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The S6E1C1 Series is a series of highly integrated 32-bit microcontrollers designed for embedded controllers aiming at low power consumption and low cost. This series has the ARM Cortex-M0+ Processor with on-chip Flash memory and SRAM, and consists of peripheral functions such as various timers, ADC and communication interfaces (UART, CSIO (SPI), I<sup>2</sup>C, I<sup>2</sup>S, and Smart Card). The products which are described in this data sheet are placed into TYPE3-M0+ product categories in "FM0+ Family Peripheral Manual".

## Features

### 32-bit ARM Cortex-M0+ Core

- Processor version: r0p1
- Maximum operating frequency: 40.8 MHz
- Nested Vectored Interrupt Controller (NVIC): 1 NMI (non-maskable interrupt) and 24 peripheral interrupt with 4 selectable interrupt priority levels
- 24-bit System timer (Sys Tick): System timer for OS task management

### Bit Band Operation

Compatible with Cortex-M3 bit band operation.

### On-Chip Memory

- Flash memory
  - Up to 128 Kbytes
  - Read cycle: 0 wait-cycle
  - Security function for code protection
- SRAM

The on-chip SRAM of this series has one independent SRAM .

  - Up to 16 Kbytes
  - 4Kbytes: can retain value in Deep standby Mode

### Multi-Function Serial Interface (Max 6channels)

- 3 channels with 64Byte FIFO (Ch.4, 6 and 7), 3 channels without FIFO (Ch.0, 1 and 3)
- The operation mode of each channel can be selected from one of the following.
  - UART
  - CSIO (CSIO is known to many customers as SPI)
  - I<sup>2</sup>C
- UART
  - Full duplex double buffer
  - Parity can be enabled or disabled.
  - Built-in dedicated baud rate generator
  - External clock available as a serial clock
  - Hardware Flow control\* : Automatically control the transmission by CTS/RTS (only ch.4)
  - \* : S6E1C12B0A/S6E1C11B0A and S6E1C12C0A/S6E1C11C0A do not support Hardware Flow control.
  - Various error detection functions (parity errors, framing errors, and overrun errors)

- CSIO (also known as SPI)
  - Full duplex double buffer
  - Built-in dedicated baud rate generator
  - Overrun error detection function
  - Serial chip select function (ch1 and ch6 only)
  - Data length: 5 to 16 bits
- I<sup>2</sup>C
  - Standard-mode (Max: 100 kbps) supported / Fast-mode (Max 400 kbps) supported.
- I<sup>2</sup>S (MFS-I2S)
  - Using CSIO (Max 2 ch: ch.4, ch.6) and I<sup>2</sup>S clock generator
  - Supports two transfer protocol
    - I<sup>2</sup>S
    - MSB-justified
  - Master mode only

### I2C Slave

- I2C Slave supports the slave function of I2C and wake-up function from Standby mode.

### Descriptor System Data Transfer Controller (DSTC) (64 Channels)

- The DSTC can transfer data at high-speed without going via the CPU. The DSTC adopts the Descriptor system and, following the specified contents of the Descriptor that has already been constructed on the memory, can access directly the memory / peripheral device and performs the data transfer operation.
- It supports the software activation, the hardware activation, and the chain activation functions

### A/D Converter (Max: 8 Channels)

- 12-bit A/D Converter
  - Successive approximation type
  - Conversion time: 2.0 μs @ 2.7 V to 3.6 V
  - Priority conversion available (2 levels of priority)
  - Scan conversion mode
  - Built-in FIFO for conversion data storage (for scan conversion: 16 steps, for priority conversion: 4 steps)

### Base Timer (Max: 8 Channels)

The operation mode of each channel can be selected from one of the following.



- 16-bit PWM timer
- 16-bit PPG timer
- 16/32-bit reload timer
- 16/32-bit PWC timer

## General-Purpose I/O Port

This series can use its pin as a general-purpose I/O port when it is not used for an external bus or a peripheral function. All ports can be set to fast general-purpose I/O ports or slow general-purpose I/O ports. In addition, this series has a port relocate function that can set to which I/O port a peripheral function can be allocated.

- All ports are Fast GPIO which can be accessed by 1 cycle
- Capable of controlling the pull-up of each pin
- Capable of reading pin level directly
- Port relocate function
- Up to 54 fast general-purpose I/O ports @64-pin package
- Certain ports are 5 V tolerant.  
See 4.List of Pin Functions and 5.I/O Circuit Type for the corresponding pins.

## Dual Timer (32-/16-bit Down Counter)

The Dual Timer consists of two programmable 32-/16-bit down counters. The operation mode of each timer channel can be selected from one of the following.

- Free-running mode
- Periodic mode (= Reload mode)
- One-shot mode

## Real-Time Clock

The Real-time Clock counts year/month/day/hour/minute/second/day of the week from year 00 to year 99.

- The RTC can generate an interrupt at a specific time (year/month/day/hour/minute/second/day of the week) and can also generate an interrupt in a specific year, in a specific month, on a specific day, at a specific hour or at a specific minute.
- It has a timer interrupt function generating an interrupt upon a specific time or at specific intervals.
- It can keep counting while rewriting the time.
- It can count leap years automatically.

## Watch Counter

The Watch Counter wakes up the microcontroller from the low power consumption mode. The clock source can be selected from the main clock, the sub clock, the built-in high-speed CR clock or the built-in low-speed CR clock.

Interval timer: up to 64 s (sub clock: 32.768 kHz)

## External Interrupt Controller Unit

- Up to 12 external interrupt input pins
- Non-maskable interrupt (NMI) input pin: 1

## Watchdog Timer (2 Channels)

The watchdog timer generates an interrupt or a reset when the counter reaches a time-out value.

This series consists of two different watchdogs, hardware watchdog and software watchdog.

The hardware watchdog timer is clocked by the built-in low-speed CR oscillator. Therefore, the hardware watchdog is active in any low-power consumption modes except RTC, Stop, Deep standby RTC and Deep standby Stop mode.

## CRC (Cyclic Redundancy Check) Accelerator

The CRC accelerator calculates the CRC which has a heavy software processing load, and achieves a reduction of the integrity check processing load for reception data and storage.

- CCITT CRC16 and IEEE-802.3 CRC32 are supported.
  - CCITT CRC16 Generator Polynomial: 0x1021
  - IEEE-802.3 CRC32 Generator Polynomial: 0x04C11DB7

## HDMI-CEC/Remote Control Receiver (Up to 2 Channels)

- HDMI-CEC transmitter
  - Header block automatic transmission by judging Signal free
  - Generating status interrupt by detecting Arbitration lost
  - Generating START, EOM, ACK automatically to output CEC transmission by setting 1 byte data
  - Generating transmission status interrupt when transmitting 1 block (1 byte data and EOM/ACK)
- HDMI-CEC receiver
  - Automatic ACK reply function available
  - Line error detection function available
- Remote control receiver
  - 4 bytes reception buffer
  - Repeat code detection function available

## Smart Card Interface (Max 1 Channel)

- Compliant with ISO7816-3 specification
- Card Reader only/B class card only
- Available protocols
  - Transmitter: 8E2, 8O2, 8N2
  - Receiver: 8E1, 8O1, 8N2, 8N1, 9N1
  - Inverse mode
- TX/RX FIFO integrated (RX: 16-bytes, TX:16-bytes)

## Clock and Reset

- Clocks
 

A clock can be selected from five clock sources (two external oscillators, two built-in CR oscillator, and main PLL).

  - Main clock: 8 MHz to 48 MHz

- Sub clock: 32.768 kHz
- Built-in high-speed CR clock: 8 MHz
- Built-in low-speed CR clock: 100 kHz
- Main PLL clock 8MHz to 16MHz (Input),  
75MHz to 150MHz (Output)

### ■ Resets

- Reset request from the INITX pin
- Power on reset
- Software reset
- Watchdog timer reset
- Low-voltage detection reset
- Clock supervisor reset

### Clock Supervisor (CSV)

The Clock Supervisor monitors the failure of external clocks with a clock generated by a built-in CR oscillator.

- If an external clock failure (clock stop) is detected, a reset is asserted.
- If an external frequency anomaly is detected, an interrupt or a reset is asserted.

### Low-Voltage Detector (LVD)

This series monitors the voltage on the VCC pin with a 2-stage mechanism. When the voltage falls below a designated voltage, the Low-voltage Detector generates an interrupt or a reset.

- LVD1: monitor V<sub>CC</sub> and error reporting via an interrupt
- LVD2: auto-reset operation

### Low Power Consumption Mode

This series has six low power consumption modes.

- Sleep
- Timer
- RTC
- Stop
- Deep standby RTC (selectable between keeping the value of RAM and not)
- Deep standby Stop (selectable between keeping the value of RAM and not)

### Peripheral Clock Gating

The system can reduce the current consumption of the total system with gating the operation clocks of peripheral functions not used.

### Debug

- Serial Wire Debug Port (SW-DP)
- Micro Trace Buffer (MTB)

### Unique ID

A 41-bit unique value of the device has been set.

### Power Supply

- Wide voltage range: VCC = 1.65V to 3.6 V

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## 1. Product Lineup

### Memory Size

Product name	S6E1C11B0A/ S6E1C11C0A/ S6E1C11D0A	S6E1C12B0A/ S6E1C12C0A/ S6E1C12D0A
On-chip Flash memory	64 Kbytes	128 Kbytes
On-chip SRAM	12 Kbytes	16 Kbytes

### Function

Product name	S6E1C12B0A/ S6E1C11B0A	S6E1C12C0A/ S6E1C12C0A	S6E1C11D0A/ S6E1C12D0A
Pin count	32	48	64
CPU	Cortex-M0+		
Frequency	40.8 MHz		
Power supply voltage range	1.65 V to 3.6 V		
DSTC	64 ch.		
Multi-function Serial Interface (UART/CSIO/I <sup>2</sup> C/I2S)	4 ch. (Max) Ch.0/1/3 without FIFO Ch. 6 with FIFO	6 ch. (Max) Ch.0/1/3 without FIFO Ch.4/6/7 with FIFO	6 ch. (Max) Ch.0/1/3 without FIFO Ch.4/6/7 with FIFO
	I2S : No	I2S : 1 ch (Max) Ch. 6 with FIFO	I2S : 2 ch (Max) Ch. 4/6 with FIFO
Base Timer (PWC/Reload timer/PWM/PPG)	8 ch. (Max)		
Dual Timer	1 unit		
HDMI-CEC/ Remote Control Receiver	1 ch.(Max) Ch.1	2 ch (Max) Ch.0/1	
I2C Slave	1 ch (Max)		
Smart Card Interface	No		1 ch (Max)
Real-time Clock	1 unit		
Watch Counter	1 unit		
CRC Accelerator	Yes		
Watchdog timer	1 ch. (SW) + 1 ch. (HW)		
External Interrupt	7 pins (Max), NMI x 1	9 pins (Max), NMI x 1	12 pins (Max), NMI x 1
I/O port	24 pins (Max)	38 pins (Max)	54 pins (Max)
12-bit A/D converter	6 ch. (1 unit)	8 ch. (1 unit)	8 ch. (1 unit)
CSV (Clock Supervisor)	Yes		
LVD (Low-voltage Detection)	2 ch.		
Built-in CR	High-speed	8 MHz (Typ)	
	Low-speed	100 kHz (Typ)	
Debug Function	SW-DP		
Unique ID	Yes		

#### Note:

- All signals of the peripheral function in each product cannot be allocated by limiting the pins of package. It is necessary to use the port relocate function of the I/O port according to your function use.  
See "11. Electrical Characteristics 11.4 AC Characteristics 11.4.3 Built-in CR Oscillation Characteristics" for accuracy of built-in CR.

## 2. Packages

Package	Product name	S6E1C12B0A/ S6E1C11B0A	S6E1C12C0A/ S6E1C11C0A	S6E1C12D0A/ S6E1C11D0A
LQFP: FPT-32P-M30 (0.80 mm pitch)		○	-	-
QFN: LCC-32P-M73 (0.50 mm pitch)		○		
LQFP: FPT-48P-M49 (0.50 mm pitch)		-	○	-
QFN: LCC-48P-M74 (0.50 mm pitch)		-	○	-
LQFP: FPT-64P-M38 (0.50 mm pitch)		-	-	○
QFN: LCC-64P-M25 (0.50 mm pitch)		-	-	○

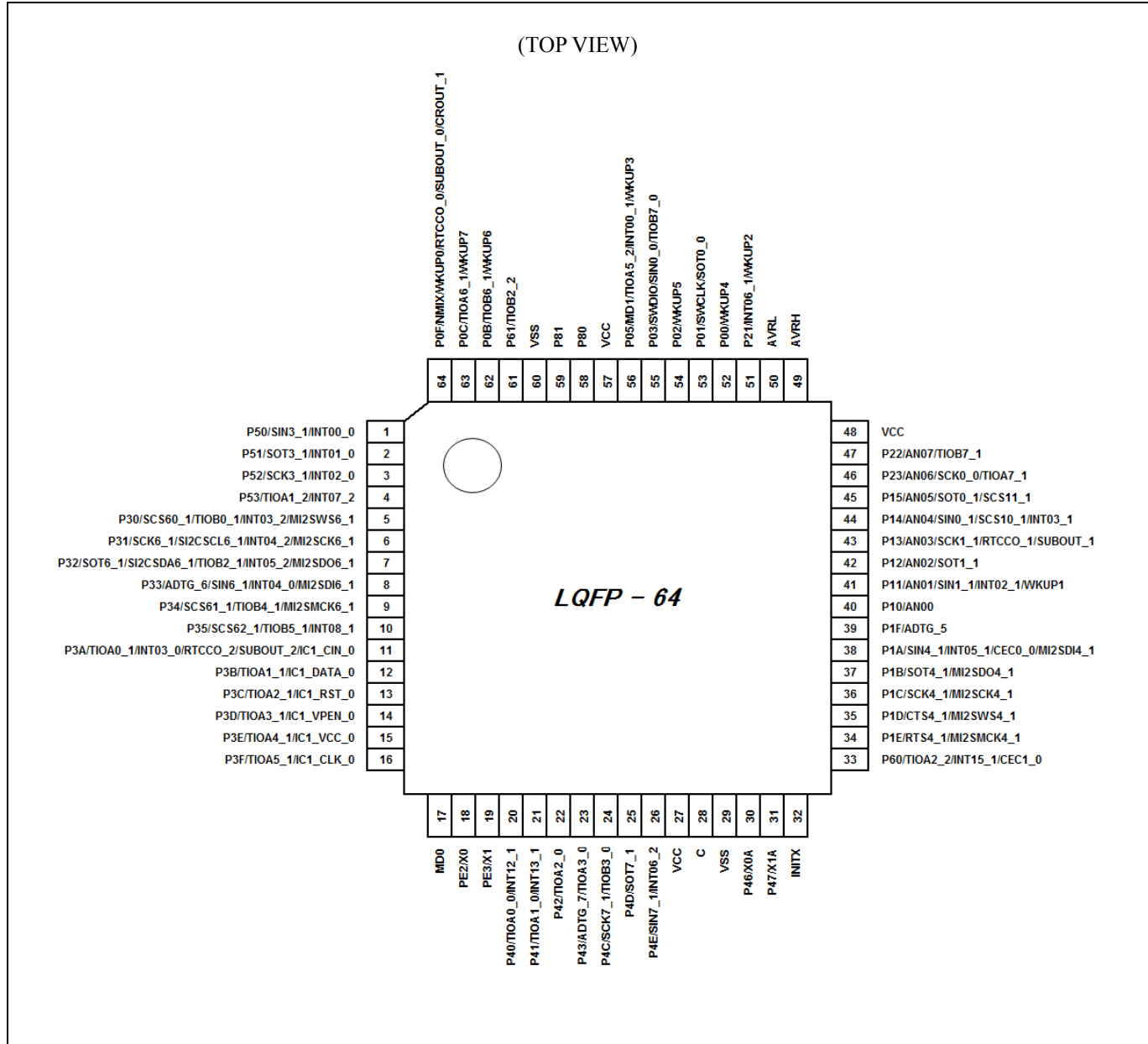
○: Available

**Note:**

- See "13. Package Dimensions" for detailed information on each package.

## 3. Pin Assignment

### FPT-64P-M38

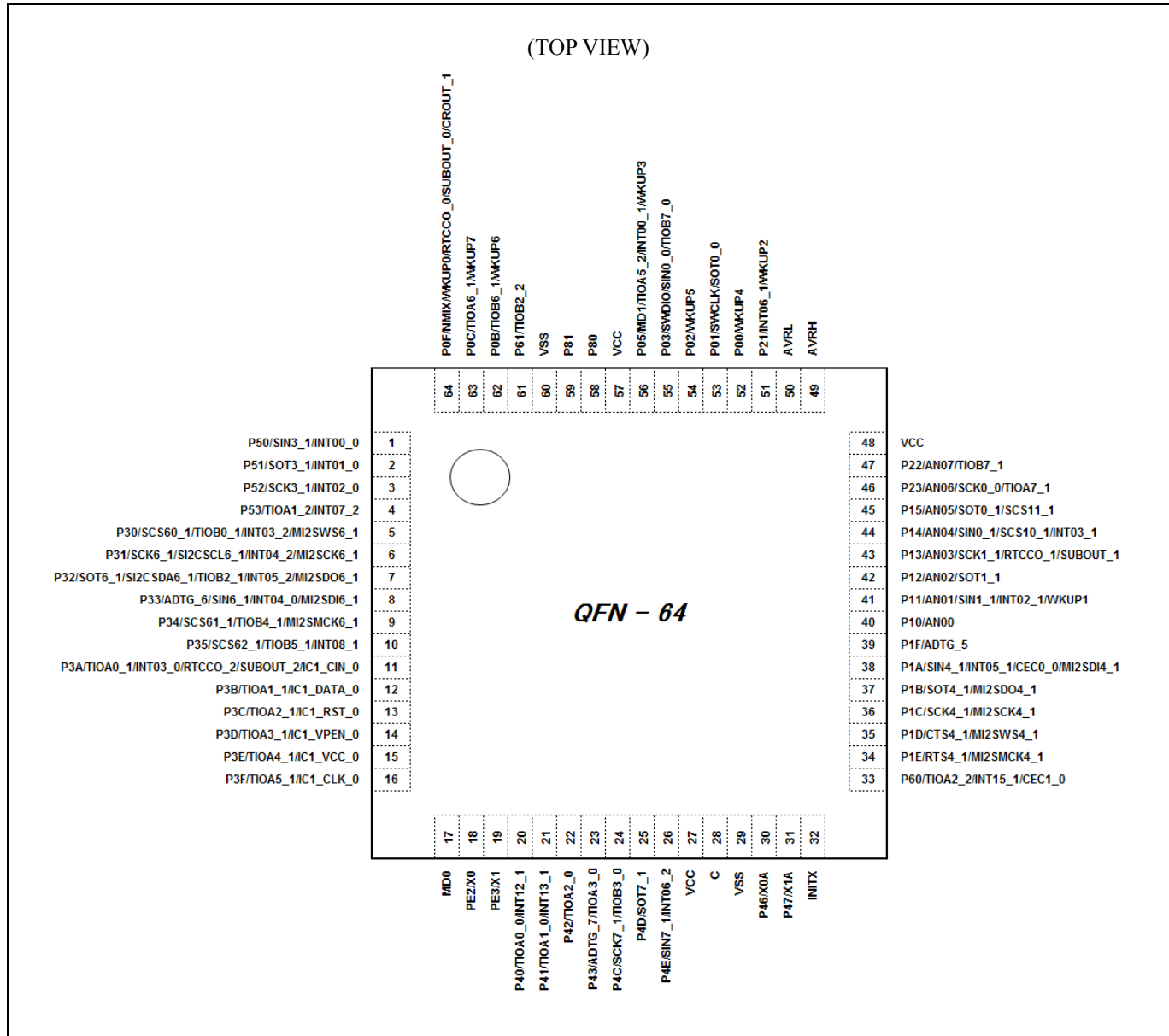


**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.



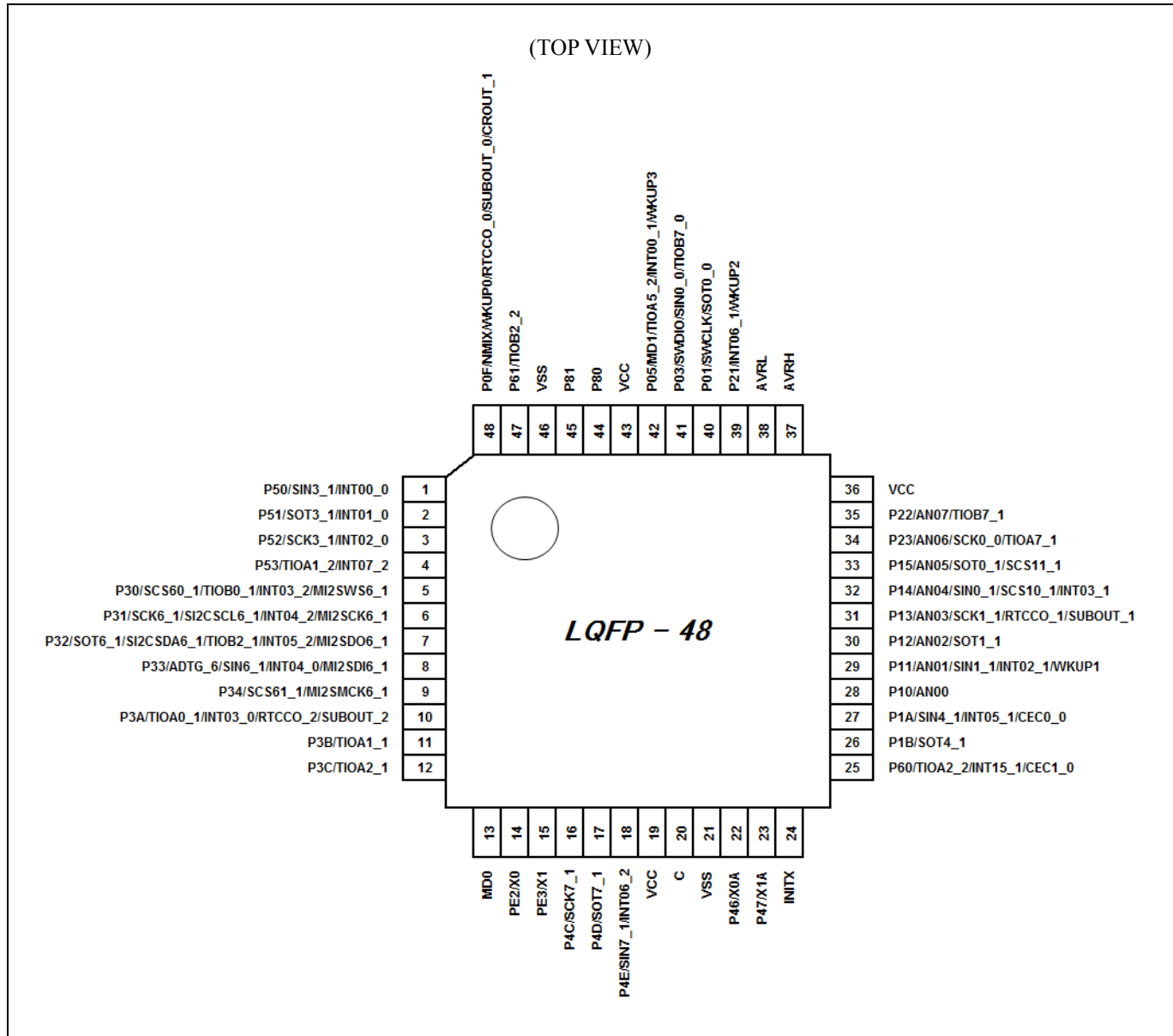
## LCC-64P-M25



**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

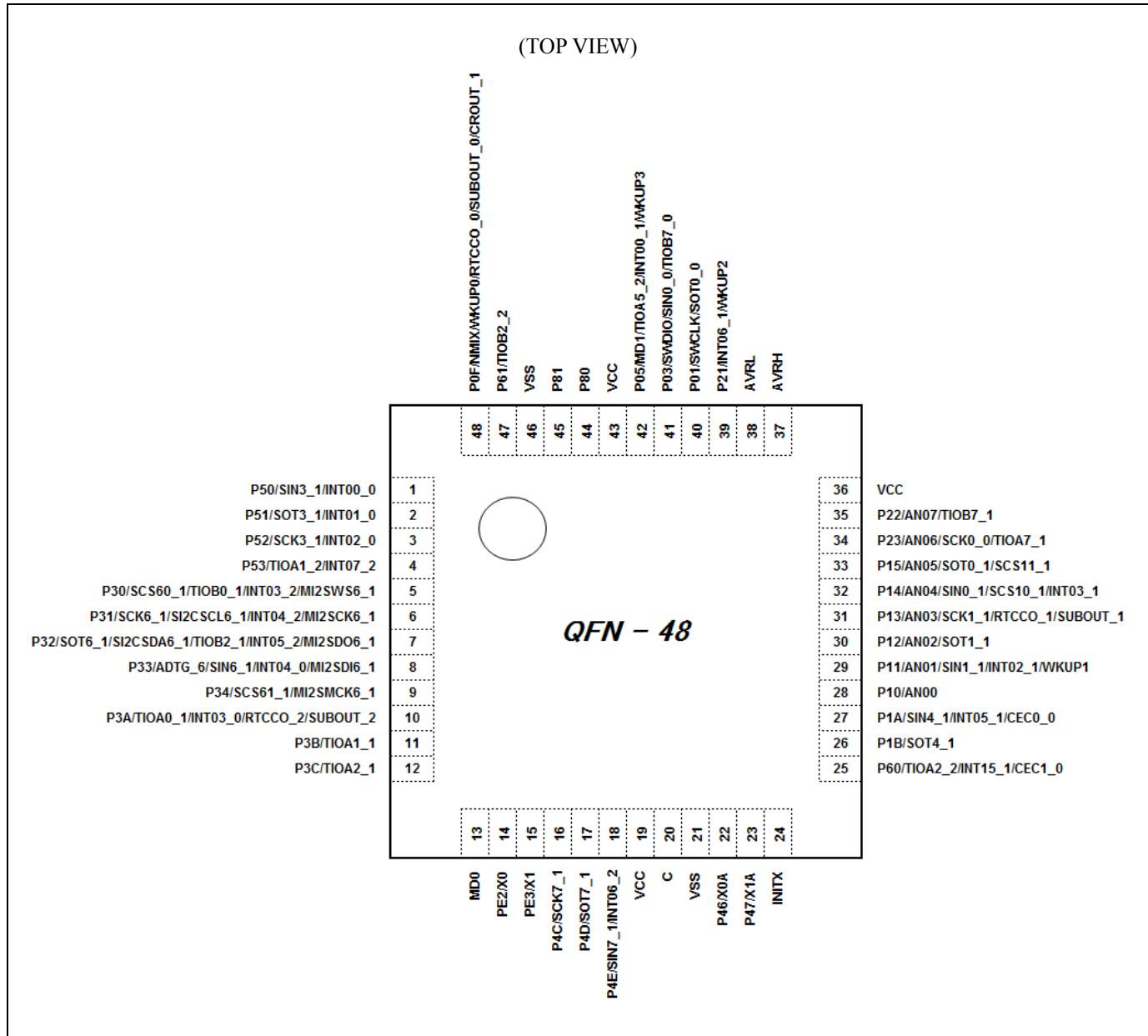
## FPT-48P-M49



**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

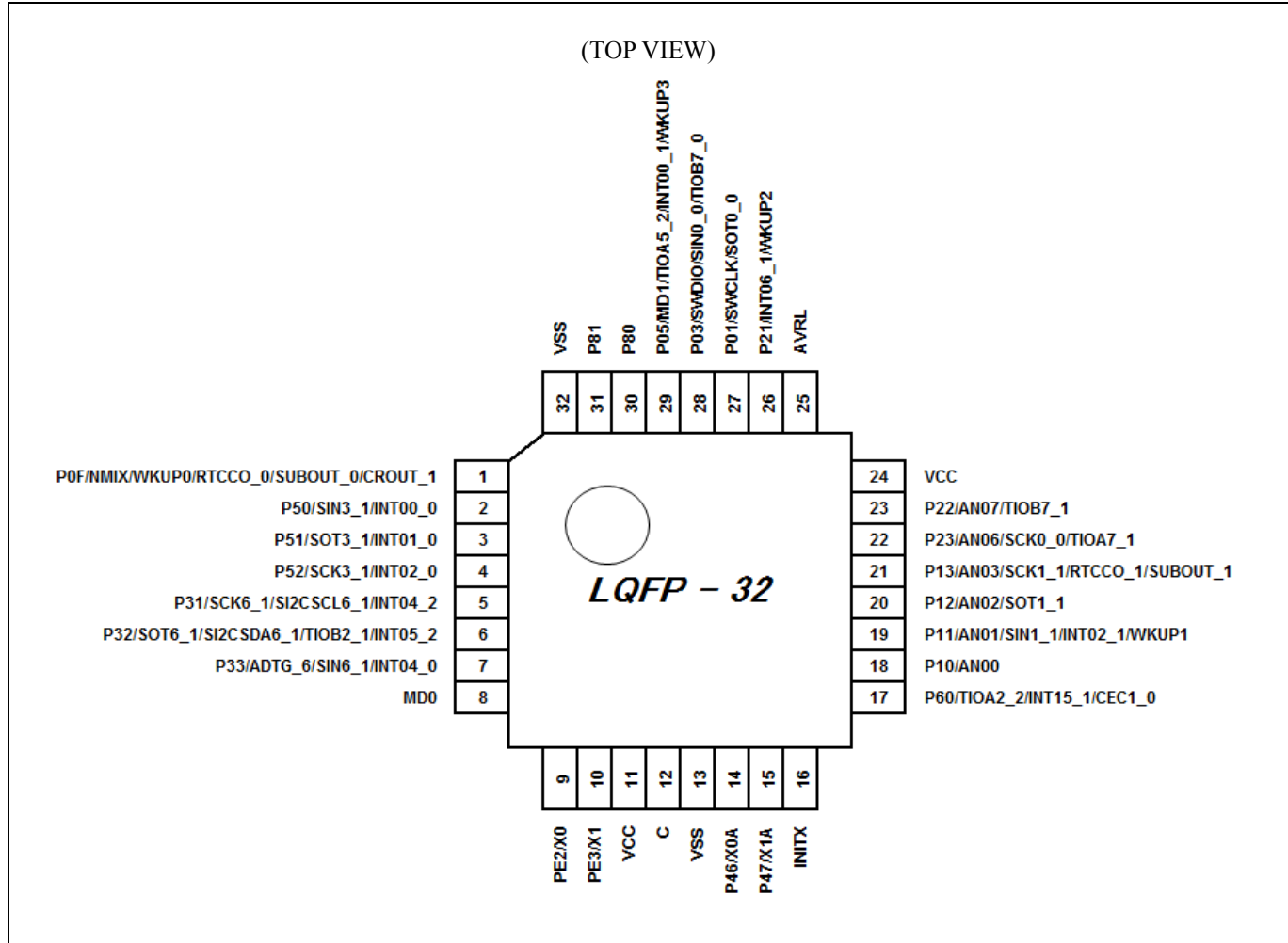
## LCC-48P-M74



**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

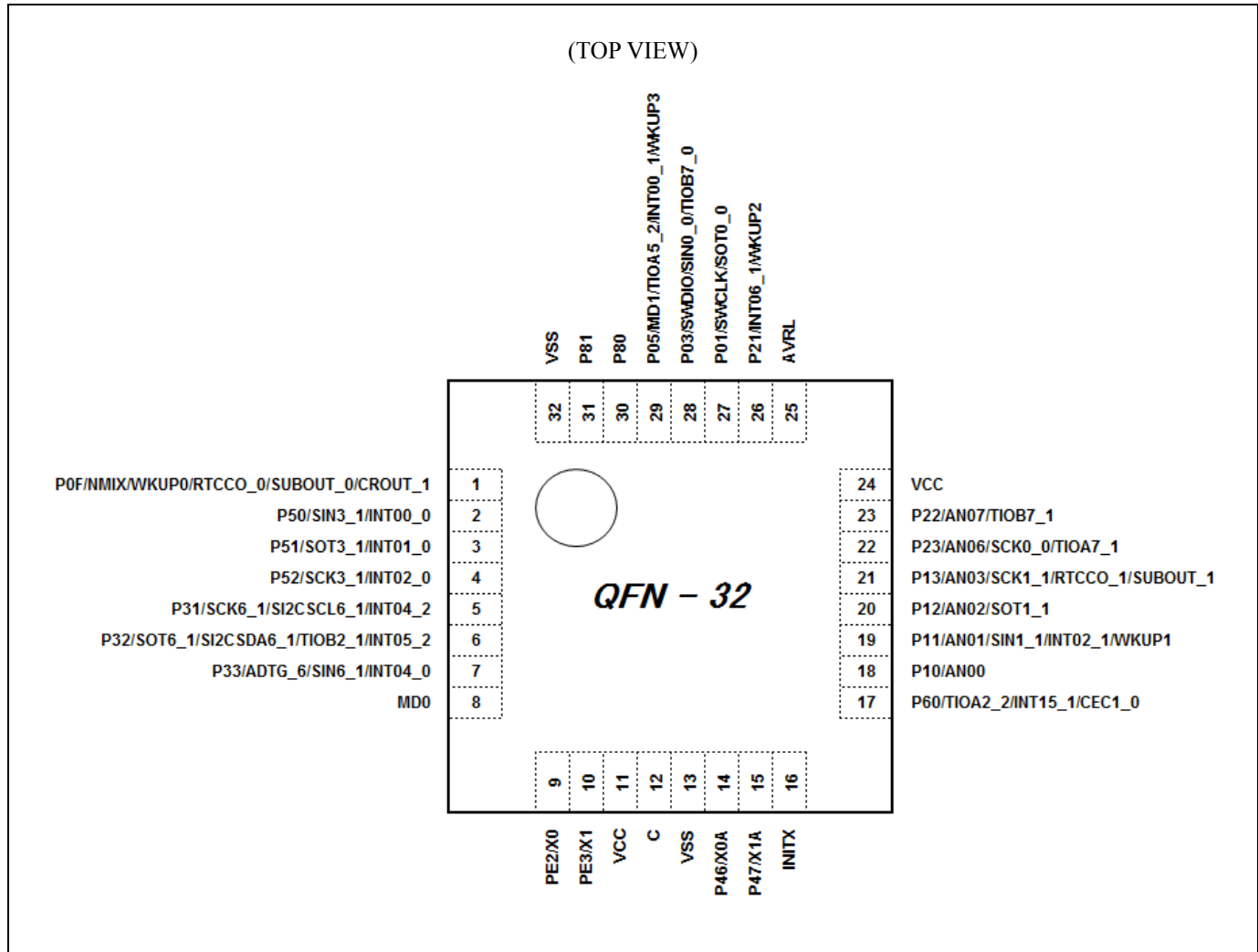
## FPT-32P-M30



**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

LCC-32P-M73



**Note:**

- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.



## 4. List of Pin Functions

### List of Pin Numbers

The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
1	1	2	P50	D	K
			SIN3_1		
			INT00_0		
2	2	3	P51	D	K
			SOT3_1		
			INT01_0		
3	3	4	P52	D	K
			SCK3_1		
			INT02_0		
4	4	-	P53	D	K
			TIOA1_2		
			INT07_2		
5	5	-	P30	D	K
			SCS60_1		
			TIOB0_1		
			INT03_2		
			MI2SWS6_1		
6	6	-	P31	H	K
			SCK6_1		
			SI2CSCL6_1		
			INT04_2		
			MI2SCK6_1		
-	-	5	P31	H	K
			SCK6_1		
			SI2CSCL6_1		
			INT04_2		
7	7	-	P32	H	K
			SOT6_1		
			SI2CSDA6_1		
			TIOB2_1		
			INT05_2		
			MI2SDO6_1		
-	-	6	P32	H	K
			SOT6_1		
			SI2CSDA6_1		
			TIOB2_1		
			INT05_2		

Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
8	8	-	P33	H	K
			ADTG_6		
			SIN6_1		
			INT04_0		
		7	MI2SDI6_1	H	K
			P33		
			ADTG_6		
			SIN6_1		
9	-	-	INT04_0	D	K
			P34		
			SCS61_1		
			TIOB4_1		
	9	-	MI2SMCK6_1	D	K
			P34		
			SCS61_1		
10	-	-	MI2SMCK6_1	D	K
			P35		
			SCS62_1		
			TIOB5_1		
11	-	-	INT08_1	D	K
			P3A		
			TIOA0_1		
			INT03_0		
			RTCCO_2		
	10	-	SUBOUT_2	D	K
			IC1_CIN_0		
			P3A		
			TIOA0_1		
			INT03_0		
12	-	-	RTCCO_2	D	K
			SUBOUT_2		
			P3B		
	11	-	TIOA1_1	D	K
			IC1_DATA_0		
13	-	-	P3C	D	K
			TIOA2_1		
			IC1_RST_0		
	12	-	P3C	D	K
			TIOA2_1		
14	-	-	P3D	D	K
			TIOA3_1		
			IC1_VPEN_0		

Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
15	-	-	P3E	D	K
			TIOA4_1		
			IC1_VCC_0		
16	-	-	P3F	D	K
			TIOA5_1		
			IC1_CLK_0		
17	13	8	MD0	I	F
18	14	9	PE2	A	A
			X0		
19	15	10	PE3	A	B
			X1		
20	-	-	P40	D	K
			TIOA0_0		
			INT12_1		
21	-	-	P41	D	K
			TIOA1_0		
			INT13_1		
22	-	-	P42	D	K
			TIOA2_0		
23	-	-	P43	D	K
			ADTG_7		
			TIOA3_0		
24	-	-	P4C	D	K
			SCK7_1		
			TIOB3_0		
-	16	-	P4C	D	K
			SCK7_1		
25	17	-	P4D	D	K
			SOT7_1		
26	18	-	P4E	D	K
			SIN7_1		
			INT06_2		
27	19	11	VCC	-	-
28	20	12	C	-	-
29	21	13	VSS	-	-
30	22	14	P46	C	C
			X0A		
31	23	15	P47	C	D
			X1A		
32	24	16	INITX	B	E
33	25	17	P60	H	K
			TIOA2_2		
			INT15_1		
			CEC1_0		

Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
34	-	-	P1E	D	K
			RTS4_1		
			MI2SMCK4_1		
35	-	-	P1D	D	K
			CTS4_1		
			MI2SWS4_1		
36	-	-	P1C	D	K
			SCK4_1		
			MI2SCK4_1		
37	-	-	P1B	D	K
			SOT4_1		
			MI2SDO4_1		
-	26	-	P1B	D	K
			SOT4_1		
38	-	-	P1A	H	K
			SIN4_1		
			INT05_1		
			CEC0_0		
-	27	-	MI2SDI4_1	H	K
			P1A		
			SIN4_1		
			INT05_1		
39	-	-	CEC0_0	D	K
			P1F		
40	28	18	ADTG_5	F	J
			P10		
41	29	19	AN00	G	J
			P11		
			AN01		
			SIN1_1		
			INT02_1		
42	30	20	WKUP1	F	J
			P12		
			AN02		
43	31	21	SOT1_1	F	J
			P13		
			AN03		
			SCK1_1		
			RTCCO_1		
44	32	-	SUBOUT_1	F	J
			P14		
			AN04		
			SIN0_1		
			SCS10_1		
			INT03_1		

Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
45	33	-	P15	F	J
			AN05		
			SOT0_1		
			SCS11_1		
46	34	22	P23	F	J
			AN06		
			SCK0_0		
			TIOA7_1		
47	35	23	P22	F	J
			AN07		
			TIOB7_1		
48	36	24	VCC	-	-
49	37	-	AVRH *	-	-
50	38	25	AVRL	-	-
51	39	26	P21	E	K
			INT06_1		
			WKUP2		
52	-	-	P00	E	K
			WKUP4		
53	40	27	P01	D	K
			SWCLK		
			SOT0_0		
54	-	-	P02	E	K
			WKUP5		
55	41	28	P03	D	K
			SWDIO		
			SIN0_0		
			TIOB7_0		
56	42	29	P05	E	K
			MD1		
			TIOA5_2		
			INT00_1		
			WKUP3		
57	43	-	VCC	-	-
58	44	30	P80	J	G
59	45	31	P81	J	G
60	46	32	VSS	-	-
61	47	-	P61	H	K
			TIOB2_2		
62	-	-	P0B	E	K
			TIOB6_1		
			WKUP6		
63	-	-	P0C	E	K
			TIOA6_1		
			WKUP7		



Pin no.			Pin Function	I/O circuit type	Pin state type
LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32			
64	48	1	P0F	E	I
			NMIX		
			WKUP0		
			RTCCO_0		
			SUBOUT_0		
CROUT_1					

\*: In case of 32-pin package, AVRH pin is internally connected to VCC pin.

## List of Pin Functions

The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
ADC	ADTG_5	A/D converter external trigger input pin	39	-	-
	ADTG_6		8	8	7
	ADTG_7		23	-	-
ADC	AN00	A/D converter analog input pin. ANxx describes ADC ch.xx.	40	28	18
	AN01		41	29	19
	AN02		42	30	20
	AN03		43	31	21
	AN04		44	32	-
	AN05		45	33	-
	AN06		46	34	22
	AN07		47	35	23
Base Timer 0	TIOA0_0	Base timer ch.0 TIOA pin	20	-	-
	TIOA0_1		11	10	-
	TIOB0_1	Base timer ch.0 TIOB pin	5	5	-
Base Timer 1	TIOA1_0	Base timer ch.1 TIOA pin	21	-	-
	TIOA1_1		12	11	-
	TIOA1_2		4	4	-
Base Timer 2	TIOA2_0	Base timer ch.2 TIOA pin	22	-	-
	TIOA2_1		13	12	-
	TIOA2_2		33	25	17
	TIOB2_1	Base timer ch.2 TIOB pin	7	7	6
	TIOB2_2	61	47	-	
Base Timer 3	TIOA3_0	Base timer ch.3 TIOA pin	23	-	-
	TIOA3_1		14	-	-
	TIOB3_0	Base timer ch.3 TIOB pin	24	-	-
Base Timer 4	TIOA4_1	Base timer ch.4 TIOA pin	15	-	-
	TIOB4_1	Base timer ch.4 TIOB pin	9	-	-
Base Timer 5	TIOA5_1	Base timer ch.5 TIOA pin	16	-	-
	TIOA5_2		56	42	29
	TIOB5_1	Base timer ch.5 TIOB pin	10	-	-
Base Timer 6	TIOA6_1	Base timer ch.6 TIOA pin	63	-	-
	TIOB6_1	Base timer ch.6 TIOB pin	62	-	-
Base Timer 7	TIOA7_1	Base timer ch.7 TIOA pin	46	34	22
	TIOB7_0	Base timer ch.7 TIOB pin	55	41	28
	TIOB7_1		47	35	23
Debugger	SWCLK	Serial wire debug interface clock input pin	53	40	27
	SWDIO	Serial wire debug interface data input / output pin	55	41	28

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
External Interrupt	INT00_0	External interrupt request 00 input pin	1	1	2
	INT00_1		56	42	29
	INT01_0	External interrupt request 01 input pin	2	2	3
	INT02_0	External interrupt request 02 input pin	3	3	4
	INT02_1		41	29	19
	INT03_0	External interrupt request 03 input pin	11	10	-
	INT03_1		44	32	-
	INT03_2		5	5	-
	INT04_0	External interrupt request 04 input pin	8	8	7
	INT04_2		6	6	5
	INT05_1	External interrupt request 05 input pin	38	27	-
	INT05_2		7	7	6
	INT06_1	External interrupt request 06 input pin	51	39	26
	INT06_2		26	18	-
	INT07_2	External interrupt request 07 input pin	4	4	-
	INT08_1	External interrupt request 08 input pin	10	-	-
	INT12_1	External interrupt request 12 input pin	20	-	-
	INT13_1	External interrupt request 13 input pin	21	-	-
INT15_1	External interrupt request 15 input pin	33	25	17	
NMIX	Non-Maskable Interrupt input pin	64	48	1	
GPIO	P00	General-purpose I/O port 0	52	-	-
	P01		53	40	27
	P02		54	-	-
	P03		55	41	28
	P05		56	42	29
	P0B		62	-	-
	P0C		63	-	-
	P0F		64	48	1
GPIO	P10	General-purpose I/O port 1	40	28	18
	P11		41	29	19
	P12		42	30	20
	P13		43	31	21
	P14		44	32	-
	P15		45	33	-
	P1A		38	27	-
	P1B		37	26	-
	P1C		36	-	-
	P1D		35	-	-
	P1E		34	-	-
	P1F		39	-	-
GPIO	P21	General-purpose I/O port 2	51	39	26
	P22		47	35	23
	P23		46	34	22

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
GPIO	P30	General-purpose I/O port 3	5	5	-
	P31		6	6	5
	P32		7	7	6
	P33		8	8	7
	P34		9	9	-
	P35		10	-	-
	P3A		11	10	-
	P3B		12	11	-
	P3C		13	12	-
	P3D		14	-	-
	P3E		15	-	-
	P3F		16	-	-
GPIO	P40	General-purpose I/O port 4	20	-	-
	P41		21	-	-
	P42		22	-	-
	P43		23	-	-
	P46		30	22	14
	P47		31	23	15
	P4C		24	16	-
	P4D		25	17	-
	P4E		26	18	-
GPIO	P50	General-purpose I/O port 5	1	1	2
	P51		2	2	3
	P52		3	3	4
	P53		4	4	-
GPIO	P60	General-purpose I/O port 6	33	25	17
	P61		61	47	-
GPIO	P80	General-purpose I/O port 8	58	44	30
	P81		59	45	31
GPIO	PE2	General-purpose I/O port E	18	14	9
	PE3		19	15	10
Multi-function Serial 0	SIN0_0	Multi-function serial interface ch.0 input pin	55	41	28
	SIN0_1		44	32	-
	SOT0_0 (SDA0_0)	Multi-function serial interface ch.0 output pin. This pin operates as SOT0 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA0 when used as an I2C pin (operation mode 4).	53	40	27
	SOT0_1 (SDA0_1)		45	33	-
	SCK0_0 (SCL0_0)	Multi-function serial interface ch.0 clock I/O pin. This pin operates as SCK0 when used as a CSIO pin (operation mode 2) and as SCL0 when used as an I2C pin (operation mode 4).	46	34	22

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
Multi-function Serial 1	SIN1_1	Multi-function serial interface ch.1 input pin	41	29	19
	SOT1_1 (SDA1_1)	Multi-function serial interface ch.1 output pin. This pin operates as SOT1 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA1 when used as an I2C pin (operation mode 4).	42	30	20
	SCK1_1 (SCL1_1)	Multi-function serial interface ch.1 clock I/O pin. This pin operates as SCK1 when used as a CSIO pin (operation mode 2) and as SCL1 when used as an I2C pin (operation mode 4).	43	31	21
	SCS10_1	Multi-function serial interface ch.1 serial chip select 0 input/output pin.	44	32	-
	SCS11_1	Multi-function serial interface ch.1 serial chip select 1 output pin.	45	33	-
Multi-function Serial 3	SIN3_1	Multi-function serial interface ch.3 input pin	1	1	2
	SOT3_1 (SDA3_1)	Multi-function serial interface ch.3 output pin. This pin operates as SOT3 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA3 when used as an I2C pin (operation mode 4).	2	2	3
	SCK3_1 (SCL3_1)	Multi-function serial interface ch.3 clock I/O pin. This pin operates as SCK3 when used as a CSIO (operation mode 2) and as SCL3 when used as an I2C pin (operation mode 4).	3	3	4



Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
Multi-function Serial 4	SIN4_1	Multi-function serial interface ch.4 input pin	38	27	-
	SOT4_1 (SDA4_1)	Multi-function serial interface ch.4 output pin. This pin operates as SOT4 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA4 when used as an I2C pin (operation mode 4).	37	26	-
	SCK4_1 (SCL4_1)	Multi-function serial interface ch.4 clock I/O pin. This pin operates as SCK4 when used as a CSIO (operation mode 2) and as SCL4 when used as an I2C pin (operation mode 4).	36	-	-
	CTS4_1	Multi-function serial interface ch4 CTS input pin	35	-	-
	RTS4_1	Multi-function serial interface ch4 RTS output pin	34	-	-
Multi-function Serial 6	SIN6_1	Multi-function serial interface ch.6 input pin	8	8	7
	SOT6_1 (SDA6_1)	Multi-function serial interface ch.6 output pin. This pin operates as SOT6 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA6 when used as an I2C pin (operation mode 4).	7	7	6
	SCK6_1 (SCL6_1)	Multi-function serial interface ch.6 clock I/O pin. This pin operates as SCK6 when used as a CSIO (operation mode 2) and as SCL6 when used as an I2C pin (operation mode 4).	6	6	5
	SCS60_1	Multi-function serial interface ch.6 serial chip select 0 input/output pin.	5	5	-
	SCS61_1	Multi-function serial interface ch.6 serial chip select 1 output pin.	9	9	-
	SCS62_1	Multi-function serial interface ch.6 serial chip select 2 output pin.	10	-	-
Multi-function Serial 7	SIN7_1	Multi-function serial interface ch.7 input pin	26	18	-
	SOT7_1 (SDA7_1)	Multi-function serial interface ch.7 output pin. This pin operates as SOT7 when used as a UART/CSIO/LIN pin (operation mode 0 to 3) and as SDA7 when used as an I2C pin (operation mode 4).	25	17	-
	SCK7_1 (SCL7_1)	Multi-function serial interface ch.7 clock I/O pin. This pin operates as SCK7 when used as a CSIO (operation mode 2) and as SCL7 when used as an I2C pin (operation mode 4).	24	16	-

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
I2S(MFS)	MI2SDI4_1	I2S Serial Data Input pin (operation mode 2).	38	-	-
	MI2SDO4_1	I2S Serial Data Output pin (operation mode 2).	37	-	-
	MI2SCK4_1	I2S Serial Clock Output pin (operation mode 2).	36	-	-
	MI2SWS4_1	I2S Word Select Output pin (operation mode 2).	35	-	-
	MI2SMCK4_1	I2S Master Clock Input/output pin (operation mode 2).	34	-	-
	MI2SDI6_1	I2S Serial Data Input pin (operation mode 2).	8	8	-
	MI2SDO6_1	I2S Serial Data Output pin (operation mode 2).	7	7	-
	MI2SCK6_1	I2S Serial Clock Output pin (operation mode 2).	6	6	-
	MI2SWS6_1	I2S Word Select Output pin (operation mode 2).	5	5	-
	MI2SMCK6_1	I2S Master Clock Input/output pin (operation mode 2).	9	9	-
Smart Card Interface	IC1_CIN_0	Smart Card insert detection output pin	11	-	-
	IC1_CLK_0	Smart Card serial interface clock output pin	16	-	-
	IC1_DATA_0	Smart Card serial interface data input pin	12	-	-
	IC1_RST_0	Smart Card reset output pin	13	-	-
	IC1_VCC_0	Smart Card power enable output pin	15	-	-
	IC1_VPEN_0	Smart Card programming output pin	14	-	-
Real-time Clock	RTCCO_0	0.5 seconds pulse output pin of real-time clock	64	48	1
	RTCCO_1		43	31	21
	RTCCO_2		11	10	-
	SUBOUT_0	Sub clock output pin	64	48	1
	SUBOUT_1		43	31	21
	SUBOUT_2		11	10	-
HDMI-CEC/Remote Control Reception	CEC0_0	HDMI-CEC/Remote Control Reception ch.0 input/output pin	38	27	-
	CEC1_0	HDMI-CEC/Remote Control Reception ch.1 input/output pin	33	25	17

Pin function	Pin name	Function description	Pin no.		
			LQFP-64 QFN-64	LQFP-48 QFN-48	LQFP-32 QFN-32
Low Power Consumption Mode	WKUP0	Deep Standby mode return signal input pin 0	64	48	1
	WKUP1	Deep Standby mode return signal input pin 1	41	29	19
	WKUP2	Deep Standby mode return signal input pin 2	51	39	26
	WKUP3	Deep Standby mode return signal input pin 3	56	42	29
	WKUP4	Deep Standby mode return signal input pin 4	52	-	-
	WKUP5	Deep Standby mode return signal input pin 5	54	-	-
	WKUP6	Deep Standby mode return signal input pin 6	62	-	-
	WKUP7	Deep Standby mode return signal input pin 7	63	-	-
I2C Slave	SI2CSCL6_1	I2C Clock Pin	6	6	5
	SI2CSDA6_1	I2C Data Pin	7	7	6
RESET	INITX	External Reset Input pin. A reset is valid when INITX="L".	32	24	16
MODE	MD0	Mode 0 pin. During normal operation, input MD0="L". During serial programming to Flash memory, input MD0="H".	17	13	8
	MD1	Mode 1 pin. During normal operation, input is not needed. During serial programming to Flash memory, MD1 = "L" must be input.	56	42	29
CLOCK	X0	Main clock (oscillation) input pin	18	14	9
	X0A	Sub clock (oscillation) input pin	30	22	14
	X1	Main clock (oscillation) I/O pin	19	15	10
	X1A	Sub clock (oscillation) I/O pin	31	23	15
	CROUT_1	Built-in high-speed CR oscillation clock output port	64	48	1
POWER	VCC	Power supply pin	27	19	11
	VCC		48	36	24
	VCC		57	43	-
GND	VSS	GND pin	29	21	13
	VSS		60	46	32
Analog Reference	AVRH *	A/D converter analog reference voltage input pin	49	37	-
	AVRL	A/D converter analog reference voltage input pin	50	38	25
C pin	C	Power supply stabilization capacitance pin	28	20	12

\*: In case of 32-pin package, AVRH pin is internally connected to VCC pin.