- High-Performance Static CMOS Technology
  - 100 MHz (10-ns Cycle Time)
  - Low-Power (1.8-V Core, 3.3-V I/O) Design
  - 3.3-V Flash Voltage
- JTAG Boundary Scan Support†
- High-Performance 32-Bit CPU (TMS320C28x)
  - 16 x 16 and 32 x 32 MAC Operations
  - 16 x 16 Dual MAC
  - Harvard Bus Architecture
  - Atomic Operations
  - Fast Interrupt Response and Processing
  - Unified Memory Programming Model
  - Code-Efficient (in C/C++ and Assembly)
- On-Chip Memory
  - F2808: 64-KW Flash, 18-KW SARAM
    F2806: 32-KW Flash, 10-KW SARAM
    F2801: 16-KW Flash, 6-KW SARAM
  - 1K x 16 OTP ROM
- Boot ROM (4K x 16)
  - With Software Boot Modes
  - Standard Math Tables
- Clock and System Control
  - Dynamic PLL Ratio Changes Supported
  - On-Chip Oscillator
  - Clock-Fail-Detect Mode
  - Watchdog Timer Module
- Three External Interrupts (Any GPIO Pin Can Be the Interrupt Source)
- Peripheral Interrupt Expansion (PIE) Block That Supports up to 96 Peripheral Interrupts
- 128-Bit Security Key/Lock
  - Protects Flash/OTP
  - Prevents Firmware Reverse Engineering
- Three 32-Bit CPU-Timers
- Up to 32 Individually Programmable, Multiplexed General-Purpose Input/Output (GPIO) Pins
- Enhanced Control Peripherals
  - Up to 16 PWM Outputs
  - Up to Four Capture Inputs
  - Up to Two Quadrature Encoder Interfaces
  - Up to Six 32-bit Timers
  - Up to Six 16-bit Timers
- Serial Port Peripherals
  - Up to 4 Serial Peripheral Interfaces (SPIs)
  - Up to 2 Serial Communications Interfaces (SCIs), Standard UART
  - Up to 2 Enhanced Controller Area Networks (eCANs)
  - One Inter-Integrated-Circuit ($I^2C$) Bus
- 12-Bit ADC, 16 Channels
  - 2 x 8 Channel Input Multiplexer
  - Two Sample-and-Hold
  - Single/Simultaneous Conversions
  - Fast Conversion Rate: 160 ns/6.25 MSPS
- Advanced Emulation Features
  - Analysis and Breakpoint Functions
  - Real-Time Debug via Hardware
- Development Tools Include
  - ANSI C/C++ Compiler/Assembler/Linker
  - Supports TMS320C24x™/240x Instructions
  - Code Composer Studio™ IDE
  - DSP/BIOS™
  - JTAG Scan Controllers† [Texas Instruments (TI) or Third-Party]
  - Evaluation Modules
  - Broad Third-Party Digital Motor Control Support
- Low-Power Modes and Power Savings
  - IDLE, STANDBY, HALT Modes Supported
  - Disable Individual Peripheral Clocks
- Package Options
  - Thin Quad Flatpack (LQFP) (2808, 2806, 2801)
  - MicroStar BGA (2808, 2806)
- Temperature Options:
  - A: −40°C to 85°C
  - S: −40°C to 125°C

PRODUCT PREVIEW

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† IEEE Standard 1149.1−1990, IEEE Standard Test-Access Port

## description

The TMS320F2808, TMS320F2806, and TMS320F2801 devices, members of the TMS320C28x™ DSP generation, are highly integrated, high-performance solutions for demanding control applications.

Throughout this document, TMS320F2808, TMS320F2806, and TMS320F2801 are abbreviated as F2808, F2806, and F2801, respectively.

Table 1 provides a summary of each device's features.

**Table 1. Hardware Features**

| FEATURE | | F2808 | F2806 | F2801 |
|---|---|---|---|---|
| Instruction cycle (at 100 MHz) | | 10 ns | 10 ns | 10 ns |
| Single-access RAM (SARAM) (16-bit word) | | 18 kW† (L0, L1, M0, M1, H0) | 10 kW† (L0, L1, M0, M1) | 6 kW† (L0, M0, M1) |
| 3.3-V on-chip flash (16-bit word) | | 64 kW | 32 kW | 16 kW |
| Code security for on-chip flash | | Yes | Yes | Yes |
| Boot ROM (4K) | | Yes | Yes | Yes |
| One-time programmable (OTP) ROM | | Yes | Yes | Yes |
| External memory interface | | — | — | — |
| Enhanced PWM outputs (six 16-bit timer-based modules with 2 PWM outputs/module) | | 12 | 12 | 6 |
| Enhanced 32-bit CAPTURE inputs or auxiliary PWM outputs | | 4 | 4 | 2 |
| Enhanced 32-bit QEP channels (four inputs/channel) | | 2 | 2 | 1 |
| Watchdog timer | | Yes | Yes | Yes |
| 12-Bit ADC | | Yes | Yes | Yes |
| − Channels | | 16 | 16 | 16 |
| 32-Bit CPU timers | | 3 | 3 | 3 |
| SPI | | 4 | 4 | 2 |
| SCI | | 2 | 2 | 1 |
| CAN | | 2 | 1 | 1 |
| $I^2C$ | | 1 | 1 | 1 |
| Digital I/O pins (shared) | | 32 | 32 | 32 |
| External interrupts | | 3 | 3 | 3 |
| Supply voltage | | 1.8-V Core, 3.3-V I/O | 1.8-V Core, 3.3-V I/O | 1.8-V Core, 3.3-V I/O |
| Packaging | | 100 Pin | 100 Pin | 100 Pin |
| Temperature options | A: −40°C to 85°C | Yes | Yes | Yes |
| | S: −40°C to 125°C | Yes | Yes | Yes |
| Product status | | PP | PP | PP |

† L0 and L1 − 4K X 16 each single-access RAM (SARAM) (0 wait-state)
M0 and M1 − 1K X 16 each SARAM (0 wait-state)
H0 − 8K X 16 (1 wait-state).

PRODUCT PREVIEW

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