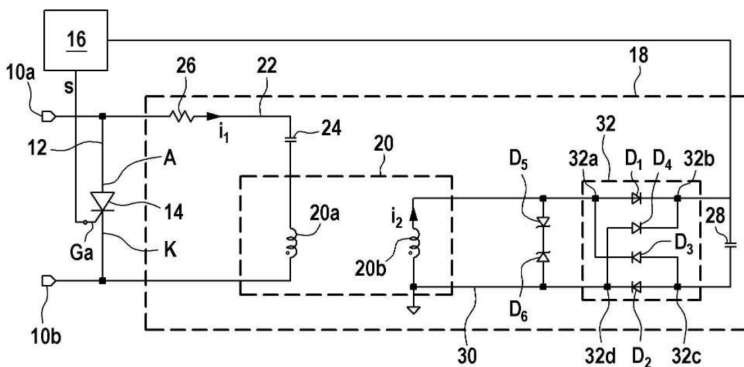




Auxiliary Power Harvesting Circuit for Series Connected Device Applications

CONTEXT

In high and medium voltage applications it is common to utilise series connection of devices to achieve higher voltages from the switch compared to a single device. The gate and control cards of these single devices have to be powered in order to provide control of device operation. The number of devices in series can range from 2 or 3 in medium voltage application to 100 in HVDC applications. As the number of devices increase the device voltage with respect to ground becomes very high and solution based on power harvesting circuit in parallel to semiconductor device become preferred for powering device gate/control electronics. Normally, these solutions are based on harvesting some power from the passive voltage balancing RC type snubbers connected in parallel to the device. When the snubber is reduced or replaced by the active solution the power harvesting circuit might not be able to operate correctly.



TECHNOLOGY DESCRIPTION

An alternative solution for power harvesting circuit is proposed which does not rely on the voltage balancing RC snubber. The proposed solution is shown in the figure. Conventional snubber and capacitor divider circuit is replaced with by a circuit consisting of at least one low-value high-voltage capacitor and a low-voltage transformer. The introduction of the transformer produces a circuit equivalent to the classic circuit but the divider bridge is largely defined by the transformation ratio of the transformer. This makes it possible to obtain enough power even with a low value of high voltage capacitance. Indeed, the transformer being chosen voltage step-down, it increases the current and it is therefore possible to size the series capacitor for a much lower current, which reduces its capacitive value and its size.

The patent main claim is very generic covering general converters and not limiting to HVDC application only.

APPLICATION DOMAIN

- Series connected devices
- HVDC LCC valve
- Director switch

ADVANTAGES

Can be used without any or reduced RC snubber

Independent design of snubber and power harvesting circuit

TRL SCALE



DELIVERABLES

PATENT FR2113843

Simulation files

SCIENTIFIC REFERENCE

None