摩芯半导体
MOTIONSILICON

MX33X

32-Bit Single-Chip Microcontroller

Data Sheet

V1.2

2023.12

Table of Contents

1 Summary of Features

The MX33X product family has the following features:

- High Performance Microcontroller with two CPU cores
- Two 32-bit super-scalar CPUs，each having the following features:
  - Superior real-time performance
  - Strong bit handling
  - Fully integrated DSP capabilities
  - Multiply-accumulate unit able to sustain MAC operations
  - Fully pipelined Floating point unit (FPU)
  - Up to 200 MHz operation at full temperature range
  - Up to 128 Kbyte Data Scratch-Pad RAM（DSPR）/Instruction Scratch-Pad RAM（PSPR）
  - Up to 8 Kbyte Instruction Cache (ICACHE)
  - Up to 8 Kbyte Data Cache (DCACHE)
- Lockstepped shadow cores for one
- Sophisticated interrupt system
- Multiple on-chip memories
  - All embedded NVM and SRAM are ECC protected
  - Up to 2 Mbyte Flash Memory (FLASH)
  - Up to 512 Kbyte Memory (SRAM)
  - BootROM (BROM)
- 32/64 Channel DMA Controller with safe data transfer
- High performance on-chip bus structure
  - 64-bit Cross Bar Interconnect
  - Provides fast parallel access between CPU and memory
  - 32-bit System Peripheral Bus (SPB) for on-chip peripheral and functional units
- Optional Hardware Security Module (HSM) on some variants
  - AES

- CRC
- PKA
- SM2
- TRNG

➢ Support handling safety monitor alarms

➢ Versatile On-chip Peripheral Units

- 8 ASCLIN
- 2 UART
- 2 SPI
- 1 QSPI
- 1 serial Micro Second Bus interfaces (MSC) for serial port expansion to external power devices
- 1 DSPI（MSC/SPI）
- 8 CAN (4 CAN-FD enabled) nodes
- 16 Single Edge Nibble Tran smission (SENT) channels for connection to sensors
- 1 FlexRay ™ module with 2 channels
- One ATM providing a powerful set of digital signal filtering and timer functionality to realize autonomous and complex Input/Output management
- 1 CCU6 (Two kernels CCU60 and CCU61)
- One General Purpose 12 Timer Unit (GPT12)
- 4 PSI5
- 1 Peripheral Sensor Interface with Serial PHY (PSI5-S)
- 2 I2C
- 2 I3C
- 1 10M/100M ETH MAC

➢ ADC

- 16 channels
- Input voltage range from 0 V to 3.3V (ADC supply)

➢ 80 GPIO

- On-chip debug support for JTAG
- Clock Generation Unit with System PLL and Peripheral PLL
- AEC-Q100 Grade 1 qualified

Table 1-1 Platform Feature Overview

Feature		**MX33X**
CPUs	Type	real time CPU
	Cores / Checker Cores	2 (1/1)
	Max. Freq.	200 MHz
Cache per CPU	Program	8 KB
	Data	8 KB
SRAM per CPU	TCM	128 KB
SRAM global	LMU	256 KB
EFlash	Size	2 MB
	Banks	2 x 1 MB
DMA	Channels	64/32
ADC	Channels	16
ATM	TIM	6 x 8
	TOM	5 x 16
	ATOM	9 x 8
Timer	GPT12	1
	CCU6	1
STM	Modules	8
FlexRay	Modules	1
	Channels	2
CAN/CAN FD	Modules	8/4
	Nodes	8
SPI	QSPI	1
	SPI	2
ASCLIN	Modules	8
UART	Modules	2
I2C	Interfaces	2

Feature		**MX33X**
I3C	Interfaces	2
SENT	Channels	16
PSI5	Modules	4
PSI5-S	Modules	1
MSC	Modules	1
DSPI	Modules	1
Ethernet (10/100Mbit)	Modules	1
FCE	Modules	1
Security	AES/CRC/PKA/TRNG/SM2	1
Debug	JTAG	yes
Low Power Features	Standby	yes
Packages	Type	eLQFP-100
I/O	Type	3.3V CMOS
$T_{junction}$	Range	−40 ~ +150°C

2 Pin Definition and Functions

2.1 Pin Definition

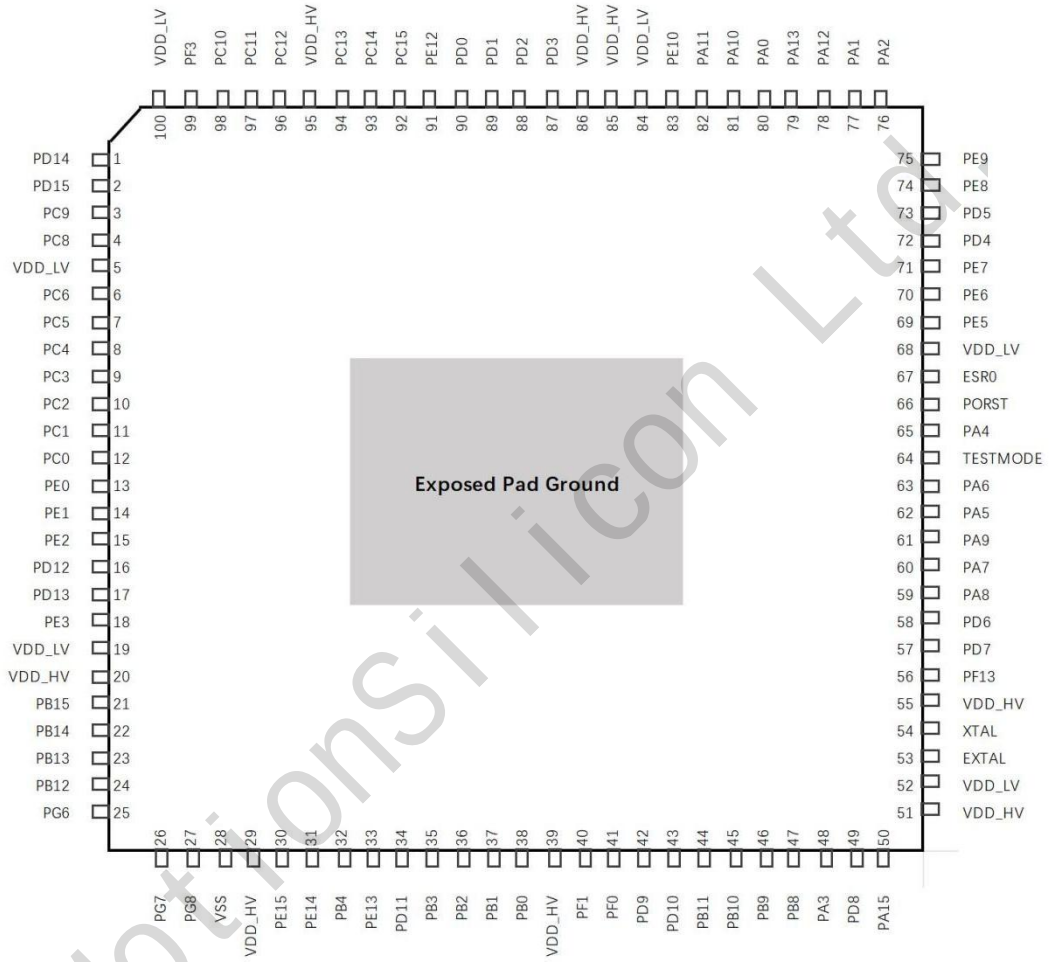


Figure 2-1 100-pin eLQFP configuration (top view)

2.2 Pin Description

The following sections provide a description of the signals as well as pertinent information about the function and configuration of the device.

2.2.1 General purpose pins

The I/O Signal Description Table contains information on generic pins.

2.2.1.1 PD14

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD14	0	GPIO_0	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(1)	1	msc0_en_0	O		MSC Chip Select
	2	GPIO_89	I/O		General-purpose input/output
	3	dspi1_pcs1	O		Dspi1 Chip Select 1
	4	can3_rx	I		CAN receive input
	5	lin3_rx	I		LIN Receive input
	6	ether_clk_rmii	I		Ether rmii clock input
	7	ether_clk_tx	I		Ether tx clock input
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_8	O		channel 8 of TOM module 1
	10	atm_atom0_0	O		channel 0 of ATOM module 0
	11	atm_atom1_0	O		channel 0 of ATOM module 1
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_t12hrx_0	I		External timer start 12
	15	ccu61_cc61in_0	I		T12 capture input

2.2.1.2 PD15

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD15 (2)	0	GPIO_1	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	msc0_en_1	O		MSC Chip Select
	2	qspi0_ss_11_n	O		Qspi chip select 11
	3	dspi1_pcs2	O		Dspi1 Chip Select 2
	4	can3_tx	O		CAN transmit output
	5	lin3_tx	O		LIN transmit output
	6	atm_atom4_3	O		channel 3 of ATOM module 4
	7	ether_clk_rx	I		Ether rx clock input
	8	atm_tom0_9	O		channel 9 of TOM module 0
	9	atm_tom1_9	O		channel 9 of TOM module 1
	10	atm_atom0_1	O		channel 1 of ATOM module 0
	11	atm_atom1_1	O		channel 1 of ATOM module 1
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_t12hrx_1	I		External timer start 12
	15	ccu61_cc61in_1	I		T12 capture input

2.2.1.3 PC9

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC9 (3)	0	GPIO_2	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	msc0_en_2	O		MSC Chip Select
	2	gpt12_capin_0	I		Trigger input to capture value of timer T5 into CAPREL register
	3	lin1_tx	O		CAN transmit output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	can2_tx	O		LIN transmit output
	5	dspi1_pcs3	O		Dspi1 Chip Select 3
	6	atm_atom4_4	O		channel 4 of ATOM module 4
	7	ether_gmii_mdc	O		Ether mdio clock output
	8	atm_tom0_10	O		channel 10 of TOM module 0
	9	atm_tom1_10	O		channel 10 of TOM module 1
	10	atm_atom0_2	O		channel 2 of ATOM module 0
	11	atm_atom1_2	O		channel 2 of ATOM module 1
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu60_t12hrx_2	I		External timer start 12
	15	ccu61_cc61in_2	I		T12 capture input

2.2.1.4 PC8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC8	0	GPIO_3	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(4)	1	msc0_en_3	O		MSC Chip Select
	2	gpt12_capin_1	I		Trigger input to capture value of timer T5 into CAPREL register
	3	lin1_rx	I		LIN Receive input
	4	can2_rx	I		CAN receive input
	5	dspi1_pcs4_mtrig	O		Dspi1 Chip Select 4 muxed with MTRIG
	6	atm_atom4_5	O		channel 5 of ATOM module 4
	7	ether_gmii_mdio	I/O		Ether mdio data

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	8	atm_tom0_11	O		channel 11 of TOM module 0
	9	atm_tom1_11	O		channel 11 of TOM module 1
	10	atm_atom0_3	O		channel 3 of ATOM module 0
	11	atm_atom1_3	O		channel 3 of ATOM module 1
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	ccu60_t12hrx_3	I		External timer start 12
	15	ccu61_cc61in_3	I		T12 capture input

2.2.1.5 PC6

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC6	0	GPIO_5	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(6)	1	msc0_inj_1	I		Injection signal from port
	2	gpt12_capin_3	I		Trigger input to capture value of timer T5 into CAPREL register
	3	can0_tx	O		CAN transmit output
	4	sent_rx_3	I		Receive input channel 3
	5	dspi1_sout	O		Dspi1 Data output
	6	dspi1_sin	I		Dspi1 Data input
	7	ether_phy_txen	O		Ether Transmit Enable
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_13	O		channel 13 of TOM module 1
	10	atm_atom0_5	O		channel 5 of ATOM module 0
	11	atm_atom1_5	O		channel 5 of ATOM module 1
	12	atm_tim0_5	I		channel 5 of TIM module 0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	ccu60_t12hrx_5	I		External timer start 12
	15	ccu61_cc62in_1	I		T12 capture input

2.2.1.6 PC5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC5	0	GPIO_6	I/O	Pull-up	General-purpose input/output
(7)	1	msc0_rxd_0	I	/FAST/	Upstream asynchronous input signal
	2	gpt12_t2eud_0	I	CMOS	Count direction control input of timer T2
	3	sent_rx_0	I		Receive input channel 0
	4	dspi1_sout	O		Dspi1 Data output
	5	dspi1_sin	I		Dspi1 Data input
	6	lin4_rx	I		LIN Receive input
	7	ether_phy_txer	O		Ether Transmit Error
	8	atm_tom0_14	O		channel 14 of TOM module 0
	9	atm_tom1_14	O		channel 14 of TOM module 1
	10	atm_atom0_6	O		channel 6 of ATOM module 0
	11	atm_atom1_6	O		channel 6 of ATOM module 1
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	ccu60_t12hrx_6	I		External timer start 12
	15	ccu61_cc62in_2	I		T12 capture input

2.2.1.7 PC4

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC4	0	GPIO_7	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(8)	1	msc0_rxd_1	I		Upstream asynchronous input signal
	2	gpt12_t2eud_1	I		Count direction control input of timer T2
	3	sent_rx_1	I		Receive input channel 1
	4	dspi1_i_sck	I		Dspi Slave Serial Clock
	5	dspi1_o_sck	O		Dspi Master Serial Clock
	6	lin4_tx	O		LIN transmit output
	7	ether_phy_txd_0	O		Ether Transmit output
	8	atm_tom0_15	O		channel 15 of TOM module 0
	9	atm_tom1_15	O		channel 15 of TOM module 1
	10	atm_atom0_7	O		channel 7 of ATOM module 0
	11	atm_atom1_7	O		channel 7 of ATOM module 1
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	ccu60_t12hrx_7	I		External timer start 12
	15	ccu61_cc62in_3	I		T12 capture input

2.2.1.8 PC3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC3	0	GPIO_8	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(9)	1	msc0_rxd_2	I		Upstream asynchronous input signal
	2	gpt12_t2in_0	I		Trigger/gate input of timer T2
	3	sent_rx_2	I		Receive input channel 2
	4	dspi1_pcs2	O		Dspi1 Chip Select 2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	dspi1_pcs5_pcss	O		Dspi1 Chip Select 5 muxed with PCSS
	6	atm_atom4_7	O		channel 7 of ATOM module 4
	7	ether_phy_txd_1	O		Ether Transmit output
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_0	O		channel 8 of TOM module 1
	10	atm_atom0_0	O		channel 0 of ATOM module 0
	11	atm_atom1_0	O		channel 0 of ATOM module 1
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_cc60in_0	I		T12 capture input
	15	ccu61_ccpos0_0	I		Hall capture input

2.2.1.9 PC2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC2	0	GPIO_9	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(10)	1	msc0_rxd_3	I		Upstream asynchronous input signal
	2	gpt12_t2in_1	I		Trigger/gate input of timer T2
	3	lin0_tx	O		LIN transmit output
	4	dspi1_pcs1	O		Dspi1 Chip Select 1
	5	lin5_tx	O		LIN transmit output
	6	atm_atom5_0	O		channel 0 of ATOM module 5
	7	ether_phy_txd_2	O		Ether Transmit output
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_0	O		channel 8 of TOM module 1
	10	atm_atom0_0	O		channel 0 of ATOM module 0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom1_0	O		channel 0 of ATOM module 1
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_cc60in_1	I		T12 capture input
	15	ccu61_ccpos0_1	I		Hall capture input

2.2.1.10 PC1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC1	0	GPIO_10	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(11)	1	msc0_rxd_4	I		Upstream asynchronous input signal
	2	gpt12_t3eud_0	I		Count direction control of core timer T3
	3	lin0_rx	I		LIN Receive input
	4	sent_rx_0	I		Receive input channel 0
	5	dspi1_pcs2	O		Dspi1 Chip Select 2
	6	lin6_rx	I		LIN Receive input
	7	ether_phy_txd_3	O		Ether Transmit output
	8	atm_tom0_9	O		channel 9 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom0_1	O		channel 1 of ATOM module 0
	11	atm_atom1_1	O		channel 1 of ATOM module 1
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_cc60in_2	I		T12 capture input
	15	ccu61_ccpos0_2	I		Hall capture input

2.2.1.11 PC0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC0	0	GPIO_11	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(12)	1	msc0_rxd_5	I		Upstream asynchronous input signal
	2	gpt12_t3eud_1	I		Count direction control of core timer T3
	3	sent_rx_3	I		Receive input channel 3
	4	can4_rx	I		CAN receive input
	5	dspi1_pcs3	O		Dspi1 Chip Select 3
	6	lin6_tx	O		LIN transmit output
	7	ether_phy_txd_4	O		Ether Transmit output
	8	atm_tom0_9	O		channel 9 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom0_1	O		channel 1 of ATOM module 0
	11	atm_atom1_1	O		channel 1 of ATOM module 1
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_cc60in_3	I		T12 capture input
	15	ccu61_ccpos0_3	I		Hall capture input

2.2.1.12 PE0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE0	0	GPIO_12	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(13)	1	UART1_RX	I		UART1 receive input
	2	gpt12_t3eud_2	I		Count direction control of core timer T3
	3	sent_rx_4	I		Receive input channel 4
	4	can4_tx	O		CAN transmit output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	dspi1_pcs4_mtrig	O		Dspi1 Chip Select 4 muxed with MTRIG
	6	lin7_rx	I		LIN Receive input
	7	ether_phy_txd_5	O		Ether Transmit output
	8	atm_tom0_10	O		channel 12 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1
	10	atm_atom0_2	O		channel 2 of ATOM module 0
	11	atm_atom1_2	O		channel 2 of ATOM module 1
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu60_cc61in_0	I		T12 capture input
	15	ccu61_ccpos1_0	I		Hall capture input

2.2.1.13 PE1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE1 (14)	0	GPIO_13	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	UART1_TX	O		UART Transmit output
	2	gpt12_t3eud_3	I		Count direction control of core timer T3
	3	sent_rx_5	I		Receive input channel 5
	4	can5_rx	I		CAN receive input
	5	dspi1_pcs0	O		Dspi1 Chip Select 0
	6	dspi1_ss_b	I		Dspi1 Slave Select
	7	ether_phy_txd_6	O		Ether Transmit output
	8	atm_tom0_11	O		channel 11 of TOM module 0
	9	atm_tom1_3	O		channel 3 of TOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	10	atm_atom0_3	O		channel 3 of ATOM module 0
	11	atm_atom1_3	O		channel 3 of ATOM module 1
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	ccu60_cc61in_1	I		T12 capture input
	15	ccu61_ccpos1_1	I		Hall capture input

2.2.1.14 PE2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE2 (15)	0	GPIO_14	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	dspi1_sout	O		Dspi1 Data output
	2	dspi1_sin	I		Dspi1 Data input
	3	atm_tom2_0	O		channel 0 of TOM module 2
	4	lin2_tx	O		LIN transmit output
	5	atm_tim5_0	I		Channel 0 of TIM module 5
	6	atm_atom5_1	O		channel 1 of ATOM module 5
	7	atm_tom4_8	O		channel 8 of TOM module 4
	8	atm_tom0_12	O		channel 12 of TOM module 0
	9	atm_tom1_4	O		channel 4 of TOM module 1
	10	atm_atom0_4	O		channel 4 of ATOM module 0
	11	atm_atom1_4	O		channel 4 of ATOM module 1
	12	atm_tim0_4	I		channel 4 of TIM module 0
	13	atm_tim1_4	I		channel 4 of TIM module 1
	14	ccu60_cc61in_2	I		T12 capture input
	15	ccu61_ccpos1_2	I		Hall capture input

2.2.1.15 PD12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD12 (16)	0	GPIO_15	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	dspi1_sout	O		Dspi1 Data output
	2	dspi1_sin	I		Dspi1 Data input
	3	atm_tom2_1	O		channel 1 of TOM module 2
	4	lin2_rx	I		LIN Receive input
	5	atm_tim5_1	I		Channel 1 of TIM module 5
	6	atm_atom5_2	O		channel 2 of ATOM module 5
	7	atm_tom4_9	O		channel 9 of TOM module 4
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_5	O		channel 5 of TOM module 1
	10	atm_atom0_5	O		channel 5 of ATOM module 0
	11	atm_atom1_5	O		channel 5 of ATOM module 1
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	ccu60_cc61in_3	I		T12 capture input
	15	ccu61_ccpos1_3	I		Hall capture input

2.2.1.16 PD13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD13 (17)	0	GPIO_16	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	dspi1_o_sck	O		Dspi1 Master Serial Clock
	2	dspi1_i_sck	I		Dspi1 Slave Serial Clock
	3	atm_tom2_2	O		channel 2 of TOM module 2
	4	lin2_tx	O		LIN transmit output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	atm_tim5_2	I		Channel 2 of TIM module 5
	6	atm_atom5_3	O		channel 3 of ATOM module 5
	7	atm_tom4_10	O		channel 10 of TOM module 4
	8	atm_tom0_14	O		channel 14 of TOM module 0
	9	atm_tom1_6	O		channel 6 of TOM module 1
	10	atm_atom0_6	O		channel 6 of ATOM module 0
	11	atm_atom1_6	O		channel 6 of ATOM module 1
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	ccu60_cc62in_0	I		T12 capture input
	15	ccu61_ccpos2_0	I		Hall capture input

2.2.1.17 PE3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE3	0	GPIO_17	I/O	Pull-up	General-purpose input/output
(18)	1	dspi1_pcs6	O	/FAST/	Dspi1 Chip Select 6
	2	GPIO_90	I/O	CMOS	General-purpose input/output
	3	atm_tom2_3	O		channel 3 of TOM module 2
	4	lin2_rx	I		LIN Receive input
	5	atm_tim5_3	I		Channel 3 of TIM module 5
	6	atm_atom5_4	O		channel 4 of ATOM module 5
	7	atm_tom4_11	O		channel 11 of TOM module 4
	8	atm_tom0_15	O		channel 15 of TOM module 0
	9	atm_tom1_7	O		channel 7 of TOM module 1
	10	atm_atom0_7	O		channel 7 of ATOM module 0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom1_7	O		channel 7 of ATOM module 1
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	ccu60_cc62in_1	I		T12 capture input
	15	ccu61_ccpos2_1	I		Hall capture input

2.2.1.18 PB15

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB15	0	GPIO_18	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(21)	1	gpt12_t3in_0	I		Trigger/gate input of core timer T3
	2	atm_tom2_4	O		channel 4 of TOM module 2
	3	sent_rx_6	I		Receive input channel 6
	4	can5_tx	O		CAN transmit output
	5	dspi0_pcs7	O		Dspi1 Chip Select 7
	6	lin7_tx	O		LIN transmit output
	7	ether_tx_clk	I		Ether Transmit Clock
	8	atm_tom2_0	O		channel 0 of TOM module 2
	9	atm_tom3_0	O		channel 0 of TOM module 3
	10	atm_atom3_0	O		channel 0 of ATOM module 3
	11	atm_atom5_0	O		channel 0 of ATOM module 5
	12	atm_tim2_0	I		channel 0 of TIM module 2
	13	atm_tim4_0	I		channel 0 of TIM module 4
	14	ccu60_cc62in_2	I		T12 capture input
	15	ccu61_ccpos2_2	I		Hall capture input
	A	adc_vin_15	AI		ADC channel input 15

2.2.1.19 PB14

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB14 (22)	0	GPIO_19	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	I2C1_SCL	I/O		I2C Serial Clock
	2	atm_tom2_5	O		channel 5 of TOM module 2
	3	sent_rx_7	I		Receive input channel 7
	4	gpt12_t3in_1	I		Trigger/gate input of core timer T3
	5	-	-		-
	6	ether_phy_rxdv	I		Ether Receive Data Valid
	7	atm_tom2_1	O		channel 1 of TOM module 2
	8	atm_tom3_1	O		channel 1 of TOM module 3
	9	atm_atom3_1	O		channel 1 of ATOM module 3
	10	atm_atom5_1	O		channel 1 of ATOM module 5
	11	atm_tim2_1	I		channel 1 of TIM module 2
	12	atm_tim4_1	I		channel 1 of TIM module 4
	13	ccu60_cc62in_3	I		T12 capture input
	14	ccu61_ccpos2_3	I		Hall capture input
	A	adc_vin_14	AI		ADC channel input 14

2.2.1.20 PB13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB13 (23)	0	GPIO_20	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	I2C1_SDA	I/O		I2C Serial Data
	2	atm_tom2_6	O		channel 6 of TOM module 2
	3	sent_rx_8	I		Receive input channel 8
	4	gpt12_t3in_2	I		Trigger/gate input of core timer T3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	-	-		-
	6	ether_phy_rxer	I		Ether Receive Data error
	7	atm_tom2_2	O		channel 2 of TOM module 2
	8	atm_tom3_2	O		channel 2 of TOM module 3
	9	atm_atom3_2	O		channel 2 of ATOM module 3
	10	atm_atom5_2	O		channel 2 of ATOM module 5
	11	atm_tim2_2	I		channel 2 of TIM module 2
	12	atm_tim4_2	I		channel 2 of TIM module 4
	13	ccu60_ccpos0_0	I		Hall capture input
	14	ccu61_ctrap_n_0	I		Trap input capture
	A	adc_vin_13	AI		ADC channel input 13

2.2.1.21 PB12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB12	0	GPIO_21	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(24)	1	gpt12_t3in_3	I		Trigger/gate input of core timer T3
	2	atm_tom2_7	O		channel 7 of TOM module 2
	3	sent_rx_9	I		Receive input channel 9
	4	qspi0_sclk_out	O		Qspi clock output
	5	-	-		-
	6	ether_phy_rxd_0	I		Ether Receive Data
	7	atm_tom2_3	O		channel 3 of TOM module 2
	8	atm_tom3_3	O		channel 3 of TOM module 3
	9	atm_atom3_3	O		channel 3 of ATOM module 3
	10	atm_atom5_3	O		channel 3 of ATOM module 5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_tim2_3	I		channel 3 of TIM module 2
	12	atm_tim4_3	I		channel 3 of TIM module 4
	13	ccu60_ccpos0_1	I		Hall capture input
	14	ccu61_ctrap_n_1	I		Trap input capture
	A	adc_vin_12	AI		ADC channel input 12

2.2.1.22 PG6

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PG6	0	GPIO_22	I/O	Pull-up	General-purpose input/output
(25)	1	sent_rx_0	I	/FAST/	Receive input channel 0
	2	GPIO_91	I/O	CMOS	General-purpose input/output
	3	sent_rx_10	I		Receive input channel 10
	4	atm_tim4_1	I		channel 1 of TIM module 4
	5	atm_atom3_0	O		channel 0 of ATOM module 3
	6	atm_atom5_5	O		channel 5 of ATOM module 5
	7	atm_tom4_12	O		channel 12 of TOM module 4
	8	atm_tom2_4	O		channel 4 of TOM module 2
	9	atm_tom3_4	O		channel 4 of TOM module 3
	10	atm_atom3_4	O		channel 4 of ATOM module 3
	11	atm_atom5_4	O		channel 4 of ATOM module 5
	12	atm_tim2_4	I		channel 4 of TIM module 2
	13	atm_tim4_4	I		channel 4 of TIM module 4
	14	ccu60_ccpos0_2	I		Hall capture input
	15	ccu61_ctrap_n_2	I		Trap input capture
	A	adc_vin_11	AI		ADC channel input 11

2.2.1.23 PG7

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PG7 (26)	0	UART0_RX	I	Pull-up /FAST/ CMOS	UART receive input
	1	GPIO_23	I/O		General-purpose input/output
	2	gpt12_t3out	O		External output for overflow/underflow detection of core timer T3
	3	sent_rx_11	I		Receive input channel 11
	4	atm_tim2_6	I		channel 6 of TIM module 2
	5	-	-		-
	6	ether_phy_rxd_1	I		Ether Receive Data
	7	atm_tom2_5	O		channel 5 of TOM module 2
	8	atm_tom3_5	O		channel 5 of TOM module 3
	9	atm_atom3_5	O		channel 5 of ATOM module 3
	10	atm_atom5_5	O		channel 5 of ATOM module 5
	11	atm_tim2_5	I		channel 5 of TIM module 2
	12	atm_tim4_5	I		channel 5 of TIM module 4
	13	ccu60_ccpos0_3	I		Hall capture input
	14	ccu61_ctrap_n_3	I		Trap input capture
	A	adc_vin_10	AI		ADC channel input 10

2.2.1.24 PG8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PG8 (27)	0	UART0_TX	O	Pull-up /FAST/ CMOS	UART transmit output
	1	GPIO_24	I/O		General-purpose input/output
	2	gpt12_t4eud_0	I		Count direction control input of timer T4
	3	sent_rx_12	I		Receive input channel 12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	-	-		-
	5	I2C0_SCL	I/O		I2C Serial Clock
	6	can3_rx	I		CAN receive input
	7	ether_phy_rxd_2	I		Ether Receive Data
	8	atm_tom2_6	O		channel 6 of TOM module 2
	9	atm_tom3_6	O		channel 6 of TOM module 3
	10	atm_atom3_6	O		channel 6 of ATOM module 3
	11	atm_atom5_6	O		channel 6 of ATOM module 5
	12	atm_tim2_6	I		channel 6 of TIM module 2
	13	atm_tim4_6	I		channel 6 of TIM module 4
	14	ccu60_ccpos1_0	I		Hall capture input
	15	ccu61_cout60	O		T12 PWM channel
	A	adc_vin_9	AI		ADC channel input 9

2.2.1.25 PE15

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE15 (30)	0	GPIO_25	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	GPIO_83	I/O		General-purpose input/output
	2	GPIO_92	I/O		General-purpose input/output
	3	sent_rx_13	I		Receive input channel 13
	4	atm_tim3_1	I		channel 1 of TIM module 3
	5	atm_atom3_1	O		channel 1 of ATOM module 3
	6	atm_atom5_6	O		channel 6 of ATOM module 5
	7	atm_tom4_13	O		channel 13 of TOM module 4
	8	atm_tom2_7	O		channel 7 of TOM module 2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	9	atm_tom3_7	O		channel 7 of TOM module 3
	10	atm_atom3_7	O		channel 7 of ATOM module 3
	11	atm_atom5_7	O		channel 7 of ATOM module 5
	12	atm_tim2_7	I		channel 7 of TIM module 2
	13	atm_tim4_7	I		channel 7 of TIM module 4
	14	ccu60_ccpos1_1	I		Hall capture input
	15	ccu61_cout61	O		T12 PWM channel
	A	adc_vin_8	AI		ADC channel input 8

2.2.1.26 PE14

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE14 (31)	0	GPIO_26	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	uart0_nuartrts	O		UART request to send
	2	gpt12_t4eud_1	I		Count direction control input of timer T4
	3	sent_rx_14	I		Receive input channel 14
	4	-	-		-
	5	I2C0_SDA	I/O		I2C Serial Data
	6	can3_tx	O		CAN transmit output
	7	ether_phy_rxd_3	I		Ether Receive Data
	8	atm_tom2_8	O		channel 8 of TOM module 2
	9	atm_tom3_8	O		channel 8 of TOM module 3
	10	atm_atom4_0	O		channel 0 of ATOM module 4
	11	atm_atom6_0	O		channel 0 of ATOM module 6
	12	atm_tim3_0	I		channel 0 of TIM module 3
	13	atm_tim5_0	I		channel 0 of TIM module 5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	14	ccu60_ccpos1_2	I		Hall capture input
	15	ccu61_cout62	O		T12 PWM channel
	A	adc_vin_7	AI		ADC channel input 7

2.2.1.27 PB4

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB4	0	GPIO_27	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(32)	1	uart0_nuartcts	I		UART clear to send
	2	gpt12_t4eud_2	I		Count direction control input of timer T4
	3	lin3_rx	I		LIN Receive input
	4	-	-		-
	5	I2C1_SCL	I/O		I2C Serial Clock
	6	can4_rx	I		CAN receive input
	7	ether_phy_rxd_4	I		Ether Receive Data
	8	atm_tom2_9	O		channel 9 of TOM module 2
	9	atm_tom3_9	O		channel 9 of TOM module 3
	10	atm_atom4_1	O		channel 1 of ATOM module 4
	11	atm_atom6_1	O		channel 1 of ATOM module 6
	12	atm_tim3_1	I		channel 1 of TIM module 3
	13	atm_tim5_1	I		channel 1 of TIM module 5
	14	ccu60_ccpos1_3	I		Hall capture input
	15	ccu61_cout63	O		T13 PWM channel
	A	adc_vin_6	AI		ADC channel input 6

2.2.1.28 PE13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE13	0	GPIO_28	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(33)	1	msc0_rxd_6	I		Upstream asynchronous input signal
	2	gpt12_t4eud_3	I		Count direction control input of timer T4
	3	lin3_tx	O		LIN transmit output
	4	dspi0_ext_trigger	I		Dspi0 External Trigger
	5	I2C1_SDA	I/O		I2C Serial Data
	6	can4_tx	O		CAN transmit output
	7	ether_phy_rxd_5	I		Ether Receive Data
	8	atm_tom2_10	O		channel 10 of TOM module 2
	9	atm_tom3_10	O		channel 10 of TOM module 3
	10	atm_atom4_2	O		channel 2 of ATOM module 4
	11	atm_atom6_2	O		channel 2 of ATOM module 6
	12	atm_tim3_2	I		channel 2 of TIM module 3
	13	atm_tim5_2	I		channel 2 of TIM module 5
	14	ccu60_ccpos2_0	I		Hall capture input
	15	ccu61_cc60	O		T12 PWM channel
	A	adc_vin_5	AI		ADC channel input 5

2.2.1.29 PD11

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD11	0	GPIO_29	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(34)	1	msc0_rxd_7	I		Upstream asynchronous input signal
	2	gpt12_t4in_0	I		Trigger/gate input of timer T4
	3	lin4_rx	I		LIN Receive input

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	dspi0_ht	I		Dspi0 Hardware Trigger
	5	SPI1_SCLK	I/O		Spi clock
	6	can5_rx	I		CAN receive input
	7	ether_phy_rxd_6	I		Ether Receive Data
	8	atm_tom2_11	O		channel 11 of TOM module 2
	9	atm_tom3_11	O		channel 11 of TOM module 3
	10	atm_atom4_3	O		channel 3 of ATOM module 4
	11	atm_atom6_3	O		channel 3 of ATOM module 6
	12	atm_tim3_3	I		channel 3 of TIM module 3
	13	atm_tim5_3	I		channel 3 of TIM module 5
	14	ccu60_ccpos2_1	I		Hall capture input
	15	ccu61_cc61	O		T12 PWM channel
	A	adc_vin_4	AI		ADC channel input 4

2.2.1.30 PB3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB3	0	GPIO_30	I/O	Pull-up	General-purpose input/output
(35)	1	uart1_nuartrts	O	/FAST/	UART request to send
	2	gpt12_t4in_1	I	CMOS	Trigger/gate input of timer T4
	3	lin4_tx	O		LIN transmit output
	4	dspi1_pcs6	O		Dspi1 chip select 6
	5	SPI1_CS	I/O		Spi chip select
	6	can5_tx	O		CAN transmit output
	7	ether_phy_rxd_7	I		Ether Receive Data
	8	atm_tom2_12	O		channel 12 of TOM module 2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	9	atm_tom3_12	O		channel 12 of TOM module 3
	10	atm_atom4_4	O		channel 4 of ATOM module 4
	11	atm_atom6_4	O		channel 4 of ATOM module 6
	12	atm_tim3_4	I		channel 4 of TIM module 3
	13	atm_tim5_4	I		channel 4 of TIM module 5
	14	ccu60_ccpos2_2	I		Hall capture input
	15	ccu61_cc62	O		T12 PWM channel
	A	adc_vin_3	AI		ADC channel input 3

2.2.1.31 PB2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB2	0	GPIO_31	I/O	Pull-up	General-purpose input/output
(36)	1	uart1_nuartcts	I	/FAST/	UART clear to send
	2	gpt12_t4in_2	I	CMOS	Trigger/gate input of timer T4
	3	lin5_rx	I		LIN Receive input
	4	dspi1_pcs7	O		Dspi1 chip select 7
	5	SPI1_RXD	I		Spi receive input
	6	can6_rx	I		CAN receive input
	7	ether_phy_crs	I		Ether Carrier Sense
	8	atm_tom2_13	O		channel 13 of TOM module 2
	9	atm_tom3_13	O		channel 13 of TOM module 3
	10	atm_atom4_5	O		channel 5 of ATOM module 4
	11	atm_atom6_5	O		channel 5 of ATOM module 6
	12	atm_tim3_5	I		channel 5 of TIM module 3
	13	atm_tim5_5	I		channel 5 of TIM module 5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	14	ccu60_ccpos2_3	I		Hall capture input
	15	ccu61_t13hrx_0	I		External timer start 13
	A	adc_vin_2	AI		ADC channel input 2

2.2.1.32 PB1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB1	0	GPIO_32	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(37)	1	SPI0_SCLK	I/O		Spi clock
	2	gpt12_t4in_3	I		Trigger/gate input of timer T4
	3	lin5_tx	O		LIN transmit output
	4	-	-		-
	5	SPI1_TXD	O		Spi transmit output
	6	can6_tx	O		CAN transmit output
	7	ether_phy_col_i	I		Ether Collision
	8	atm_tom2_14	O		channel 14 of TOM module 2
	9	atm_tom3_14	O		channel 14 of TOM module 3
	10	atm_atom4_6	O		channel 6 of ATOM module 4
	11	atm_atom6_6	O		channel 6 of ATOM module 6
	12	atm_tim3_6	I		channel 6 of TIM module 3
	13	atm_tim5_6	I		channel 6 of TIM module 5
	14	ccu60_ctrap_n_0	I		Trap input capture
	15	ccu61_t13hrx_1	I		External timer start 13
	A	adc_vin_1	AI		ADC channel input 1

2.2.1.33 PB0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB0	0	GPIO_33	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(38)	1	SPI0_CS	I/O		Spi chip select
	2	gpt12_t5in_0	I		Trigger/gate input of timer T5
	3	sent_rx_15	I		Receive input channel 15
	4	-	-		-
	5	I3C1_SDA	I/O		I3C serial data
	6	can7_rx	I		CAN receive input
	7	psi5_0_dout_0	O		PSI5 sync pulse data Output
	8	atm_tom2_15	O		channel 15 of TOM module 2
	9	atm_tom3_15	O		channel 15 of TOM module 3
	10	atm_atom4_7	O		channel 7 of ATOM module 4
	11	atm_atom6_7	O		channel 7 of ATOM module 6
	12	atm_tim3_7	I		channel 7 of TIM module 3
	13	atm_tim5_7	I		channel 7 of TIM module 5
	14	ccu60_ctrap_n_1	I		Trap input capture
	15	ccu61_t13hrx_2	I		External timer start 13
	A	adc_vin_0	AI		ADC channel input 0

2.2.1.34 PF1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PF1	0	GPIO_34	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(40)	1	GPIO_84	I/O		General-purpose input/output
	2	GPIO_93	I/O		General-purpose input/output
	3	atm_tom2_8	O		channel 8 of TOM module 2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	atm_tom3_8	O		channel 8 of TOM module 3
	5	I3C1_SCL	I/O		I3C serial clock
	6	atm_atom5_7	O		channel 7 of ATOM module 5
	7	atm_tom4_14	O		channel 14 of TOM module 4
	8	atm_tom0_0	O		channel 0 of TOM module 0
	9	atm_tom1_0	O		channel 0 of TOM module 1
	10	atm_atom2_0	O		channel 0 of ATOM module 2
	11	atm_atom0_0	O		channel 0 of ATOM module 0
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_ctrap_n_2	I		Trap input capture
	15	ccu61_t13hrx_3	I		External timer start 13

2.2.1.35 PF0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PF0	0	GPIO_35	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(41)	1	dspi0_pcs7	O		Dspi0 chip select 7
	2	dspi1_pcs7	O		Dspi1 chip select 7
	3	atm_tom2_9	O		channel 9 of TOM module 2
	4	atm_tom3_9	O		channel 9 of TOM module 3
	5	I3C1_PUR_OUT	O		I3C Pullup-R
	6	atm_atom6_0	O		channel 0 of ATOM module 6
	7	atm_tom4_15	O		channel 15 of TOM module 4
	8	atm_tom0_1	O		channel 1 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	10	atm_atom2_1	O		channel 1 of ATOM module 2
	11	atm_atom0_1	O		channel 1 of ATOM module 0
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_ctrap_n_3	I		Trap input capture
	15	ccu61_t13hrx_4	I		External timer start 13

2.2.1.36 PD9

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD9 (42)	0	GPIO_36	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	GPIO_85	I/O		General-purpose input/output
	2	GPIO_94	I/O		General-purpose input/output
	3	atm_tom2_10	O		channel 10 of TOM module 2
	4	atm_tom3_10	O		channel 10 of TOM module 3
	5	atm_tim5_4	I		channel 4 of TIM module 5
	6	atm_atom6_1	O		channel 1 of ATOM module 6
	7	psi5_0_dout_1	O		PSI5 sync pulse data Output
	8	atm_tom0_2	O		channel 2 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1
	10	atm_atom2_2	O		channel 2 of ATOM module 2
	11	atm_atom0_2	O		channel 2 of ATOM module 0
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu60_cout60	O		T12 PWM channel
	15	ccu61_t13hrx_5	I		External timer start 13

2.2.1.37 PD10

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD10 (43)	0	GPIO_37	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	GPIO_86	I/O		General-purpose input/output
	2	GPIO_95	I/O		General-purpose input/output
	3	atm_tom2_11	O		channel 11 of TOM module 2
	4	atm_tom3_11	O		channel 11 of TOM module 3
	5	atm_tim5_5	I		channel 5 of TIM module 5
	6	atm_atom6_2	O		channel 2 of ATOM module 6
	7	psi5_0_dout_2	O		PSI5 sync pulse data Output
	8	atm_tom0_3	O		channel 3 of TOM module 0
	9	atm_tom1_3	O		channel 3 of TOM module 1
	10	atm_atom2_3	O		channel 3 of ATOM module 2
	11	atm_atom0_3	O		channel 3 of ATOM module 0
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	ccu60_cout61	O		T12 PWM channel
	15	ccu61_t13hrx_6	I		External timer start 13

2.2.1.38 PB11

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB11 (44)	0	GPIO_38	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	SPI0_RXD	I		Spi receive input
	2	gpt12_t5in_1	I		Trigger/gate input of timer T5
	3	can0_rx	I		CAN receive input
	4	-	-		-

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	atm_tim5_6	I		channel 6 of TIM module 5
	6	can7_tx	O		CAN transmit output
	7	psi5_0_dout_3	O		PSI5 sync pulse data Output
	8	atm_tom0_4	O		channel 4 of TOM module 0
	9	atm_tom1_4	O		channel 4 of TOM module 1
	10	atm_atom2_4	O		channel 4 of ATOM module 2
	11	atm_atom0_4	O		channel 4 of ATOM module 0
	12	atm_tim0_4	I		channel 4 of TIM module 0
	13	atm_tim1_4	I		channel 4 of TIM module 1
	14	ccu60_cout62	O		T12 PWM channel
	15	ccu61_t13hrx_7	I		External timer start 13

2.2.1.39 PB10

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB10	0	GPIO_39	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(45)	1	SPI0_TXD	O		Spi transmit output
	2	gpt12_t5eud_0	I		Count direction control input of timer T5
	3	atm_tim2_1	I		channel 1 of TIM module 2
	4	-	-		-
	5	atm_tim5_7	I		channel 7 of TIM module 5
	6	atm_tom2_12	O		channel 12 of TOM module 2
	7	psi5_0_dout_4	O		PSI5 sync pulse data Output
	8	atm_tom0_1	O		channel 1 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom0_1	O		channel 1 of ATOM module 0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom1_1	O		channel 1 of ATOM module 1
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_cout63	O		T13 PWM channel
	15	-	-		-

2.2.1.40 PB9

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB9	0	GPIO_40	I/O	Pull-up	General-purpose input/output
(46)	1	sent_idle_chnl_0	O	/FAST/	Sent Bus Idle
	2	gpt12_t5eud_1	I	CMOS	Count direction control input of timer T5
	3	lin6_rx	I		LIN Receive input
	4	-	-		-
	5	uart1_sirin	I		SiR receive input
	6	atm_tom2_13	O		channel 13 of TOM module 2
	7	psi5_0_din_0	I		PSI5 Sensor Data Input
	8	atm_tom0_0	O		channel 0 of TOM module 0
	9	atm_tom1_0	O		channel 0 of TOM module 1
	10	atm_atom2_0	O		channel 0 of ATOM module 2
	11	atm_atom0_0	O		channel 0 of ATOM module 0
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_cc60	O		T12 PWM channel
	15	-	-		-

2.2.1.41 PB8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PB8	0	GPIO_41	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(47)	1	sent_idle_chnl_1	O		Sent Bus Idle
	2	gpt12_t6in_0	I		Trigger/gate input of timer T6
	3	lin6_tx	O		LIN transmit output
	4	-	-		-
	5	uart1_nsirout	O		SiR receive output
	6	atm_tom2_14	O		channel 14 of TOM module 2
	7	psi5_0_din_1	I		PSI5 Sensor Data Input
	8	atm_tom0_2	O		channel 2 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1
	10	atm_atom0_2	O		channel 2 of ATOM module 0
	11	atm_atom1_2	O		channel 2 of ATOM module 1
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu60_cc61	O		T12 PWM channel
	15	-	-		-

2.2.1.42 PA3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA3	0	GPIO_42	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(48)	1	sent_idle_chnl_2	O		Sent Bus Idle
	2	gpt12_t6in_1	I		Trigger/gate input of timer T6
	3	lin1_tx	O		LIN transmit output
	4	-	-		-

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	SWDO	O		SW Data Out
	6	atm_tom2_15	O		channel 15 of TOM module 2
	7	psi5_0_din_2	I		PSI5 Sensor Data Input
	8	atm_tom0_12	O		channel 12 of TOM module 0
	9	atm_tom1_12	O		channel 12 of TOM module 1
	10	atm_atom2_4	O		channel 4 of ATOM module 2
	11	atm_atom0_4	O		channel 4 of ATOM module 0
	12	atm_tim1_0	I		channel 0 of TIM module 1
	13	atm_tim0_0	I		channel 0 of TIM module 0
	14	ccu60_cc62	O		T12 PWM channel
	15	-	-		-

2.2.1.43 PD8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD8 (49)	0	GPIO_43	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	sent_idle_chnl_3	O		Sent Bus Idle
	2	gpt12_t6eud_0	I		Count direction control input of core timer T6
	3	dspi1_ext_trigger	I		Dspi1 External Trigger
	4	flexray0_rxda	I		Flexray Receive Channel A
	5	qspi0_ss_14_n	O		Qspi chip select 14
	6	atm_atom6_3	O		channel 3 of ATOM module 6
	7	psi5_0_din_3	I		PSI5 Sensor Data Input
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_13	O		channel 13 of TOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	10	atm_atom2_5	O		channel 5 of ATOM module 2
	11	atm_atom0_5	O		channel 5 of ATOM module 0
	12	atm_tim1_1	I		channel 1 of TIM module 1
	13	atm_tim0_1	I		channel 1 of TIM module 0
	14	ccu60_t13hrx_0	I		External timer start 13
	15	-	-		-

2.2.1.44 PA15

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA15	0	GPIO_44	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(50)	1	sent_idle_chnl_4	O		Sent Bus Idle
	2	gpt12_t6eud_1	I		Count direction control input of core timer T6
	3	lin1_rx	I		LIN Receive input
	4	flexray0_rxdb	I		Flexray Receive Channel B
	5	dspi1_ht	I		Dspi1 Hardware Trigger
	6	atm_atom6_4	O		channel 4 of ATOM module 6
	7	psi5_0_din_4	I		PSI5 Sensor Data Input
	8	atm_tom0_5	O		channel 5 of TOM module 0
	9	atm_tom1_5	O		channel 5 of TOM module 1
	10	atm_atom0_5	O		channel 5 of ATOM module 0
	11	atm_atom1_5	O		channel 5 of ATOM module 1
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	ccu60_t13hrx_1	I		External timer start 13
	15	-	-		-

2.2.1.45 PF13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PF13 (56)	0	can0_rx	I	Pull-up /FAST/ CMOS	CAN receive input
	1	sent_idle_chnl_5	O		Sent Bus Idle
	2	gpt12_t6out	O		External output for overflow/underflow detection of core timer T6
	3	dspi1_sin	I		Dspi1 Data input
	4	flexray0_txda	O		Flexray Transmit Channel B
	5	qspi0_ss_15_n	O		Qspi chip select 15
	6	GPIO_45	I/O		General-purpose input/output
	7	psi5_1_dout_0	O		PSI5 sync pulse data Output
	8	atm_tom0_0	O		channel 0 of TOM module 0
	9	atm_tom1_0	O		channel 0 of TOM module 1
	10	atm_atom0_0	O		channel 0 of ATOM module 0
	11	atm_atom1_0	O		channel 0 of ATOM module 1
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	ccu60_t13hrx_2	I		External timer start 13
	15	-	-		-

2.2.1.46 PD7

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD7 (57)	0	can0_tx	O	Pull-up /FAST/ CMOS	CAN transmit output
	1	sent_idle_chnl_6	O		Sent Bus Idle
	2	gpt12_t6ofl	O		Overflow/underflow signal of timer T6
	3	lin7_rx	I		LIN Receive input

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	flexray0_txdb	O		Flexray Transmit Channel B
	5	dspi1_sin	I		Dspi1 Data input
	6	GPIO_46	I/O		General-purpose input/output
	7	psi5_1_dout_1	O		PSI5 sync pulse data Output
	8	atm_tom0_1	O		channel 1 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom0_1	O		channel 1 of ATOM module 0
	11	atm_atom1_1	O		channel 1 of ATOM module 1
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu60_t13hrx_3	I		External timer start 13
	15	-	-		-

2.2.1.47 PD6

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD6	0	GPIO_47	I/O	Pull-up	General-purpose input/output
(58)	1	sent_idle_chnl_7	O	/FAST/	Sent Bus Idle
	2	lin7_tx	O	CMOS	LIN transmit output
	3	psi5_s_uart_tclk	O		PSI5S uart transmit clock
	4	qspi0_ss_12_n	O		Qspi chip select 12
	5	atm_tim4_0	I		channel 4 of TIM module 0
	6	atm_atom6_5	O		channel 5 of TOM module 6
	7	psi5_1_dout_2	O		PSI5 sync pulse data Output
	8	atm_tom0_2	O		channel 2 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	10	atm_atom0_2	O		channel 2 of ATOM module 0
	11	atm_atom1_2	O		channel 2 of ATOM module 1
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu60_t13hrx_4	I		External timer start 13
	15	-	-		-

2.2.1.48 PA8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA8	0	tdi	I	Pull-up	Jtag test data input
(59)	1	sent_idle_chnl_8	O	/FAST/	Sent Bus Idle
	2	GPIO_48	I/O	CMOS	General-purpose input/output
	3	flexray0_txea_b	O		Flexray Transmit Enable Channel A
	4	I2C0_SCL	I/O		I2C Serial Clock
	5	dspi0_ss_b	I		Dspi0 Slave Select
	6	psi5_1_dout_3	O		PSI5 sync pulse data Output
	7	atm_tom0_4	O		channel 4 of TOM module 0
	8	atm_tom1_4	O		channel 4 of TOM module 1
	9	atm_atom0_4	O		channel 4 of ATOM module 0
	10	atm_atom1_4	O		channel 4 of ATOM module 1
	11	atm_tim0_4	I		channel 4 of TIM module 0
	12	atm_tim1_4	I		channel 4 of TIM module 1
	13	ccu60_t13hrx_5	I		External timer start 13
	14	atm_tdi	I		Atm Jtag data input

2.2.1.49 PA7

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA7	0	tms	I	Pull-up /FAST/ CMOS	Jtag test mode select
(60)	1	sent_idle_chnl_9	O		Sent Bus Idle
	2	GPIO_49	I/O		General-purpose input/output
	3	flexray0_txeb_b	O		Flexray Transmit Enable Channel B
	4	I2C0_SDA	I/O		I2C Serial Data
	5	atm_tom3_12	O		channel 12 of TOM module 3
	6	psi5_1_dout_4	O		PSI5 sync pulse data Output
	7	atm_tom4_0	O		channel 0 of TOM module 4
	8	atm_tom4_4	O		channel 4 of TOM module 4
	9	atm_atom7_0	O		channel 0 of ATOM module 7
	10	atm_atom1_3	O		channel 3 of ATOM module 1
	11	atm_tim0_3	I		channel 3 of TIM module 0
	12	atm_tim1_3	I		channel 3 of TIM module 1
	13	ccu60_t13hrx_6	I		External timer start 13
	14	atm_tms	I		Atm Jtag test mode select

2.2.1.50 PA9

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA9	0	tdo	O	Pull-up /FAST/ CMOS	Jtag test data output
(61)	1	sent_idle_chnl_10	O		Sent Bus Idle
	2	GPIO_50	I/O		General-purpose input/output
	3	psi5_s_lintx	O		PSI5S lin transmit output
	4	can6_rx	I		CAN receive input
	5	atm_tom3_13	O		channel 13 of TOM module 3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	6	psi5_1_din_0	I		PSI5 Sensor Data Input
	7	atm_tom0_5	O		channel 5 of TOM module 0
	8	atm_tom1_5	O		channel 5 of TOM module 1
	9	atm_atom0_5	O		channel 5 of ATOM module 0
	10	atm_atom1_5	O		channel 5 of ATOM module 1
	11	atm_tim0_5	I		channel 5 of TIM module 0
	12	atm_tim1_5	I		channel 5 of TIM module 1
	13	atm_atom1_7	O		channel 7 of ATOM module 1
	14	atm_tdo	O		Atm Jtag test data output

2.2.1.51 PA5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA5	0	trst	I	Pull-up	Jtag test reset
(62)	1	sent_idle_chnl_11	O	/FAST/	Sent Bus Idle
	2	GPIO_51	I/O	CMOS	General-purpose input/output
	3	psi5_s_linrx	I		PSI5S LIN Receive input
	4	can6_tx	O		CAN transmit output
	5	atm_tom3_14	O		channel 14 of TOM module 3
	6	psi5_1_din_1	I		PSI5 Sensor Data Input
	7	atm_tom4_1	O		channel 1 of TOM module 4
	8	atm_tom4_5	O		channel 5 of TOM module 4
	9	atm_atom7_1	O		channel 1 of ATOM module 7
	10	atm_atom1_6	O		channel 6 of ATOM module 1
	11	atm_tim0_6	I		channel 6 of TIM module 0
	12	atm_tim1_6	I		channel 6 of TIM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	13	ccu60_t13hrx_7	I		External timer start 13
	14	atm_trst	I		Atm Jtag test reset

2.2.1.52 PA6

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA6 (63)	0	tck	I	Pull-up /FAST/ CMOS	Jtag test clock
	1	sent_idle_chnl_12	O		Sent Bus Idle
	2	GPIO_52	I/O		General-purpose input/output
	3	atm_atom6_6	O		channel 6 of ATOM module 6
	4	SPI0_SCLK	I/O		SPI clock
	5	can7_rx	I		CAN receive input
	6	atm_tom3_15	O		channel 15 of TOM module 3
	7	psi5_1_din_2	I		PSI5 Sensor Data Input
	8	atm_tom4_2	O		channel 2 of TOM module 4
	9	atm_tom4_6	O		channel 6 of TOM module 4
	10	atm_atom7_2	O		channel 2 of ATOM module 7
	11	atm_atom1_7	O		channel 7 of ATOM module 1
	12	atm_tim1_0	I		channel 0 of TIM module 1
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	ccu61_t12hrx_0	I		External timer start 12
	15	atm_tck	I		Atm Jtag test clock

2.2.1.53 PA4

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA4	0	GPIO_53	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(65)	1	GPIO_87	I/O		General-purpose input/output
	2	atm_tim3_0	I		channel 0 of TIM module 3
	3	atm_tim2_5	I		channel 5 of TIM module 2
	4	atm_tim3_2	I		channel 2 of TIM module 3
	5	can7_tx	O		CAN transmit output
	6	UART0_RX	I		UART receive input
	7	psi5_1_din_3	I		PSI5 Sensor Data Input
	8	atm_tom4_3	O		channel 3 of TOM module 4
	9	atm_tom4_7	O		channel 7 of TOM module 4
	10	atm_atom7_3	O		channel 3 of ATOM module 7
	11	atm_atom2_0	O		channel 0 of ATOM module 2
	12	atm_tim1_1	I		channel 1 of TIM module 1
	13	atm_tim0_1	I		channel 1 of TIM module 0
	14	ccu61_t12hrx_1	I		External timer start 12
	15	-	-		-

2.2.1.54 PE5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE5	0	GPIO_54	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(69)	1	dspi0_pcs0	O		Dspi0 Chip Select 0
	2	dspi1_pcs0	O		Dspi1 Chip Select 0
	3	dspi0_ss_b	I		Dspi0 Slave Select
	4	dspi1_ss_b	I		Dspi1 Slave Select

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	can2_rx	I		CAN receive input
	6	UART0_TX	O		UART transmit output
	7	psi5_1_din_4	I		PSI5 Sensor Data Input
	8	atm_tom0_7	O		channel 7 of TOM module 0
	9	atm_tom1_7	O		channel 7 of TOM module 1
	10	atm_atom0_7	O		channel 7 of ATOM module 0
	11	atm_atom2_7	O		channel 7 of ATOM module 2
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	ccu61_t12hrx_2	I		External timer start 12
	15	-	-		-

2.2.1.55 PE6

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE6	0	GPIO_55	I/O	Pull-up	General-purpose input/output
(70)	1	dspi0_pcs1	O	/FAST/	Dspi0 Chip Select 1
	2	dspi1_pcs1	O	CMOS	Dspi1 Chip Select 1
	3	lin1_rx	I		LIN Receive input
	4	atm_tim3_3	I		channel 3 of TIM module 3
	5	can2_tx	O		CAN transmit output
	6	atm_atom7_0	O		channel 0 of ATOM module 7
	7	can0_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_13	O		channel 13 of TOM module 1
	10	atm_atom1_5	O		channel 5 of ATOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom2_5	O		channel 5 of ATOM module 2
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	ccu61_t12hrx_3	I		External timer start 12
	15	atm_tim4_2	I		channel 2 of TIM module 4

2.2.1.56 PE7

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE7	0	GPIO_56	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(71)	1	dspi0_pcs6	O		Dspi0 Chip Select 6
	2	dspi1_pcs6	O		Dspi1 Chip Select 6
	3	lin1_tx	O		LIN transmit output
	4	atm_tim3_4	I		channel 4 of TIM module 3
	5	atm_tim4_4	I		channel 4 of TIM module 4
	6	atm_atom7_1	O		channel 1 of ATOM module 7
	7	can0_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_14	O		channel 14 of TOM module 0
	9	atm_tom1_14	O		channel 14 of TOM module 1
	10	atm_atom1_6	O		channel 6 of ATOM module 1
	11	atm_atom2_6	O		channel 6 of ATOM module 2
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	ccu61_t12hrx_4	I		External timer start 12
	15	atm_tim4_3	I		channel 3 of TIM module 4

2.2.1.57 PD4

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD4	0	GPIO_57	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(72)	1	sent_idle_chnl_13	O		Sent Bus Idle
	2	dspi0_o_sck	O		Dspi0 Master Serial Clock
	3	SPI0_CS	I/O		spi chip select
	4	qspi0_ss_13_n	O		Qspi chip select 13
	5	atm_tim4_5	I		channel 5 of TIM module 4
	6	atm_atom7_2	O		channel 2 of ATOM module 7
	7	can1_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_15	O		channel 15 of TOM module 0
	9	atm_tom1_15	O		channel 15 of TOM module 1
	10	atm_atom1_7	O		channel 7 of ATOM module 1
	11	atm_atom2_7	O		channel 7 of ATOM module 2
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	ccu61_t12hrx_5	I		External timer start 12
	15	atm_tim2_0	I		channel 0 of TIM module 2

2.2.1.58 PD5

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD5	0	GPIO_58	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(73)	1	sent_idle_chnl_14	O		Sent Bus Idle
	2	dspi0_sout	O		Dspi0 Data output
	3	dspi0_sin	I		Dspi0 Data input
	4	ether_ptp_pps_0	O		Ether ptp pps output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	SPI0_RXD	I		Spi receive input
	6	atm_atom7_3	O		channel 3 of ATOM module 7
	7	atm_tom4_2	O		channel 2 of TOM module 4
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_0	O		channel 0 of TOM module 1
	10	atm_atom1_0	O		channel 0 of ATOM module 1
	11	atm_atom2_0	O		channel 0 of ATOM module 2
	12	atm_tim1_0	I		channel 0 of TIM module 0
	13	atm_tim0_0	I		channel 0 of TIM module 1
	14	ccu61_t12hrx_6	I		External timer start 12
	15	atm_tom3_0	O		channel 0 of TOM module 3

2.2.1.59 PE8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE8	0	GPIO_59	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(74)	1	dspi0_pcs2	O		Dspi0 Chip Select 2
	2	dspi1_pcs2	O		Dspi1 Chip Select 2
	3	dspi0_ss_b	I		Dspi0 Slave Select
	4	atm_tim3_5	I		channel 5 of TIM module 3
	5	atm_tim4_6	I		channel 6 of TIM module 4
	6	atm_atom7_4	O		channel 4 of ATOM module 7
	7	atm_tom4_3	O		channel 3 of TOM module 4
	8	atm_tom0_9	O		channel 9 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom1_1	O		channel 1 of ATOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom2_1	O		channel 1 of ATOM module 2
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	ccu61_t12hrx_7	I		External timer start 12
	15	atm_tom3_1	O		channel 1 of TOM module 3

2.2.1.60 PE9

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE9	0	GPIO_60	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(75)	1	sent_idle_chnl_15	O		Sent Bus Idle
	2	dspi0_sout	O		Dspi0 Data output
	3	dspi0_sin	I		Dspi0 Data input
	4	fps_pin_0	O		Fps output
	5	SPI0_TXD	O		Spi transmit output
	6	atm_atom7_5	O		channel 5 of ATOM module 7
	7	atm_tom4_4	O		channel 4 of TOM module 4
	8	atm_tom0_10	O		channel 10 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1
	10	atm_atom1_2	O		channel 2 of ATOM module 1
	11	atm_atom2_2	O		channel 2 of ATOM module 2
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	ccu61_cc60in_0	I		T12 capture input
	15	atm_tom3_2	O		channel 2 of TOM module 3

2.2.1.61 PA2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA2 (76)	0	GPIO_61	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	dspi1_ss_b	I		Dspi1 Slave Select
	2	can2_tx	O		CAN transmit output
	3	lin1_tx	O		LIN transmit output
	4	dspi0_pcs1	O		Dspi0 Chip Select 1
	5	msc0_fcln	O		Shift-clock inverted part of the differential signal
	6	atm_atom7_6	O		channel 6 of ATOM module 7
	7	atm_tom4_5	O		channel 5 of TOM module 4
	8	atm_tom0_11	O		channel 11 of TOM module 0
	9	atm_tom1_3	O		channel 3 of TOM module 1
	10	atm_atom1_3	O		channel 3 of ATOM module 1
	11	atm_atom2_3	O		channel 3 of ATOM module 2
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	ccu61_cc60in_1	I		T12 capture input
	15	atm_tom3_3	O		channel 3 of TOM module 3

2.2.1.62 PA1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA1 (77)	0	GPIO_62	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_data_0	I/O		Qspi data
	2	can2_rx	I		CAN receive input
	3	lin1_tx	O		LIN transmit output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	4	dspi0_pcs2	O		Dspi0 Chip Select 2
	5	lin1_rx	I		LIN Receive input
	6	atm_atom7_7	O		channel 7 of ATOM module 7
	7	atm_tom4_6	O		channel 6 of TOM module 4
	8	atm_tom0_12	O		channel 12 of TOM module 0
	9	atm_tom1_4	O		channel 4 of TOM module 1
	10	atm_atom1_4	O		channel 4 of ATOM module 1
	11	atm_atom2_4	O		channel 4 of ATOM module 2
	12	atm_tim0_4	I		channel 4 of TIM module 0
	13	atm_tim1_4	I		channel 4 of TIM module 1
	14	ccu61_cc60in_2	I		T12 capture input
	15	-	-		-

2.2.1.63 PA12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA12 (78)	0	GPIO_63	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_data_1	I/O		Qspi data
	2	can1_tx	O		CAN transmit output
	3	lin0_tx	O		LIN transmit output
	4	dspi0_pcs0	O		Dspi0 Chip Select 0
	5	dspi0_sout	O		Dspi0 Data output
	6	dspi0_sin	I		Dspi0 Data input
	7	atm_tom4_7	O		channel 7 of TOM module 4
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_5	O		channel 5 of TOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	10	atm_atom1_5	O		channel 5 of ATOM module 1
	11	atm_atom2_5	O		channel 5 of ATOM module 2
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	ccu61_cc60in_3	I		T12 capture input
	15	-	-		-

2.2.1.64 PA13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA13	0	GPIO_64	I/O	Pull-up	General-purpose input/output
(79)	1	qspi0_data_2	I/O	/FAST/	Qspi data
	2	can1_rx	I	CMOS	CAN receive input
	3	can2_rx	I		CAN receive input
	4	lin0_tx	O		LIN transmit output
	5	dspi0_i_sck	I		Dspi0 Slave Serial Clock
	6	dspi1_pcs1	O		Dspi1 Chip Select 1
	7	atm_tom4_8	O		channel 8 of TOM module 4
	8	atm_tom0_14	O		channel 14 of TOM module 0
	9	atm_tom1_6	O		channel 6 of TOM module 1
	10	atm_atom1_6	O		channel 6 of ATOM module 1
	11	atm_atom2_6	O		channel 6 of ATOM module 2
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	atm_atom7_4	O		channel 4 of ATOM module 7
	15	-	-		-

2.2.1.65 PA0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA0	0	GPIO_65	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(80)	1	lin1_tx	O		LIN transmit output
	2	dspi0_sout	O		Dspi0 Data output
	3	dspi1_pcs0	O		Dspi1 Chip Select 0
	4	dspi1_ss_b	I		Dspi1 Slave Select
	5	lin1_rx	I		LIN Receive input
	6	atm_tom0_0	O		channel 0 of TOM module 0
	7	atm_tom1_0	O		channel 0 of TOM module 1
	8	atm_tom0_15	O		channel 15 of TOM module 0
	9	atm_tom1_7	O		channel 7 of TOM module 1
	10	atm_atom1_0	O		channel 0 of ATOM module 1
	11	atm_atom0_0	O		channel 0 of ATOM module 0
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim0_0	I		channel 0 of TIM module 0
	14	atm_atom7_5	O		channel 5 of ATOM module 7
	15	-	-		-

2.2.1.66 PA10

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA10	0	GPIO_66	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(81)	1	qspi0_data_3	I/O		Qspi data
	2	can1_tx	O		CAN transmit output
	3	lin0_tx	O		LIN transmit output
	4	fps_pin_1	O		Fps output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	atm_tim4_7	I		channel 7 of TIM module 4
	6	atm_atom8_0	O		channel 0 of ATOM module 8
	7	can1_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_3	O		channel 3 of TOM module 0
	9	atm_tom1_3	O		channel 3 of TOM module 1
	10	atm_atom1_2	O		channel 2 of ATOM module 1
	11	atm_atom0_2	O		channel 2 of ATOM module 0
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	atm_atom7_6	O		channel 6 of ATOM module 7
	15	-	-		-

2.2.1.67 PA11

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PA11	0	GPIO_67	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(82)	1	qspi0_ss_0_n	O		Qspi chip select 0
	2	can1_rx	I		CAN receive input
	3	can2_rx	I		CAN receive input
	4	lin0_tx	O		LIN transmit output
	5	lin0_rx	I		LIN Receive input
	6	atm_atom8_1	O		channel 1 of ATOM module 8
	7	can2_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_4	O		channel 4 of TOM module 0
	9	atm_tom1_4	O		channel 4 of TOM module 1
	10	atm_atom1_4	O		channel 4 of ATOM module 1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom0_4	O		channel 4 of ATOM module 0
	12	atm_tim0_4	I		channel 4 of TIM module 0
	13	atm_tim1_4	I		channel 4 of TIM module 1
	14	atm_atom7_7	O		channel 7 of ATOM module 7
	15	-	-		-

2.2.1.68 PE10

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE10	0	GPIO_68	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
(83)	1	dspi1_pcs3	O		Dspi1 Chip Select 3
	2	lin0_rx	I		LIN Receive input
	3	atm_tim2_2	I		channel 2 of TIM module 2
	4	atm_tim3_6	I		channel 6 of TIM module 3
	5	atm_atom3_2	O		channel 2 of ATOM module 3
	6	atm_atom8_2	O		channel 2 of ATOM module 8
	7	can2_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_6	O		channel 6 of TOM module 0
	9	atm_tom1_6	O		channel 6 of TOM module 1
	10	atm_atom0_2	O		channel 2 of ATOM module 0
	11	atm_atom1_2	O		channel 2 of ATOM module 1
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	atm_atom8_0	O		channel 0 of ATOM module 8
	15	-	-		-

2.2.1.69 PD3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD3 (87)	0	GPIO_70	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_1_n	O		Qspi chip select 1
	2	dspi1_sck_n	O		Dspi1 master clock differential negative signal
	3	dspi1_i_sck	I		Dspi1 Slave Serial Clock
	4	dspi1_pcs1	O		Dspi1 Chip Select 1
	5	msc0_fclp	O		Shift-clock direct part of the differential signal
	6	lin6_rx	I		LIN Receive input
	7	can3_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_5	O		channel 5 of TOM module 0
	9	atm_tom1_5	O		channel 5 of TOM module 1
	10	atm_atom2_5	O		channel 5 of ATOM module 2
	11	atm_atom0_5	O		channel 5 of ATOM module 0
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	atm_atom8_2	O		channel 2 of ATOM module 8
	15	-	-		-

2.2.1.70 PD2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD2 (88)	0	GPIO_71	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_2_n	O		Qspi chip select 2
	2	dspi1_sck_p	O		Dspi1 master clock differential positive

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
					signal
	3	dspi1_i_sck	I		Dspi1 Slave Serial Clock
	4	fps_pin_2	O		Fps output
	5	I3C0_SDA	I/O		I3C serial data
	6	lin6_tx	O		LIN transmit output
	7	can4_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_6	O		channel 6 of TOM module 0
	9	atm_tom1_6	O		channel 6 of TOM module 1
	10	atm_atom2_6	O		channel 6 of ATOM module 2
	11	atm_atom0_6	O		channel 6 of ATOM module 0
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	atm_atom8_3	O		channel 3 of ATOM module 8
	15	-	-		-

2.2.1.71 PD1

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD1 (89)	0	GPIO_72	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_3_n	O		Qspi chip select 3
	2	dspi1_sout_n	O		Dspi1 data out differential negative signal
	3	dspi1_i_sck	I		Dspi1 Slave Serial Clock
	4	atm_atom2_7	O		channel 2 of ATOM module 7
	5	I3C0_SCL	I/O		I3C serial clock
	6	lin7_rx	I		LIN Receive input

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	7	can4_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_7	O		channel 7 of TOM module 0
	9	atm_tom1_7	O		channel 7 of TOM module 1
	10	atm_atom2_7	O		channel 7 of ATOM module 2
	11	atm_atom0_7	O		channel 7 of ATOM module 0
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	atm_atom8_4	O		channel 4 of ATOM module 8
	15	-	-		-

2.2.1.72 PD0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PD0 (90)	0	GPIO_73	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_4_n	O		Qspi chip select 4
	2	dspi1_sout_p	O		Dspi1 data output differential positive signal
	3	atm_atom6_7	O		channel 7 of ATOM module 6
	4	atm_atom3_4	O		channel 4 of ATOM module 3
	5	I3C0_PUR_OUT	O		I3C Pullup-R
	6	lin7_tx	O		LIN transmit output
	7	can5_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_0	O		channel 0 of TOM module 1
	10	atm_atom2_0	O		channel 0 of ATOM module 2
	11	atm_atom0_0	O		channel 0 of ATOM module 0

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	12	atm_tim0_0	I		channel 0 of TIM module 0
	13	atm_tim1_0	I		channel 0 of TIM module 1
	14	atm_atom8_5	O		channel 5 of ATOM module 8
	15	-	-		-

2.2.1.73 PE12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PE12 (91)	0	GPIO_74	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_5_n	O		Qspi chip select 5
	2	dspi1_pcs1	O		Dspi1 Chip Select 1
	3	dspi1_pcs5_pcss	O		Dspi1 Chip Select 5 muxed with PCSS
	4	dspi0_pcs5_pcss	O		Dspi0 Chip Select 5 muxed with PCSS
	5	msc0_sop	O		Data output - direct part of the differential signal
	6	I3C0_SDA	I/O		I3C serial data
	7	can5_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_8	O		channel 8 of TOM module 0
	9	atm_tom1_1	O		channel 1 of TOM module 1
	10	atm_atom2_1	O		channel 1 of ATOM module 2
	11	atm_atom0_1	O		channel 1 of ATOM module 0
	12	atm_tim0_1	I		channel 1 of TIM module 0
	13	atm_tim1_1	I		channel 1 of TIM module 1
	14	atm_atom8_6	O		channel 6 of ATOM module 8

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	15	-	-		-

2.2.1.74 PC15

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC15 (92)	0	GPIO_75	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_6_n	O		Qspi chip select 6
	2	dspi1_sin	I		Dspi1 Data output
	3	dspi1_sout	O		Dspi1 Data input
	4	uart0_sirin	I		SiR receive input
	5	atm_atom3_5	O		channel 5 of ATOM module 3
	6	I3C0_SCL	I/O		I3C serial clock
	7	can6_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_10	O		channel 10 of TOM module 0
	9	atm_tom1_2	O		channel 2 of TOM module 1
	10	atm_atom2_2	O		channel 2 of ATOM module 2
	11	atm_atom0_2	O		channel 2 of ATOM module 0
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	atm_atom8_7	O		channel 7 of ATOM module 8
	15	-	-		-

2.2.1.75 PC14

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC14 (93)	0	GPIO_76	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_7_n	O		Qspi chip select 7
	2	dspi1_i_sck	I		Dspi1 Slave Serial Clock
	3	dspi1_ss_b	I		Dspi1 Slave Select
	4	uart0_nsirout	O		SiR receive output
	5	atm_atom3_6	O		channel 6 of ATOM module 3
	6	I3C0_PUR_OUT	O		I3C Pullup-R
	7	atm_tom4_9	O		channel 9 of TOM module 4
	8	atm_tom0_11	O		channel 11 of TOM module 0
	9	atm_tom1_3	O		channel 3 of TOM module 1
	10	atm_atom2_3	O		channel 3 of ATOM module 2
	11	atm_atom0_3	O		channel 3 of ATOM module 0
	12	atm_tim0_3	I		channel 3 of TIM module 0
	13	atm_tim1_3	I		channel 3 of TIM module 1
	14	atm_atom8_4	O		channel 4 of ATOM module 8
	15	-	-		-

2.2.1.76 PC13

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC13 (94)	0	GPIO_77	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_8_n	O		Qspi chip select 8
	2	dspi1_sout	O		Dspi1 Data output
	3	lin1_rx	I		LIN Receive input
	4	dspi1_sin	I		Dspi1 Data input

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	5	atm_atom3_7	O		channel 7 of ATOM module 3
	6	atm_atom4_2	O		channel 2 of ATOM module 4
	7	atm_tom4_10	O		channel 10 of TOM module 4
	8	atm_tom0_12	O		channel 12 of TOM module 0
	9	atm_tom1_4	O		channel 4 of TOM module 1
	10	atm_atom2_4	O		channel 4 of ATOM module 2
	11	atm_atom0_4	O		channel 4 of ATOM module 0
	12	atm_tim0_4	I		channel 4 of TIM module 0
	13	atm_tim1_4	I		channel 4 of TIM module 1
	14	atm_atom8_5	O		channel 5 of ATOM module 8
	15	sigdelta0_igtrig2	O		ADC sync mode igtrigger

2.2.1.77 PC12

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC12	0	GPIO_78	I/O	Pull-up	General-purpose input/output
(96)	1	qspi0_ss_9_n	O	/FAST/	Qspi chip select 9
	2	lin0_rx	I	CMOS	LIN Receive input
	3	dspi0_pcs3	O		Dspi0 Chip Select 3
	4	dspi1_pcs3	O		Dspi1 Chip Select 3
	5	dspi1_ss_b	I		Dspi1 Slave Select
	6	atm_tom4_12	O		channel 12 of TOM module 4
	7	atm_tom4_11	O		channel 11 of TOM module 4
	8	atm_tom0_13	O		channel 13 of TOM module 0
	9	atm_tom1_5	O		channel 5 of TOM module 1
	10	atm_atom2_5	O		channel 5 of ATOM module 2

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	11	atm_atom0_5	O		channel 5 of ATOM module 0
	12	atm_tim0_5	I		channel 5 of TIM module 0
	13	atm_tim1_5	I		channel 5 of TIM module 1
	14	atm_atom8_6	O		channel 6 of ATOM module 8
	15	sigdelta0_igtrig3	O		ADC sync mode igtrigger

2.2.1.78 PC11

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC11 (97)	0	GPIO_79	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	dspi1_ss_b	I		Dspi1 Slave Select
	2	lin0_rx	I		LIN Receive input
	3	dspi0_pcs4_mtrig	O		Dspi0 Chip Select 4 muxed with MTRIG
	4	dspi1_pcs4_mtrig	O		Dspi1 Chip Select 4 muxed with MTRIG
	5	dspi1_pcs0	O		Dspi1 Chip Select 0
	6	atm_tom4_13	O		channel 4 of TOM module 13
	7	dspi0_ss_b	I		Dspi1 Chip Select
	8	atm_tom0_14	O		channel 14 of TOM module 0
	9	atm_tom1_6	O		channel 6 of TOM module 1
	10	atm_atom2_6	O		channel 6 of ATOM module 2
	11	atm_atom0_6	O		channel 6 of ATOM module 0
	12	atm_tim0_6	I		channel 6 of TIM module 0
	13	atm_tim1_6	I		channel 6 of TIM module 1
	14	ether_ptp_pps_2	O		Ether ptp pps output

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
	15	adc_0_igtrig2	O		ADC sync mode igtrigger

2.2.1.79 PC10

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PC10 (98)	0	GPIO_80	I/O	Pull-up /FAST/ CMOS	General-purpose input/output
	1	qspi0_ss_10_n	O		Qspi chip select 10
	2	lin1_tx	O		LIN transmit output
	3	dspi0_pcs6	O		Dspi0 Chip Select 6
	4	dspi1_pcs3	O		Dspi1 Chip Select 3
	5	msc0_son	O		Data output - inverted part of the differential signal
	6	atm_atom8_7	O		channel 7 of ATOM module 8
	7	can6_gfl_wak_req_b	I		Can Wake-up request
	8	atm_tom0_15	O		channel 15 of TOM module 0
	9	atm_tom1_7	O		channel 7 of TOM module 1
	10	atm_atom2_7	O		channel 7 of ATOM module 2
	11	atm_atom0_7	O		channel 7 of ATOM module 0
	12	atm_tim0_7	I		channel 7 of TIM module 0
	13	atm_tim1_7	I		channel 7 of TIM module 1
	14	UART1_RX	I		UART receive input
	15	adc_0_igtrig3	O		ADC sync mode igtrigger

2.2.1.80 PF3

Ball	Number	Symbol	Ctrl.	Buffer Type	Function
PF3	0	GPIO_81	I/O	Pull-up	General-purpose input/output
(99)	1	dspi0_pcs0	O	/FAST/	Dspi0 Chip Select 0
	2	dspi1_pcs1	O	CMOS	Dspi1 Chip Select 1
	3	dspi0_sout	O		Dspi0 Data output
	4	dspi0_ss_b	I		Dspi0 Slave Select
	5	atm_atom4_0	O		channel 0 of ATOM module 4
	6	atm_tom4_0	O		channel 0 of TOM module 4
	7	can7_gfl_wak_req	I		Can Wake-up request
	8	atm_tom0_2	O		channel 2 of TOM module 0
	9	atm_tom1_10	O		channel 10 of TOM module 1
	10	atm_atom1_2	O		channel 2 of ATOM module 1
	11	atm_atom0_2	O		channel 2 of ATOM module 0
	12	atm_tim0_2	I		channel 2 of TIM module 0
	13	atm_tim1_2	I		channel 2 of TIM module 1
	14	UART1_TX	O		UART transmit output
	15	adc_1_igtrig2	O		ADC sync mode igtrigger

2.2.2 Power supply pins

Table 2-1contains information on power supply and reference pin functions for the devices.

Supply			
Symbol	**Type**	**Description**	**100pin**
VSS	Ground		Exposed Pad/28
VDD_LV	Power	Low voltage power supply (1.1v)	5/19/52/68/84/100
VDD_HV	Power	High voltage power supply (3.3v)	20/29/39/51/55/85/86/95

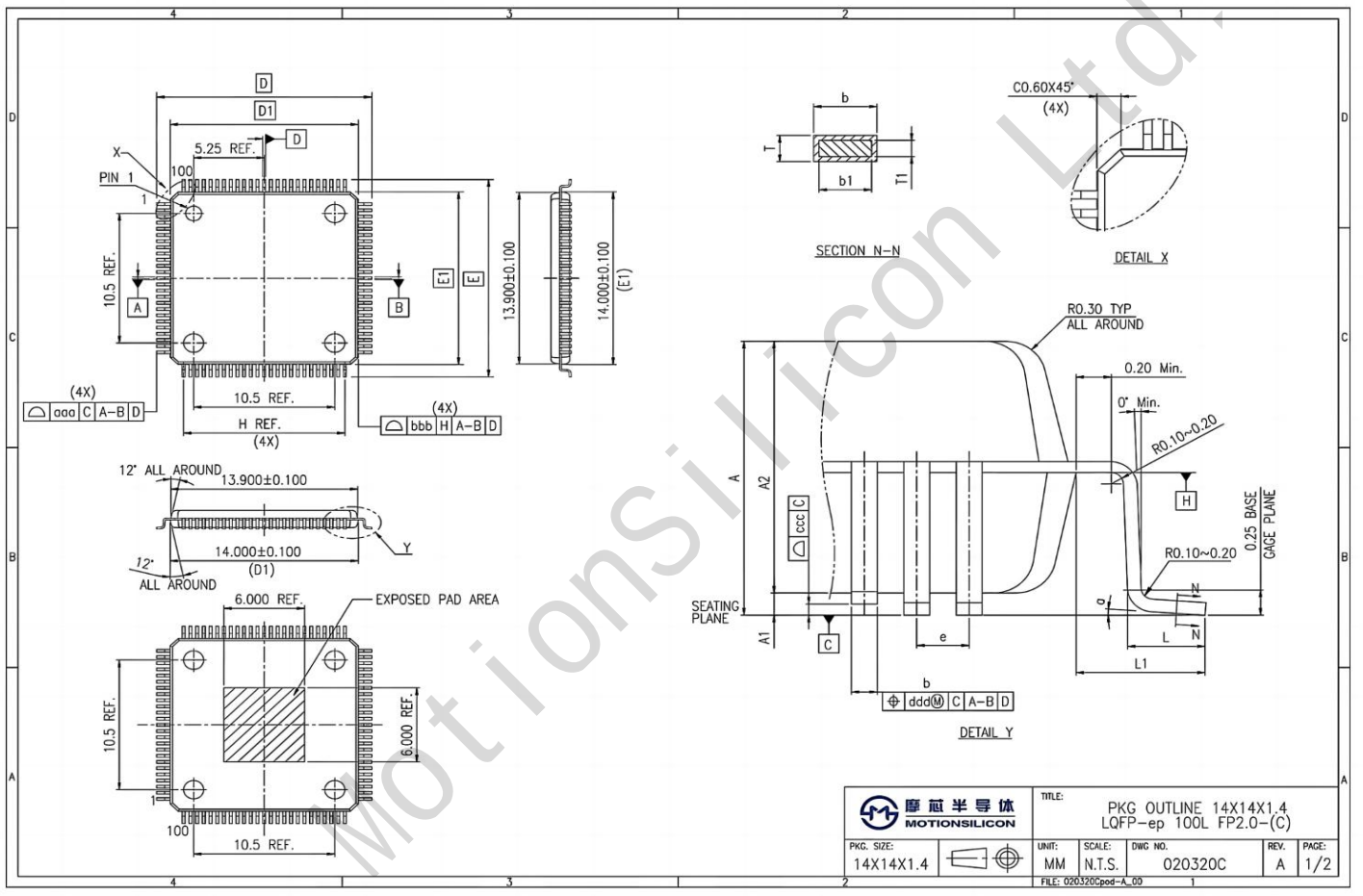
2.2.3 System Control Pins

Table 2-2 contains information on system pin functions for the devices.

Symbol	**Description**	**Direction**	**QFP pin**
			100
PORST	Power on reset with Schmitt trigger characteristics and noise filter. PORST is active low	Input	66
ESR0	External functional reset with Schmitt trigger characteristics and noise filter. ESR0 is active low	Input	67
TESTMODE	Pin for testing purpose only. An internal pull-down is implemented on the TESTMODE pin to prevent the device from entering TESTMODE. It is recommended to connect the TESTMODE pin to VSS on the board.	Input	64
XTAL	Analog output of the oscillator amplifier circuit needs to be grounded if oscillator is used in bypass mode	Output	54
EXTAL	Analog input of the oscillator amplifier circuit when oscillator is not in bypass mode Analog input for the clock generator when	Input	53

Symbol	Description	Direction	QFP pin
			100
	oscillator is in bypass mode		

2.3 Package Outline



DIMENSION LIST (FOOTPRINT:2.00)

S/N	SYM	DIMENSIONS	REMARKS
1	A	MAX. 1.600	OVERALL HEIGHT
2	A1	0.100±0.050	STANDOFF
3	A2	1.400±0.050	PKG THICKNESS
4	D	16.000±0.200	LEAD TIP TO TIP
5	D1	14.000±0.100	PKG LENGTH
6	E	16.000±0.200	LEAD TIP TO TIP
7	E1	14.000±0.100	PKG WIDTH
8	L	0.600±0.150	FOOT LENGTH
9	L1	1.000 REF.	LEAD LENGTH
10	T	$0.150^{+0.050}_{-0.060}$	LEAD THICKNESS
11	T1	0.127±0.030	LEAD BASE METAL THICKNESS
12	a	0*~7*	FOOT ANGLE
13	b	0.220±0.050	LEAD WIDTH
14	b1	0.200±0.030	LEAD BASE METAL WIDTH
15	e	0.500 BASE	LEAD PITCH
16	H(REF.)	(12.000)	CUM. LEAD PITCH
17	aaa	0.200	PROFILE OF LEAD TIPS
18	bbb	0.200	PROFILE OF MOLD SURFACE
19	ccc	0.080	FOOT COPLANARITY
20	ddd	0.080	FOOT POSITION

3 Electrical Specification

3.1 Introduction

Introduces power supply usage precautions, DC/AC electrical specification, and AC timing parameters.

3.2 Absolute Maximum Ratings

Symbol	Parameter	Conditions	Value		Unit
			Min	Max	
VDD_LV	1.1 V core supply voltage	—	-0.3	1.3	V
VDD_HV	I/O supply voltage	—	-0.3	4.0	V

3.3 ESD

Parameter	Conditions	Value	Unit
HBM	All pins	2000	V
CDM	All pins	750	V

3.4 Operating Conditions

Symbol	Parameter	Conditions	Value			Unit
			Min	Typ	Max	
Frequency						
f_{SYS}	Device operating frequency[2]	T_J = –40 °C to 150 °C	—	200	—	MHz
Temperature						
T_J	Operating temperature range - junction	—	-40.0	—	150.0	°C

Symbol	Parameter	Conditions	Value			Unit
			Min	Typ	Max	
T_A (T_L to T_H)	Ambient operating temperature range	—	-40.0	—	125.0	°C
Voltage						
VDD_LV	External core supply voltage	—	—	1.1	1.21	V
VDD_HV	I/O supply voltage	—	—	3.3	3.63	V
VSS	Ground voltage	—	-25	—	25	mV
V_{RAMP_LV}	Slew rate on core power supply pins	—	—	—	100	V/ms
V_{RAMP_HV}	Slew rate on HV power supply pins	—	—	—	100	V/ms
V_{IN}	I/O input voltage range	—	0	—	3.63	V

3.5 AC specifications

3.5.1 JTAG interface timing

#	Symbol	Characteristic	Value		Unit
			Min	Max	
1	t_{JCYC}	TCK cycle time	100	-	ns
2	t_{JDC}	TCK clock pulse width	40	60	%
3	$t_{TCKRISE}$	TCK rise and fall times (40%–70%)	-	3	ns
4	t_{TMSS}, t_{TDIS}	TMS, TDI data setup time	5	-	ns
5	t_{TMSH}, t_{TDIH}	TMS, TDI data hold time	5	-	ns
6	t_{TDOV}	TCK low to TDO data valid	-	16	ns
7	t_{TDOI}	TCK low to TDO data invalid	0	-	ns
8	t_{TDOHZ}	TCK low to TDO high impedance	-	15	ns
9	t_{JCMPPW}	JCOMP assertion time	100	-	ns
10	t_{JCMPS}	JCOMP setup time to TCK low	40	-	ns
11	t_{BSDV}	TCK falling edge to output valid	-	600	ns
12	t_{BSDVZ}	TCK falling edge to output valid out of high impedance	-	600	ns
13	t_{BSDHZ}	TCK falling edge to output high impedance	-	600	ns
14	t_{BSDST}	Boundary scan input valid to TCK rising edge	15	-	ns
15	t_{BSDHT}	TCK rising edge to boundary scan input invalid	15	-	ns

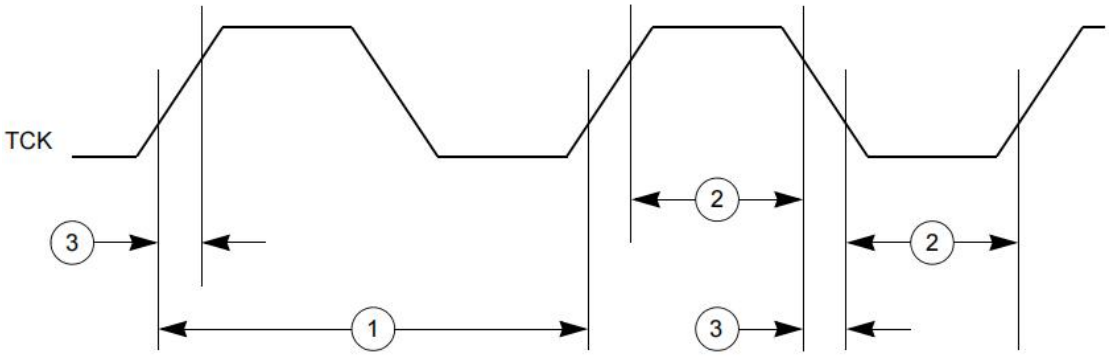


Figure 3-1

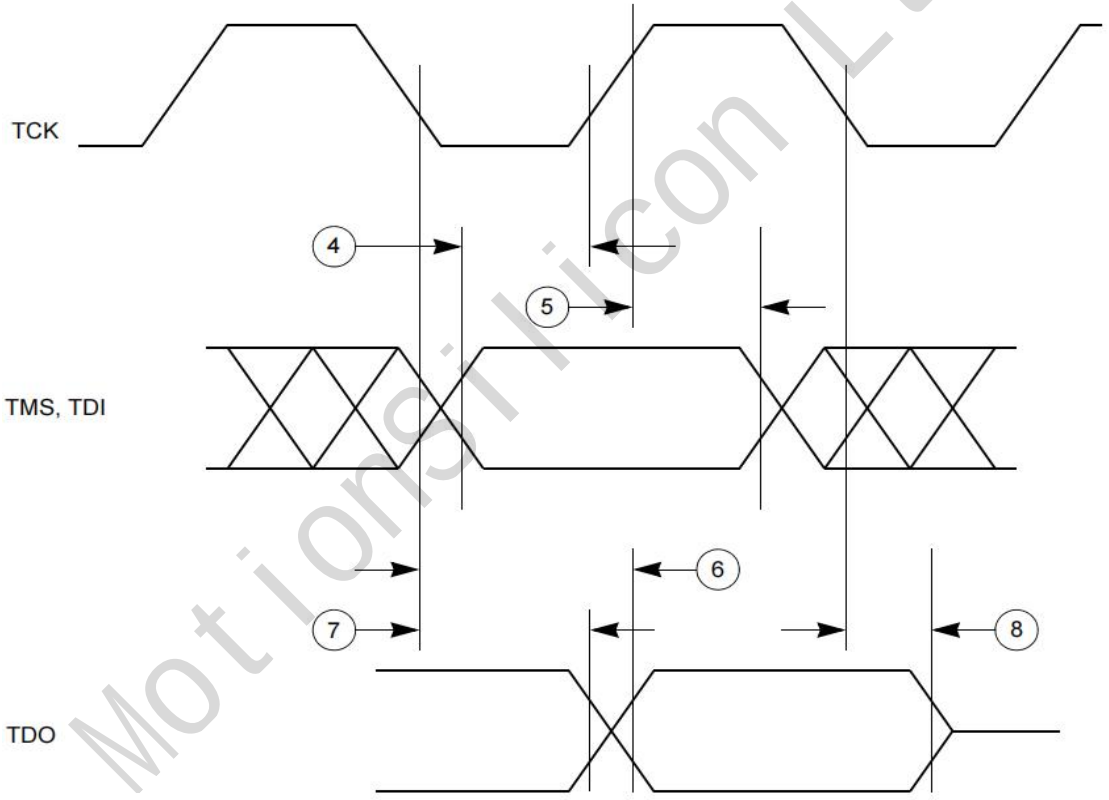


Figure 3-2

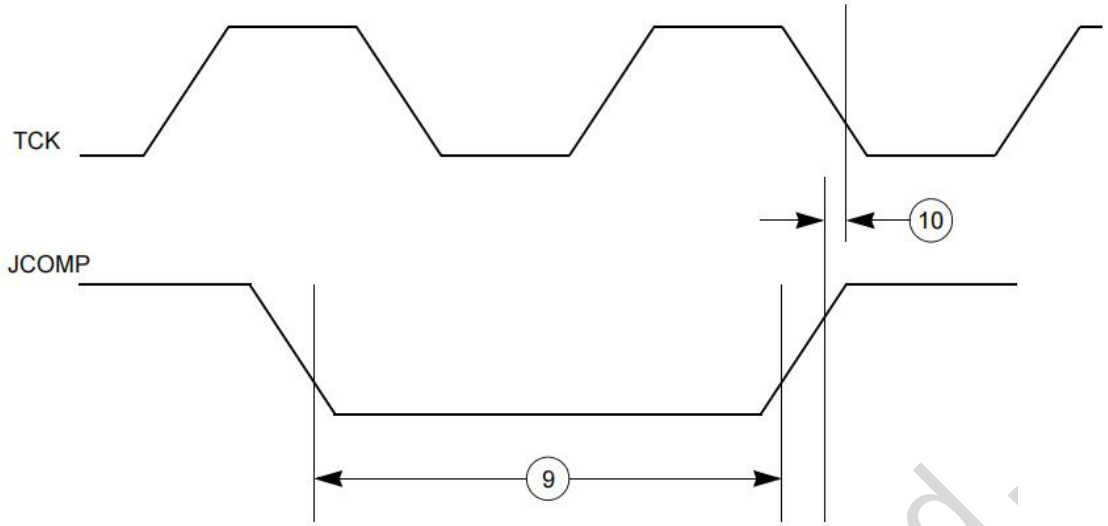


Figure 3-3

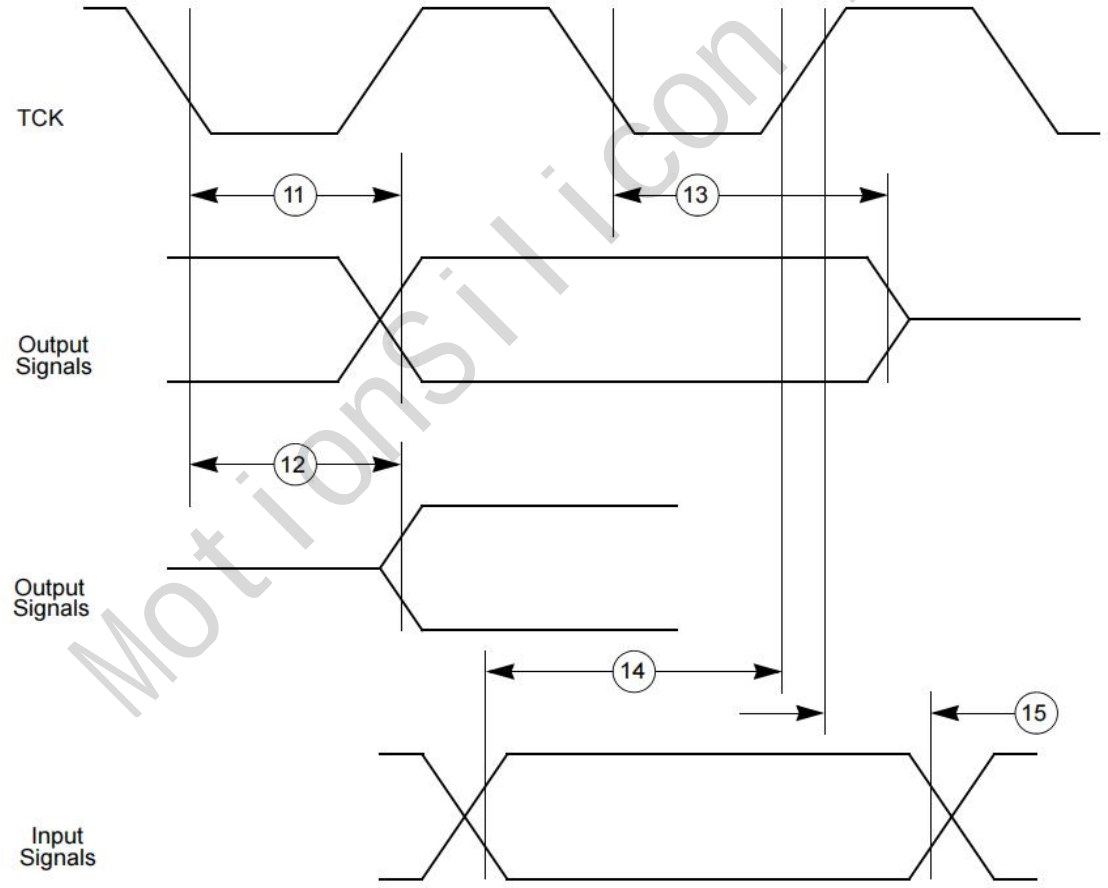


Figure 3-4

3.5.2 PSI5 timing

The following table describes the PSI5 timing.

Symbol	Parameter	Value		Unit
		Min.	Max.	
t_{MSG_DLY}	Delay from last bit of frame (CRC0) to assertion of new message received interrupt	—	3	µs
t_{SYNC_DLY}	Delay from internal sync pulse to sync pulse trigger at the SDOUT_PSI5_n pin	—	2	µs
t_{MSG_JIT}	Delay jitter from last bit of frame (CRC0) to assertion of new message received interrupt	—	1	cycles[1]
t_{SYNC_JIT}	Delay jitter from internal sync pulse to sync pulse trigger at the SDOUT_PSI5_n pin	—	± (1 PSI5_1µs_CLK + 1 PBRIDGEn_CLK)	cycles

[1] Measured in PSI5 clock cycles (PBRIDGEn_CLK on the device). Minimum PSI5 clock period is 20 ns.

3.5.3 I2C timing

The I²C AC timing specifications are provided in the following tables.

I²C input timing specifications — SCL and SDA

No.	Symbol	Parameter	Value		Unit
			Min	Max	
1	-	Start condition hold time	2	-	I2C CLK Cycle
2	-	Clock low time	8	-	I2C CLK Cycle
3	-	Bus free time between Start and Stop condition	4.7	-	µs
4	-	Data hold time	0.0	-	ns
5	-	Clock high time	4	-	I2C CLK Cycle
6	-	Data setup time	0.0	-	ns
7	-	Start condition setup time (for repeated start condition only)	2	-	I2C CLK Cycle

No.	Symbol	Parameter	Value		Unit
			Min	Max	
8	-	Stop condition setup time	2	-	I2C CLK Cycle

I²C output timing specifications — SCL and SDA

No.	Symbol	Parameter	Value		Unit
			Min.	Max.	
1	-	Start condition hold time	6	-	I2C CLK Cycle
2	-	Clock low time	10	-	I2C CLK Cycle
3	-	Bus free time between Start and Stop condition	4.7	-	μs
4	-	Data hold time	7	-	I2C CLK Cycle
5	-	Clock high time	10	-	I2C CLK Cycle
6	-	Data setup time	2	-	I2C CLK Cycle
7	-	Start condition setup time (for repeated start condition only)	20	-	I2C CLK Cycle
8	-	Stop condition setup time	10	-	I2C CLK Cycle

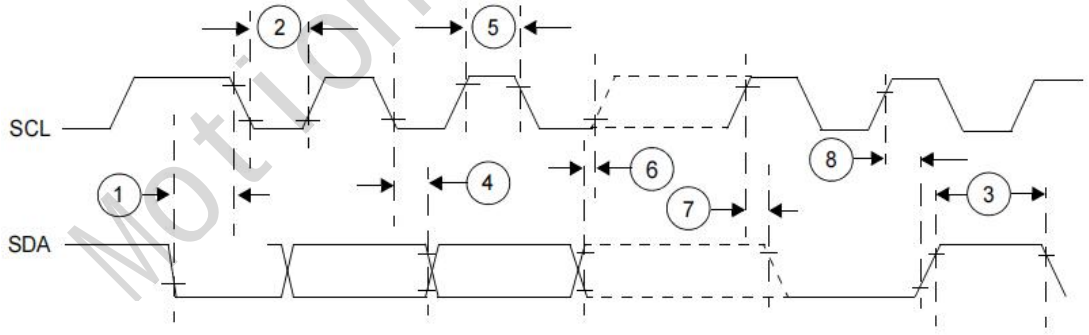


Figure 3-5

3.5.4 ETH Management Signal Parameters (ETH_MDC, ETH_MDIO)

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_1	ETH_MDC period	400	-	-	ns	C_L=25pF
t_2	ETH_MDC high time	160	-	-	ns	C_L=25pF
t_3	ETH_MDC low time	160	-	-	ns	C_L=25pF
t_4	ETH_MDIO setup time (output)	10	-	-	ns	C_L=25pF
t_5	ETH_MDIO hold time (output)	10	-	-	ns	C_L=25pF
t_6	ETH_MDIO data valid (input)	0	-	300	ns	C_L=25pF

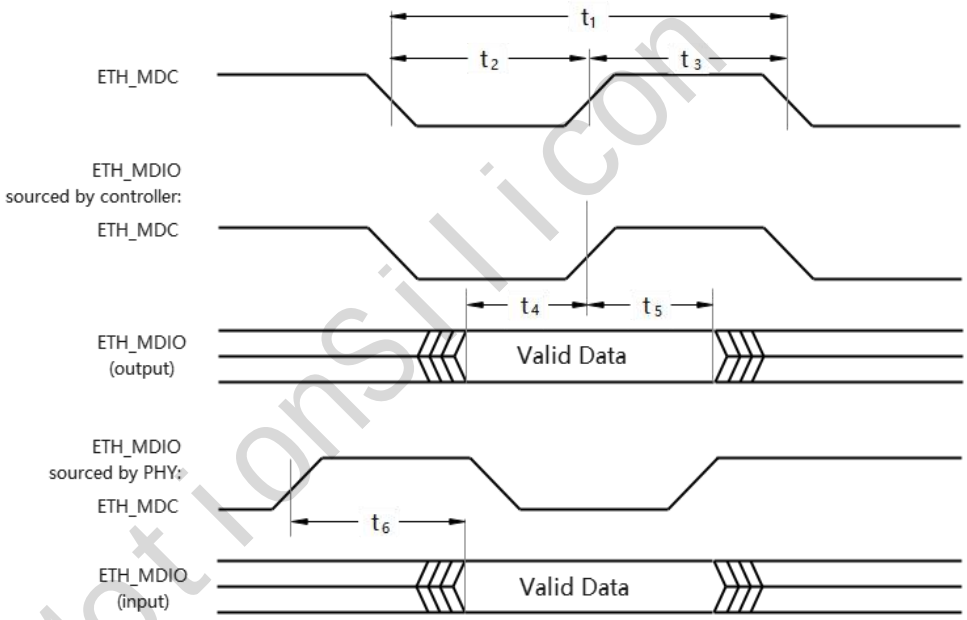


Figure 3-6

3.5.5 ETH MII Parameters

In the following, the parameters of the MII (Media Independent Interface) are described.

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_7	Clock period	-	40	-	ns	C_L=25pF; baudrate=100Mbps
		-	400	-	ns	C_L=25pF; baudrate=10Mbps
t_8	Clock high time	14	-	26	ns	C_L=25pF; baudrate=100Mbps
		140 [1)]	-	260 [2)]	ns	C_L=25pF; baudrate=10Mbps
t_9	Clock low time	14	-	26	ns	C_L=25pF; baudrate=100Mbps
		140 [1)]	-	260 [2)]	ns	C_L=25pF; baudrate=10Mbps
t_{10}	Input setup time	10	-	-	ns	C_L=25pF
t_{11}	Input hold time	10	-	-	ns	C_L=25pF
t_{12}	Output valid time	0	-	25	ns	C_L=25pF

1) Defined by 35% of clock period.

2) Defined by 65% of clock period.

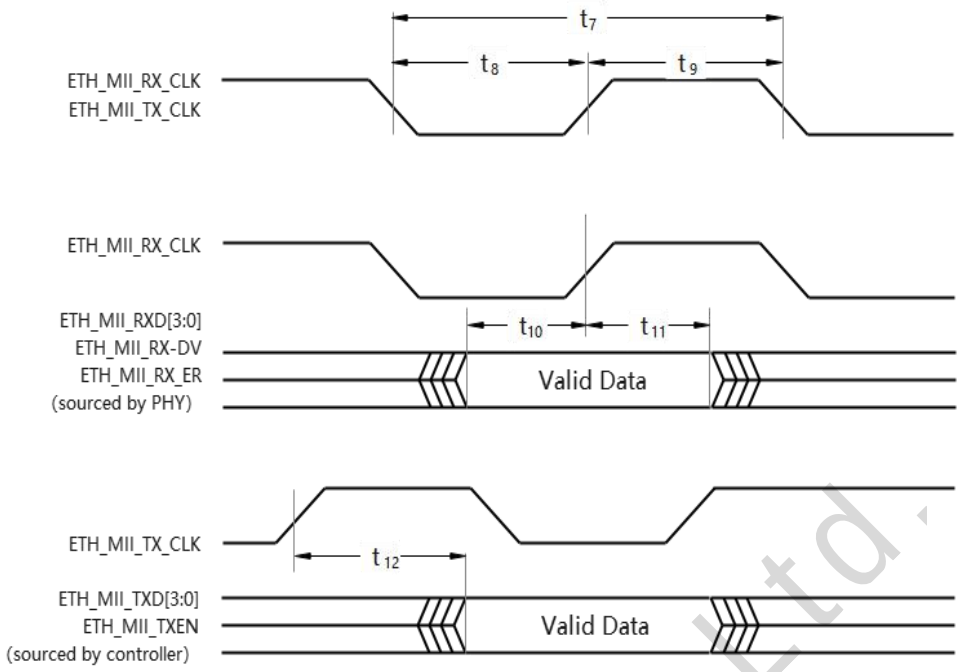


Figure 3-7

3.5.6 ETH RMII Parameters

In the following, the parameters of the RMII (Reduced Media Independent Interface) are described.

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{13}	ETH_RMII_REF_CL clock period	-	20	-	ns	50ppm ; C_L=25pF
t_{14}	ETH_RMII_REF_CL clock high time	7 1)	-	13 2)	ns	C_L=25pF
t_{15}	ETH_RMII_REF_CL clock low time	7 1)	-	13 2)	ns	C_L=25pF
t_{16}	ETHTXEN, ETHTXD [1:0], ETHRXD [1:0], ETHCRSDV; setup time	4	-	-	ns	C_L=25pF
t_{17}	ETHTXEN, ETHTXD[1:0], ETHRXD[1:0];hold time	2	-	-	ns	C_L=25pF

1) Defined by 35% of clock period.

2) Defined by 65% of clock period.

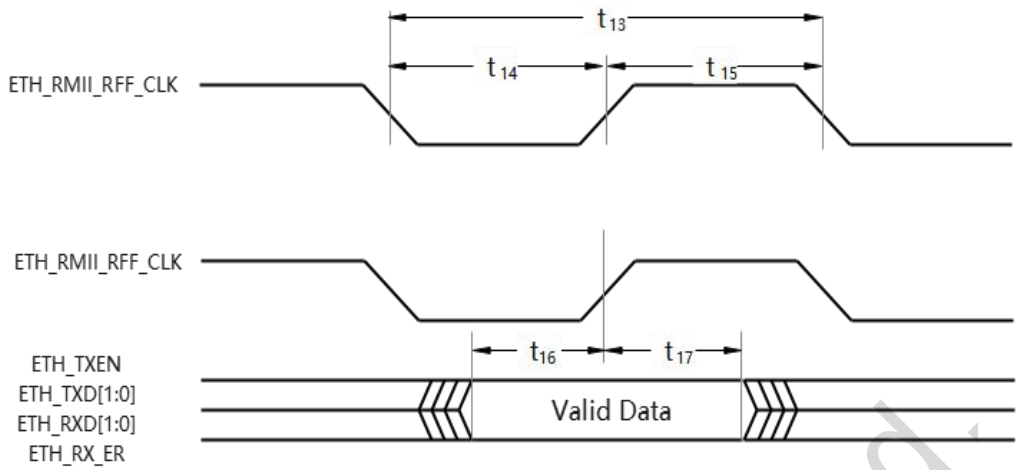


Figure 3-8

3.5.7 ETH RGMII Parameters

In the following, the parameters of the RGMII are described.

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{19}	TX Clock period	36	40	44	ns	100Mbps
		360	400	440	ns	10Mbps
t_{20}	Data to Clock Output skew	-500	0	500	ps	
t_{21}	Data to Clock input skew (at receiver)	1	1.8	2.6	ns	
t_{duty}	Clock duty cycle	40	50	60	%	10/100Mbps
t_{duty_in}	GREFCLK duty cycle	45	-	55	%	
ACC	GREFCLK Input accuracy	-0.005	-	0.005	%	

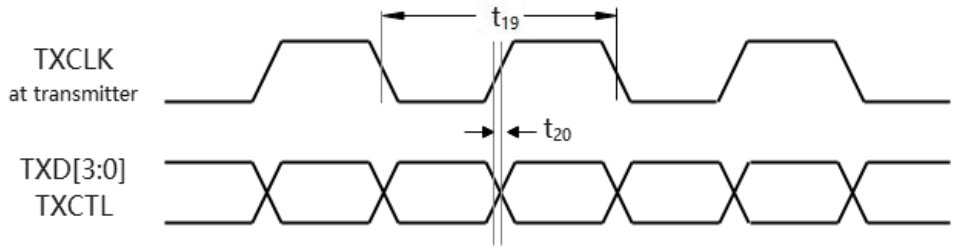


Figure 3-9

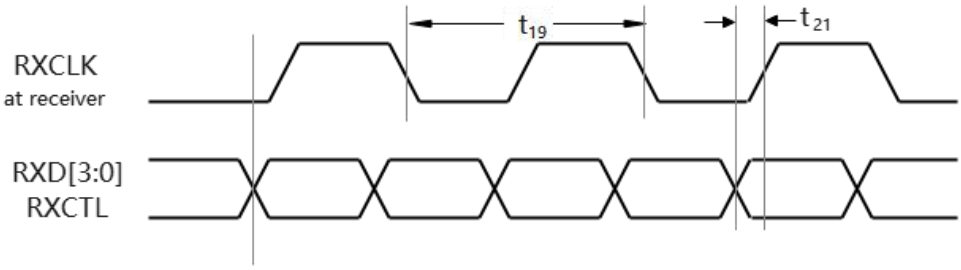


Figure 3-10

3.5.8 FlexRay Parameters

The timings of this section are valid for the strong driver and sharp edge settings of the output drivers with CL = 25 pF.

Transmit Parameters

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
$t_{dCCTxENRise25}$	Rise time of TxEN	-	-	9	ns	C_L=25pF
$t_{dCCTxENFall25}$	Fall time of TxEN	-	-	9	ns	C_L=25pF
$t_{dCCTxRise25+dCCTxFall25}$	Sum of rise and fall time	-	-	9	ns	20% - 80% ; C_L=25pF
$t_{dCCTxEN01}$	Sum of delay between TP1_FF and TP1_CC and delays derived from TP1_FFi, rising edge of TxEN	-	-	25	ns	
$t_{dCCTxEN10}$	Sum of delay between TP1_FF and TP1_CC and delays derived from TP1_FFi, falling edge of TxEN	-	-	25	ns	
t_{tx_asym}	Asymmetry of sending	-2.45	-	2.45	ns	C_L=25pF
$t_{dCCTxD01}$	Sum of delay between TP1_FF and TP1_CC and delays derived from TP1_FFi, rising edge of TxD	-	-	25	ns	

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
$t_{dCCTxD10}$	Sum of delay between TP1_FF and TP1_CC and delays derived from TP1_FFi, falling edge of TxD	-	-	25	ns	
t_{txd_sum}	TxD signal sum of rise and fall time at TP1_BD	-	-	9	ns	

Receive Parameters

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
$t_{dCCTxAsymAccept25}$	Acceptance of asymmetry at receiving part	-30.5	-	43.0	ns	C_L=25pF
$t_{dCCTxAsymAccept15}$	Acceptance of asymmetry at receiving part	-31.5	-	44.0	ns	C_L=15pF
$T_{uCCLogic1}$	Threshold for detecting logical high	35	-	70	%	
$T_{uCCLogic0}$	Threshold for detecting logical low	30	-	65	%	
$t_{dCCRxD01}$	Sum of delay between TP4_CC and TP4_FF and delays derived from TP4_FFi, rising edge of RxD	-	-	10	ns	
$t_{dCCRxD10}$	Sum of delay between TP4_CC and TP4_FF and delays derived from TP4_FFi, falling edge of RxD	-	-	10	ns	

3.5.9 MSC Timing Operation

clock/data valid

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{40}	FCLPx clock period	2 * TA	-	-	ns	CL=50pF
t_{400}	Deviation from ideal duty cycle	-5	-	5	ns	CL=50pF
t_{44}	SOPx output delay	-7	-	7	ns	CL=50pF
t_{45}	ENx output delay	-7	-	7	ns	CL=50pF

Upstream Interface

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{46}	SDI bit time	8 * t_{MSC}	-	-	ns	
t_{48}	SDI rise time	-	-	200	ns	
t_{49}	SDI fall time	-	-	200	ns	

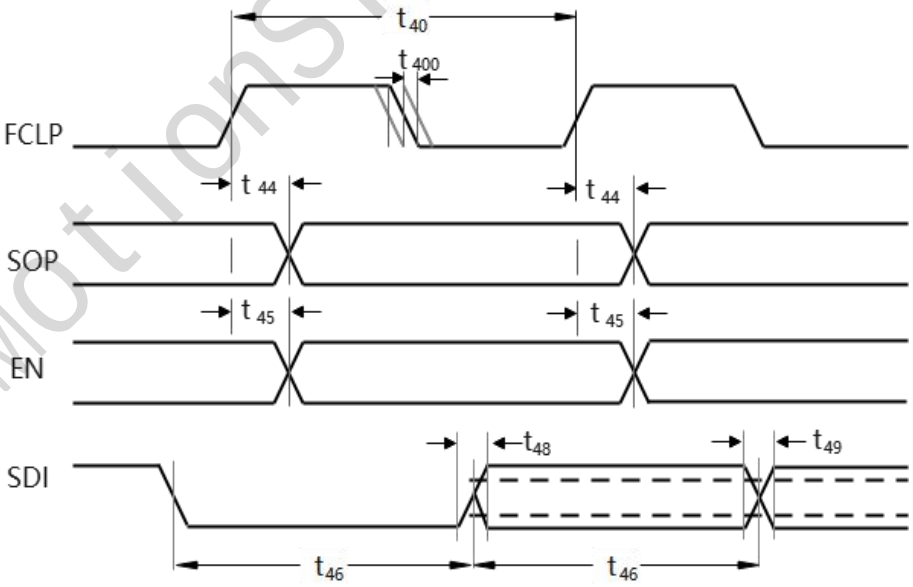


Figure 3-11

3.5.10 SPI Master Timing

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{50}	CLK_OUT clock period	50	-	-	ns	CL=25pF
t_{500}	Deviation from the ideal duty cycle	-5	-	5	ns	CL=25pF
t_{51}	DATA_OUT delay from CLK_OUT shifting edge	-7	-	7	ns	CL=25pF
t_{510}	SS_N deviation from the ideal programmed position	-7	-	7	ns	CL=25pF
t_{52}	DATA_IN setup to CLK_OUT latching edge	35	-	-	ns	CL=25pF
t_{53}	DATA_IN hold from CLK_OUT latching edge	-5	-	-	ns	CL=25pF

3.5.11 QSPI Master Timing

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
t_{50}	CLK_OUT clock period	50	-	-	ns	CL=25pF
t_{500}	Deviation from the ideal duty cycle	-2	-	2	ns	CL=25pF
t_{51}	DATA_OUT delay from CLK_OUT shifting edge	-4	-	5	ns	CL=25pF
t_{510}	SS_N deviation from the ideal programmed position	-4	-	5	ns	CL=25pF
t_{52}	DATA_IN setup to CLK_OUT latching edge	25	-	-	ns	CL=25pF
t_{53}	DATA_IN hold from CLK_OUT latching edge	-2	-	-	ns	CL=25pF

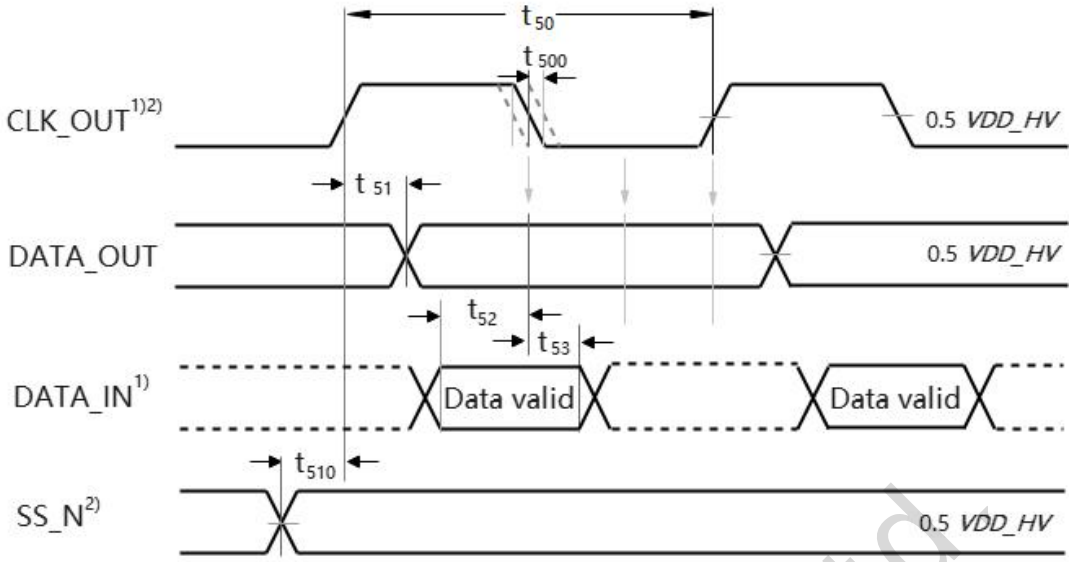


Figure 3-12

1) This timing is based on the following setup: CPH = 1, CPOL = 0.

2) t_{510} is the deviation from the ideal position configured with the leading delay.

4 History

Version 0.4 is the first version of this document.

4.1 Changes from Version 0.4 to Version 0.5

Changes in chapter “Summary of Features”：

- Add 12Bit at ADC description
- Change "jtag/swd" to capitalize "JTAG/SWD".

Changes in in table “Platform Feature Overview”

- "Tambient" to "$T_{junction}$"
- Temperature range changed to "-40～+150° C".

4.2 Changes from Version 0.5 to Version 0.6

Changes to catalog structure

4.3 Changes from Version 0.6 to Version 1.1

Changes in chapter “Summary of Features”：

- The number of ASCLINs was changed to 8

Changes in chapter “Platform Feature Overview”：

- The number of ASCLINs was changed to 8

Changes in chapter “General purpose pins”：

- Remove pin definitions and descriptions for lin8
- Remove pin definitions and descriptions for lin9
- Add functional description of each pin multiplexing information

4.4 Changes from Version 1.1 to Version 1.2

Add chapter on Electrical Specification