Graphenea

# Technical Datasheet

# Graphene Field-Effect Transistor Chip: S10

## General Description

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

The GFET-S10 chip from Graphenea provides 30 graphene Hall-bar devices distributed in a grid pattern on the chip. These 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, enabling immediate optimization.

## Features

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

## Applications

- Graphene device research
- Quantum transport
- Chemical sensors
- Magnetic sensors
- Gas sensors
- Photodetectors

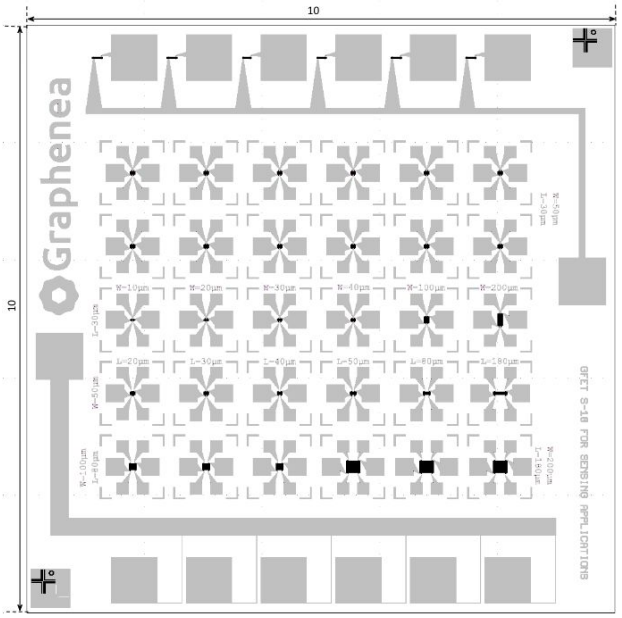
## Typical Specifications

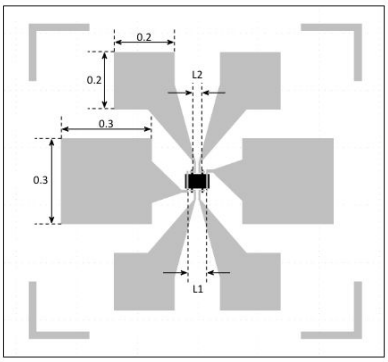
| | |
|---|---|
| Chip dimensions | 10 mm x 10 mm |
| Chip thickness | 675 µm |
| Number of GFETs per chip | 30 |
| Gate Oxide thickness | 90 nm |
| Gate Oxide material | $SiO_2$ |
| Resistivity of substrate | 1-10 Ω·cm |
| Metallization | Au contacts |
| Graphene field-effect mobility | > 1000 $cm^2/V{\cdot}s$ |
| Dirac point | < 25 V |
| Number of graphene channels with integrity | > 75 % |

## Absolute Maximum Ratings

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

## GFET-S10 Layout

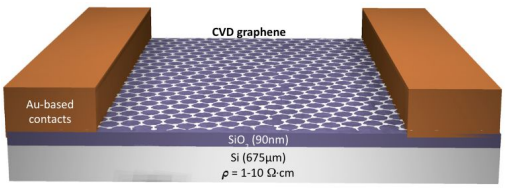


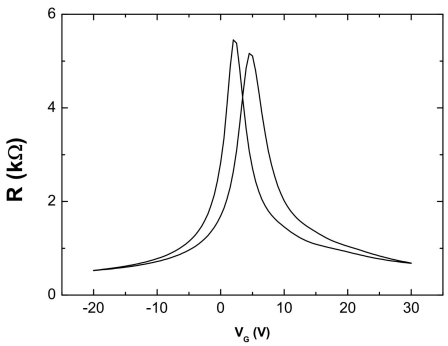

## Channel geometries

| Description | W (µm) | L1 (µm) | L2 (µm) | Quantity |
|---|---|---|---|---|
| Standard | 50 | 30 | 60 | 12 |
| Varying width | 10 | 30 | 60 | 1 |
| | 20 | | | 1 |
| | 30 | | | 1 |
| | 40 | | | 1 |
| | 100 | | | 1 |
| | 200 | | | 1 |
| Varying length | 50 | 20 | 50 | 1 |
| | | 30 | 60 | 1 |
| | | 40 | 70 | 1 |
| | | 50 | 80 | 1 |
| | | 80 | 110 | 1 |
| | | 180 | 210 | 1 |
| Large square | 100 | 80 | 110 | 3 |
| | 200 | 180 | 210 | 3 |

## Device cross-section




## Typical characteristics




Transfer curve measured at source-drain voltage of 20mV, at room temperature and vacuum conditions on a device with W=50 µm, L=60 µm.