

Designing a 3GHz, 130nm, Intel® Pentium®4 Processor

Daniel Deleganes, Jonathon Douglas, Badari Kommandur, Marek Patyra
Intel Architecture Group,
2501 NW 229th Ave. MS RA2-401
Hillsboro, OR, 97124, USA

The design of an IA32 processor fabricated on state-of-the art 130nm CMOS process with improved six layers of dual-damascene copper metallization is described. Engineering an IA32 processor for server, desktop, and mobile platforms, particularly meeting diverse power & thermal constraints, poses numerous challenges. This presentation focuses on methods applied to achieve high frequency and low power on the same chip, particularly, the use of Dual Vt process, clock skew design, and thermal management techniques.