



GaAs Triac-like Triangular Barrier Switch Prepared by Molecular Beam Epitaxy

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A new S-shaped negative differential resistance (NDR) switching device, prepared by molecular beam epitaxy (MBE), has been successfully developed in a GaAs double triangular barrier structure. Symmetrical bidirectional S-shaped NDR characteristics are observed experimentally. The bidirectional current-voltage (I-V) characteristics exhibit a new type of NDR caused by an avalanche multiplication process in reverse biased base-collector region and barrier redistribution. Under a base current injection with respect to the cathode, the device exhibits a conventional transistor with a current gain of 1.2 at room temperature. The experimental electrical results can be easily understood by an equivalent circuit. In addition, a new optoelectronic switching device is also proposed which may have the potential for bidirectional wavelength emission.

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