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Accession number:12631286
Title:Terahertz Current Oscillation in Wurtzite InN
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Source title:Chinese Physics Letters
Abbreviated source title:Chin. Phys. Lett. (China)
Volume:29
Issue:1
Publication date:Jan. 2012
Pages:017304 (4 pp.)
Language:English
ISSN:0256-307X
CODEN:CPLEEU
Document type:Journal article (JA)
Publisher:Chinese Physical Society
Country of publication:China
Material Identity Number:CY92-2012-001
Abstract:Current self-oscillation in doped n⁺ nn⁺ wurtzite InN diodes driven by a dc electric field is theoretically investigated by solving the time-dependent drift-diffusion model. Current self-oscillation is associated with the negative differential mobility effect in the highly non-parabolic conduction band of InN. A detailed analysis of the dependence of current oscillations on the doping concentration and the applied electric field is presented. The current oscillation frequencies can reach up to the terahertz (THz) region. The n⁺ nn⁺ InN self-oscillating diode may be a promising candidate for THz generation, and the calculation results may guide the design of the devices.
Number of references:22
Inspec controlled terms:conduction bands - current fluctuations - diodes - III-V semiconductors - indium compounds - narrow band gap semiconductors
Uncontrolled terms:terahertz current oscillation - wurtzite - current sell oscillation - diodes - dc electric field - time dependent drift diffusion model - negative differential mobility - conduction band - InN
Inspec classification codes:A7220F Low-field transport and mobility; piezoresistance (semiconductors/insulators) - A7125T Electronic structure of crystalline semiconductor compounds and insulators - A7270 Noise processes and phenomena in electronic transport - B2395 Other electron tubes
Chemical indexing:InN/bin In/bin N/bin
Treatment:Practical (PRA); Theoretical or Mathematical (THR)
Discipline:Physics (A); Electrical/Electronic engineering (B)
DOI:10.1088/0256-307X/29/1/017304
Database:Inspec