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Applications of "Embedded - Microcontrollers"

Details	
Product Status	Not For New Designs
Core Processor	STM8A
Core Size	8-Bit
Speed	24MHz
Connectivity	CANbus, I²C, LINbus, SPI, UART/USART
Peripherals	Brown-out Detect/Reset, POR, PWM, WDT
Number of I/O	38
Program Memory Size	32KB (32K x 8)
Program Memory Type	FLASH
EEPROM Size	1K x 8
RAM Size	6K x 8
Voltage - Supply (Vcc/Vdd)	3V ~ 5.5V
Data Converters	A/D 10x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 150°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/stm8af5268tdy

5.7.4 Advanced control and general purpose timers 20
5.7.5 Basic timer 21
5.8 Analog to digital converter (ADC) 22
5.9 Communication interfaces 22
5.9.1 Universal synchronous/asynchronous receiver transmitter (USART) . . 22
5.9.2 Universal asynchronous receiver/transmitter with LIN support (LINUART) 24
5.9.3 Serial peripheral interface (SPI) 25
5.9.4 Inter integrated circuit (I^2C) interface 25
5.9.5 Controller area network interface (beCAN) 26
5.10 Input/output specifications 27

6 Pinouts and pin description 28
6.1 Package pinouts 28
6.2 Alternate function remapping 39

7 Memory and register map 40
7.1 Memory map 40
7.2 Register map 41

8 Interrupt table 53

9 Option bytes 54

10 Electrical characteristics 59
10.1 Parameter conditions 59
10.1.1 Minimum and maximum values 59
10.1.2 Typical values 59
10.1.3 Typical curves 59
10.1.4 Loading capacitor 59
10.1.5 Pin input voltage 60
10.2 Absolute maximum ratings 60
10.3 Operating conditions 62
10.3.1 VCAP external capacitor 63
10.3.2 Supply current characteristics 63
10.3.3 External clock sources and timing characteristics 68
10.3.4 Internal clock sources and timing characteristics 70

5.9.3 Serial peripheral interface (SPI)

The devices covered by this datasheet contain one SPI. The SPI is available on all the supported packages.

- Maximum speed: 10 Mbit/s or $f_{MASTER}/2$ for master, 8 Mbit/s or f_{MASTER} /2 for slave
- Full duplex synchronous transfers
- Simplex synchronous transfers on two lines with a possible bidirectional data line
- Master or slave operation - selectable by hardware or software
- CRC calculation
- 1 byte Tx and Rx buffer
- Slave mode/master mode management by hardware or software for both master and slave
- Programmable clock polarity and phase
- Programmable data order with MSB-first or LSB-first shifting
- Dedicated transmission and reception flags with interrupt capability
- SPI bus busy status flag
- Hardware CRC feature for reliable communication:
  - CRC value can be transmitted as last byte in Tx mode
  - CRC error checking for last received byte

5.9.4 Inter integrated circuit (I^2C) interface

The devices covered by this datasheet contain one I^2C interface. The interface is available on all the supported packages.

- I^2C master features:
  - Clock generation
  - Start and stop generation
- I^2C slave features:
  - Programmable I^2C address detection
  - Stop bit detection
- Generation and detection of 7-bit/10-bit addressing and general call
- Supports different communication speeds:
  - Standard speed (up to 100 kHz),
  - Fast speed (up to 400 kHz)
- Status flags:
  - Transmitter/receiver mode flag
  - End-of-byte transmission flag
  - I^2C busy flag
- Error flags:
  - Arbitration lost condition for master mode
  - Acknowledgement failure after address/data transmission
  - Detection of misplaced start or stop condition
  - Overrun/underrun if clock stretching is disabled

- Interrupt:
  - Successful address/data communication
  - Error condition
  - Wakeup from Halt
- Wakeup from Halt on address detection in slave mode

5.9.5 Controller area network interface (beCAN)

The beCAN controller (basic enhanced CAN), interfaces the CAN network and supports the CAN protocol version 2.0A and B. It is equipped with a receive FIFO and a very versatile filter bank. Together with a filter match index, this allows a very efficient message handling in today's car network architectures. The CPU is significantly unloaded. The maximum transmission speed is 1 Mbit/s.

Transmission

- Three transmit mailboxes
- Configurable transmit priority by identifier or order request

Reception

- 11- and 29-bit ID
- 1 receive FIFO (3 messages deep)
- Software-efficient mailbox mapping at a unique address space
- FMI (filter match index) stored with message for quick message association
- Configurable FIFO overrun
- Time stamp on SOF reception
- 6 filter banks, 2 x 32 bytes (scalable to 4 x 16-bit) each, enabling various masking configurations, such as 12 filters for 29-bit ID or 48 filters for 11-bit ID.
- Filtering modes (mixable):
  - Mask mode permitting ID range filtering
  - ID list mode

Interrupt management

- Maskable interrupt
- Software-efficient mailbox mapping at a unique address space

Table 10. Legend/abbreviation for the pin description table

Type	I= input, O = output, S = power supply	
Level	Input	CM = CMOS (standard for all I/Os)
	Output	HS = high sink (8 mA)
Output speed	O1 = Standard (up to 2 MHz) O2 = Fast (up to 10 MHz) O3 = Fast/slow programmability with slow as default state after reset O4 = Fast/slow programmability with fast as default state after reset	
Port and control configuration	Input	float = floating, wpu = weak pull-up
	Output	T = true open drain, OD = open drain, PP = push pull
Reset state	Bold X (pin state after reset release). Unless otherwise specified, the pin state is the same during the reset phase (i.e. “under reset”) and after internal reset release (i.e. at reset state).	

Table 11. STM8AF526x/8x/Ax and STM8AF6269/8x/Ax pin description

Pin number					Pin name	Type	Input			Output				Main function (after reset)	Default alternate function	Alternate function after remap [option bit]
LQFP80	LQFP64	LQFP48	STM8AF62xx LQFP32/VFQFPN32	STM8AF52x6 VFQFPN32			Floating	Wpu	Ext. interrupt	High sink	Speed	OD	PP			
1	1	1	1	1	NRST	I/O	-	**X**	-	-	-	-	-	Reset		-
2	2	2	2	2	PA1/OSCIN(1)	I/O	**X**	X	-	-	O1	X	X	**Port A1**	Resonator/ crystal in	-
3	3	3	3	3	PA2/OSCOUT	I/O	**X**	X	X	-	O1	X	X	**Port A2**	Resonator/ crystal out	-
4	4	4	-	-	V_{SSIO_1}	S	-	-	-	-	-	-	-	I/O ground		-
5	5	5	4	4	V_{SS}	S	-	-	-	-	-	-	-	Digital ground		-
6	6	6	5	5	VCAP	S	-	-	-	-	-	-	-	1.8 V regulator capacitor		-
7	7	7	6	6	V_{DD}	S	-	-	-	-	-	-	-	Digital power supply		-
8	8	8	7	7	V_{DDIO_1}	S	-	-	-	-	-	-	-	I/O power supply		-
9	9	9	-	-	PA3/TIM2_CH3	I/O	**X**	X	X	-	O1	X	X	**Port A3**	Timer 2 - channel 3	TIM3_CH1 [AFR1]
10	10	10	-	-	PA4/USART_RX	I/O	**X**	X	X	-	O3	X	X	**Port A4**	USART receive	-
11	11	11	-	-	PA5/USART_TX	I/O	**X**	X	X	-	O3	X	X	**Port A5**	USART transmit	-
12	12	12	-	8	PA6/USART_CK (2)	I/O	**X**	X	X	-	O3	X	X	**Port A6**	USART synchro nous clock	-
13	-	-	-	-	PH0	I/O	X	X	-	HS	O3	X	X	**Port H0**	-	-
14	-	-	-	-	PH1	I/O	**X**	X	-	HS	O3	X	X	**Port H1**	-	-
15	-	-	-	-	PH2	I/O	**X**	X	-	-	O1	X	X	**Port H2**	-	-
16	-	-	-	-	PH3	I/O	**X**	X	-	-	O1	X	X	**Port H3**	-	-
17	13	-	-	-	PF7/AIN15	I/O	**X**	X	-	-	O1	X	X	**Port F7**	Analog input 15	-
18	14	-	-	-	PF6/AIN14	I/O	**X**	X	-	-	O1	X	X	**Port F6**	Analog input 14	-
19	15	-	-	-	PF5/AIN13	I/O	**X**	X	-	-	O1	X	X	**Port F5**	Analog input 13	-
20	16	-	8	-	PF4/AIN12	I/O	**X**	X	-	-	O1	X	X	**Port F4**	Analog input 12	-
21	17	-	-	-	PF3/AIN11	I/O	**X**	X	-	-	O1	X	X	**Port F3**	Analog input 11	-

Table 11. STM8AF526x/8x/Ax and STM8AF6269/8x/Ax pin description (continued)

Pin number					Pin name	Type	Input			Output				Main function (after reset)	Default alternate function	Alternate function after remap [option bit]
LQFP80	LQFP64	LQFP48	STM8AF62xx LQFP32/VFQFPN32	STM8AF52x6 VFQFPN32			Floating	Wpu	Ext. interrupt	High sink	Speed	OD	PP			
22	18	-	-	-	V_{REF+}	S	-	-	-	-	-	-	-	ADC positive reference voltage		-
23	19	13	9	9	V_{DDA}	S	-	-	-	-	-	-	-	Analog power supply		-
24	20	14	10	10	V_{SSA}	S	-	-	-	-	-	-	-	Analog ground		-
25	21	-	-	-	V_{REF-}	S	-	-	-	-	-	-	-	ADC negative reference voltage		-
26	22	-	-	-	PF0/AIN10	I/O	**X**	X	-	-	O1	X	X	**Port F0**	Analog input 10	-
27	23	15	-	-	PB7/AIN7	I/O	**X**	X	X	-	O1	X	X	**Port B7**	Analog input 7	-
28	24	16	-	-	PB6/AIN6	I/O	**X**	X	X	-	O1	X	X	**Port B6**	Analog input 6	-
29	25	17	11	11	PB5/AIN5	I/O	**X**	X	X	-	O1	X	X	**Port B5**	Analog input 5	I^2C_SDA [AFR6]
30	26	18	12	12	PB4/AIN4	I/O	**X**	X	X	-	O1	X	X	**Port B4**	Analog input 4	I^2C_SCL [AFR6]
31	27	19	13	13	PB3/AIN3	I/O	**X**	X	X	-	O1	X	X	**Port B3**	Analog input 3	TIM1_ETR [AFR5]
32	28	20	14	14	PB2/AIN2	I/O	**X**	X	X	-	O1	X	X	**Port B2**	Analog input	TIM1_CH3N [AFR5]
33	29	21	15	15	PB1/AIN1	I/O	**X**	X	X	-	O1	X	X	**Port B1**	Analog input 1	TIM1_CH2N [AFR5]
34	30	22	16	16	PB0/AIN0	I/O	**X**	X	X	-	O1	X	X	**Port B0**	Analog input 0	TIM1_CH1N [AFR5]
35	-	-	-	-	PH4/TIM1_ETR	I/O	**X**	X	-	-	O1	X	X	**Port H4**	Timer 1 - trigger input	-
36	-	-	-	-	PH5/ TIM1_CH3N	I/O	**X**	X	-	-	O1	X	X	**Port H5**	Timer 1 - inverted channel 3	-
37	-	-	-	-	PH6/ TIM1_CH2N	I/O	**X**	X	-	-	O1	X	X	**Port H6**	Timer 1 - inverted channel 2	-

6.2 Alternate function remapping

As shown in the rightmost column of *Table 11*, some alternate functions can be remapped at different I/O ports by programming one of eight AFR (alternate function remap) option bits. Refer to *Section 9: Option bytes on page 54*. When the remapping option is active, the default alternate function is no longer available.

To use an alternate function, the corresponding peripheral must be enabled in the peripheral registers.

Alternate function remapping does not effect GPIO capabilities of the I/O ports (see the GPIO section of STM8S series and STM8AF series 8-bit microcontrollers reference manual, RM0016).

Table 13. I/O port hardware register map (continued)

Address	Block	Register label	Register name	Reset status
0x00 5014	Port E	PE_ODR	Port E data output latch register	0x00
0x00 5015		PE_IDR	Port E input pin value register	0xXX(1)
0x00 5016		PE_DDR	Port E data direction register	0x00
0x00 5017		PE_CR1	Port E control register 1	0x00
0x00 5018		PE_CR2	Port E control register 2	0x00
0x00 5019	Port F	PF_ODR	Port F data output latch register	0x00
0x00 501A		PF_IDR	Port F input pin value register	0xXX(1)
0x00 501B		PF_DDR	Port F data direction register	0x00
0x00 501C		PF_CR1	Port F control register 1	0x00
0x00 501D		PF_CR2	Port F control register 2	0x00
0x00 501E	Port G	PG_ODR	Port G data output latch register	0x00
0x00 501F		PG_IDR	Port G input pin value register	0xXX(1)
0x00 5020		PG_DDR	Port G data direction register	0x00
0x00 5021		PG_CR1	Port G control register 1	0x00
0x00 5022		PG_CR2	Port G control register 2	0x00
0x00 5023	Port H	PH_ODR	Port H data output latch register	0x00
0x00 5024		PH_IDR	Port H input pin value register	0xXX(1)
0x00 5025		PH_DDR	Port H data direction register	0x00
0x00 5026		PH_CR1	Port H control register 1	0x00
0x00 5027		PH_CR2	Port H control register 2	0x00
0x00 5028	Port I	PI_ODR	Port I data output latch register	0x00
0x00 5029		PI_IDR	Port I input pin value register	0xXX(1)
0x00 502A		PI_DDR	Port I data direction register	0x00
0x00 502B		PI_CR1	Port I control register 1	0x00
0x00 502C		PI_CR2	Port I control register 2	0x00

1. Depends on the external circuitry.

Table 14. General hardware register map (continued)

Address	Block	Register label	Register name	Reset status
0x00 5200	SPI	SPI_CR1	SPI control register 1	0x00
0x00 5201		SPI_CR2	SPI control register 2	0x00
0x00 5202		SPI_ICR	SPI interrupt control register	0x00
0x00 5203		SPI_SR	SPI status register	0x02
0x00 5204		SPI_DR	SPI data register	0x00
0x00 5205		SPI_CRCPR	SPI CRC polynomial register	0x07
0x00 5206		SPI_RXCRCR	SPI Rx CRC register	0xFF
0x00 5207		SPI_TXCRCR	SPI Tx CRC register	0xFF
0x00 5208 to 0x00 520F	Reserved area (8 bytes)			
0x00 5210	I2C	I2C_CR1	I2C control register 1	0x00
0x00 5211		I2C_CR2	I2C control register 2	0x00
0x00 5212		I2C_FREQR	I2C frequency register	0x00
0x00 5213		I2C_OARL	I2C own address register low	0x00
0x00 5214		I2C_OARH	I2C own address register high	0x00
0x00 5215				
0x00 5216		I2C_DR	I2C data register	0x00
0x00 5217		I2C_SR1	I2C status register 1	0x00
0x00 5218		I2C_SR2	I2C status register 2	0x00
0x00 5219		I2C_SR3	I2C status register 3	0x00
0x00 521A		I2C_ITR	I2C interrupt control register	0x00
0x00 521B		I2C_CCRL	I2C clock control register low	0x00
0x00 521C		I2C_CCRH	I2C clock control register high	0x00
0x00 521D		I2C_TRISER	I2C TRISE register	0x02
0x00 521E to 0x00 522F	Reserved area (18 bytes)			

Table 14. General hardware register map (continued)

Address	Block	Register label	Register name	Reset status
0x00 5250	TIM1	TIM1_CR1	TIM1 control register 1	0x00
0x00 5251		TIM1_CR2	TIM1 control register 2	0x00
0x00 5252		TIM1_SMCR	TIM1 slave mode control register	0x00
0x00 5253		TIM1_ETR	TIM1 external trigger register	0x00
0x00 5254		TIM1_IER	TIM1 Interrupt enable register	0x00
0x00 5255		TIM1_SR1	TIM1 status register 1	0x00
0x00 5256		TIM1_SR2	TIM1 status register 2	0x00
0x00 5257		TIM1_EGR	TIM1 event generation register	0x00
0x00 5258		TIM1_CCMR1	TIM1 capture/compare mode register 1	0x00
0x00 5259		TIM1_CCMR2	TIM1 capture/compare mode register 2	0x00
0x00 525A		TIM1_CCMR3	TIM1 capture/compare mode register 3	0x00
0x00 525B		TIM1_CCMR4	TIM1 capture/compare mode register 4	0x00
0x00 525C		TIM1_CCER1	TIM1 capture/compare enable register 1	0x00
0x00 525D		TIM1_CCER2	TIM1 capture/compare enable register 2	0x00
0x00 525E		TIM1_CNTRH	TIM1 counter high	0x00
0x00 525F		TIM1_CNTRL	TIM1 counter low	0x00
0x00 5260		TIM1_PSCRH	TIM1 prescaler register high	0x00
0x00 5261		TIM1_PSCRL	TIM1 prescaler register low	0x00
0x00 5262		TIM1_ARRH	TIM1 auto-reload register high	0xFF
0x00 5263		TIM1_ARRL	TIM1 auto-reload register low	0xFF
0x00 5264		TIM1_RCR	TIM1 repetition counter register	0x00
0x00 5265		TIM1_CCR1H	TIM1 capture/compare register 1 high	0x00
0x00 5266		TIM1_CCR1L	TIM1 capture/compare register 1 low	0x00
0x00 5267		TIM1_CCR2H	TIM1 capture/compare register 2 high	0x00
0x00 5268		TIM1_CCR2L	TIM1 capture/compare register 2 low	0x00
0x00 5269		TIM1_CCR3H	TIM1 capture/compare register 3 high	0x00
0x00 526A		TIM1_CCR3L	TIM1 capture/compare register 3 low	0x00
0x00 526B		TIM1_CCR4H	TIM1 capture/compare register 4 high	0x00
0x00 526C		TIM1_CCR4L	TIM1 capture/compare register 4 low	0x00
0x00 526D		TIM1_BKR	TIM1 break register	0x00
0x00 526E		TIM1_DTR	TIM1 dead-time register	0x00
0x00 526F		TIM1_OISR	TIM1 output idle state register	0x00
0x00 5270 to 0x00 52FF	Reserved area (147 bytes)			

Table 14. General hardware register map (continued)

Address	Block	Register label	Register name	Reset status
0x00 5320	TIM3	TIM3_CR1	TIM3 control register 1	0x00
0x00 5321		TIM3_IER	TIM3 interrupt enable register	0x00
0x00 5322		TIM3_SR1	TIM3 status register 1	0x00
0x00 5323		TIM3_SR2	TIM3 status register 2	0x00
0x00 5324		TIM3_EGR	TIM3 event generation register	0x00
0x00 5325		TIM3_CCMR1	TIM3 capture/compare mode register 1	0x00
0x00 5326		TIM3_CCMR2	TIM3 capture/compare mode register 2	0x00
0x00 5327		TIM3_CCER1	TIM3 capture/compare enable register 1	0x00
0x00 5328		TIM3_CNTRH	TIM3 counter high	0x00
0x00 5329		TIM3_CNTRL	TIM3 counter low	0x00
0x00 532A		TIM3_PSCR	TIM3 prescaler register	0x00
0x00 532B		TIM3_ARRH	TIM3 auto-reload register high	0xFF
0x00 532C		TIM3_ARRL	TIM3 auto-reload register low	0xFF
0x00 532D		TIM3_CCR1H	TIM3 capture/compare register 1 high	0x00
0x00 532E		TIM3_CCR1L	TIM3 capture/compare register 1 low	0x00
0x00 532F		TIM3_CCR2H	TIM3 capture/compare register 2 high	0x00
0x00 5330		TIM3_CCR2L	TIM3 capture/compare register 2 low	0x00
0x00 5331 to 0x00 533F	Reserved area (15 bytes)			
0x00 5340	TIM4	TIM4_CR1	TIM4 control register 1	0x00
0x00 5341		TIM4_IER	TIM4 interrupt enable register	0x00
0x00 5342		TIM4_SR	TIM4 status register	0x00
0x00 5343		TIM4_EGR	TIM4 event generation register	0x00
0x00 5344		TIM4_CNTR	TIM4 counter	0x00
0x00 5345		TIM4_PSCR	TIM4 prescaler register	0x00
0x00 5346		TIM4_ARR	TIM4 auto-reload register	0xFF
0x00 5347 to 0x00 53FF	Reserved area (185 bytes)			

9 Option bytes

Option bytes contain configurations for device hardware features as well as the memory protection of the device. They are stored in a dedicated block of the memory. Each option byte has to be stored twice, for redundancy, in a regular form (OPTx) and a complemented one (NOPTx), except for the ROP (read-out protection) option byte and option bytes 8 to 16.

Option bytes can be modified in ICP mode (via SWIM) by accessing the EEPROM address shown in *Table 18: Option bytes* below.

Option bytes can also be modified 'on the fly' by the application in IAP mode, except the ROP and UBC options that can only be changed in ICP mode (via SWIM).

Refer to the STM8 Flash programming manual (PM0047) and STM8 SWIM communication protocol and debug module user manual (UM0470) for information on SWIM programming procedures.

Table 18. Option bytes

Addr.	Option name	Option byte no.	Option bits								Factory default setting
			7	6	5	4	3	2	1	0	
0x00 4800	Read-out protection (ROP)	OPT0	ROP[7:0]								0x00
0x00 4801	User boot code (UBC)	OPT1	UBC[7:0]								0x00
0x00 4802		NOPT1	NUBC[7:0]								0xFF
0x00 4803	Alternate function remapping (AFR)	OPT2	AFR7	AFR6	AFR5	AFR4	AFR3	AFR2	AFR1	AFR0	0x00
0x00 4804		NOPT2	NAFR7	NAFR6	NAFR5	NAFR4	NAFR3	NAFR2	NAFR1	NAFR0	0xFF
0x00 4805	Watchdog option	OPT3	Reserved				LSI_EN	IWDG_HW	WWDG_HW	WWDG_HALT	0x00
0x00 4806		NOPT3	Reserved				NLSI_EN	NIWDG_HW	NWWDG_HW	NWWG_HALT	0xFF
0x00 4807	Clock option	OPT4	Reserved				EXTCLK	CKAWUSEL	PRSC1	PRSC0	0x00
0x00 4808		NOPT4	Reserved				NEXTCLK	NCKAWUSEL	NPRSC1	NPRSC0	0xFF
0x00 4809	HSE clock startup	OPT5	HSECNT[7:0]								0x00
0x00 480A		NOPT5	NHSECNT[7:0]								0xFF

Table 19. Option byte description

Option byte no.	Description
OPT0	**ROP[7:0]: Memory readout protection (ROP)** 0xAA: Enable readout protection (write access via SWIM protocol) *Note: Refer to STM8S series and STM8AF series 8-bit microcontrollers reference manual (RM0016) section on Flash/EEPROM memory readout protection for details.*
OPT1	**UBC[7:0]: User boot code area** 0x00: No UBC, no write-protection 0x01: Page 0 to 1 defined as UBC, memory write-protected 0x02: Page 0 to 3 defined as UBC, memory write-protected 0x03 to 0xFF: Pages 4 to 255 defined as UBC, memory write-protected *Note: Refer to STM8S series and STM8AF series 8-bit microcontrollers reference manual (RM0016) section on Flash/EEPROM write protection for more details.*
OPT2	**AFR7: Alternate function remapping option 7** 0: Port D4 alternate function = TIM2_CH1 1: Port D4 alternate function = BEEP **AFR6: Alternate function remapping option 6** 0: Port B5 alternate function = AIN5, port B4 alternate function = AIN4 1: Port B5 alternate function = I^2C_SDA, port B4 alternate function = I^2C_SCL. **AFR5: Alternate function remapping option 5** 0: Port B3 alternate function = AIN3, port B2 alternate function = AIN2, port B1 alternate function = AIN1, port B0 alternate function = AIN0. 1: Port B3 alternate function = TIM1_ETR, port B2 alternate function = TIM1_CH3N, port B1 alternate function = TIM1_CH2N, port B0 alternate function = TIM1_CH1N. **AFR4: Alternate function remapping option 4** 0: Port D7 alternate function = TLI 1: Reserved **AFR3: Alternate function remapping option 3** 0: Port D0 alternate function = TIM3_CH2 1: Port D0 alternate function = TIM1_BKIN **AFR2: Alternate function remapping option 2** 0: Port D0 alternate function = TIM3_CH2 1: Port D0 alternate function = CLK_CCO *Note: AFR2 option has priority over AFR3 if both are activated* **AFR1: Alternate function remapping option 1** 0: Port A3 alternate function = TIM2_CH3, port D2 alternate function TIM3_CH1. 1: Port A3 alternate function = TIM3_CH1, port D2 alternate function TIM2_CH3. **AFR0: Alternate function remapping option 0** 0: Port D3 alternate function = TIM2_CH2 1: Port D3 alternate function = ADC_ETR

10.3.4 Internal clock sources and timing characteristics

Subject to general operating conditions for V_{DD} and T_A.

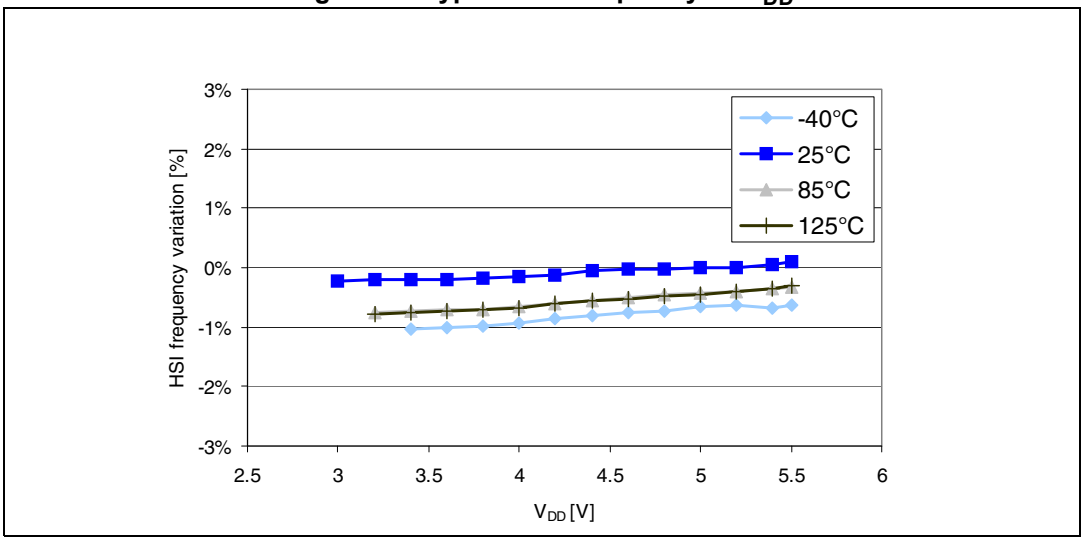
High-speed internal RC oscillator (HSI)

Table 33. HSI oscillator characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f_{HSI}	Frequency	-	-	16	-	MHz
ACC_{HS}	HSI oscillator user trimming accuracy	Trimmed by the application for any V_{DD} and T_A conditions	-1	-	1	%
	HSI oscillator accuracy (factory calibrated)	$V_{DD} = 3.0\ V \leq V_{DD} \leq 5.5\ V$, $-40\ °C \leq T_A \leq 150\ °C$	-5	-	5	
$t_{su(HSI)}$	HSI oscillator wakeup time	-	-	-	2(1)	µs

1. Guaranteed by characterization results, not tested in production.

Figure 21. Typical HSI frequency vs V_{DD}



Low-speed internal RC oscillator (LSI)

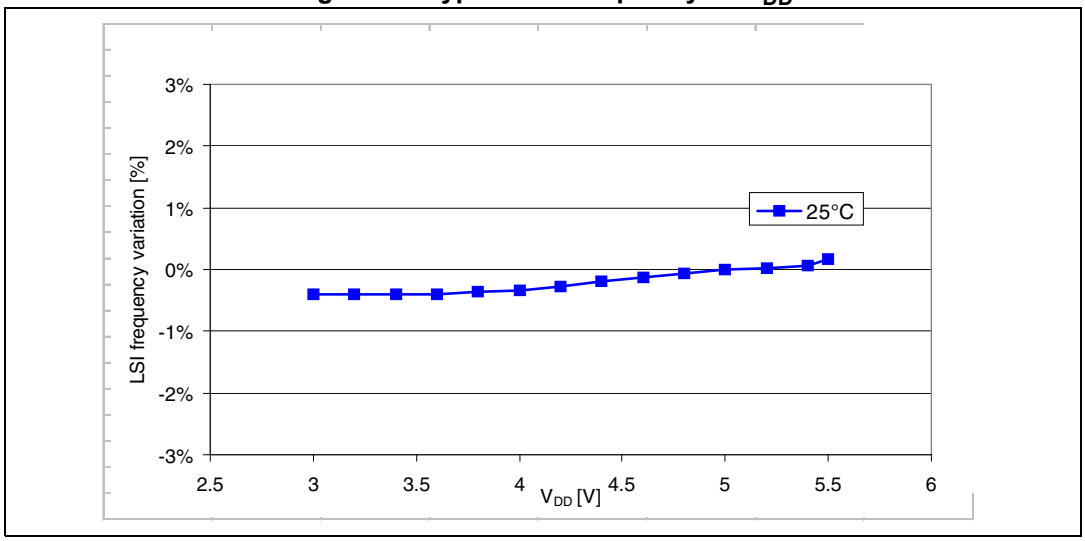
Subject to general operating conditions for V_{DD} and T_A.

Table 34. LSI oscillator characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f_{LSI}	Frequency	-	112	128	144	kHz
$t_{su(LSI)}$	LSI oscillator wakeup time	-	-	-	7(1)	µs

1. Guaranteed by characterization results, not tested in production.

Figure 22. Typical LSI frequency vs V_{DD}



10.3.7 Reset pin characteristics

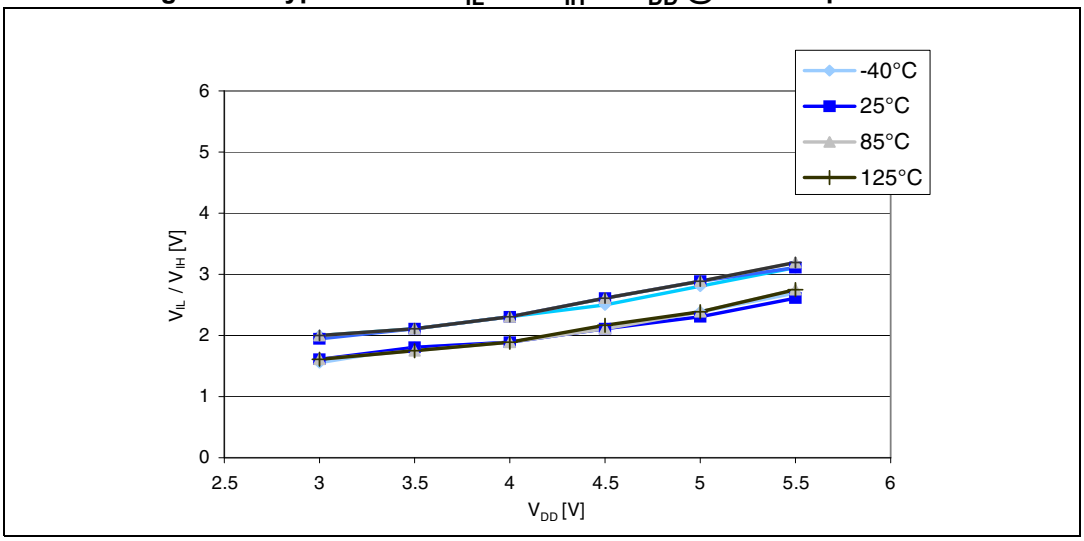
Subject to general operating conditions for V_{DD} and T_A unless otherwise specified.

Table 39. NRST pin characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{IL(NRST)}$	NRST low-level input voltage(1)	-	V_{SS}	-	0.3 x V_{DD}	V
$V_{IH(NRST)}$	NRST high-level input voltage(1)	-	0.7 x V_{DD}	-	V_{DD}	
$V_{OL(NRST)}$	NRST low-level output voltage(1)	I_{OL} = 3 mA	-	-	0.6	
$R_{PU(NRST)}$	NRST pull-up resistor	-	30	40	60	kΩ
t_{IFP}	NRST input filtered pulse(1)	-	85	-	315	ns
$t_{INFP(NRST)}$	NRST Input not filtered pulse duration(2)	-	500	-	-	

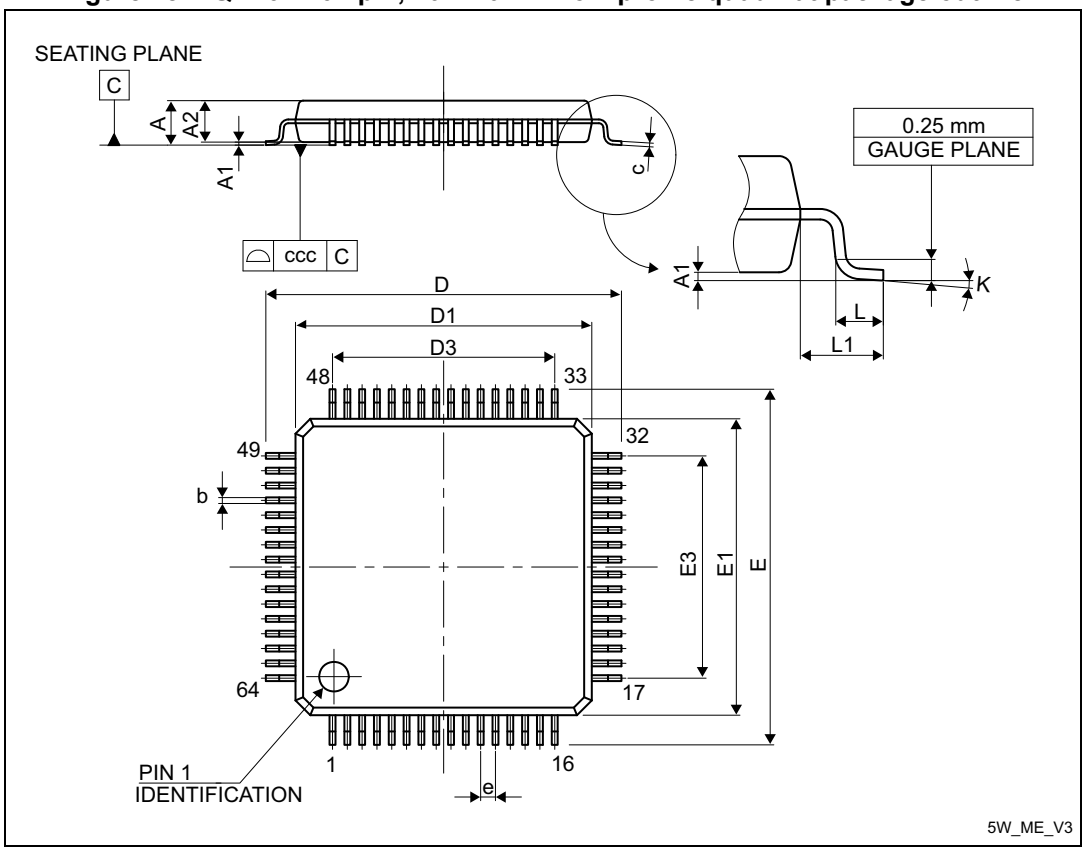
1. Guaranteed by characterization results, not tested in production.
2. Guaranteed by design, not tested in production.

Figure 36. Typical NRST V_{IL} and V_{IH} vs V_{DD} @ four temperatures



11.2 LQFP64 package information

Figure 48. LQFP64 - 64-pin, 10 x 10 mm low-profile quad flat package outline

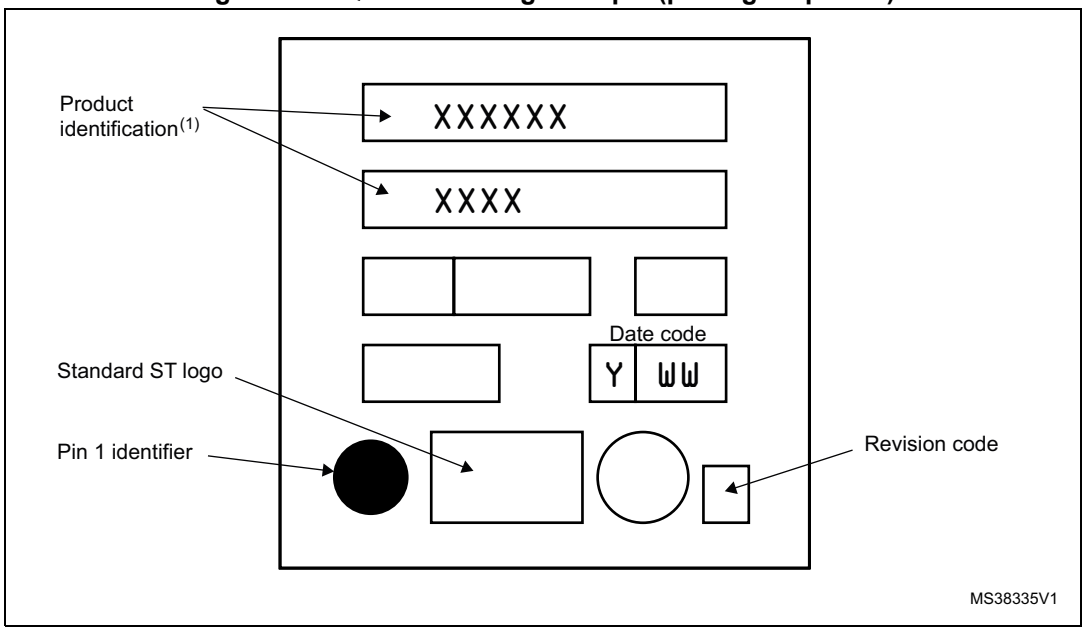


1. Drawing is not to scale.

Table 50. LQFP64 - 64-pin, 10 x 10 mm 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	-	12.000	-	-	0.4724	-
D1	-	10.000	-	-	0.3937	-
D3	-	7.500	-	-	0.2953	-
E	-	12.000	-	-	0.4724	-
E1	-	10.000	-	-	0.3937	-

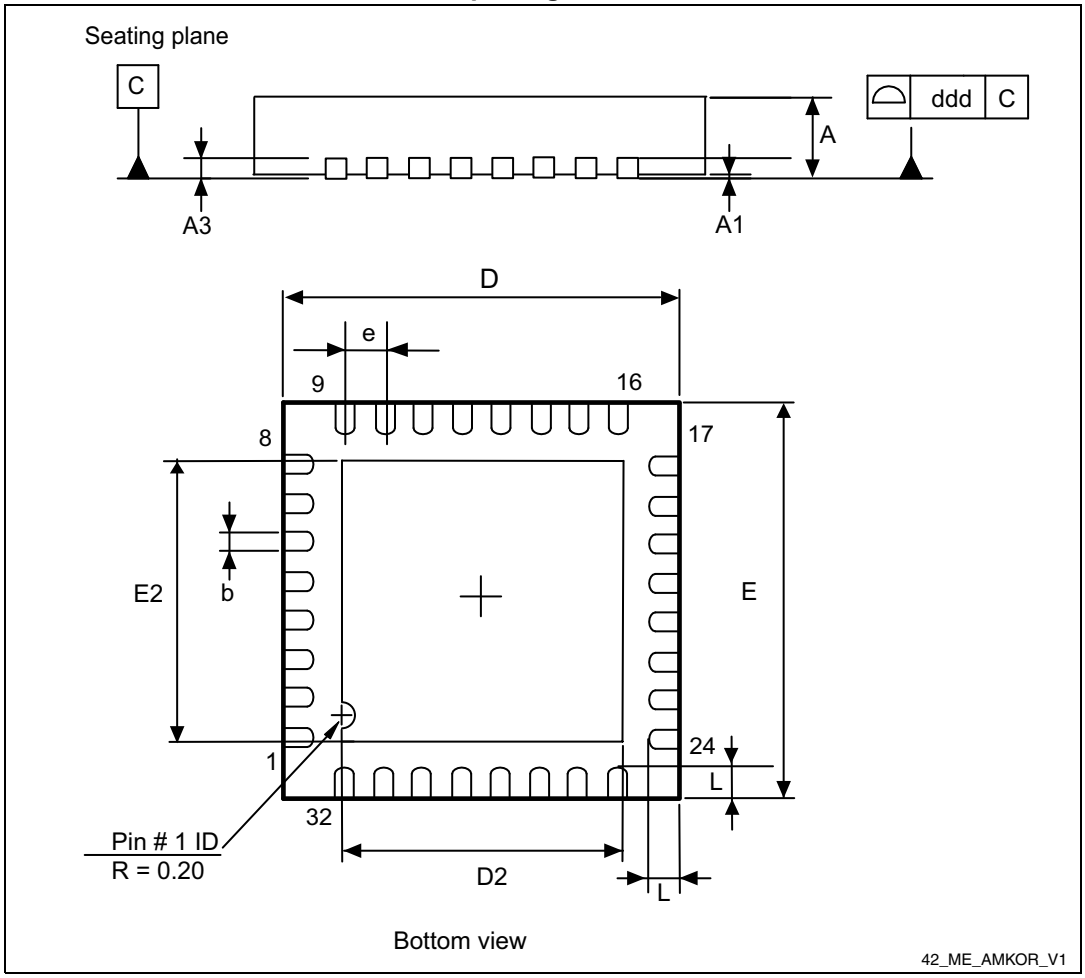
Figure 53. LQFP48 marking example (package top view)



1. Parts marked as "ES","E" or accompanied by an Engineering Sample notification letter are not yet qualified and therefore not approved for use in production. ST is not responsible for any consequences resulting from such use. In no event will ST be liable for the customer using any of these engineering samples in production. ST's quality department must be contacted to run a qualification activity prior to any decision to use these engineering samples.

11.5 VFQFPN32 package information

Figure 57. VFQFPN32 - 32-pin, 5x5 mm, 0.5 mm pitch very thin profile fine pitch quad flat package outline



1. Drawing is not to scale.

Table 55. Document revision history (continued)

Date	Revision	Changes
30-Jan-2011	8 (continued)	Removed note 1 in *Table 24: General operating conditions* and note 1 below *Figure 11: fCPUmax versus VDD*. Removed note 3 in *Table 26: Total current consumption in Run, Wait and Slow mode. General conditions for VDD apply, TA = -40 °C to 150 °C*. Removed note 2 in *Table 31: HSE external clock characteristics* and *Table 35: Flash program memory/data EEPROM memory* Removed note 1 in *Table 37: Data memory*. Modified T_{WE} maximum value in *Table 36: Flash program memory* and *Table 37: Data memory*. Added $t_{IFP(NRST)}$ and renamed $V_{F(NRST)}$ t_{IFP} in *Table 39: NRST pin characteristics*. Added recommendation concerning NRST pin level, and power consumption sensitive applications, above *Figure 39: Recommended reset pin protection,* and updated external capacitor value. Updated *Note 1* in *Table 40: TIM 1, 2, 3, and 4 electrical specifications.* Updated *Note 1* in *Table 41: SPI characteristics.* Moved know limitations to separate errata sheet. Added “not recommended for new design” note to device family 51, memory size 7 and 9, and temperature range B, in *Figure 60: STM8AF526x/8x/Ax and STM8AF6269/8x/Ax ordering information scheme1*. Added Raisonance compiler in *Section 13.2: Software tools.*
18-Jul-2012	9	Updated wildcards of document part numbers. Added VFQFPN package. Added STM8AF62A6 part number. *Table 1: Device summary* updated footnote *1* and added footnote *2*. *Table: STM8AF52xx product line-up with CAN* and *Table: STM8AF62xx product line-up without CAN*: added “P” version for all order codes; updated size of data EEPROM for 64K devices to 2K instead of 1.5K; updated RAM. *Figure 1: STM8AF526x/8x/Ax and STM8AF6269/8x/Ax block diagram*: updated POR, BOR and WDG; removed PDR; added legend. *Section 5.4: Flash program and data EEPROM*: removed non relevant bullet points and added a sentence about the factory program. Added *Table 4: Peripheral clock gating bits (CLK_PCKENR1)* and updated *Table 5: Peripheral clock gating bits (CLK_PCKENR2)* *Section : ADC features*: updated ADC input range. *Table 12: Memory model 128K:* updated RAM size, RAM end addresses, and stack roll-over addresses; updated footnote *1* *Table 18: Option bytes:* updated factory default setting for NOPT17; updated footnotes. *Table 20: Voltage characteristics:* updated V_{DDX} - V_{DD} to V_{DDX} - V_{SS}. *Table 24: General operating conditions:* updated V_{CAP}.