

ABSTRACT

GALLIUM NITRIDE EPITAXIAL STRUCTURES FOR POWER DEVICES

An epitaxial semiconductor structure includes an engineered substrate having a substrate coefficient of thermal expansion. The engineered substrate includes a polycrystalline ceramic core; a barrier layer encapsulating the polycrystalline ceramic core; a bonding layer coupled to the barrier layer; and a single crystalline layer coupled to the bonding layer. The epitaxial semiconductor structure further includes an epitaxial layer coupled to the single crystalline layer, and the epitaxial layer is characterized by an epitaxial coefficient of thermal expansion substantially equal to the substrate coefficient of thermal expansion.

(Fig. 12)