About MSPM0

1. What is MSPM0?

The MSPM0G3507 belongs to Texas Instruments' MSPM0G350x family of highly integrated, ultra-low-power 32-bit microcontrollers (MCUs). This MCU family is based on an enhanced Arm Cortex-M0+ 32-bit core platform and operates at frequencies up to 80MHz. These low-cost MCUs offer high-performance analog peripheral integration, support an operating temperature range of -40°C to 125°C, and operate from a supply voltage of 1.62V to 3.6V.
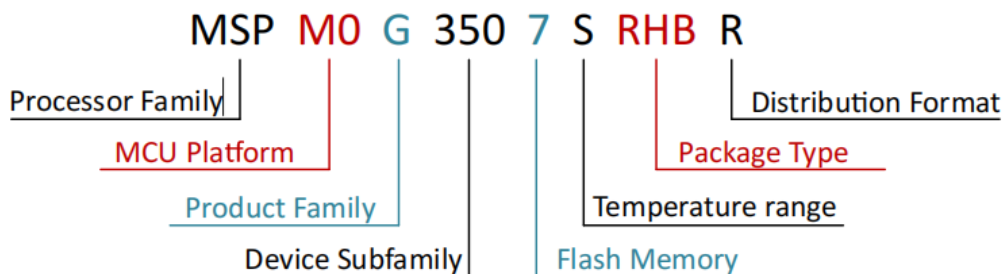
The MSPM0G3507 features 128KB Flash memory, 32KB SRAM, two 4Msps ADCs, a 12-bit 1Msps DAC, three COMPs, two operational amplifiers, CAN-FD, two 16-bit advanced control timers, five general-purpose timers (one 16-bit general-purpose timer for QEI interface, two 16-bit general-purpose timers for standby mode, and one 32-bit general-purpose timer), two window watchdog timers, and communication interfaces (four UARTs, two I2Cs, two SPIs, and one Controller Area Network (CAN) interface supporting CAN 2.0 A or B and CAN-FD).

2. Chip Naming Conventions

TI assigns prefixes to the product models of all MSP MCU devices and supporting tools. Each MSP MCU commercial family has one of two prefixes: MSP or X. These prefixes represent the development stage of the product, from engineering prototype (X) to fully qualified production device (MSP).

X – Experimental device, not necessarily representing the final device's electrical specifications.
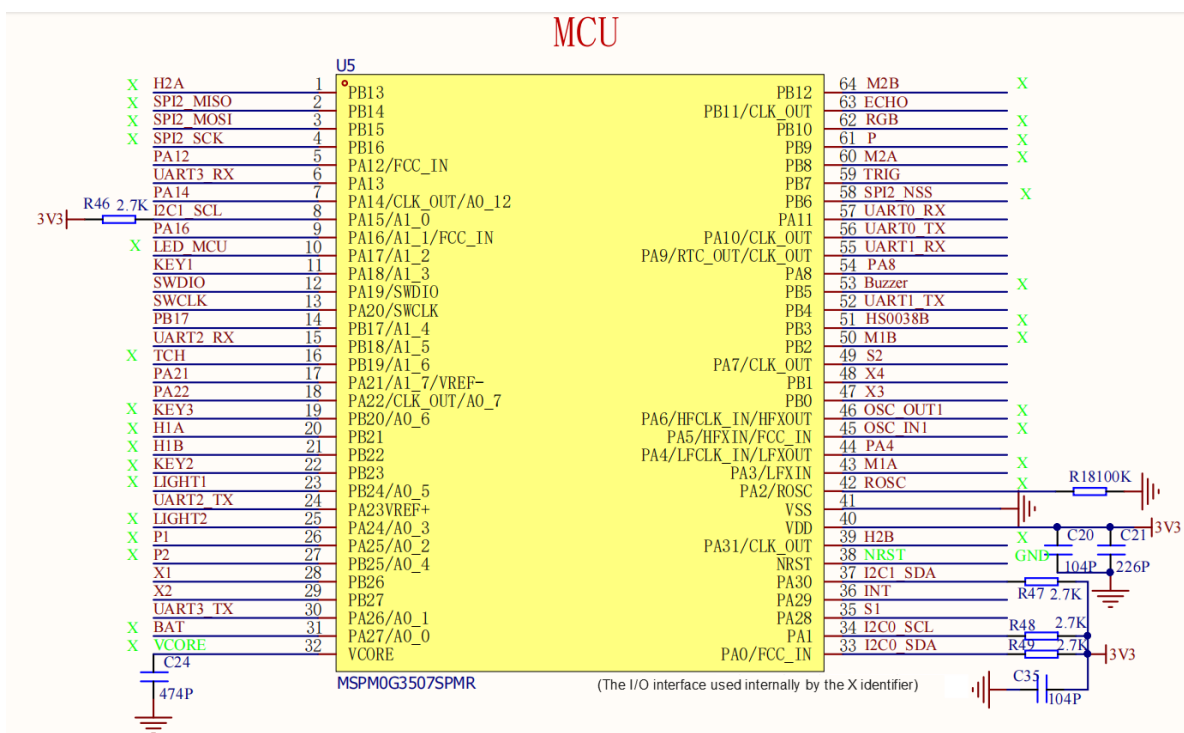
MSP – Fully qualified production device.

Processor Family	MSP = Mixed-signal processor X = Experimental silicon
MCU Platform	M0 = Arm based 32-bit M0+
Product Family	G = 80-MHz frequency
Device Subfamily	350 = CAN-FD, 2x ADC, 2x OPA, 3x COMP
Flash Memory	5 = 32KB 6 = 64KB 7 = 128KB
Temperature Range	S = –40°C to 125°C
Package Type	See the Device Comparison section and https://www.ti.com/packaging
Distribution Format	R = Large reel

DEVICE NAME [1] [4]	FLASH / SRAM (KB)	QUAL[2]	MATH ACCEL	ADC / CHAN	COMP	DAC	OPA	GPAMP	UART/I2C/SPI	CAN	TIMA	TIMG	GPIO	PACKAGE [PACKAGE SIZE] [3]
MSPM0G3505xPM	32 / 16	S	Y	2 / 17	3	1	2	1	4 / 2 / 2	1	2	5	60	64 LQFP [12 mm × 12 mm]
MSPM0G3506xPM	64 / 32													
MSPM0G3507xPM	128 / 32													

3. Introduction to I/O Ports

4. Features of MSPM0

1. **Based on ARM Cortex-M0 core:**

- **Cortex-M0** is a low-power, high-performance 32-bit microcontroller core launched by ARM. It is the lowest performance in the ARM Cortex-M series, but still provides enough computing power for applications with strict requirements on cost and power consumption.

2. **Low-power design:**

- The MSPM0 series has extremely low power consumption and is suitable for battery-powered devices. Its low power consumption makes it very suitable for IoT devices, sensors and embedded applications that require long-term operation.
- It has multiple low-power modes to optimize battery life under different working conditions.

3. **Rich peripherals and interfaces:**

- **GPIO**: Supports multiple general-purpose input and output pins, which can be used to control external devices such as LEDs, buttons, sensors, etc.
- **Timer**: Includes basic timer, PWM output and other functions for precise time control and signal generation.
- **Serial communication**: Supports **USART** for serial communication with external devices.
- **I2C/SPI**: Supports common communication protocols (I2C and SPI), which facilitates data exchange with sensors and peripherals.
- **ADC (Analog-to-Digital Converter)**: Used to convert analog signals into digital signals, widely used in sensor signal processing.

4. **Small package and high integration:**

- The MSPM0 series supports a variety of package types (such as QFN, TSSOP) to adapt to different sizes and application requirements.
- It integrates a wealth of peripherals, reduces the need for external components, and helps to simplify circuit design.

5. **Wide application scenarios:**

- **IoT devices**: Due to its low power consumption and small size, it is suitable for a variety of smart devices and sensors, such as environmental monitoring, smart home, health monitoring, etc.
- **Consumer electronics**: In battery-powered products (such as smart watches, remote controls, toys, etc.), the MSPM0 series is a common choice.
- **Industrial control**: It can be used in various low-power automation control systems, such as motor control, sensor interface, data acquisition, etc.

6. **Development tools and support:**

- **IDE support**: TI provides a complete development tool chain, including **Code Composer Studio** and **IAR Embedded Workbench**. In addition, third-party tools such as **Keil** can also be used for development.
- **Hardware debugging**: Supports **SWD** debugging interface, which is convenient for developers to perform hardware debugging and program burning.