

Bachelor Thesis



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Development and Setup of a handheld B-Field Probe with Oscilloscope Interface



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Background:

For research projects of our institute, knowledge about the magnetic fields present around power semiconductors, current bearing wires and within motor air gaps is of potential interest. Especially due to the fast switching, EMI is emitted by the respective power electronic devices. Common B-field measurement devices are often not suitable, as either only mean values are available, the field of interest exceeds the sensitivity range of the measurement device, or its spatial dimensions exceeds the available space for measurement.

Goal:

Utilizing a given B-field sensor, the goal of this thesis is the development of a compact magnetic field probe with the following requirements:

- For real time, analogue measurements the probe should interface with oscilloscope BNC terminals.
- Small / flat geometry to be able to reach into small spaces, like larger motor air gaps (approx. 1 PCB thickness).
- Usable as handheld device, as well as mounted probe.

Tasks:

1. Research of relevant topics, amongst others: B-Field measurement, electric circuits for measurement and evaluation, oscilloscope interfaces, EMI, verification, and characterisation of measurement systems
2. Characterization of the given sensor
3. Component Selection and Schematic design, with the utilisation of simulations
4. PCB design
5. Assembly and verification of proper function
6. Characterisation of the complete system (e.g. transfer function, bandwidth, sensitivity)
7. Documentation

Working Language: German, English

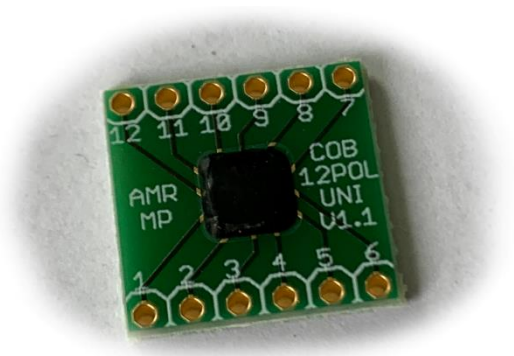


Fig. 1 Sensitec GA-757 Sensor