### TARGET APPLICATIONS
- Power Management Applications
- Industrial Controls
- Commercial Controls

### FEATURES BENEFITS

#### HIGH-PERFORMANCE 16-BIT HCS12 CPU CORE
- 25 MHz bus operation at 5 V for 40 nsec minimum instruction cycle time
- 16 MHz bus operation at 3.3 V for 62.5 nsec minimum instruction cycle time
- Opcode compatible with the 68HC11 and 68HC12
- C optimized architecture produces extremely compact code

#### ON-CHIP DEBUG INTERFACE
- Single-wire background debug mode
- On-chip trace buffer with nine flexible trigger modes and multiple hardware breakpoints
- Non-intrusive emulation
- Real-time emulation of MCU functions at full operating voltage and frequency range with no limitations like traditional emulators
- Bus state analysis without the expense of a traditional emulator
- Non-intrusive debugging through a single, dedicated pin helps eliminate the need and cost of cumbersome emulator cables
- View and change internal registers and memory while running application

#### INTEGRATED THIRD-GENERATION FLASH MEMORY
- In-application re-programmable
- Self-timed, fast programming
  - Fast Flash Page Erase—20 msec (1024 bytes)
  - Can program 16 bits in 20 μsec while in burst mode
- 3.3 V Flash program/erase/read
- Flash Granularity—1024 byte Flash erase / 2 byte Flash program
- Flexible protection and security
- Flexibility to change code in the field
- Efficient end-of-line programming
- Total program time for 128 Kbyte code is less than 5 sec
- Reduces production programming cost through ultra-fast programming
- No external high voltage or charge pump required
- Virtual EEPROM implementation, Flash array usable for EE extension

#### 10-BIT ANALOG-TO-DIGITAL CONVERTER
- One 16-channel A/D converter
- 7 μsec, 10-bit single conversion time, scan mode available
- Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing

#### DIGITAL-TO-ANALOG CONVERTER
- Two 8-bit digital-to-analog converters (DAC)
- 8-bit resolution
- Provides digital control capabilities of external analog devices

#### CLOCK GENERATION MODULE WITH PLL
- Clock monitor with self clock mode in case of no external clock
- Programmable clock frequency with 1024 options ranging from divide by 16 to multiply by 64 from base oscillator
- Real-time interrupt
- Watchdog
- Reliable, robust operation
- Provides high performance using low-cost reference crystals
- Reduces generated noise
- Reduces power consumption
- Easily able to implement real-time clock

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The HCS12 Family of microcontrollers is the next generation of the highly successful 68HC12 architecture. Utilizing Motorola's industry-leading 0.25µ Flash, the E128 is part of a pin-compatible family that is planned to scale from 32 Kbytes to 512 Kbytes of Flash memory. The E128 provides an upward migration path from Motorola's 68HC08, 68HC11 and 68HC12 architectures for applications that need larger memory, more peripherals and higher performance.

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For More Information On This Product, Go to: www.freescale.com
Three four-channel 16-bit timers with each channel programmable for input capture or output compare

Three 16-bit pulse accumulators with event counting or gated time accumulation modes

Six-channel, 8-bit or three-channel, 16-bit PWM with fault protection
- Edge- or center-aligned PWM operation
- Fault protection input

Six-channel pulse width modulator with fault protection (PMF)
- Three independent 15-bit counters with synchronous mode
- Complementary channel operation
- Programmable dead time insertion
- Integral reload rates from 1 to 16
- Four fault protection shut-down input pins
- Three current sense input pins

Efficiently implement motor control, battery charging or digital-to-analog functions

Capable of controlling most motor types: AC induction motors (ACIM), both brushless (BLDC) and brush DC motors (BDC), switched (SRM) and variable reluctance motors (VRM), and stepper motors.

Up to 6.25 Mbps
- High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals

INTER IC BUS (I²C)
- 256 clock rate options
- Provides a simple, efficient method of data exchange between devices
- Minimizes the need for large numbers of connections between devices and eliminates the need for an address decoder

UP TO 90 INPUT/OUTPUT (I/O) LINES
- Programmable pull-ups / pull-downs
- Dual drive capability
- Reduce system cost
- Able to tailor application for minimum EMC or high current loads

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