

Development status of solid-state switches for thyatron replacement

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This paper describes the development status of solid-state switches for thyatron replacement. A 50 kV, 10 kA solid-state switch has been developed based on IGBT series stacking technologies, including voltage balancing and synchronous driving. The proposed stacking structure minimizes internal inductance and provides a fast current rising time of up to 7 kA/us. Additionally, the developed switch has achieved low jitter of less than 1 ns. Owing to the modular structure of developed switch, it was implemented with various specifications for different applications. By implementing a 15 kV, 10 kA, 10 Hz switch, the solid-state kicker modulator was developed and successfully demonstrated in at Pohang Accelerator Laboratory(PAL). Furthermore, a 20 kV, 2 kA, 250 Hz switch has also been implemented and is currently used to operate a 6-MeV C-band electron linear accelerator (LINAC) at the Dongnam Institute of Radiological & Medical Sciences (DIRAMS). Additionally, a 50 kV, 10 kA switch is now ready for the klystron modulator. By sharing the development status of solid-state switches in Korea, it is hopefully expected to share our developed switch and technology and have the chance to discover its shortcomings together, so that we can work on improving them collaboratively.

Footnotes

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