Graphenea

Technical Datasheet

Graphene Field-Effect Transistor Chip: S10, 2019 version

General Description

The GFET chip from Graphenea delivers state-of-the-art graphene devices directly to the researcher to allow application-driven research without the added burden of having to fabricate high-quality GFETs from the start.

The GFET-S10 chip from Graphenea provides 36 graphene devices distributed in a grid pattern on the chip. 30 devices have a Hall-bar geometry and 6 have a 2-probe geometry. The Hall-bar devices can be used for Hall measurements as well as 4-probe and 2-probe measurements. There are varying graphene channel dimensions to allow investigation of geometry dependence on device properties.

Features

- State-of-the-art GFETs utilizing Graphenea's established consistently high-quality graphene
- Devices not encapsulated ready for your functionalization
- Perfect platform device for new sensor research and development
- 36 individual GFETs per chip
- Mobilities typically in excess of 1000 $cm^2/V.s$

Applications

- Graphene device research
- Chemical sensors
- Biosensors
- Bioelectronics
- Magnetic sensors
- Photodetectors

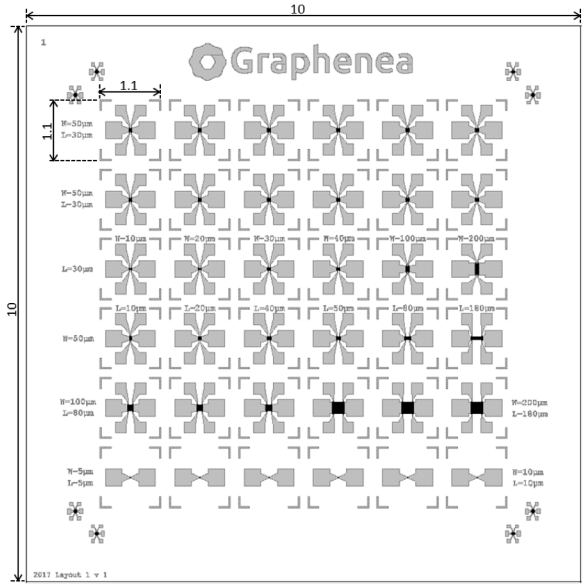
Typical Specifications

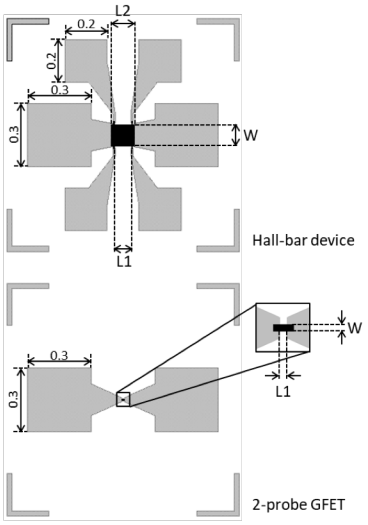
Chip dimensions	10 mm x 10 mm
Chip thickness	675 µm
Number of GFETs per chip	36
Gate Oxide thickness	90 nm
Gate Oxide material	SiO_2
Resistivity of substrate	1-10 Ω.cm
Metallization	Chromium/Gold 5/50 nm
Graphene field-effect mobility	> 1000 $cm^2/V.s$
Dirac point	< 50 V
Yield	> 75 %

Absolute Maximum Ratings

Maximum gate-source voltage	± 50 V
Maximum temperature rating	150 °C
Maximum drain-source current density	10^7 $A.cm^{-2}$

GFET-S10, 2019 version Layout





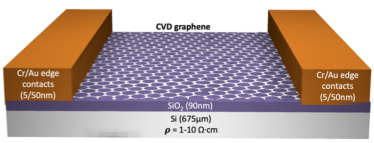
Dimensions: mm

Channel geometries

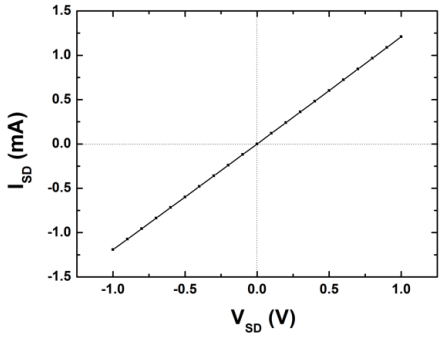
Description	W (µm)	L1 (µm)	L2 (µm)	Quantity
Standard	50	30	50	12
Varying width	10	30	50	1
	20			1
	30			1
	40			1
	100			1
	200			1
Large square	100	80	100	3
	200	180	200	3
Varying length	50	10	30	1
		20	40	1
		40	60	1
		50	70	1
		80	100	1
		180	200	1
Small 2-probe	5	5	-	3
	10	10	-	3

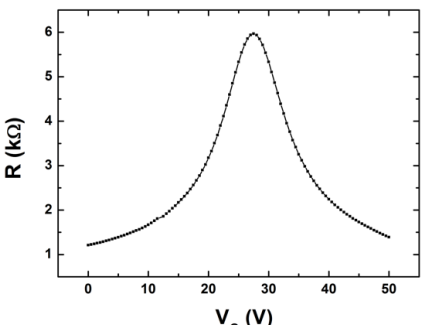
Device cross-section

Device cross-section



Typical characteristics





Output curve (left) and transfer curve measured at source-drain voltage of 20mV (right), measured at room temperature and vacuum conditions on a device with W=L=50 µm.