

Voltage Tunable Devices by External Pressure Based on Organic Inverters with Soft-Contact Lamination

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Tunable diode connected inverter is fabricated by connecting two OTFTs which adopt elastic bridge-structured PDMS stamps with deposited source-drain electrode. When pressure is applied on the PDMS stamp of drive transistor, output S-D current (I_{sd}) and threshold voltage (V_{th}) will be varied as effective channel length of OTFT is changed. Larger pressure applied on PDMS stamp leads to higher I_{sd} and lower V_{th} . Therefore, after applying gradually increased pressure on PDMS stamp of driver transistor, voltage transfer curve (VTC) of this diode connected inverter can be shifted in positive direction because of I_{sd} and V_{th} variation. Moreover, due to elasticity of PDMS material, after releasing pressure applied on PDMS stamp, it will recover to previous status. Therefore, it is possible to use the tunable organic inverter as a pressure sensing device. Relationship between applied pressure and output voltage is studied. Sensitivity of this pressure sensing device is also improved by means of different PDMS stamps with different thickness.