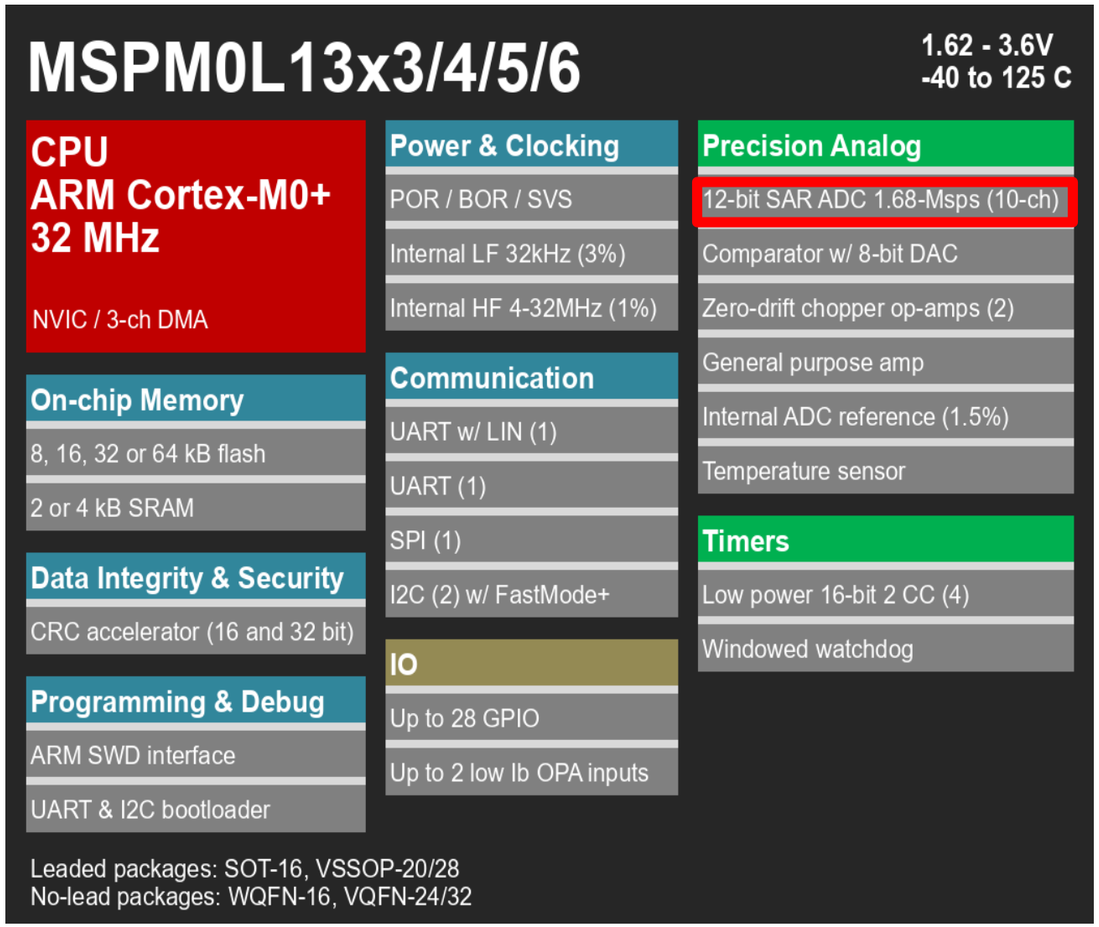
MSPM0 ADC module introduction

—— MSPM0 peripheral training series

Prepared by Yuhao Zhao

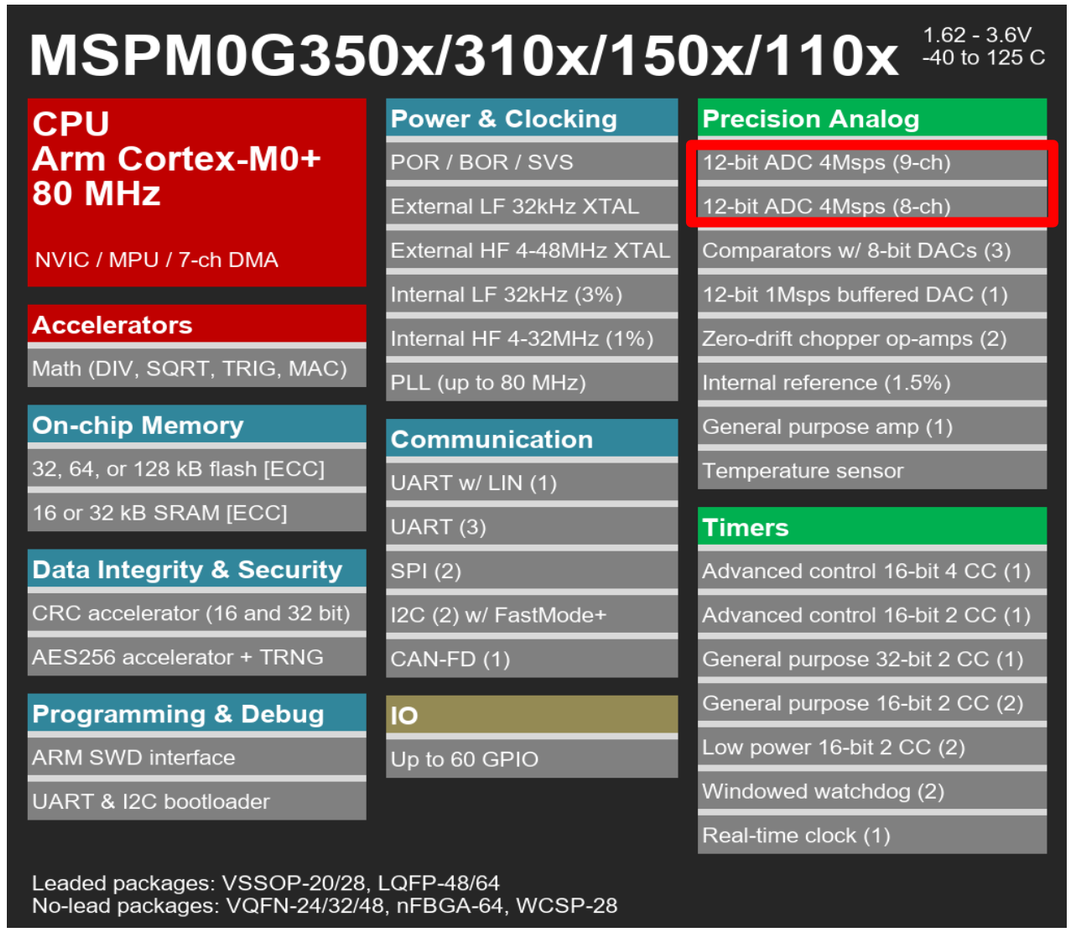
MCU level overview

——MSPM0Lxx series



32 MHz MCU with up to 64kB flash, 32 pins, 12-bit ADC, dual zero-drift OPA/PGA, COMP

——MSPM0Gxx series



80 MHz MCU with up to 128kB flash, 64 pins, advanced analog, AES/TRNG, CAN-FD

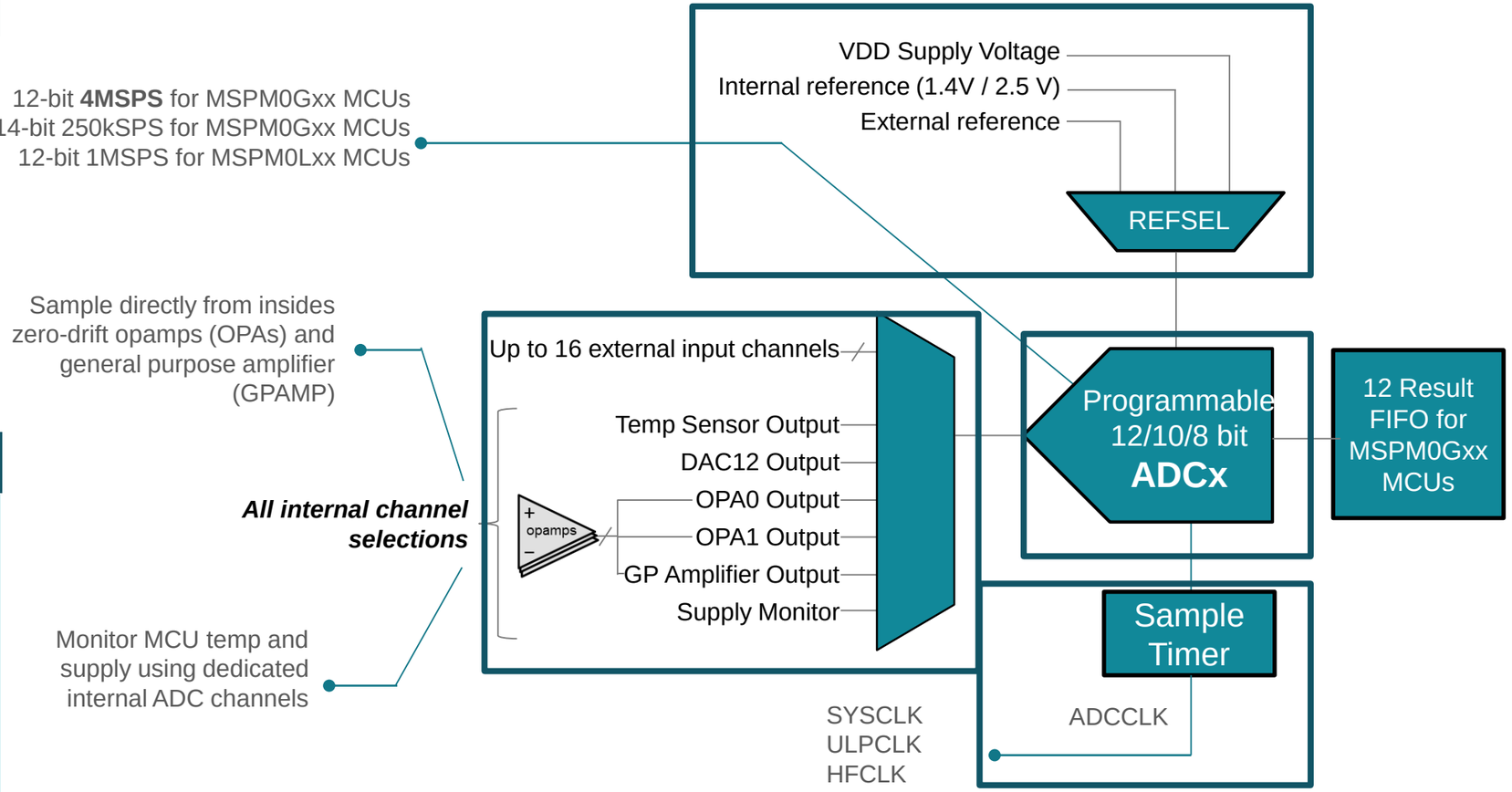
MSPM0 ADC module introduction

Key Features

- **12-bit** resolution ADC
- 14-bit 250ksps with **H/W oversampling**
- **DMA support** with interrupt
- Operates in RUN, SLEEP and STOP **low-power modes**
- Full scale operating range: **1.62V – 3.6V**
- **11.2-bit** ENOB

Key Differences between G and L MCUs

- MSPM0G350x MCUs have **2 simultaneous ADC modules** and MSPM0L130x MCUs have one ADC module
- The max ADC sampling clock on MSPM0G350x is **48 MHz** ; The MSPM0L130x's ADC CLK has a max sampling speed of **32 MHz**.
- 12-bit **4MSPS** conversion rate on MSPM0G350x MCUs
- **4 ADC FIFOS** on the MSPM0L130x and 12 on the MSPM0G350x



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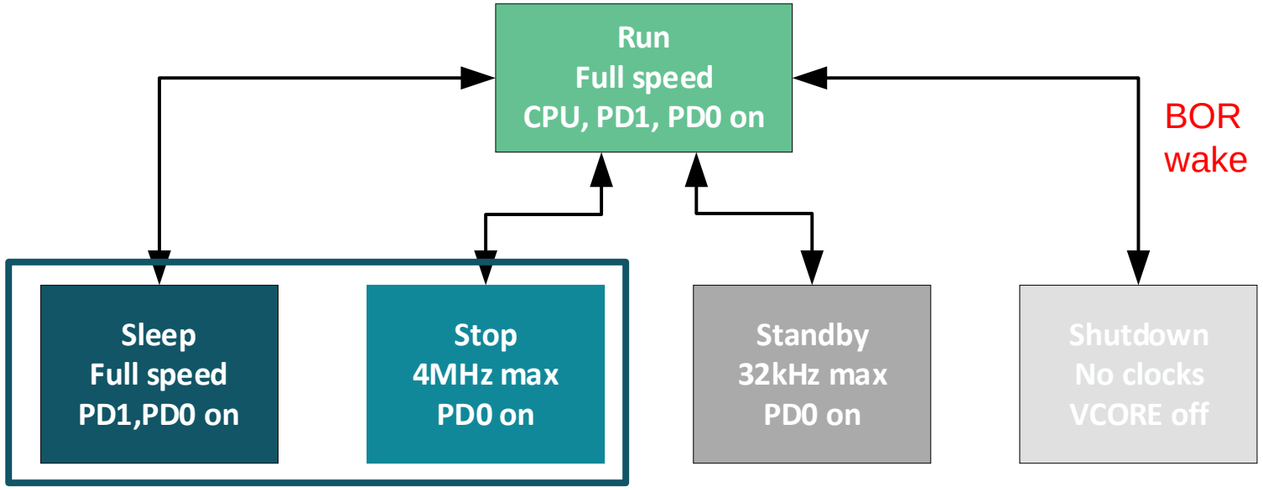
Operating Mode	RUN			SLEEP			STOP			STANDBY			SHUTDOWN
	RUN0	RUN1	RUN2	SLEEP0	SLEEP1	SLEEP2	STOP0	STOP1	STOP2	STANDBY0	STANDBY1	STANDBY2	
ADC	OPT								NS				OFF
DAC12	OPT								NS				OFF

OPT: The function is optional in the specified mode, and remains enabled if configured to be enabled.
NS: The function is not actively clocked during the specific mode but can be triggered.



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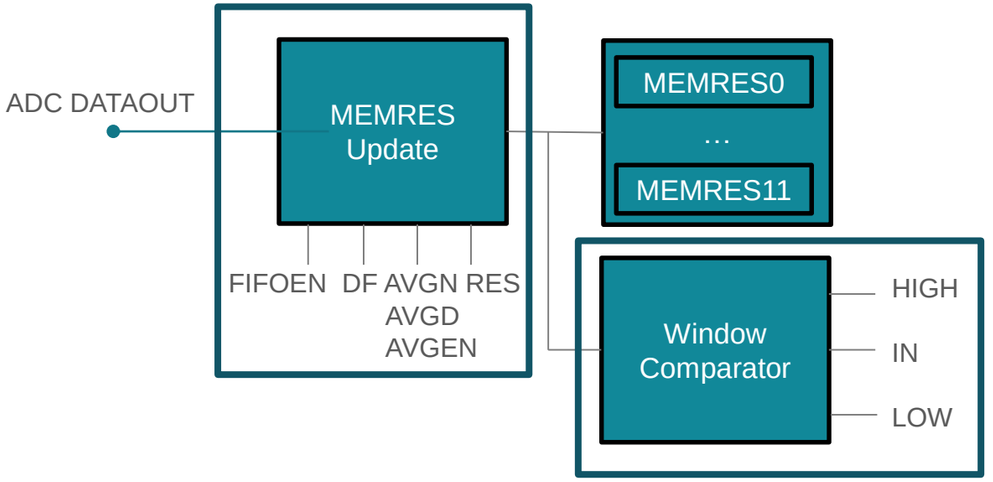

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Bit Field Value	AVGN Settings (number of samples accumulated)	AVGD Settings (number of bits to right shift)
0x0	0	0
0x1	2	1
0x2	4	2
0x3	8	3
0x4	16	4
0x5	32	5
0x6	64	6
0x7	128	7

ADC module quick start

Academy

ADC introduction lab

Driverlib Examples

MSPM0G350x:

- adc12_14bit_resolution_250ksps
- adc12_max_freq_dma
- adc12_max_freq_dma_8bit
- adc12_monitor_supply
- adc12_simultaneous_trigger_event
- adc12_simultaneous_trigger_event_stop
- adc12_single_conversion
- adc12_single_conversion_vref_external
- adc12_single_conversion_vref_internal
- adc12_triggered_by_timer_event
- adc12_triggered_by_timer_event_stop
- adc12_window_comparator

MSPM0L13xx:

- adc12_max_freq_dma
- adc12_max_freq_dma_8bit
- adc12_monitor_supply
- adc12_single_conversion
- adc12_single_conversion_vref_external
- adc12_single_conversion_vref_internal
- adc12_triggered_by_timer_event
- adc12_triggered_by_timer_event_stop
- adc12_window_comparator

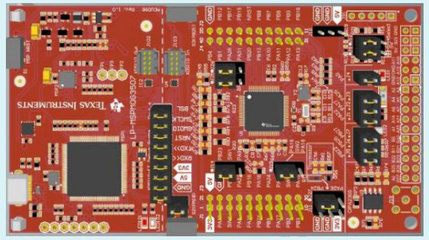
Related Links

MSPM0 online resource
MSPM0 quick start guide
MSPM0 Sysconfig user's guide

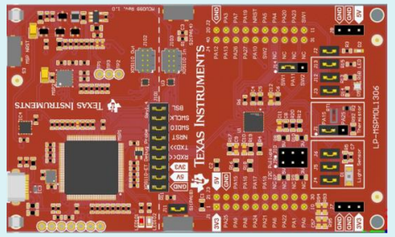
MSPM0G350x datasheet
MSPM0L13xx datasheet
MSPM0Gxx technical reference manual
MSPM0Lxx technical reference manual

Launchpad

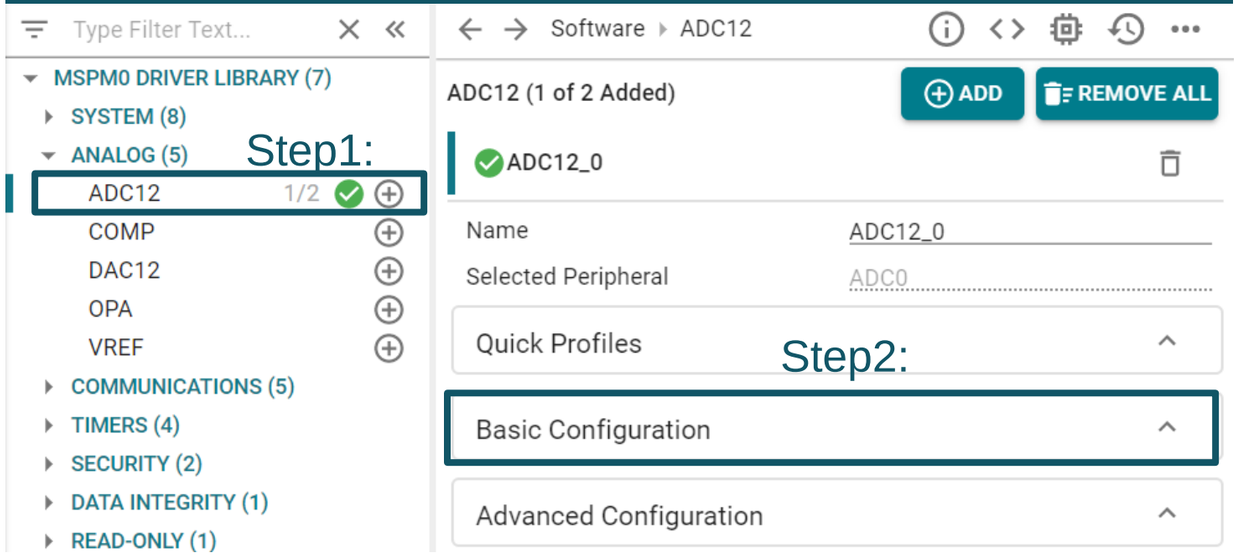
LP-MSPM0G3507



LP-MSPM0L1306



Sysconfig Entrance for ADC Setting



To find more MSPM0 training series, please visit:

- MSPM0 MCUs
- MSPM0 SDK
- MSPM0 Academies