

## **Extended 0.13 $\mu\text{m}$ CMOS Technology for the Ultra High-Speed and MS/RF Application Segments**

C. S. Chang, C. P. Chao, Y. K. Leung, C. H. Lin, H.-M. Hsu, Y. P. Wang, S. Y. Chang, T. H. Chiu, J. S. Shyu, C. C. Wu, C. H. Wang, R. Y. Chang, C. W. Chen, C. F. Huang, C. H. Chen, S. H. Chen, T. H. Yeh, J. Y. Cheng, J. J. Liaw, Y. L. Chu, T. C. Ong, M. C. Yu, C. H. Yu, H. J. Lin, H. J. Tao, M. S. Liang, Y. C. See, C. H. Diaz, Y. C. Sun  
Taiwan Semiconductor Manufacturing Company, Science-Based Industrial Park, Hsin-Chu, Taiwan, R.O.C.

### **Abstract**

This paper introduces new technology features to support ultra high-speed and MS/RF applications incorporated into a leading-edge fully manufacturable 0.13 $\mu\text{m}$  CMOS foundry technology. The new 15.5 $\text{\AA}$  gate-oxide ultra high-speed core devices offer the best  $I_{\text{off}}-I_{\text{dsat}}$  performance reported so far for 1.2V applications. Leading-edge passive elements for MS/RF applications are reported in this work. Advanced Cu/low-k back end process integration that can support up to nine layers of metal is also demonstrated.