Product Overview

MSPM0Lx22x Microcontrollers Enabling Low-Power Display and Security Designs

Flow meter, thermostat, blood pressure monitor, weigh scale… LCD display is widely applied in energy infrastructure, building automation, personal care, test and measurement and more, LCD displays help HMI interaction intuitively. Relying on advanced technology, integrated LCD controller and VBAT options, quantities of good security features like AES encryption and PSA-L1 certification, ARM® Cortex®-M0+ 32-bit MSPM0Lx22x microcontrollers from Texas Instruments can help users realize low-power, high-reliability designs for display and security related applications.

Figure 1. Different Display Applications

Key Features and Benefits

- **Core and operating characteristics**
  - Arm® Cortex®-M0+ 32-bit CPU with frequency up to 32MHz
  - Extended temperature range: –40°C to 125°C
  - Wide supply voltage range: 1.62V to 3.6V
- **Dual-bank flash**
  - 128KB / 256KB flash, organized into two main banks to support field firmware updates, with address swap support provided between the two main banks
- **User interface**
  - Ultra-low power segmented LCD controller supporting up to 8x51 / 4x55 LCD displays
- **Low power**
  - Optimized low-power modes
    - RUN: 105µA/MHz (CoreMark)
    - STOP: 60µA at 32kHz
    - STANDBY: 1.1µA (VBAT) with 32kHz, LFXT, RTC, SRAM and registrs fully retained
    - SHUTDOWN: 80nA with IO wake-up
  - VBAT island (auxiliary supply)
    - Independent supply with dedicated VBAT pin
    - Real-time clock (RTC)
    - Tamper detection with timestamp
    - Independent watchdog timer
    - Scratch pad memory
    - 32B backup memory
    - Up to 5 GPIOs supplied by VBAT pin1
- **Reliable security**
  - PSA-L1 Certified for IoT (Internet of Things) security

  - Flash and SRAM memory with ECC (Error Correction Code)
  - AES accelerator and Secure Key Storage for up to four AES keys
  - Flexible firewalls for protecting code and data
  - True random number generator (TRNG)
  - Cyclic redundancy checker (CRC-16, CRC-32)
- **High-performance analog peripherals**
  - 12-bit 1.68-Msps ADC, up to 26 external channels
  - High-speed (32ns) / low-power (min 0.7µA) comparator (COMP) with 8-bit reference DAC
  - Configurable 1.4V or 2.5V internal shared voltage reference
  - Integrated temperature sensor
- **Intelligent digital peripherals**
  - 7-channel DMA controller
  - 15-channel event fabric signaling system
  - Six timers supporting up to 18 PWM outputs, all operational down to STANDBY mode
    - One 16-bit advanced timer with dead band
    - One 32-bit general-purpose timer
    - Four 16-bit general-purpose timers
  - Window-watchdog timer
- **Abundant communication interfaces**
  - Five UART modules, with two supporting LIN, IrDA, DALI, smart card and Manchester
  - Three I2C modules supporting SMBus / PMBus and wakeup from STOP mode, with two supporting up to FM+ (1Mbit/s)
  - Two SPI modules supporting up to 16Mbit/s
- **High-accuracy integrated oscillator**
  - Internal 4 to 32MHz oscillator with up to ±1.2% accuracy

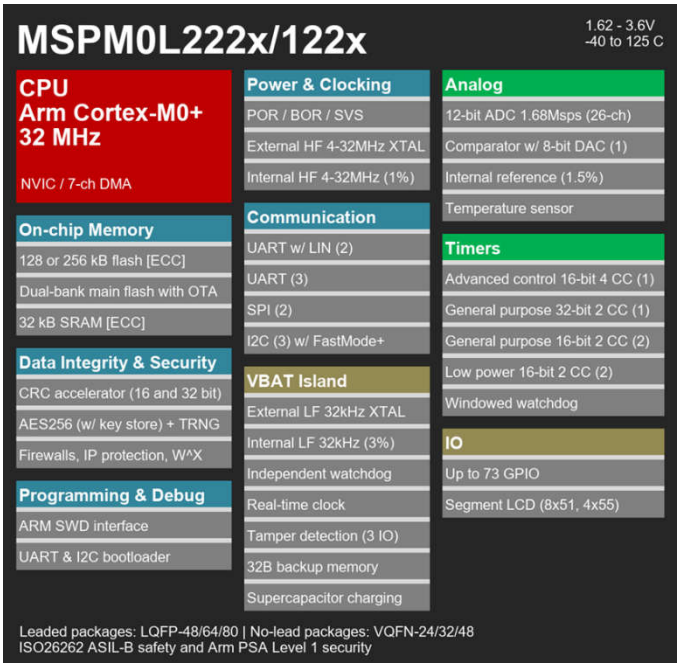
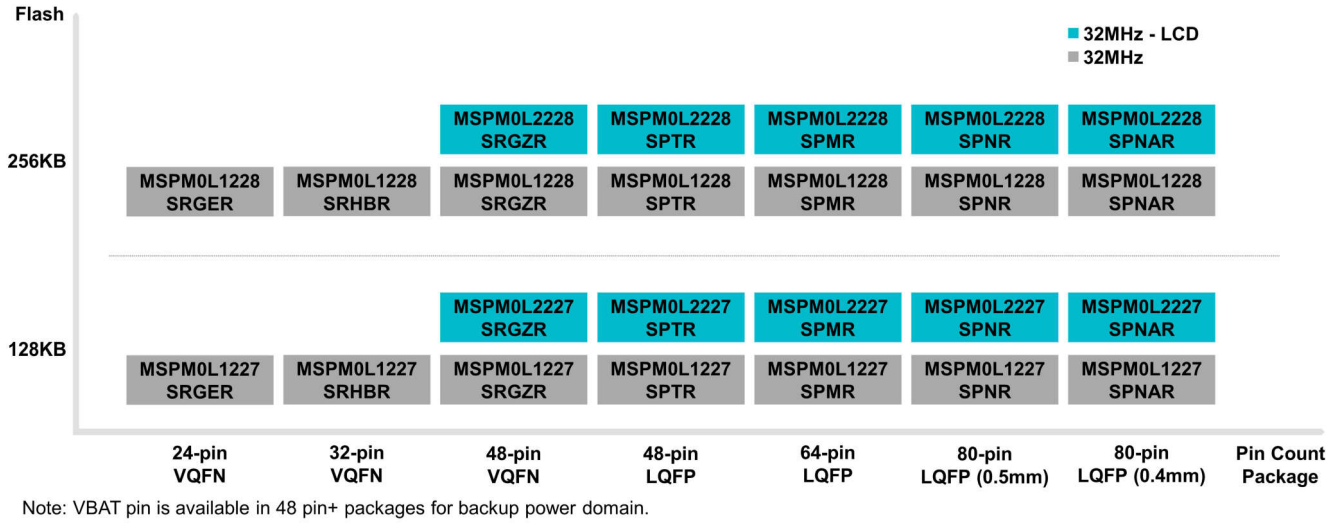


Figure 2. Block Diagram of MSPM0Lx22x Microcontrollers

Pin and Packaging Options

Figure 3 clearly shows the wide memory and package options of MSPM0Lx22x series microcontrollers for different requirements. With the same pin count and package, MSPM0Lx22x series is pin-to-pin with other series in MSPM0 family like MSPM0G350x series and MSPM0L130x series.



Note: VBAT pin is available in 48 pin+ packages for backup power domain.

Figure 3. Selection Table of MSPM0Lx22x Microcontrollers

Hardware and Software Resources

- LP-MSPM0L2228
  - Evaluation board equipped with 256KB-Flash & LQFP80 (X)MSPM0L2228SPNR applying to whole MSPM0Lx22x series
- MSPM0-SDK
  - Abundant peripheral code examples including LCD, COMP, ADC, AES and more
  - Subsystem-level code examples, the building blocks for key functionality to accelerate development process
  - Application-level middleware for faster development like LIN library, EEPROM emulation library, Energy metrology library and more
- SYSCONFIG
  - Graphical configuration tool for easier, quicker generation of code, clock tree and more

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