The parallel three-level dc-dc converter has some merits over the conventional two-level buck converter when employed for fast chargers in a bipolar-dc-bus charging station. It can be directly connected to the bipolar dc bus, and can operate with the total neutral-point current eliminated under the 180°-interleaved mode, which guarantees balanced power consumption and helps decrease dc-bus voltage fluctuation. However, this incurs circulating currents, leading to increased losses and additional current stress to switching devices. To solve this issue, an integrated inductor is proposed in this paper. The inductor has an integrated magnetic core with both output and circulating windings placed on it, producing inductances to filter output currents and to attenuate circulating currents respectively. The circulating inductance can be flexibly adjusted to be much higher than the output inductance, so that the circulating currents can be well attenuated. The output and circulating inductances, along with the ratio between them, are deduced in detail. The current ripples are analyzed and compared under two operation modes with separate and integrated inductors, respectively. The weight, losses, and volume have also been compared between separate and integrated inductors. Both simulation and experimental results are presented to verify the effectiveness of the proposed integrated inductor.