

TI's Smallest M0+ MCU Package Enables Room to do More in Your Design



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As circuits and system designs have become smaller, it is becoming a challenge for engineers to choose the right device for their designs. In many different applications such as ear buds, thermometers, wearables, stylus pens, portable sensors, and other space critical applications, it is essential to find a part that allows you to only pay for what you need and add more features without increasing the size of the board.

Texas Instruments has addressed this challenge by introducing the smallest microcontroller (MCU) in their portfolio, MSPM0C1104S8YCJR (8-ball WCSP) at only 1.38mm². The MSPM0C MCUs are based on 32-bit Arm® Cortex® M0+ core, and offer highly-integrated peripherals, low-power modes, and small package sizes all at a low cost of \$0.161 at 1 kU.

Room to do More: Size

Texas Instruments has invested in optimizing our package offerings to provide flexible options, enabling you to create more efficient designs. The MSPM0C device family offers a variety of packages including leaded, unleaded, and wafer chip scale packages. For example, the 8-pin microcontrollers are offered in SOT, WSON, and DSBGA for a wide range of application sizes.

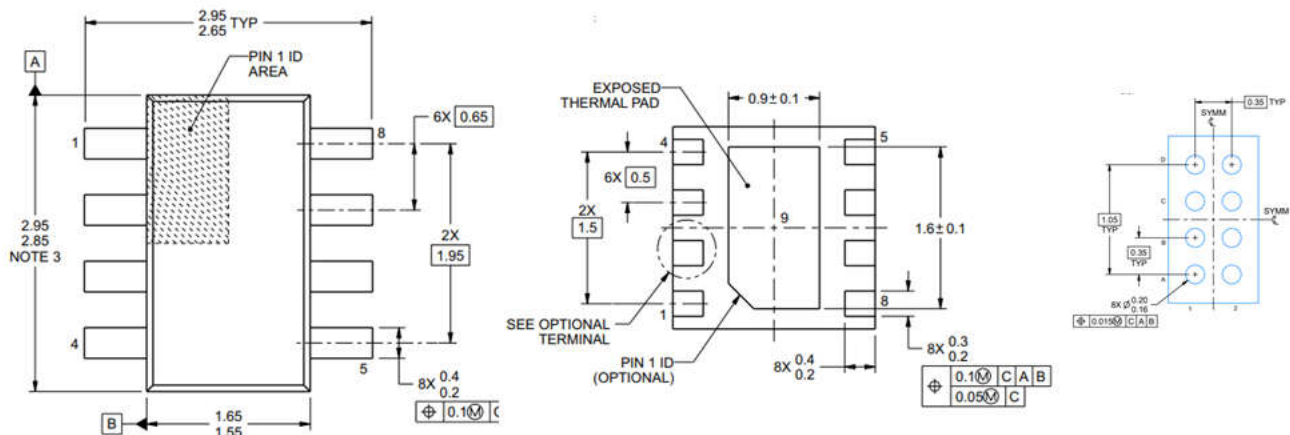


Figure 1. MSPM0C Small Package Offerings (8-SOT, 8-WSON, 8-DSBGA)

MSPM0C110x's 8 ball WCSP package includes up to 6 I/Os and engineers can seamlessly interface with various sensors, actuators, and peripheral devices, making the MSPM0C110x's a good choice for a wide array of applications. The MSPM0C110x's optimized I/Os empower designers to create innovative designs without the constraints of limited interfaces.

For example, when designing a sleek stylus pen, an engineer can select a MCU with a small form factor due to the restricted PCB size. The compact size of the MCU makes sure efficient use of limited board space. In addition to overall dimensions, the MSPM0C MCUs have a high precision internal oscillator that does not require an external crystal. These factors collectively contribute to space sensitive designs all at a low cost.

Room to Do More: Features

This portfolio is simple to use and can be introduced into the system as a power monitor, timer controller, I/O expander, housekeeping function, sensor reader, protocol transfer tool, and more. The options are unlimited.

Despite the compact form, the MSPM0C110x does not compromise on functionality. The MSPM0C110x devices are based on the enhanced Arm Cortex-M0+ core platform operating at up to 24-MHz frequency, providing up to 16KB embedded flash with 1KB SRAM. There are a number of advanced features that are able to offer the benefits to the different use cases with this small size device.

Table 1. MSPM0C110x Part Numbers With WSON Package

| Device Name | Flash/ SRAM (KB) | ADC Channels | UART/ I2C/SPI | TIMG | TIMA | GPIOs | 5V Tolerant IOs | Package Size |
|------------------|---------------------|-----------------|------------------|------|------|-------|--------------------|---------------------------|
| MSPM0C1104S8YCJR | 16/1 | 3 | 1/1/1 | 2 | 1 | 6 | 2 | 8 DSBGA (1.6 x 0.86mm) |
| MSPM0C1103S8YCJR | 8/1 | | | | | | | |
| MSPM0C1104SDSGR | 16/1 | | | | | | | 8 WSON (2 x 2mm) |
| MSPM0C1103SDSGR | 8/1 | | | | | | | |
| MSPM0C1104SDDFR | 16/1 | | | | | | | 8 SOT (2.9 x 2.8mm) |
| MSPM0C1103SDDFR | 8/1 | | | | | | | |

In many applications such as electronic toothbrushes and shavers, an analog-to-digital converter (ADC) is required and instead of designing the device discretely, which takes up space on the board. The small 1.38mm² MCU does not limit the functionality by having an integrated 12-bit, 1.5Mps ADC to accurately monitor the battery supply voltage of the system.

Room to do More: Pin to Pin Compatibility

This MSPM0C110x family is also pin to pin compatible to other devices with competing devices. Designers can use our simple migration tools to port application code from their exiting code by copy and pasting the header files and translating basic peripherals to the MSP platform. Accelerate your development and time by using this hardware and software compatibility.

Conclusion

These MCUs can be small but the performance is robust in any environment as the device is temperature rated from -40 C to 125 C. Make your size constrained and low cost designs a reality by getting started today by sampling our devices and evaluating on our launchpads on [TI.com](https://www.ti.com). As we enter an era defined by space-efficient devices, [MSPM0C110x](#) enables engineers to craft smaller and smarter products.

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