For vertical-geometry LEDs (VLEDs), a LLO technique has been widely used to separate LED epilayer stacks from the sapphire substrate, which were transferred to electrically and thermally conducting metal supporters. In our recent work, a multifunctional bonding material system, which is composed of a thick Cu diffusion barrier and a bonding layer, was used for 2-inch wafer-level fabrication of GaN-based VLEDs. VLEDs yielded more uniform current spreading and lower forward operating voltage drop as compared to conventional lateral-type configuration LEDs. However, the GaN-based VLEDs still experience current crowding (although not as much as lateral LEDs suffer) and light absorption problems at n-type ohmic electrodes. In addition, current injection through n-type electrode need to be further improved and p-type reflector should be thermally stable without agglomeration during a post-fabrication annealing process. In this work, to enhance current spreading, different types of current blocking layers are investigated. To form reliable n-type electrodes to N-polar n-GaN, we introduced different fabrication processes, such as laser-annealing, use of a blocking layer. The results of the designed n-type electrodes are much more stable than conventional untreated samples. We also demonstrate ways of the formation of high-reflectance and low-resistance p-type reflectors through. Based on the XPS, AES, TEM, and SIMS results, Ohmic formation mechanisms of the ohmic contacts are presented.