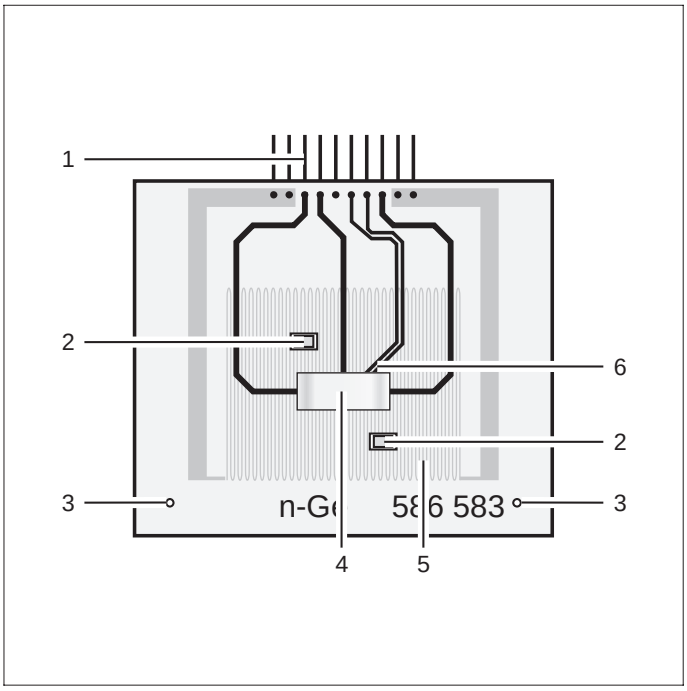
04/99-Pr-



Instruction Sheet 586 853

n-Ge on Plug-in Board (586 853)

1 Multi-pin connector
2 Spacers
3 Latch pins
4 Ge crystal, n-doped
5 Wave-form heating filament
6 PT100 temperature sensor

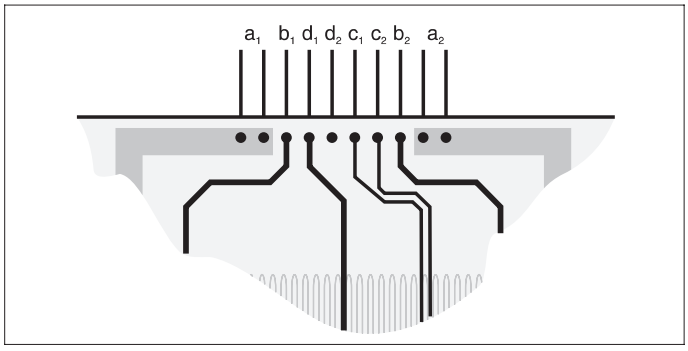
1 Description

When used in conjunction with the base unit for Hall effect (586 850), this device enables measurement of the Hall voltage and the electrical conductivity as a function of the temperature. The measurement data can then be used to determine the concentration and mobility of the charge carriers. It is also possible to investigate the relationship of the Hall voltage to the external magnetic field and to the cross-current through the crystal.

2 Technical data

Maximum cross-current:	ca. 33 mA
Dimensions of crystal:	10 mm × 20 mm × 1 mm
Dimensions of plug-in board including pin connector:	11.5 cm × 11.5 cm × 0.8 cm

3 Pin assignments



a1, a2 Wave-form heating filament
b1, b2 Cross-current through Ge crystal
c1, c2 PT100 temperature sensor
d1, d2 Hall voltage

Safety notes

The Ge crystal is extremely fragile:

- Handle the plug-in board carefully and do not subject it to mechanical shocks or loads.

Due to its high specific resistance, the Ge crystal warms up even when only the cross-current is applied:

- Do not exceed the maximum cross-current of I = 33 mA.

4 Operation

additionally required:

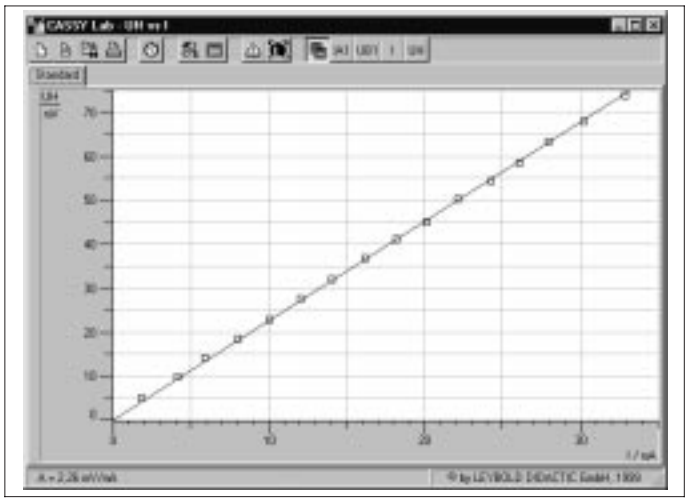
1 Base unit for Hall effect 586 850

Measuring instruments and power supplies as described in the Instruction Sheet of the base unit for Hall effect.

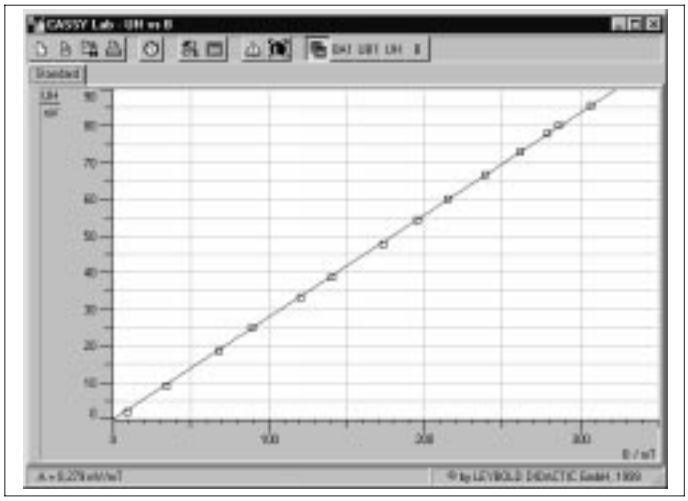
Mount the plug-in board in the base unit for Hall effect and electrically connect all apparatus as described in the Instruction Sheet of the base unit for Hall effect.

5 Experiment examples

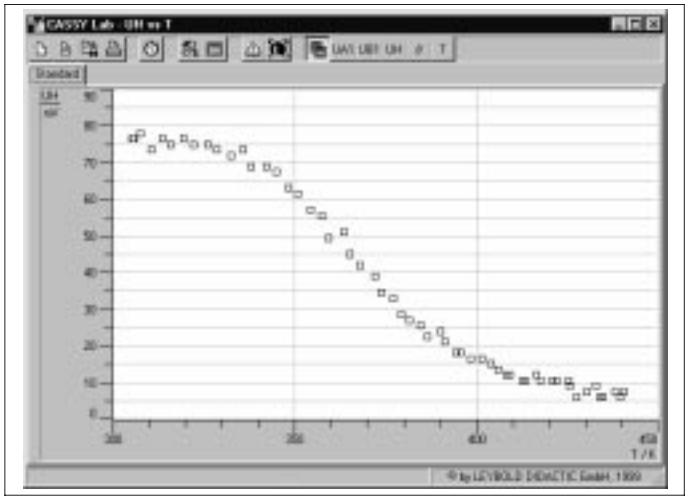
5.1 Hall voltage U_H as a function of the cross-current I through the Ge crystal



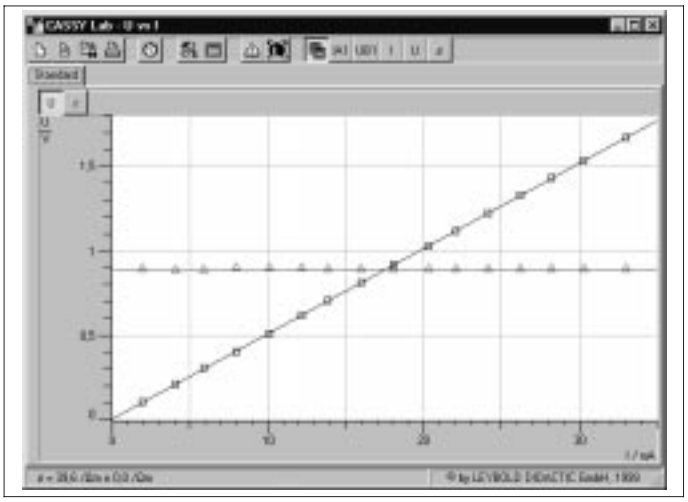
5.2 Hall voltage U_H as a function of the magnetic flux density B



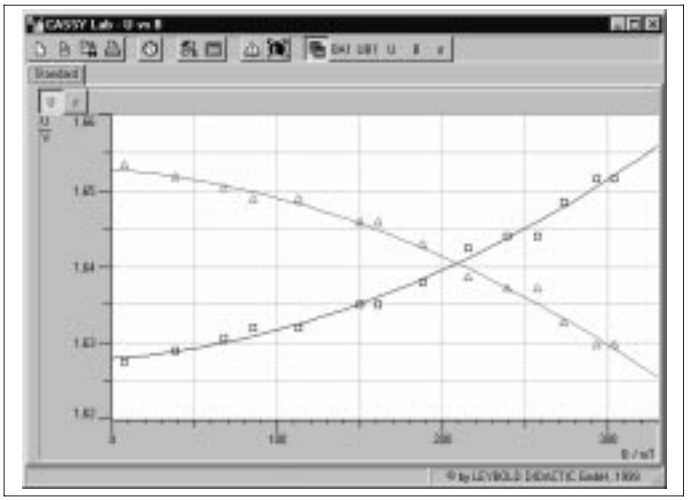
5.3 Hall voltage U_H as a function of the absolute temperature T



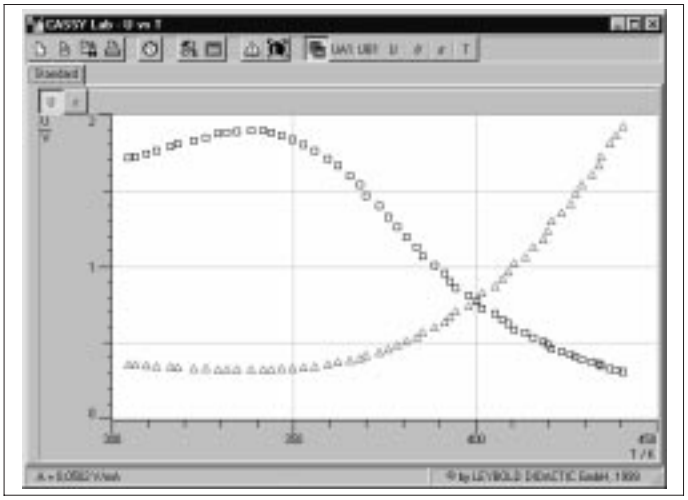
5.4 Voltage drop U and conductivity σ as a function of the cross-current I through the Ge crystal



5.5 Voltage drop U and conductivity σ as a function of the magnetic flux density B



5.6 Voltage drop U and conductivity σ as a function of the absolute temperature T



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