

Abstract: 50kW SiC Transformerless PV Inverter

Most of commercial PV string inverters utilize three-level T-type (3LT2) LCL topology and Si device. SiC T-type LCL inverter can achieve smaller device loss, however its improvement on power density is limited by current ripple loss on magnetic components as switching frequency increases. This talk presents a five-level T-type (5LT2) PV inverter which achieves better utilization of SiC devices than traditional 3LT2 LCL topology at higher switching frequency. The operation principle of the SiC 5LT2PV inverter as well as the key design aspects including magnetic balancing, short circuit protection, and digital controller computation time will be covered in the talk. A 60kW PV converter including boost stage and inverter stage has been built in the laboratory, which achieves a power density of 27 W/in³ and 3 kW/kg, and measured peak efficiency of 99.2%. The hardware prototype and experimental results will be demonstrated in the talk.