

PIEZO-RESISTIVE FORCE SENSOR WITH BUMPS ON MEMBRANE STRUCTURE

ABSTRACT

A force sensor for measuring a force from a load comprises a plunger, a flexible disc-shaped membrane, a support plate and a silicon die. The plunger is configured to receive the force from the load, and has a ring-shaped groove at the lower surface. The membrane has a ring-shaped upper bump at the upper surface, wherein the upper bump is configured to complementarily fit into the groove at the lower surface of plunger. Furthermore, the membrane has a ring-shaped lower bump at lower upper surface. The support plate has a ring-shaped groove that is configured so that the lower bump on the lower surface of the membrane can complementarily fit into. The silicon die is centrally mounted on the membrane, where the silicon die comprises piezo-resistors that vary their resistance when deformed by the force. In particular, the force received by the plunger from the load is transmitted to the membrane, causing the membrane to flex, which in turn causes the bending or compressing of the silicon die, resulting in the measurement of the force from the load.

Figure 7 accompanies the Abstract.