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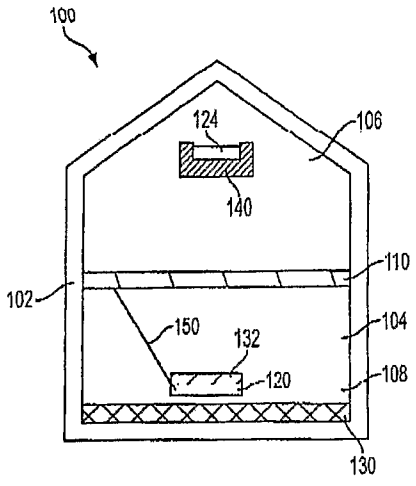
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(54) Title: GALLIUM NITRIDE CRYSTAL, HOMOEPITAXIAL GALLIUM-NITRIDE-BASED DEVICES AND METHOD FOR PRODUCING SAME



(57) Abstract: A device which includes at least one epitaxial semiconductor layer disposed on a single crystal substrate comprised of gallium nitride having a dislocation density less than about 10^4 per cm^2, substantially no tilt boundaries, and an oxygen impurity level of less than 10^{19} cm^{-3}. The electronic device may be in the form of lighting applications such as light emitting diode (LED) and laser diode (LD) applications and devices such as GaN based transistors, rectifiers, thyristors, and cascode switches, and the like. Also provided is a method of forming a single crystal substrate comprised of gallium nitride having a dislocation density less than about 10^4 per cm^2, substantially no tilt boundaries, and an oxygen impurity level of less than 10^{19} cm^{-3}, and homoepitaxially forming at least one semiconductor layer on the substrate and an. electronic device.

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