

DC-link capacitors in power electronic converters are a major constraint on improvement of power density as well as reliability. Evaluation of the dc-link capacitors in terms of power loss, ageing, and failure rate will play an important role in design stages of the next-generation power converters. This paper proposes a new evaluation circuit for dc-link capacitors used in a high-power three-phase inverter, which is intended for testing power loss, failure rate, ageing, and so on. The evaluation circuit produces a practical ripple current waveform and a dc bias voltage into a capacitor under test, in which the ripple current is equivalent to that generated by the three-phase inverter on the dc link. The evaluation circuit employs a full-scale current-rating and downscaled voltage-rating inverter for producing the ripple current, so that the power rating of the evaluation circuit is much smaller than that of a full-scale current-rating and full-scale voltage-rating inverter. Theoretical analysis and simulated results verify the effectiveness of new evaluation circuit.