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(54) **GALLIUM NITRIDE BI-DIRECTIONAL HIGH ELECTRON MOBILITY TRANSISTOR SUBSTRATE VOLTAGE MANAGEMENT CIRCUIT**

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(57) **ABSTRACT**

Apparatus for performing substrate voltage management is provided herein and comprises an active substrate voltage management circuit configured to be coupled to a substrate of a bidirectional gallium nitride high electron mobility transistor comprising a first source and a second source. The active substrate voltage management circuit comprises a first circuit that is connected to the first source and a second circuit that is connected to a second source such that when the bidirectional gallium nitride high electron mobility transistor is operational one of the first circuit or the second circuit connects one of the first source to the substrate or the second source to the substrate, respectively, to control a bias voltage applied to the substrate.