Since the future colliders, such as the International Linear Collider (ILC)3 and Circular Electron Positron Collider (CEPC)4, demand higher energy resolution of the jets, the Particle flow Algorithm (PFA) was put forward to make precise measurements of the jet’s energy5. According to the PFA, the particles inside the jets should be separated and the tracks should be assigned to the calorimeter clusters one by one, leading to a requirement for high granularity imaging calorimeter.

Thanks to the fine resolution of energy and position, the silicon PIN diodes arrays is taken as the sensitive layer of silicon-tungsten-based Electromagnetic CALorimeter (Si-W ECAL), which is considered as a promising candidate for this type of application. The basic performance of silicon PIN diodes need to be tested before using. According to the CEPC requirements for the Si-W ECAL4, the pixel pad of silicon PIN array should be about 1 × 1 cm2, or even smaller. It should also have enough Signal-to-Noise Ratio (SNR) for Minimum Ionizing Particle (MIP). The energy range must be more than 500 MIPs. To meet these demands, the readout electronics are expected to have an equivalent noise level of better than1 fC and a linear range up to at least +2000 fC, considering the equivalent charge of MIP is about 4 fC6. In addition, the electronics are expected to be self-triggered and the threshold could be set lower than 1 MIP.