

Super-junction MOSFETs exhibit low on-state resistances and low switching losses. However, the reverse recovery behavior of their intrinsic diodes and their output capacitance characteristics make their deployment in freewheeling locations challenging. In this paper, a new snubber circuit arrangement has been proposed for a three-level converter to minimize the effect of the output capacitance. This is used in conjunction with diode deactivation circuitry to address the diode recovery behavior. Results are given for a three-phase three-level neutral point clamped converter running from an input voltage of 720 V and supplying a 3-kVA load. The converter operates with no forced cooling and efficiency is estimated at 99.3%. Apart from lower energy consumption, an advantage of high efficiency is a reduced converter mass due to reduced cooling requirements.