New record for world's fastest transistor set

August 16 2006

Engineers in the School of Electronics and Computer Science (University of Southampton, UK) have developed a method to make bipolar transistors twice as fast as current devices.

Bipolar transistors are solid state semiconductor devices used in mobile phones and various wireless systems.

According to Professor Peter Ashburn who undertook this research in collaboration with STC Microelectronics, the researchers used a standard silicon bipolar technique with fluorine implants to deliver a record fT of 110 GHz which is twice as fast as the current record.

'By using fluorine implants, the transistor can operate at a higher frequency which means it will be twice as fast as it was before,' said Professor Ashburn.

The fluorine implants are used to suppress boron diffusion in the base of the transistor which means that the base width is narrower, allowing electrons to travel across it faster.

'This means that the electronics industry will be able to achieve better performance at little extra cost,' Professor Ashburn commented.

Professor Ashburn and his team believe that there is scope to reduce the boron diffusion by a further 50 per cent and they are currently monitoring how the fluorine behaves and looking at whether there are other materials that will also enable this diffusion.

‘We have already beaten the world record,’ commented Professor Ashburn. ‘We have just improved the performance of silicon to a level which was only previously possible with silicon geranium.’

Reference: eprints.ecs.soton.ac.uk/12112/

Source: University of Southampton