Growth of topological insulator Bi$_2$Se$_3$ thin films on amorphous for multi-channel structure SAHNG-KYON JERNG, YONG SEUNG KIM, JAE HONG LEE, Sejong University, Korea, YOUNGWOOK KIM, JUN SUNG KIM, Pohang University of Science and Technology, Korea, KISU JOO, EUIJOON YOON, SANG-MOON YOON, MIYOUNG KIM, Seoul National University, Korea, SEUNG-HYUN CHUN, Sejong University, Korea — A topological insulator exhibits the topologically protected gapless Dirac surface states in bulk band gap which was predicted in Bi$_2$Se$_3$. Thin layered films of Bi$_2$Se$_3$ have been heteroepitaxially grown on the crystalline substrate by molecular beam epitaxy (MBE). Here, we show the growth of Bi$_2$Se$_3$ thin films on amorphous SiO$_2$ substrate by MBE. In order to achieve the growth on amorphous surface, van der Waals epitaxy method with the selenium passivation was adopted. Bi$_2$Se$_3$ films are grown along [001] direction with periodical structure in spite of lattice mismatched amorphous substrate. Low-temperature transport measurement revealed the weak anti-localization effect with electrical gating, which suggest that surface transport properties can be comparable to those of epitaxially grown Bi$_2$Se$_3$ films on crystalline substrate. In addition, we demonstrate the growth of multi-channel Bi$_2$Se$_3$ films separated by amorphous insulating layer. These results provide a potential of growth of layered topological insulator films on amorphous materials and junctions.