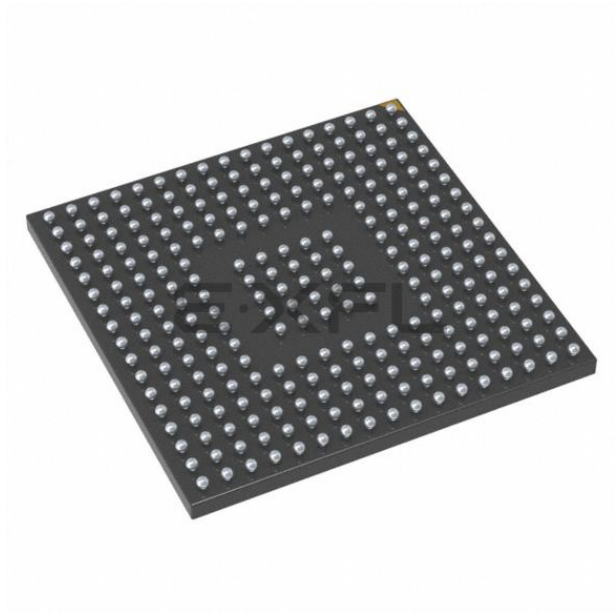

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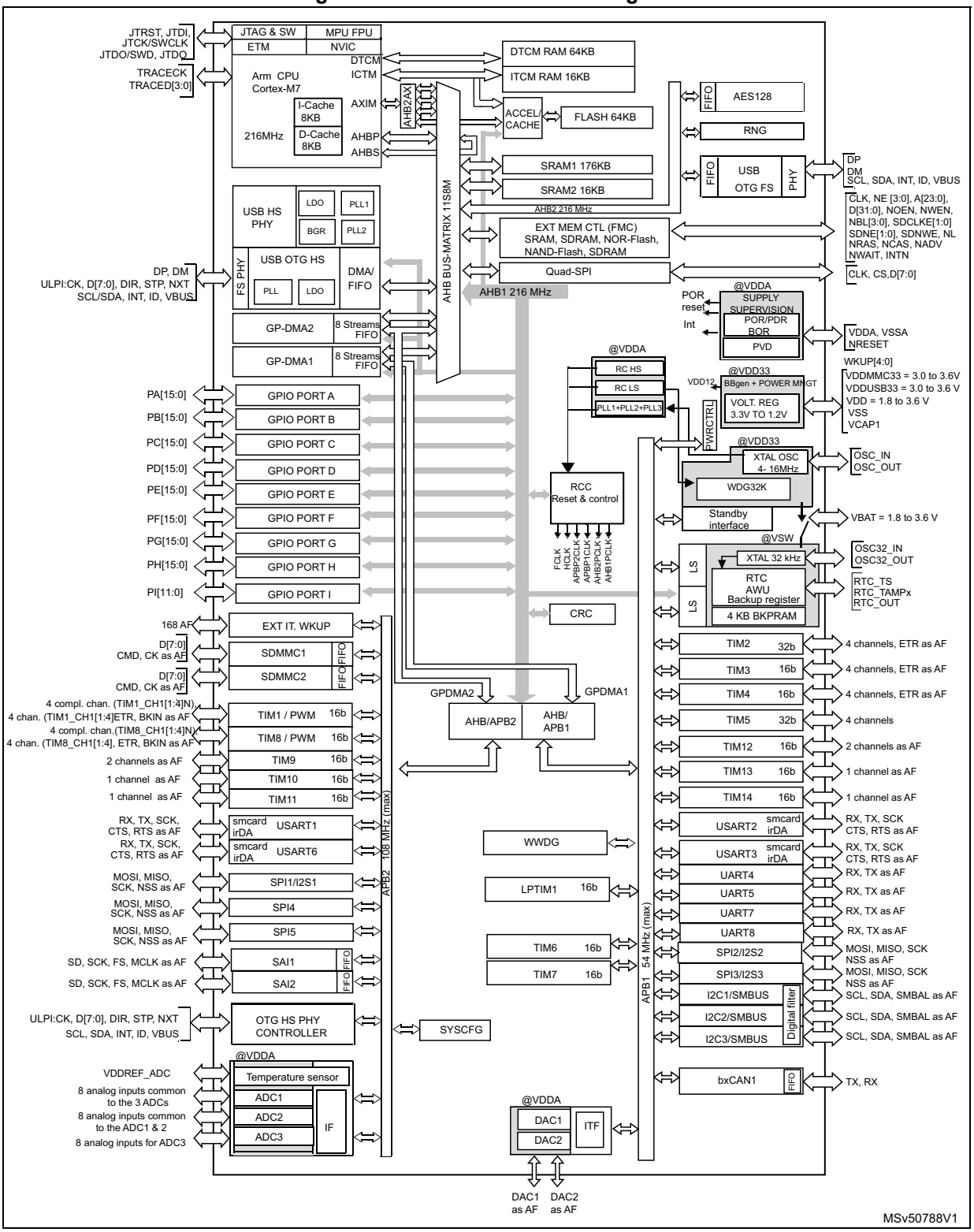
Applications of "Embedded - Microcontrollers"

Details	
Product Status	Active
Core Processor	ARM® Cortex®-M7
Core Size	32-Bit Single-Core
Speed	216MHz
Connectivity	CANbus, EBI/EMI, I²C, IrDA, LINbus, MMC/SD, QSPI, SAI, SPI, UART/USART, USB
Peripherals	Brown-out Detect/Reset, DMA, I²S, POR, PWM, WDT
Number of I/O	138
Program Memory Size	64KB (64K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	256K x 8
Voltage - Supply (Vcc/Vdd)	1.7V ~ 3.6V
Data Converters	A/D 24x12b; D/A 2x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	201-UFBGA
Supplier Device Package	176+25UFBGA (10x10)
Purchase URL	https://www.e-xfl.com/product-detail/stmicroelectronics/stm32f730i8k6

Figure 4. STM32F730x8 block diagram



1. The timers connected to APB2 are clocked from TIMxCLK up to 216 MHz, while the timers connected to APB1 are clocked from TIMxCLK either up to 108 MHz or 216 MHz depending on TIMPRE bit configuration in the RCC_DCKCFGR register.

On the STM32F7x3xx devices, the USB OTG HS sub-system uses an additional power supply pin:

- The VDD12OTGHS pin is the output of PHY HS regulator (1.2V). An external capacitor of 2.2 µF must be connected on the VDD12OTGHS pin.

3.15 Power supply supervisor

3.15.1 Internal reset ON

On packages embedding the PDR_ON pin, the power supply supervisor is enabled by holding PDR_ON high. On the other packages, the power supply supervisor is always enabled.

The device has an integrated power-on reset (POR)/ power-down reset (PDR) circuitry coupled with a Brownout reset (BOR) circuitry. At power-on, POR/PDR is always active and ensures proper operation starting from 1.8 V. After the 1.8 V POR threshold level is reached, the option byte loading process starts, either to confirm or modify default BOR thresholds, or to disable BOR permanently. Three BOR thresholds are available through option bytes. The device remains in reset mode when V_{DD} is below a specified threshold, $V_{POR/PDR}$ or V_{BOR}, without the need for an external reset circuit.

The device also features an embedded programmable voltage detector (PVD) that monitors the V_{DD}/V_{DDA} power supply and compares it to the V_{PVD} threshold. An interrupt can be generated when V_{DD}/V_{DDA} drops below the V_{PVD} threshold and/or when V_{DD}/V_{DDA} is higher than the V_{PVD} threshold. The interrupt service routine can then generate a warning message and/or put the MCU into a safe state. The PVD is enabled by software.

3.15.2 Internal reset OFF

This feature is available only on packages featuring the PDR_ON pin. The internal power-on reset (POR) / power-down reset (PDR) circuitry is disabled through the PDR_ON pin.

An external power supply supervisor should monitor V_{DD} and NRST and should maintain the device in reset mode as long as V_{DD} is below a specified threshold. PDR_ON should be connected to V_{SS}. Refer to *Figure 8: Power supply supervisor interconnection with internal reset OFF*.

Table 10. STM32F730x8 pin and ball definition (continued)

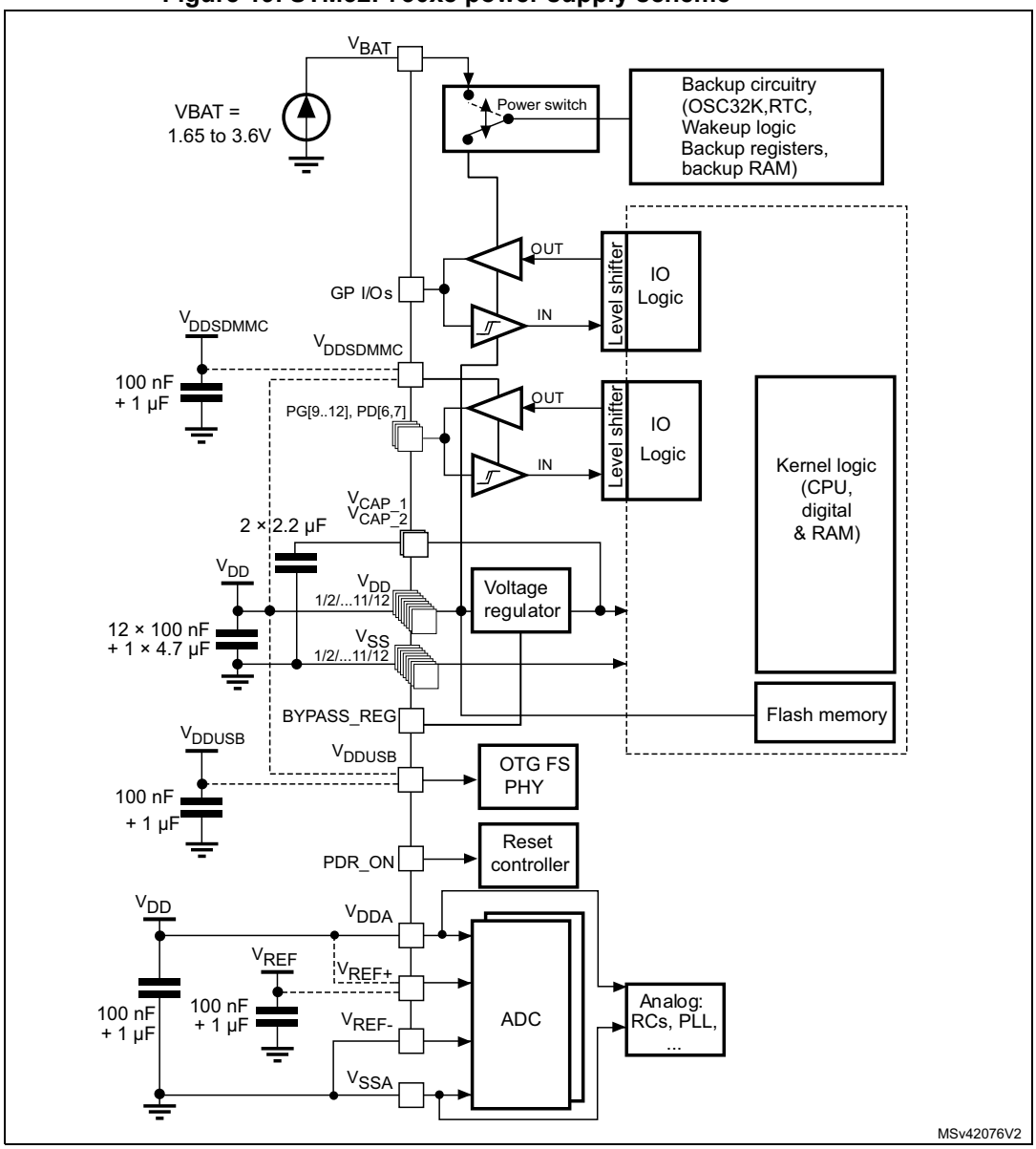
Pin Number				Pin name (function after reset)(1)	Pin type	I/O structure	Notes	Alternate functions	Additional functions
LQFP64	LQFP100	LQFP144	UFBGA176						
-	4	4	B2	PE5	I/O	FT	-	TRACED2, TIM9_CH1, SPI4_MISO, SAI1_SCK_A, FMC_A21, EVENTOUT	-
-	5	5	B3	PE6	I/O	FT	-	TRACED3, TIM1_BKIN2, TIM9_CH2, SPI4_MOSI, SAI1_SD_A, SAI2_MCK_B, FMC_A22, EVENTOUT	-
1	6	6	C1	VBAT	S	-	-	-	-
-	-	-	D2	PI8	I/O	FT	(2) (3)	EVENTOUT	RTC_TAMP2/ RTC_TS, WKUP5
2	7	7	D1	PC13	I/O	FT	(2) (3)	EVENTOUT	RTC_TAMP1/ RTC_TS/ RTC_OUT, WKUP4
3	8	8	E1	PC14-OSC32_IN(PC14)	I/O	FT	(2) (3) (5)	EVENTOUT	OSC32_IN
4	9	9	F1	PC15-OSC32_OUT(PC15)	I/O	FT	(2) (3) (5)	EVENTOUT	OSC32_OUT
-	-	-	D3	PI9	I/O	FT	-	UART4_RX, CAN1_RX, FMC_D30, EVENTOUT	-
-	-	-	E3	PI10	I/O	FT	-	FMC_D31, EVENTOUT	-
-	-	-	E4	PI11	I/O	FT	(4)	OTG_HS_ULPI_DIR, EVENTOUT	WKUP6
-	-	-	F2	VSS	S	-	-	-	-
-	-	-	F3	VDD	S	-	-	-	-
-	-	10	E2	PF0	I/O	FTf	-	I2C2_SDA, FMC_A0, EVENTOUT	-
-	-	11	H3	PF1	I/O	FTf	-	I2C2_SCL, FMC_A1, EVENTOUT	-
-	-	12	H2	PF2	I/O	FT	-	I2C2_SMBA, FMC_A2, EVENTOUT	-

Table 11. FMC pin definition

Pin name	NOR/PSRAM/SRAM	NOR/PSRAM Mux	NAND16	SDRAM
PF0	A0	-	-	A0
PF1	A1	-	-	A1
PF2	A2	-	-	A2
PF3	A3	-	-	A3
PF4	A4	-	-	A4
PF5	A5	-	-	A5
PF12	A6	-	-	A6
PF13	A7	-	-	A7
PF14	A8	-	-	A8
PF15	A9	-	-	A9
PG0	A10	-	-	A10
PG1	A11	-	-	A11
PG2	A12	-	-	A12
PG3	A13	-	-	-
PG4	A14	-	-	BA0
PG5	A15	-	-	BA1
PD11	A16	A16	CLE	-
PD12	A17	A17	ALE	-
PD13	A18	A18	-	-
PE3	A19	A19	-	-
PE4	A20	A20	-	-
PE5	A21	A21	-	-
PE6	A22	A22	-	-
PE2	A23	A23	-	-
PG13	A24	A24	-	-
PG14	A25	A25	-	-
PD14	D0	DA0	D0	D0
PD15	D1	DA1	D1	D1
PD0	D2	DA2	D2	D2
PD1	D3	DA3	D3	D3
PE7	D4	DA4	D4	D4
PE8	D5	DA5	D5	D5
PE9	D6	DA6	D6	D6
PE10	D7	DA7	D7	D7

6.1.6 Power supply scheme

Figure 19. STM32F730x8 power supply scheme



1. The two 2.2 µF ceramic capacitors should be replaced by two 100 nF decoupling capacitors when the voltage regulator is OFF.
2. The 4.7 µF ceramic capacitor must be connected to one of the V_{DD} pin.
3. $V_{DDA}=V_{DD}$ and $V_{SSA}=V_{SS}$.

Table 26. Typical and maximum current consumption in Run mode, code with data processing running from Flash memory or SRAM on AXI (L1-cache disabled), regulator ON

Symbol	Parameter	Conditions	f_{HCLK} (MHz)	Typ	Max(1)			Unit
					TA= 25 °C	TA=85 °C	TA=105 °C	
I_{DD}	Supply current in RUN mode	All peripherals enabled(2)(3)	216	129.3	137.6	162.8	173	mA
			200	122	128	153.2	163.3	
			180	108	117	136.4	146	
			168	99	104.5	122.3	132	
			144	80	84.7	99.3	109.2	
			60	42	45	59.5	70	
			25	23	23.4	37.8	48	
		All peripherals disabled(3)	216	73.3	82.3	107.4	119	
			200	70	77	101.8	113.5	
			180	62	71	90.2	101	
			168	59	63.6	81.4	92.1	
			144	49	53.3	67.9	79	
			60	26	31	45.1	56	
			25	14	16	30.6	41.2	

1. Guaranteed by characterization results.
2. When analog peripheral blocks such as ADCs, DACs, HSE, LSE, HSI, or LSI are ON, an additional power consumption should be considered.
3. When the ADC is ON (ADON bit set in the ADC_CR2 register), add an additional power consumption of 1.73 mA per ADC for the analog part.

Table 27. Typical and maximum current consumption in Run mode, code with data processing running from Flash memory on ITCM interface (ART disabled), regulator ON

Symbol	Parameter	Conditions	f_{HCLK} (MHz)	Typ	Max(1)			Unit
					TA= 25 °C	TA=85 °C	TA=105 °C	
I_{DD}	Supply current in RUN mode	All peripherals enabled(2)(3)	216	138	151	174.7	184	mA
			200	133	141	164.3	174	
			180	110	131	149.2	159	
			168	99	117	134	144	
			144	79	98	111.7	121	
			60	49	53	64	75	
			25	27	30	38.3	48	
		All peripherals disabled(3)	216	82	96	119.5	131	
			200	81	89	113.1	124	
			180	65	85	103.1	114	
			168	58	76	93.2	104	
			144	48	67	80.4	91	
			60	33	36	49.7	60	
			25	18	21	31.1	41	

1. Guaranteed by characterization results.
2. When analog peripheral blocks such as ADCs, DACs, HSE, LSE, HSI, or LSI are ON, an additional power consumption should be considered.
3. When the ADC is ON (ADON bit set in the ADC_CR2 register), add an additional power consumption of 1.73 mA per ADC for the analog part.

Table 33. Typical and maximum current consumptions in V_{BAT} mode

Symbol	Parameter	Conditions[1]	Typ			Max[2]		Unit
			T_A =25 °C			T_A =85 °C	T_A =105 °C	
			V_{BAT} = 1.7 V	V_{BAT}= 2.4 V	V_{BAT}= 3.3 V	V_{BAT} = 3.6 V		
I_{DD_VBAT}	Supply current in V_{BAT} mode	Backup SRAM OFF, RTC and LSE OFF	0.035	0.037	0.043	4	10	µA
		Backup SRAM ON, RTC and LSE OFF	0.69	0.71	0.73	9	20	
		Backup SRAM OFF, RTC ON and LSE in low drive mode	0.57	0.74	1.05	98	244	
		Backup SRAM OFF, RTC ON and LSE in medium low drive mode	0.59	0.76	1.08	101	251	
		Backup SRAM OFF, RTC ON and LSE in medium high drive mode	0.69	0.86	1.19	111	277	
		Backup SRAM OFF, RTC ON and LSE in high drive mode	0.8	0.98	1.31	122	305	
		Backup SRAM ON, RTC ON and LSE in low drive mode	1.22	1.41	1.74	162	405	
		Backup SRAM ON, RTC ON and LSE in Medium low drive mode	1.25	1.43	1.78	166	414	
		Backup SRAM ON, RTC ON and LSE in Medium high drive mode	1.46	1.65	2.01	187	468	
		Backup SRAM ON, RTC ON and LSE in High drive mode	1.46	1.65	2.01	187	468	

1. Crystal used: Abracon ABS07-120-32.768 kHz-T with a C_L of 6 pF for typical values.
2. Guaranteed by characterization results.

Table 35. Peripheral current consumption

Peripheral		I_{DD}(Typ)(1)			Unit
		Scale 1	Scale 2	Scale 3	
AHB1 (up to 216 MHz)	GPIOA	3.6	3.4	2.9	µA/MHz
	GPIOB	3.7	3.6	3.1	
	GPIOC	3.7	3.4	3.0	
	GPIOD	3.7	3.6	3.0	
	GPIOE	3.6	3.4	2.9	
	GPIOF	3.5	3.4	2.9	
	GPIOG	3.5	3.3	2.8	
	GPIOH	3.5	3.4	2.9	
	GPIOI	3.5	3.3	2.9	
	CRC	1.2	1.1	0.9	
	BKPSRAM	0.8	0.7	0.6	
	DMA1	3.07 x N + 8.7	2.98 x N + 8.4	2.52 x N + 7.02	
	DMA2	3.01 x N + 7.98	2.95 x N + 7.95	2.48 x N + 6.69	
	OTG_HS+ULPI	54.4	53.2	44.6	
AHB2 (up to 216 MHz)	RNG	1.9	1.8	1.6	µA/MHz
	USB_OTG_FS	28.7	27.9	23.5	
	AES	-	-	-	
AHB3 (up to 216 MHz)	FMC	16.2	15.8	13.3	µA/MHz
	QSPI	16.9	16.3	13.8	
Bus matrix(2)		15.8	12.8	8.5	µA/MHz

6.3.10 Internal clock source characteristics

The parameters given in *Table 42* and *Table 43* are derived from tests performed under ambient temperature and V_{DD} supply voltage conditions summarized in *Table 16*.

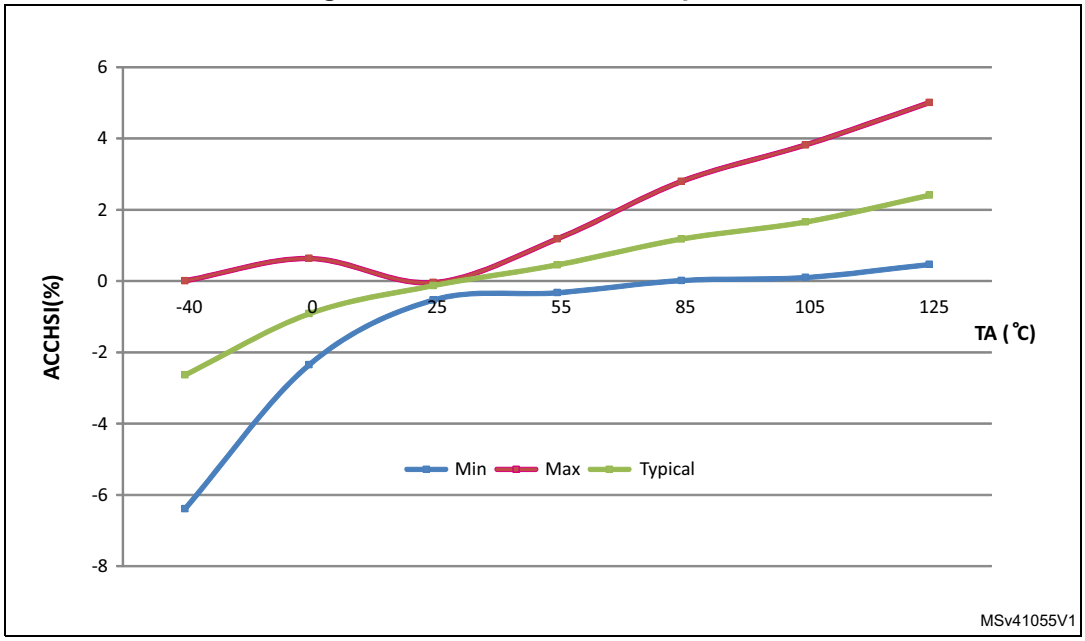
High-speed internal (HSI) RC oscillator

Table 42. HSI oscillator characteristics (1)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f_{HSI}	Frequency	-	-	16	-	MHz
ACC_{HSI}	HSI user trimming step(2)	-	-	-	1	%
	Accuracy of the HSI oscillator	T_A = –40 to 105 °C(3)	− 8	-	4.5	%
		T_A = –10 to 85 °C(3)	− 4	-	4	%
		T_A = 25 °C(4)	− 1	-	1	%
$t_{su(HSI)}$(2)	HSI oscillator startup time	-	-	2.2	4	µs
$I_{DD(HSI)}$(2)	HSI oscillator power consumption	-	-	60	80	µA

1. V_{DD} = 3.3 V, T_A = –40 to 105 °C unless otherwise specified.
2. Guaranteed by design.
3. Guaranteed by characterization results.
4. Factory calibrated, parts not soldered.

Figure 32. ACCHSI versus temperature



1. Guaranteed by characterization results.

Table 46. PLLISAI characteristics (continued)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{DD(PLLSAI)}$(4)	PLLSAI power consumption on V_{DD}	VCO freq = 100 MHz VCO freq = 432 MHz	0.15 0.45	-	0.40 0.75	mA
$I_{DDA(PLLSAI)}$(4)	PLLSAI power consumption on V_{DDA}	VCO freq = 100 MHz VCO freq = 432 MHz	0.30 0.55	-	0.40 0.85	mA

1. Take care of using the appropriate division factor M to have the specified PLL input clock values.
2. Guaranteed by design.
3. Value given with main PLL running.
4. Guaranteed by characterization results.

6.3.12 PLL spread spectrum clock generation (SSCG) characteristics

The spread spectrum clock generation (SSCG) feature allows to reduce electromagnetic interferences (see *Table 57: EMI characteristics*). It is available only on the main PLL.

Table 47. SSCG parameters constraint

Symbol	Parameter	Min	Typ	Max(1)	Unit
f_{Mod}	Modulation frequency	-	-	10	KHz
md	Peak modulation depth	0.25	-	2	%
MODEPER * INCSTEP	-	-	-	$2^{15} - 1$	-

1. Guaranteed by design.

Equation 1

The frequency modulation period (MODEPER) is given by the equation below:

$$MODEPER = round[f_{PLL\_IN} / (4 \times f_{Mod})]$$

f_{PLL_IN} and f_{Mod} must be expressed in Hz.

As an example:

If f_{PLL_IN} = 1 MHz, and f_{MOD} = 1 kHz, the modulation depth (MODEPER) is given by equation 1:

$$MODEPER = round[10^6 / (4 \times 10^3)] = 250$$

Equation 2

Equation 2 allows to calculate the increment step (INCSTEP):

$$INCSTEP = round[((2^{15} - 1) \times md \times PLLN) / (100 \times 5 \times MODEPER)]$$

f_{VCO_OUT} must be expressed in MHz.

With a modulation depth (md) = ±2 % (4 % peak to peak), and PLLN = 240 (in MHz):

$$INCSTEP = round[((2^{15} - 1) \times 2 \times 240) / (100 \times 5 \times 250)] = 126md(quantitazed)\%$$

Table 58. ESD absolute maximum ratings

Symbol	Ratings	Conditions	Class	Maximum value(1)	Unit
$V_{ESD(HBM)}$	Electrostatic discharge voltage (human body model)	T_A = +25 °C conforming to ANSI/ESDA/JEDEC JS-001-2012	2	2000	V
$V_{ESD(CDM)}$	Electrostatic discharge voltage (charge device model)	T_A = +25 °C conforming to ANSI/ESD STM5.3.1-2009, all the packages excepted WLCSP100	3	250	

1. Guaranteed by characterization results.

Static latchup

Two complementary static tests are required on six parts to assess the latchup performance:

- A supply overvoltage is applied to each power supply pin
- A current injection is applied to each input, output and configurable I/O pin

These tests are compliant with EIA/JESD 78A IC latchup standard.

Table 59. Electrical sensitivities

Symbol	Parameter	Conditions	Class
LU	Static latch-up class	T_A = +105 °C conforming to JESD78A	II level A

6.3.19 I/O current injection characteristics

As a general rule, current injection to the I/O pins, due to external voltage below V_{SS} or above V_{DD} (for standard, 3 V-capable I/O pins) should be avoided during normal product operation. However, in order to give an indication of the robustness of the microcontroller in cases when abnormal injection accidentally happens, susceptibility tests are performed on a sample basis during device characterization.

Functional susceptibilty to I/O current injection

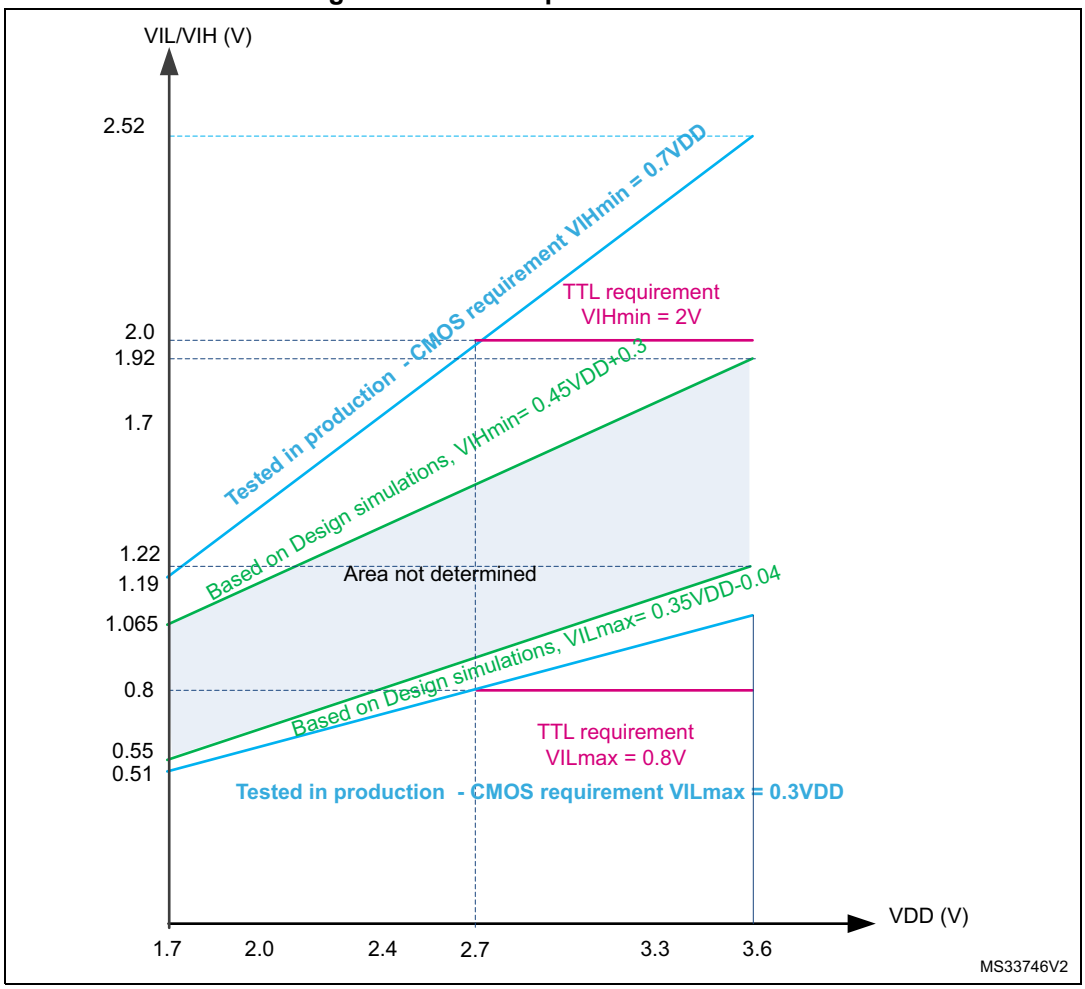
While a simple application is executed on the device, the device is stressed by injecting current into the I/O pins programmed in floating input mode. While current is injected into the I/O pin, one at a time, the device is checked for functional failures.

The failure is indicated by an out of range parameter: ADC error above a certain limit (>5 LSB TUE), out of conventional limits of induced leakage current on adjacent pins (out of –5 µA/+0 µA range), or other functional failure (for example reset, oscillator frequency deviation).

Negative induced leakage current is caused by negative injection and positive induced leakage current by positive injection.

The test results are given in *Table 60*.

Figure 36. FT I/O input characteristics



Output driving current

The GPIOs (general purpose input/outputs) can sink or source up to ±8 mA, and sink or source up to ±20 mA (with a relaxed V_{OL}/V_{OH}) except PC13, PC14, PC15 and PI8 which can sink or source up to ±3mA. When using the PC13 to PC15 and PI8 GPIOs in output mode, the speed should not exceed 2 MHz with a maximum load of 30 pF.

In the user application, the number of I/O pins which can drive current must be limited to respect the absolute maximum rating specified in *Section 6.2*. In particular:

- The sum of the currents sourced by all the I/Os on $V_{DD,}$ plus the maximum Run consumption of the MCU sourced on $V_{DD,}$ cannot exceed the absolute maximum rating ΣI_{VDD} (see *Table 14*).
- The sum of the currents sunk by all the I/Os on V_{SS} plus the maximum Run consumption of the MCU sunk on V_{SS} cannot exceed the absolute maximum rating ΣI_{VSS} (see *Table 14*).

Output voltage levels

Unless otherwise specified, the parameters given in *Table 62* are derived from tests performed under ambient temperature and V_{DD} supply voltage conditions summarized in *Table 16*. All I/Os are CMOS and TTL compliant.

6.3.21 NRST pin characteristics

The NRST pin input driver uses CMOS technology. It is connected to a permanent pull-up resistor, R_{PU} (see *Table 61: I/O static characteristics*).

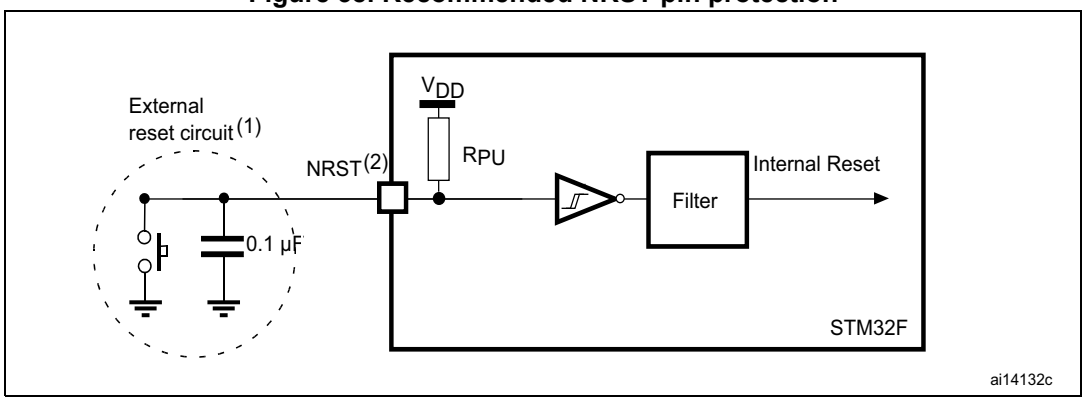
Unless otherwise specified, the parameters given in *Table 64* are derived from tests performed under the ambient temperature and V_{DD} supply voltage conditions summarized in *Table 16*.

Table 64. NRST pin characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R_{PU}	Weak pull-up equivalent resistor(1)	$V_{IN} = V_{SS}$	30	40	50	kΩ
$V_{F(NRST)}$(2)	NRST Input filtered pulse	-	-	-	100	ns
$V_{NF(NRST)}$(2)	NRST Input not filtered pulse	$V_{DD} > 2.7$ V	300	-	-	ns
T_{NRST_OUT}	Generated reset pulse duration	Internal Reset source	20	-	-	µs

1. The pull-up is designed with a true resistance in series with a switchable PMOS. This PMOS contribution to the series resistance must be minimum (~10% order).
2. Guaranteed by design.

Figure 38. Recommended NRST pin protection



1. The reset network protects the device against parasitic resets. 0.1 uF capacitor must be placed as close as possible to the chip.
2. The user must ensure that the level on the NRST pin can go below the $V_{IL(NRST)}$ max level specified in *Table 64*. Otherwise the reset is not taken into account by the device.

Figure 45. SPI timing diagram - slave mode and CPHA = 1

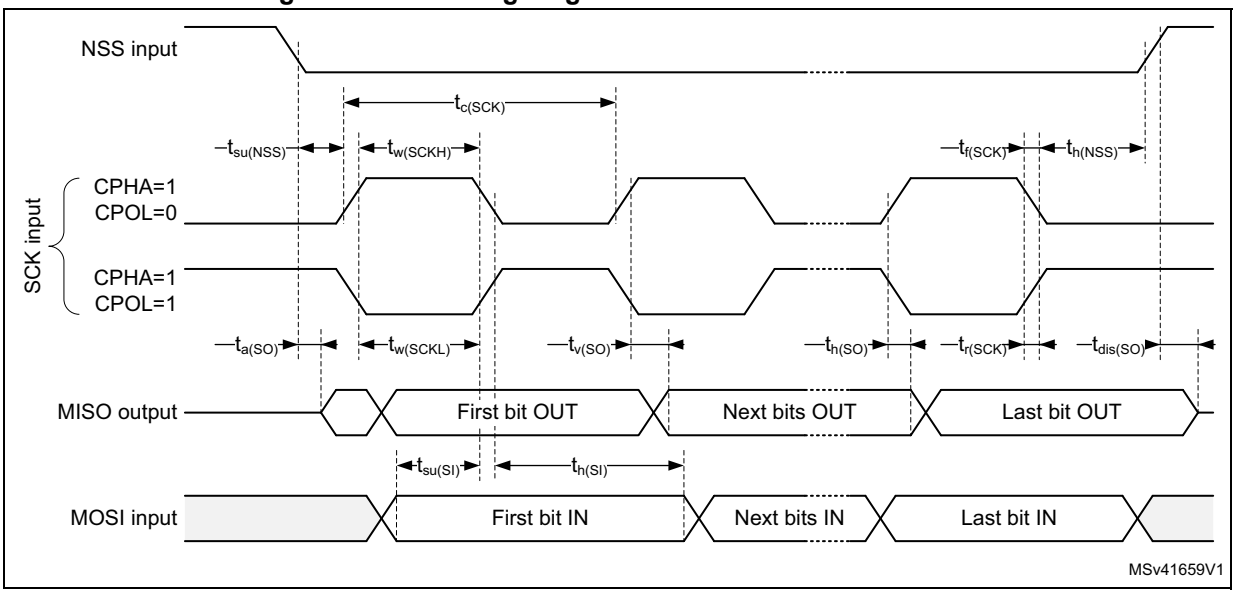


Figure 46. SPI timing diagram - master mode

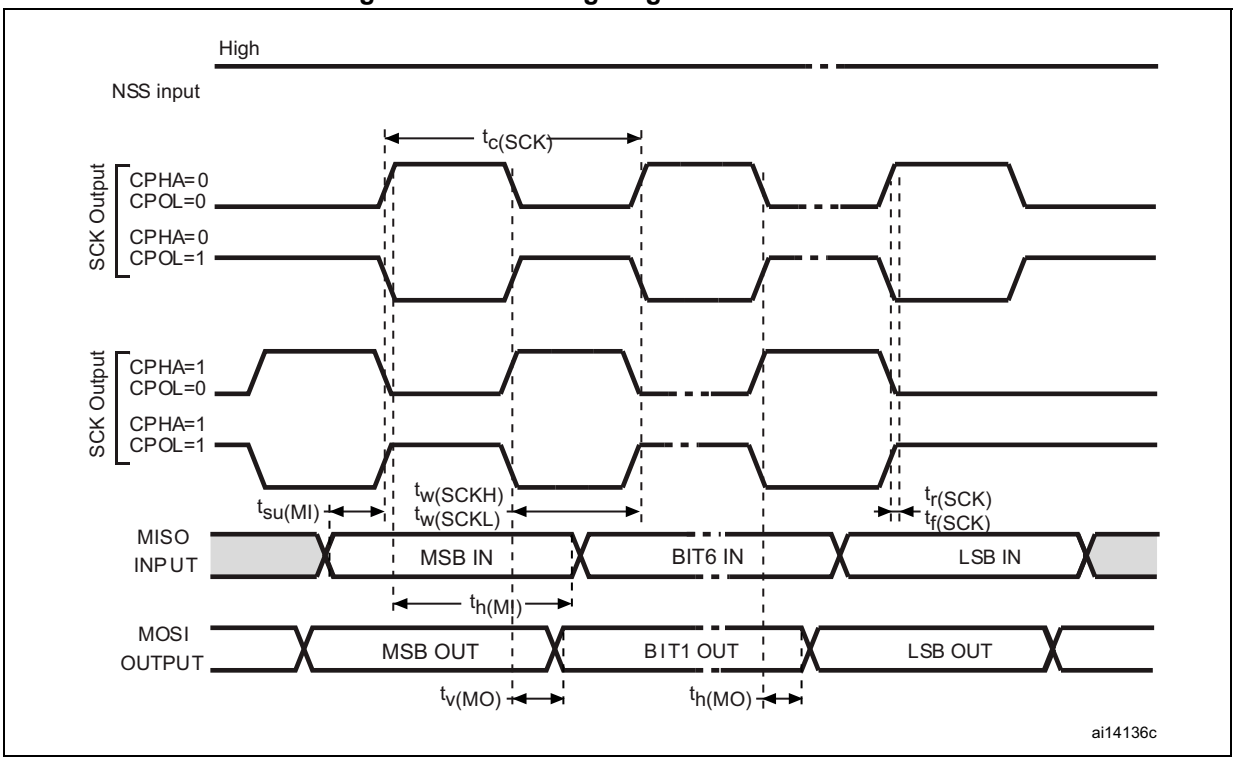


Table 89. Dynamic characteristics: USB ULPI(1)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t_{SC}	Control in (ULPI_DIR, ULPI_NXT) setup time	-	1.5	-	-	ns
t_{HC}	Control in (ULPI_DIR, ULPI_NXT) hold time	-	1	-	-	
t_{SD}	Data in setup time	-	1.5	-	-	
t_{HD}	Data in hold time	-	1	-	-	
t_{DC}/t_{DD}	Data/control output delay	2.7 V < V_{DD} < 3.6 V, C_L = 20 pF and OSPEEDRy[1:0] = 11	-	6	7.5	
		-	-	9.5	11	
		1.7 V < V_{DD} < 3.6 V, C_L = 15 pF and OSPEEDRy[1:0] = 11	-			

1. Guaranteed by characterization results.

USB high speed (HS) characteristics (embedded PHY High speed on STM32F730x8 devices)

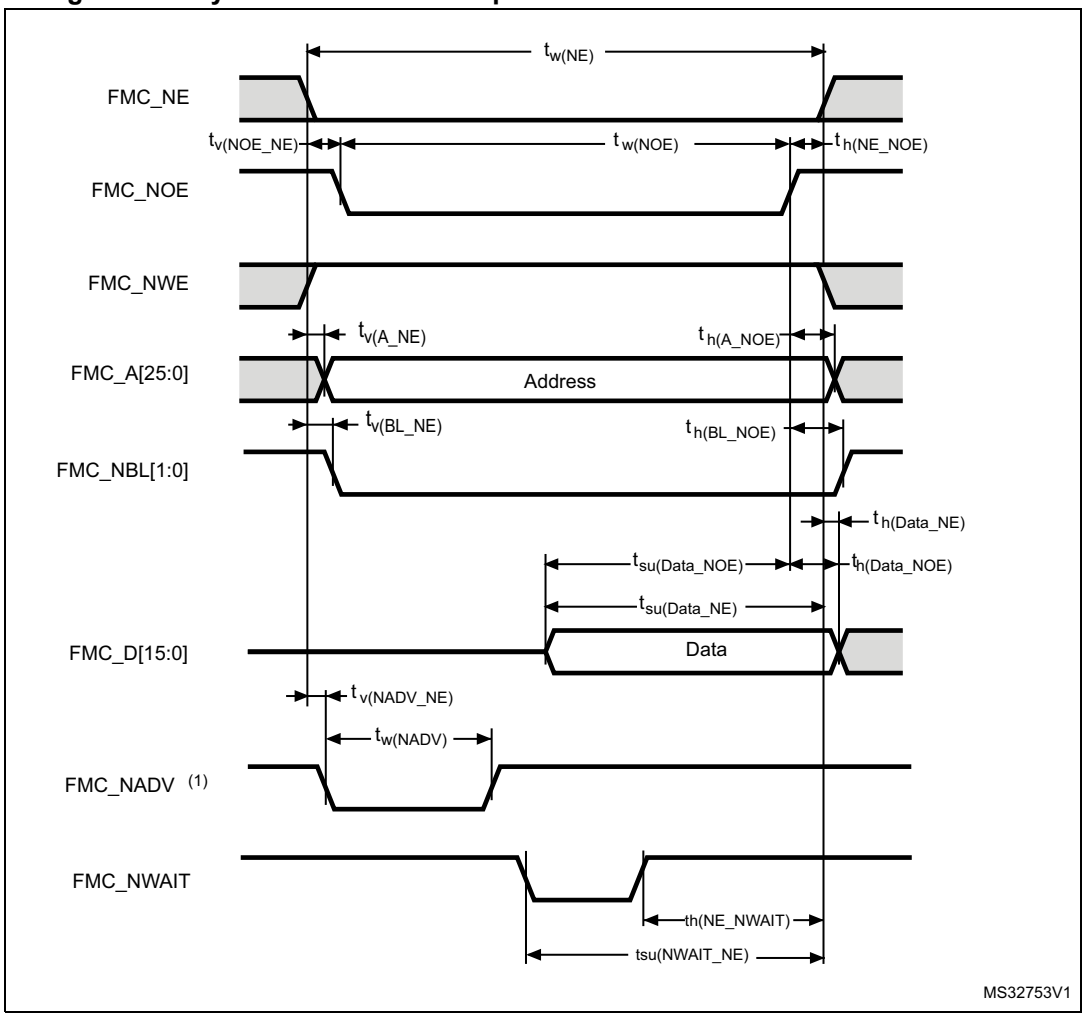
Table 90. USB OTG high speed DC electrical characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{hssq}	High speed squelch detection threshold	-	100	-	150	mV
V_{hsdsc}	High speed disconnect detection threshold	-	525	-	625	mV
V_{hsdif}	High speed differential detection threshold	-	100	-	-	mV
V_{hscm}	High speed data signalling common mode voltage range	-	-50	-	500	mV
V_{hsoi}	High speed idle level	-	-10	-	10	mV
V_{hsoh}	High speed data signaling high	-	360	-	440	mV
V_{hsol}	High speed data signaling low	-	-10	-	10	mV
V_{chirpj}	Chirp J level	-	700	-	1100	mV
V_{chirpk}	Chirp K level	-	-900	-	-500	mV

Table 91. USB OTG high speed electrical characteristics

Parameter	Comments	Conditions	Min	Typ	Max	Unit
t_{lr}	Rise time	-	0.5	-	-	ns
t_{lf}	Fall time	-	0.5	-	-	ns
t_{lrfm}	Setup time from INHSDRIVERENABLE=1 to the transition on INHSDATAP/INHSDATAN	-	10	-	-	ns
Z_{drv}	Driver output impedance	-	40.5	-	49.5	Ω

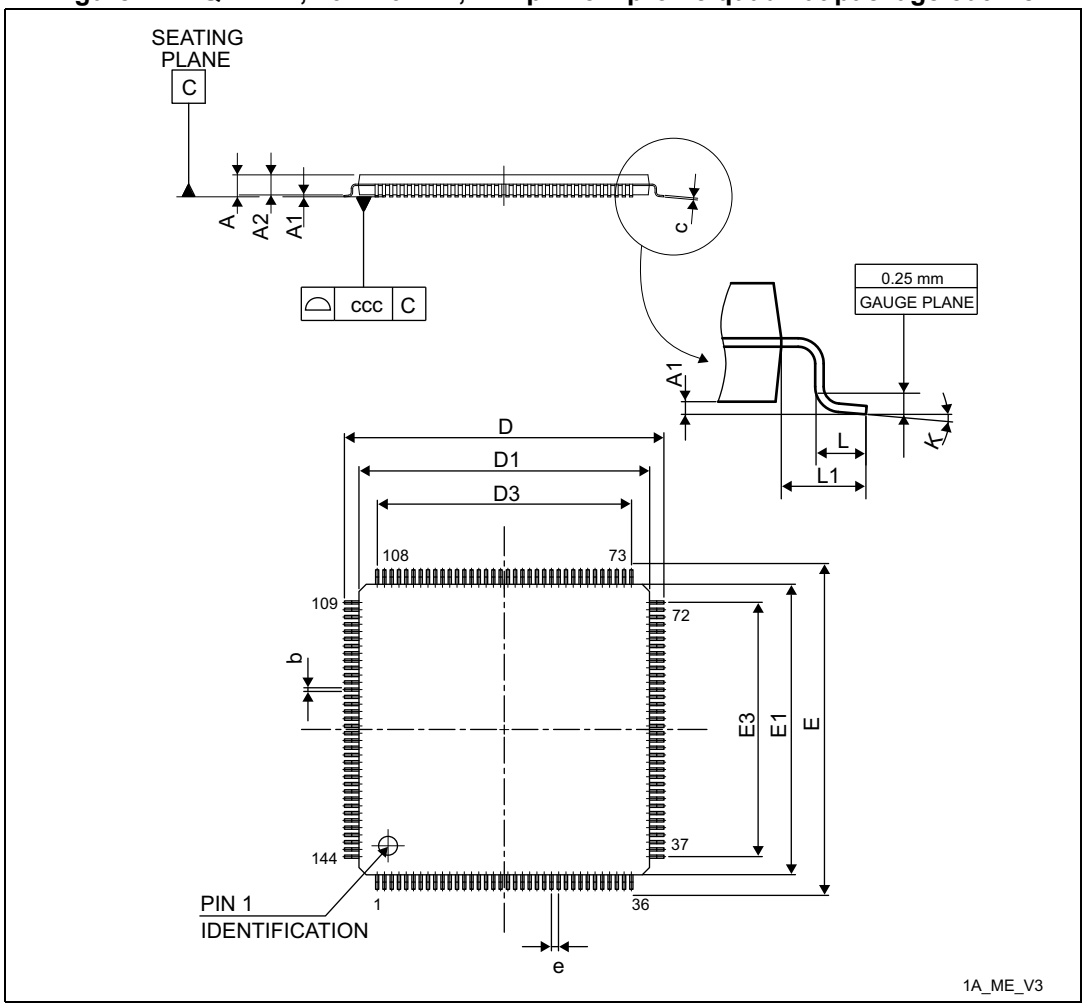
Figure 53. Asynchronous non-multiplexed SRAM/PSRAM/NOR read waveforms



1. Mode 2/B, C and D only. In Mode 1, FMC_NADV is not used.

7.3 LQFP144, 20 x 20 mm low-profile quad flat package information

Figure 77. LQFP144, 20 x 20 mm, 144-pin low-profile quad flat package outline



1. Drawing is not to scale.

Table 117. LQFP144, 20 x 20 mm, 144-pin low-profile quad flat package mechanical data

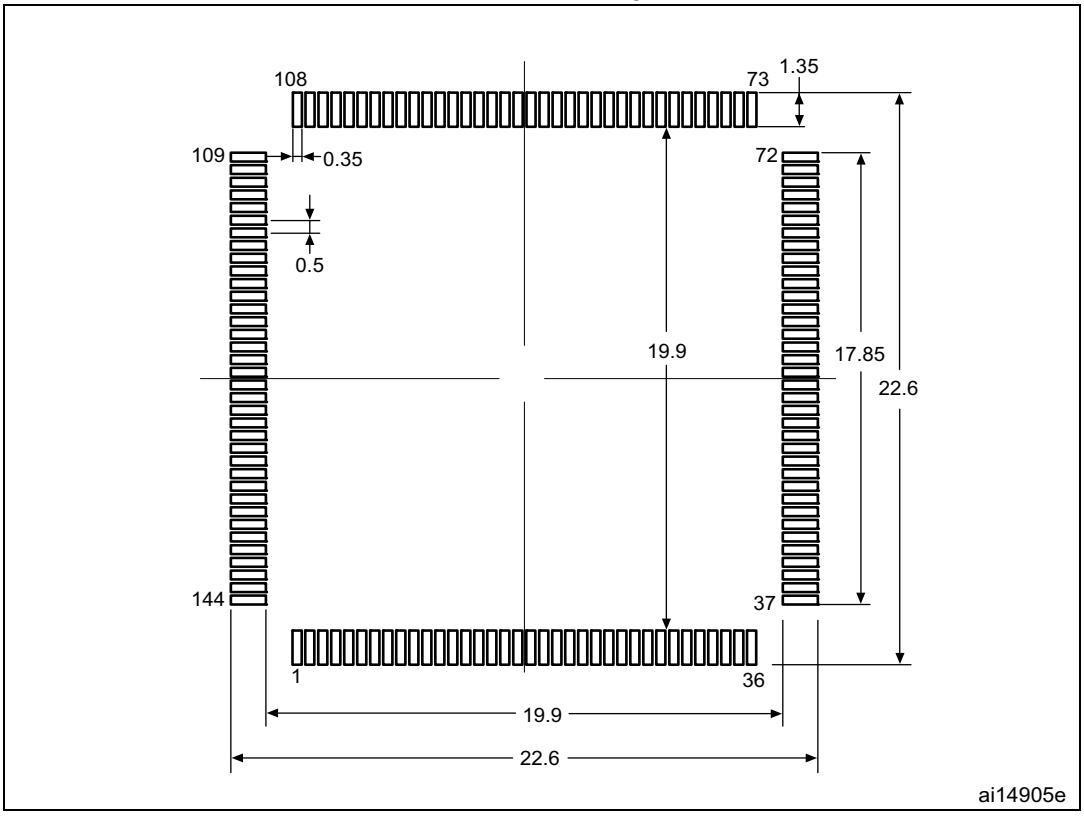
Symbol	millimeters			inches(1)		
	Min	Typ	Max	Min	Typ	Max
A	-	-	1.600	-	-	0.0630
A1	0.050	-	0.150	0.0020	-	0.0059
A2	1.350	1.400	1.450	0.0531	0.0551	0.0571
b	0.170	0.220	0.270	0.0067	0.0087	0.0106
c	0.090	-	0.200	0.0035	-	0.0079
D	21.800	22.000	22.200	0.8583	0.8661	0.874

Table 117. LQFP144, 20 x 20 mm, 144-pin low-profile quad flat package mechanical data (continued)

Symbol	millimeters			inches[1]		
	Min	Typ	Max	Min	Typ	Max
D1	19.800	20.000	20.200	0.7795	0.7874	0.7953
D3	-	17.500	-	-	0.689	-
E	21.800	22.000	22.200	0.8583	0.8661	0.8740
E1	19.800	20.000	20.200	0.7795	0.7874	0.7953
E3	-	17.500	-	-	0.6890	-
e	-	0.500	-	-	0.0197	-
L	0.450	0.600	0.750	0.0177	0.0236	0.0295
L1	-	1.000	-	-	0.0394	-
k	0°	3.5°	7°	0°	3.5°	7°
ccc	-	-	0.080	-	-	0.0031

1. Values in inches are converted from mm and rounded to 4 decimal digits.

Figure 78. LQFP144, 20 x 20 mm, 144-pin low-profile quad flat package recommended footprint



1. Dimensions are expressed in millimeters.