

Fact Sheet MPW run #1

The first MPW run is mainly intended for graphene sensors and will be provided by AMO GmbH. The design of the device can be adjusted within the specifications. The offered baseline process is a GFET (Fig. 1) consisting of the following fabrication steps:

- Back Gate & Bottom contact
- Dielectric deposition
- Wafer scale graphene transfer
- Top Contacts and Encapsulation
- Opening of encapsulation*

The summary of the key parameters for a device with local back gate is shown in the table below.

Parameter	Value
Graphene Mobility	$>1000 \text{ cm}^2/\text{Vs}$
Avg. Sheet Resistance	$V_g - V_{\text{CNP}} = -20\text{V} : \sim 1 \text{ k}\Omega$
Avg. Contact Resistance	$V_g = V_{\text{CNP}} : \sim 4 \text{ k}\Omega$
Avg. Contact Resistance	$V_g - V_{\text{CNP}} = -20\text{V} : \sim 2 \text{ k}\Omega \mu\text{m}$
Avg. Contact Resistance	$V_g = V_{\text{CNP}} : \sim 9 \text{ k}\Omega \mu\text{m}$
Minimum working devices:	$>80 \%$
Dirac point	$<50 \text{ V}$
Safe gate-source voltage range:	$\pm 50 \text{ V}$

Specifications

Substrate

- Material: Silicon, Glass
- Basic die size: $1 \times 1 \text{ cm}^2$

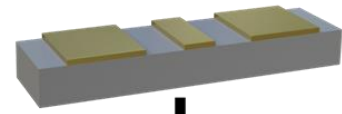
Resolution

- General design rule: $5 \mu\text{m}$ for in-layer critical dimension and over-layer alignment

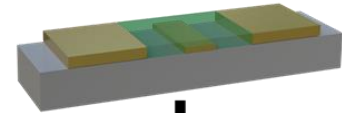
Layer Thicknesses

1	Back Gate Contact	Ti/Pd	5nm /40nm
2	Dielectric Layer	Al_2O_3	75 nm
3	Bottom Contact	Pd	30 nm
4	Graphene	Single layer	
5	Top Contact	Pd	40 nm
6	Encapsulation	Al_2O_3	80 nm
6	Encapsulation	SU-8	$7 \mu\text{m}$

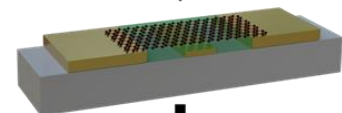
1. Back Gate & Contacts



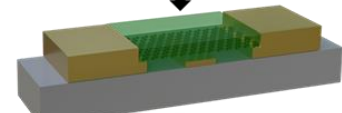
2. Dielectric



3. Graphene Transfer



4. Contacts & Encapsulation



5. Opening of encapsulation

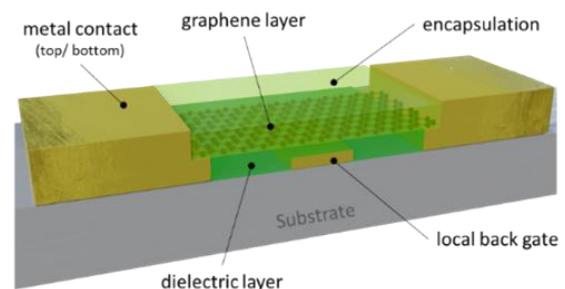
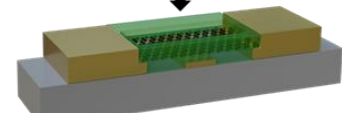


Figure 1 Scheme of the process steps and the final GFET structure.

Characterization

- Optional: Raman characterization
- Optional: Electrical measurement for as-fabricated devices

Application

- Bio/Gas/Chemical sensors, Hall Sensors, Photodetectors

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