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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	ARM® Cortex®-M0
Core Size	32-Bit Single-Core
Speed	48MHz
Connectivity	I²C, IrDA, LINbus, SPI, UART/USART
Peripherals	DMA, I²S, POR, PWM, WDT
Number of I/O	39
Program Memory Size	32KB (32K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	4K x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 3.6V
Data Converters	A/D 10x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	48-LQFP
Supplier Device Package	48-LQFP (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/stmicroelectronics/stm32f050c6t6a

1 Introduction

This datasheet provides the ordering information and mechanical device characteristics of the STM32F050x4 and STM32F050x6 microcontrollers, hereafter referred to as STM32F050xx.

This datasheet should be read in conjunction with the STM32F0xxxx reference manual (RM0091). The reference manual is available from the STMicroelectronics website www.st.com.

For information on the ARM Cortex™-M0 core, please refer to the Cortex™-M0 Technical Reference Manual, available from the www.arm.com website at the following address: http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.ddi0432c/index.html.

Table 18. Programmable voltage detector characteristics (continued)

Symbol	Parameter	Conditions	Min (1)	Typ	Max (1)	Unit
V_{PVD5}	PVD threshold 5	Rising edge	2.57	2.68	2.79	V
		Falling edge	2.47	2.58	2.69	V
V_{PVD6}	PVD threshold 6	Rising edge	2.66	2.78	2.9	V
		Falling edge	2.56	2.68	2.8	V
V_{PVD7}	PVD threshold 7	Rising edge	2.76	2.88	3	V
		Falling edge	2.66	2.78	2.9	V
$V_{PVDhyst}$(2)	PVD hysteresis		-	100	-	mV
$I_{DD(PVD)}$	PVD current consumption		-	0.15	0.26	µA

1. Data based on characterization results only, not tested in production.
2. Guaranteed by design, not tested in production.

6.3.4 Embedded reference voltage

The parameters given in Table 19 are derived from tests performed under ambient temperature and V_{DD} supply voltage conditions summarized in Table 15: General operating conditions.

Table 19. Embedded internal reference voltage

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{REFINT}	Internal reference voltage	–40 °C < T_A < +105 °C	1.16	1.2	1.25	V
		–40 °C < T_A < +85 °C	1.16	1.2	1.24(1)	V
$T_{S_vrefint}$ (2)	ADC sampling time when reading the internal reference voltage		-	5.1	17.1(3)	µs
V_{REFINT}	Internal reference voltage spread over the temperature range	V_{DDA} = 3 V ±10 mV	-	-	10(3)	mV
T_{Coeff}	Temperature coefficient		-	-	100(3)	ppm/°C

1. Data based on characterization results, not tested in production.
2. Shortest sampling time can be determined in the application by multiple iterations.
3. Guaranteed by design, not tested in production.

6.3.16 Temperature sen sor characteristics

Table 52. TS characteristics

Symbol	Parameter	Min	Typ	Max	Unit
T_L(1)	V_{SENSE} linearity with temperature	-	±1	±2	°C
Avg_Slope(1)	Average slope	4.0	4.3	4.6	mV/°C
V_{25}	Voltage at 25 °C	1.34	1.43	1.52	V
t_{START}(1)	Startup time	4	-	10	µs
T_{S_temp}(1)(2)	ADC sampling time when reading the temperature	17.1	-	-	µs

1. Guaranteed by design, not tested in production.
2. Shortest sampling time can be determined in the application by multiple iterations.

6.3.17 V_{BAT} monitoring characteristics

Table 53. V_{BAT} monitoring characteristics

Symbol	Parameter	Min	Typ	Max	Unit
R	Resistor bridge for V_{BAT}	-	50	-	K
Q	Ratio on V_{BAT} measurement	-	2	-	
Er(1)	Error on Q	–1	-	+1	%
T_{S_vbat}(1)(2)	ADC sampling time when reading the V_{BAT} 1mV accuracy	5	-	-	µs

1. Guaranteed by design, not tested in production.
2. Shortest sampling time can be determined in the application by multiple iterations.

6.3.18 Timer characteristics

The parameters given in Table 54 are guaranteed by design.

Refer to Section 6.3.13: I/O port characteristics for details on the input/output alternate function characteristics (output compare, input capture, external clock, PWM output).

Table 54. TIMx (1) characteristics

Symbol	Parameter	Conditions	Min	Max	Unit
$t_{res(TIM)}$	Timer resolution time		1	-	$t_{TIMxCLK}$
		$f_{TIMxCLK}$ = 48 MHz	20.8	-	ns
f_{EXT}	Timer external clock frequency on CH1 to CH4		0	$f_{TIMxCLK}/2$	MHz
		$f_{TIMxCLK}$ = 48 MHz	0	24	MHz
Res_{TIM}	Timer resolution	TIMx (except TIM2)	-	16	bit
		TIM2	-	32	