

# **EM78F811N**

**General MCU**

(1K × 13 bits Flash)

**Date: 2017.05.12**

**Version: Rev 1.4**

# Outline

- Feature Specification
- Package Type
- System Overview
- ADC Feature
- CMP Feature

# Feature Specification

- Elan 8-bit RISC I kernel
  - 2/4/8/16 clocks per instruction cycle selected by code option
- Operating Voltage
  - 2.2V~5.5V at -40°C~85°C (Industrial)
- Clock
  - Crystal mode
  - ERC mode
  - IRC mode

Internal RC Frequency	Drift Rate (IRC Power is Regulator)			
	Temperature (-40°C~85°C)	Voltage (2.2V~5.5V)	Process*	Total
4 MHz	± 3.75%		± 1%	± 4.75%
16 MHz	± 3.75%		± 1%	± 4.75%
8 MHz	± 3.75%		± 1%	± 4.75%
1 MHz	± 3.0%		± 1%	± 4%
455 KHz	± 3.0%		± 1%	± 4%

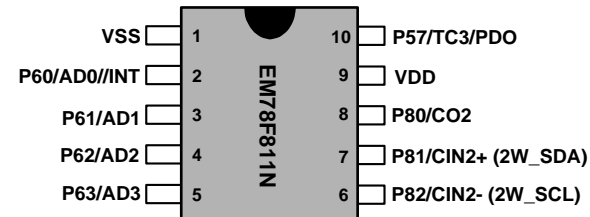
\*The drift rate is based on NUWriter trim only, detail refer to DC Electrical Characteristics

- OCDS
  - On-Chip Debug System with four breakpoints
- WDT
  - 16K/128K frequency selected by code option
- Timer & Counter
  - 8-bit real time clock (TCC)
  - One 8-bit Timer/Counter  
Timer/Counter/PDO /PWM
  - One 16-bit Timer/Counter  
Timer/Counter/PDO/PWM/Window/Buzzer/Capture
- Communication
  - UART
- ADC
  - 6+1 channels with 12-bit resolution  
Internal Vref: 2.048V/2.560V/3.072V/4.096V  
1/2 VDD power detection
- CMP
  - One set comparator with 4 to 1 CIN-
  - Offset voltage: smaller than 2 mV
- LVR/POR
  - 3 programmable Level Voltage Reset (4.0V, 3.5V, 2.5V)
  - Power-on voltage detector available (1.9V ~ 2.0V)
- I/O
  - 14 I/O pins (Max)
  - Pull high/Open drain I/O x 6 (Max)
  - Pull-down I/O x 5 (Max)
  - High sink/Wake up I/O x 6 (Max)
  - External Interrupt x 1

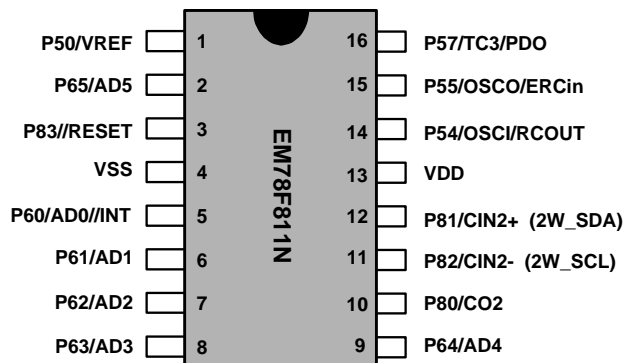
# Package Type

- 10-pin MSOP 118mil: EM78F811NMS10
- 14-pin SOP 150mil: EM78F811NSO14
- 16-pin DIP 300mil: EM78F811NAD16
- 16-pin SOP 150mil: EM78F811NASO16A

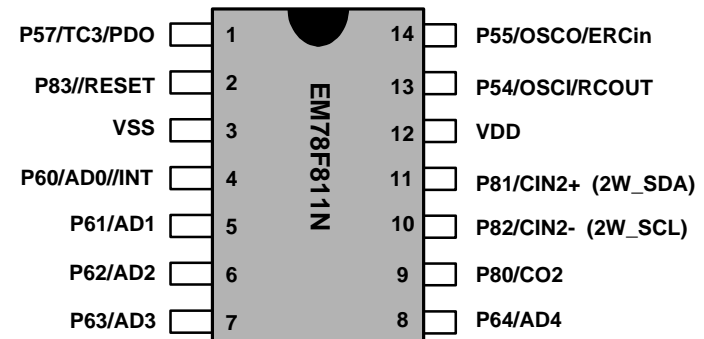
## 10-Pin MSOP



## 16-Pin DIP/SOP

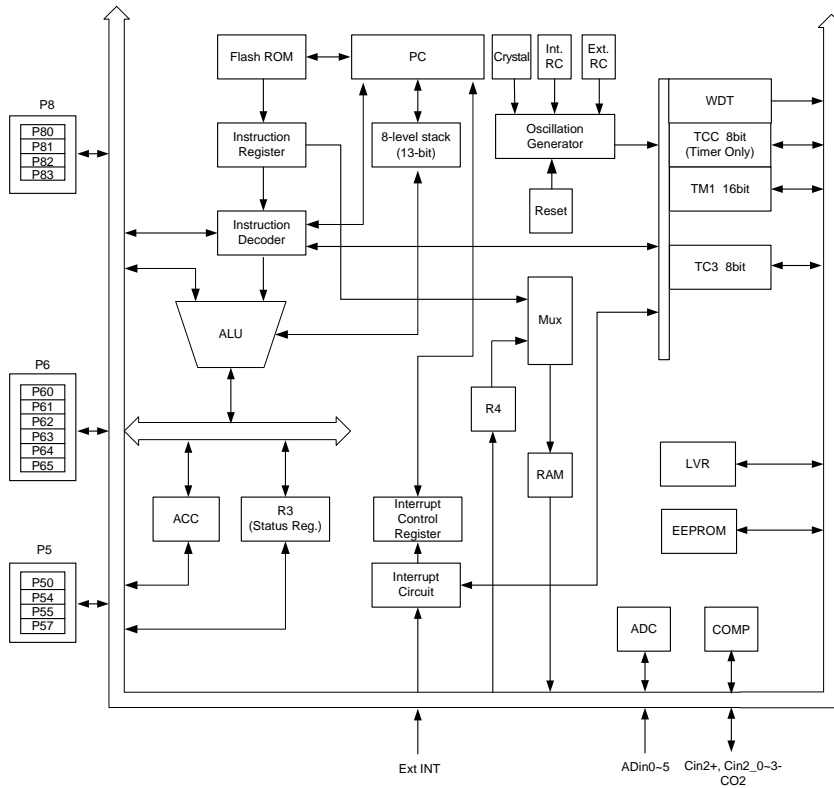


## 14-Pin SOP



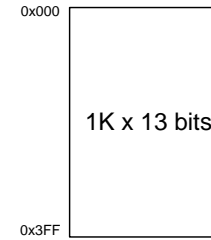
# System Overview

## Block Diagram

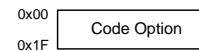


## Memory Map

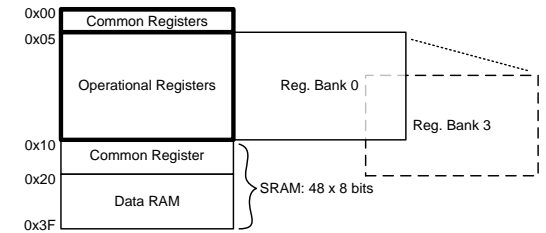
### Flash User Program Area



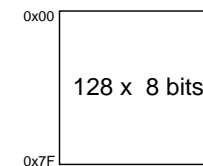
### Flash INF Area



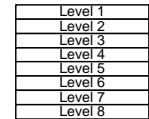
### Registers and Data RAM Memory



### EEPROM

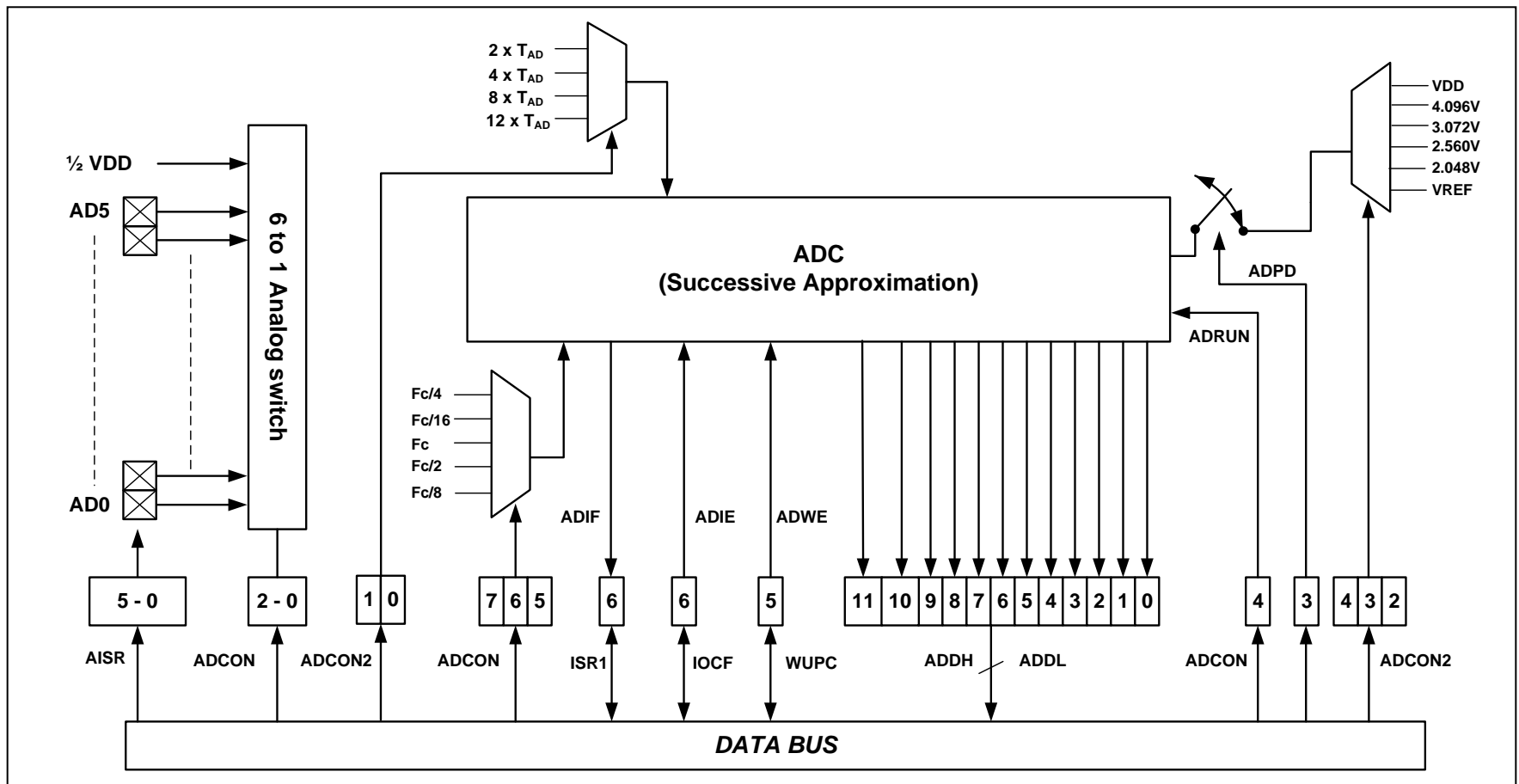


### STACK



# ADC Feature

- 6+1 channels with 12-bit resolution (INL +/- 4LSB)
- VREF: 2.048V/2.560V/3.072V/4.096V
- One of the channels is 1/2 VDD power detection
- Conversion Rate: 100 KSPS @Vdd=3.0~5.5V



# CMP Feature

- One set comparator with 4 to 1 CIN-
- Offset voltage: smaller than 2 mV
- When the internal reference is selected, the Input offset voltage at about 15mV.

