Supporting Information

Stretchable Thin-Film Transistors with Molybdenum Disulfide Channel and Graphene Electrodes

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S1. *Atomic force microscopy (AFM) image of single-layer MoS_2.*

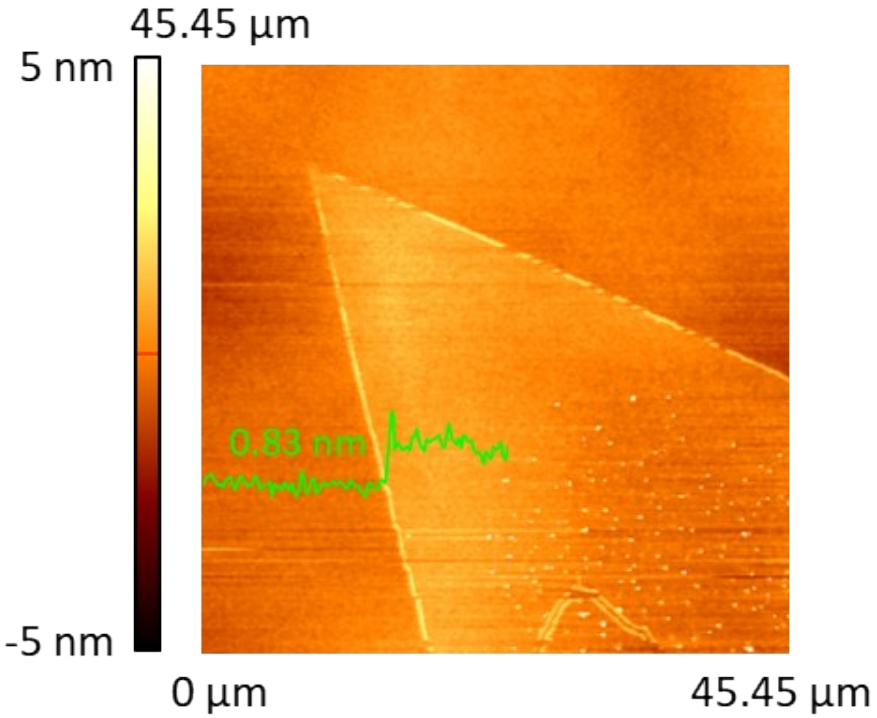

Figure S1. AFM image of the CVD-grown single-layer MoS_2. Measured thickness of the MoS_2 film is 0.83 nm.

S2. *Representative Raman spectrum of single-layer graphene.*

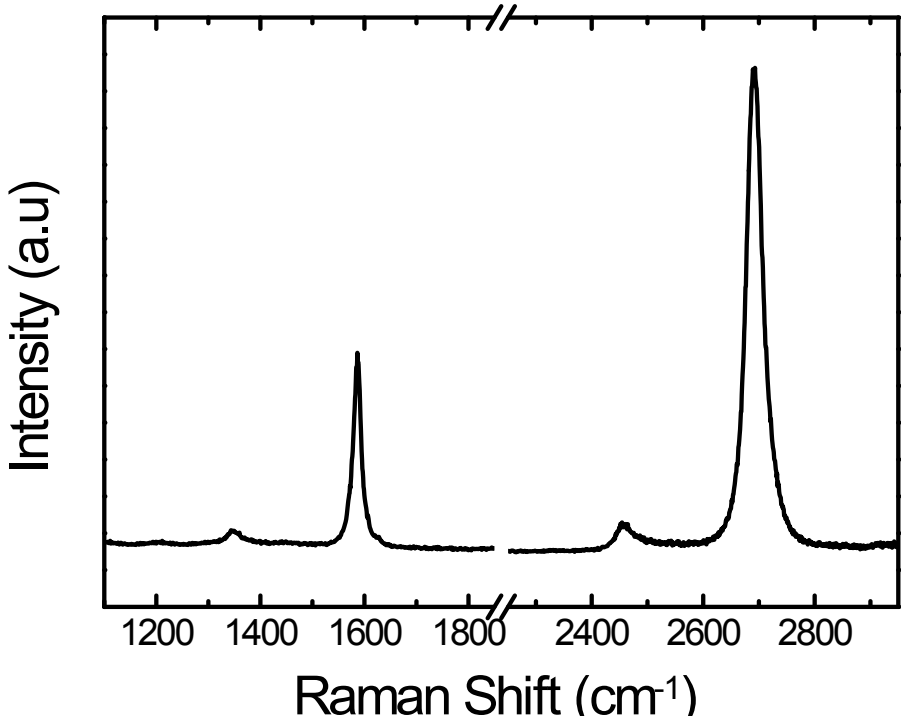

Figure S2. Representative Raman spectrum of the CVD-grown single-layer graphene.

S3. *Plot of load versus stretching strain in the MoS_2 TFTs with graphene electrode.*

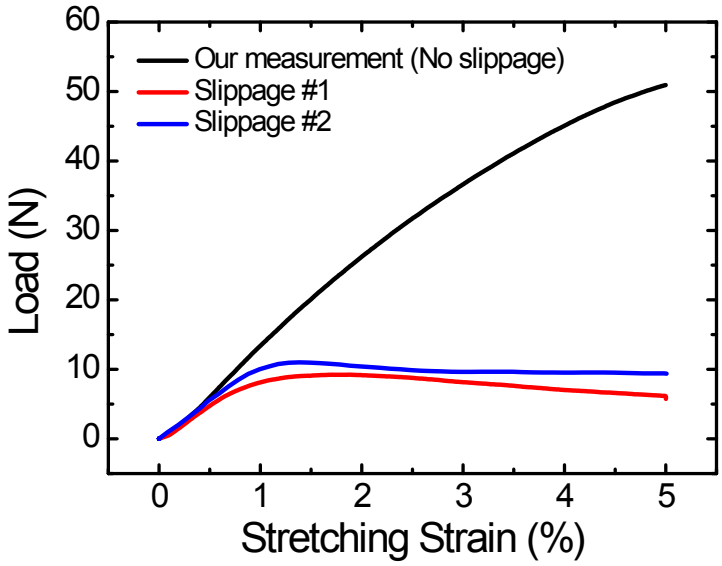

Figure S3. Plot of load versus stretching strain in the fabricated MoS_2 TFTs with graphene electrodes. The device not fully clamped exhibits the slippage #1 and #2, where the load applied to the device does not increase depending on the increase of the stretching strain. In our experiment, the device is completely clamped in which the load increases with the stretching strain.

S4. *Plot of $(I_{DS})^{1/2}$ versus V_{GS} in the fabricated MoS_2 TFTs with graphene electrode.*

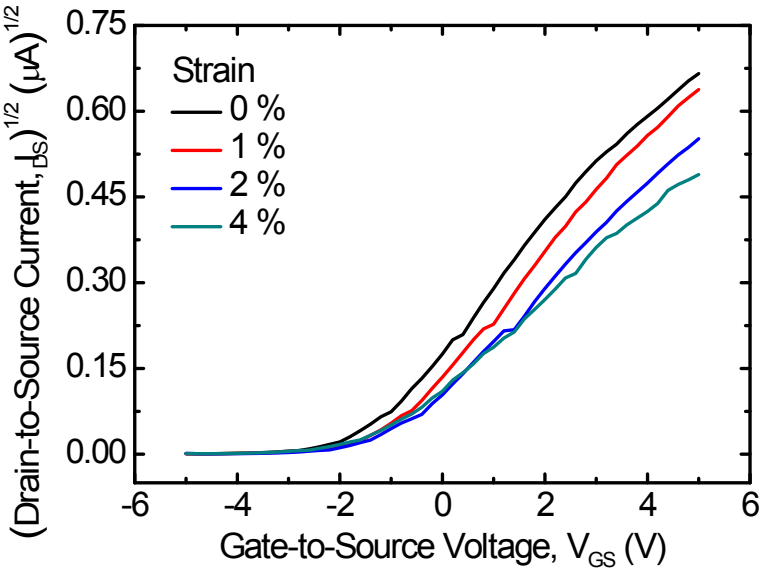

Figure S4. Plot of $(I_{DS})^{1/2}$ vs. V_{DS} in the MoS_2 TFTs measured at V_{DS} of 500 mV under mechanical stretching condition (strain: 0 % ~ 4 %). Measurements were performed in vacuum conditions.

S5. *Representative output curves of the fabricated MoS_2 TFTs with graphene electrode.*

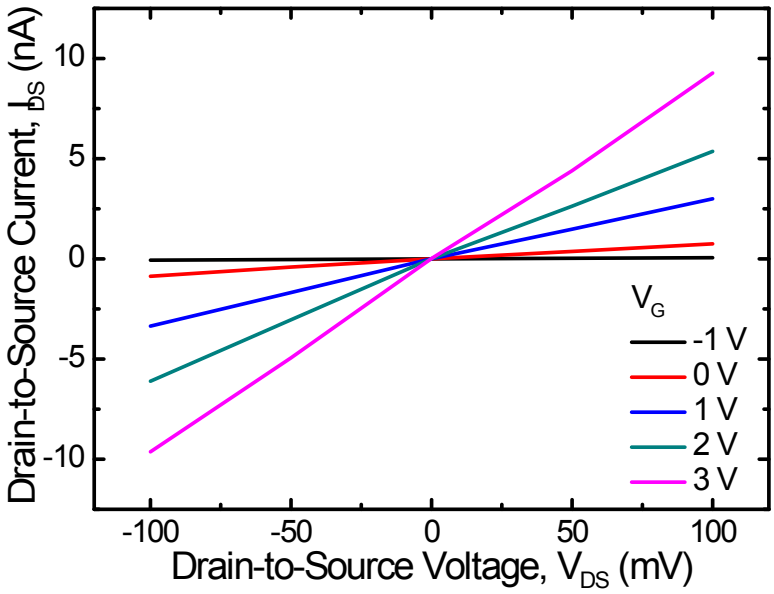

Figure S5. Representative output curves (I_{DS} vs. V_{DS}) of the MoS_2 TFTs measured at various V_{GS} ranging from -1 to 3 V, in steps of 1 V. Measurements were performed in vacuum conditions.

S6. *Hysteresis of the fabricated MoS_2 TFTs with graphene electrode.*

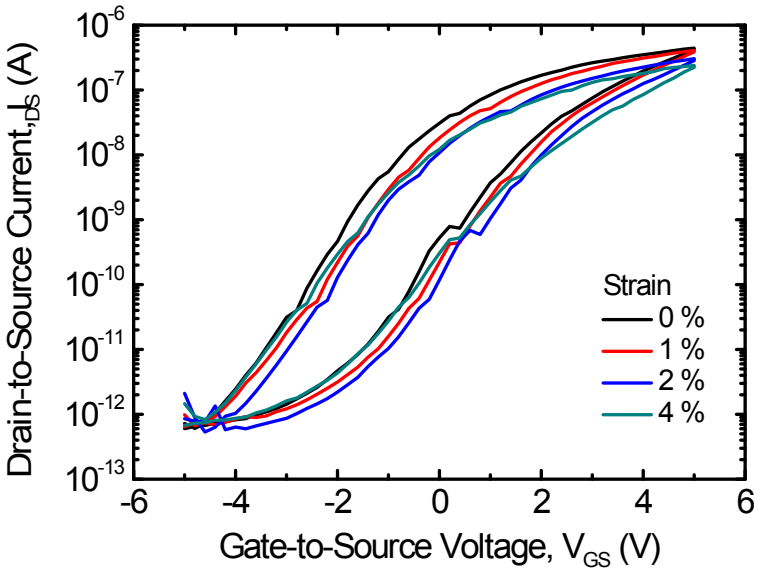

Figure S6. Forward and reverse swept transfer curves of the MoS_2 TFTs under mechanical stretching condition (strain: 0 % ~ 4 %) for extracting hysteresis of the devices.

S7. *Y-function method for extracting contact resistance of the MoS_2 TFTs with graphene electrode.*

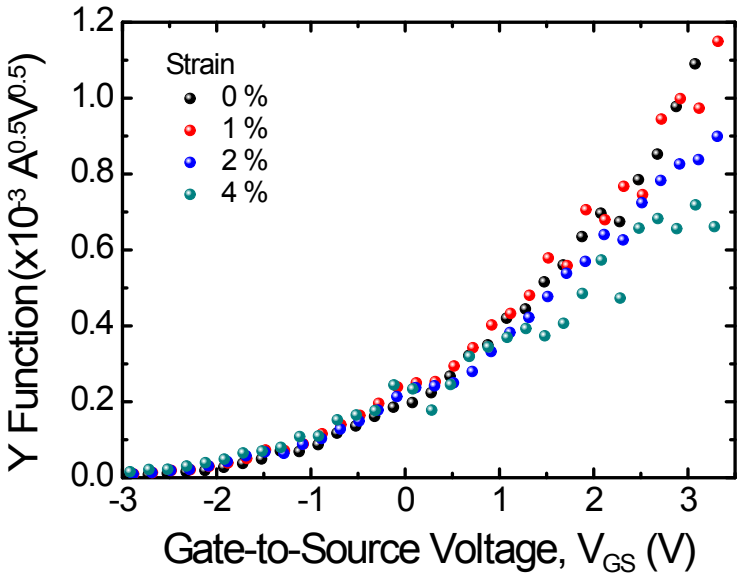

Figure S7. Plot of Y-function vs. V_{GS} for extracting contact resistance of the MoS_2 TFTs with graphene electrodes under mechanical stretching condition (strain: 0 % ~ 4 %).

S8. *Mechanical stretchability of the single-layer graphene electrode.*

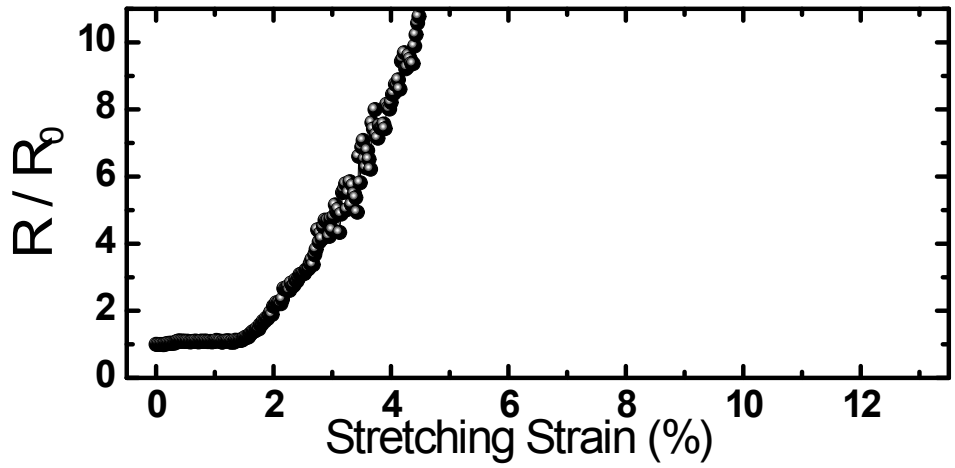

Figure S8. Mechanical stretching test (R/R_0 of the single-layer graphene) as a function of stretching strain.