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Coupled aging and radiation effects on wide bandgap power devices

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In recent years, the power electronics industry has been rapidly evolving thanks to wide bandgap (WBG) semiconductor materials such as silicon carbide and gallium nitride. However, those materials are still relatively recent within the power semiconductor devices and there are still some technological barriers, which need to be overcome to ensure reliable operation throughout their lifetime in harsh environments.
In this work, the short and long term-reliability of WBG power devices in radiation environment have been evaluated, studied and analysed through experimental analysis and modeling. Three interdependent lines of research were considered 1) the degradation of the device, 2) the effect of device aging on its radiation sensitivity and 3) effect of radiation on the long term reliability of the device/system.

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