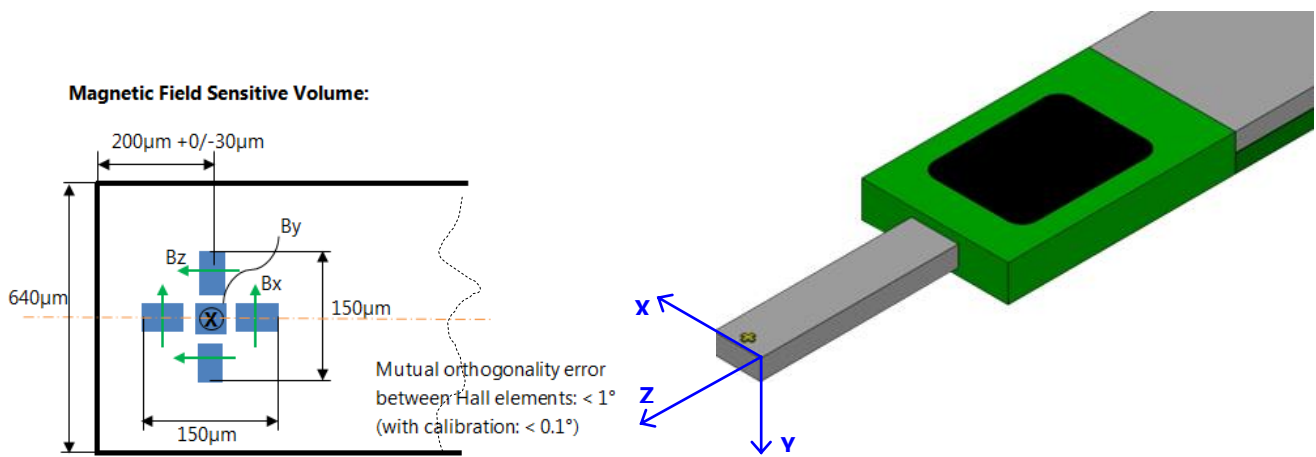


Figure 2: **MFSV and reference Cartesian coordinate system of the L Hall probe**

Dimension	X [mm]	Y [mm]	Z [mm]
Magnetic field sensitive volume (MFSV)	0.15	0.01	0.15
Position of the center of MFSV (corresponding to MFSP, see Fig.1 and 2)	0.32 +0.01/-0.00	-0.01	-0.2 +0.03/-0.00
Total external dimensions of the Probe	<ul style="list-style-type: none"> • 2.0 ± 0.1 Longer, thinner part • 4.0 ± 0.1 Shorter, thicker part of the probe 	<ul style="list-style-type: none"> • 0.5 ± 0.1 Longer, thinner part • 2.0 ± 0.1 Shorter, thicker part of the probe 	<ul style="list-style-type: none"> • 42.3 ± 0.2 Longer, thinner part • 12.0 ± 0.1 Shorter, thicker part of the probe
Angular accuracy of the axes	±2° with respect to the reference surface, after calibration: ±0.1°		
CaH Cable	Shielded, with a flexible thin part near the probe		
Total length of the CaH cable:	<ul style="list-style-type: none"> • Standard: 2 m (Probe notation: 03L02) • Optional: xx m (Probe notation: 03Lxx) <i>Note: Different lengths are available upon request.</i>		

Installation Manual for the L Hall Probe

Warning: the Probe Tip is Fragile!

The probe package is made of ceramics, and can be easily broken. Therefore, avoid any mechanical contact of the probe tip with other objects! Moreover, avoid the immersion of the probe of any liquid, and its exposure to moisture and aggressive gasses.

The following precautions shall help ensure that the transducer accurate calibration remains preserved:

The mounting of the probe should be carried out by application of very low pressure to its back-end and thin wires. If the probe head is clamped, the user should make sure that the substrate surface in contact with the reference plane of the probe is flat and covers as much of the probe reference surface as possible. Do not apply more force than required to hold the probe in its place.

In order to prevent rupture of the thin wires from the probe head, the user should fix and secure the probe cable in the proximity of the probe. The thin wires of the flexible section of the cable may be folded with care; repeated strong bending should be avoided.