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### What is "[Embedded - Microcontrollers](#)"?

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

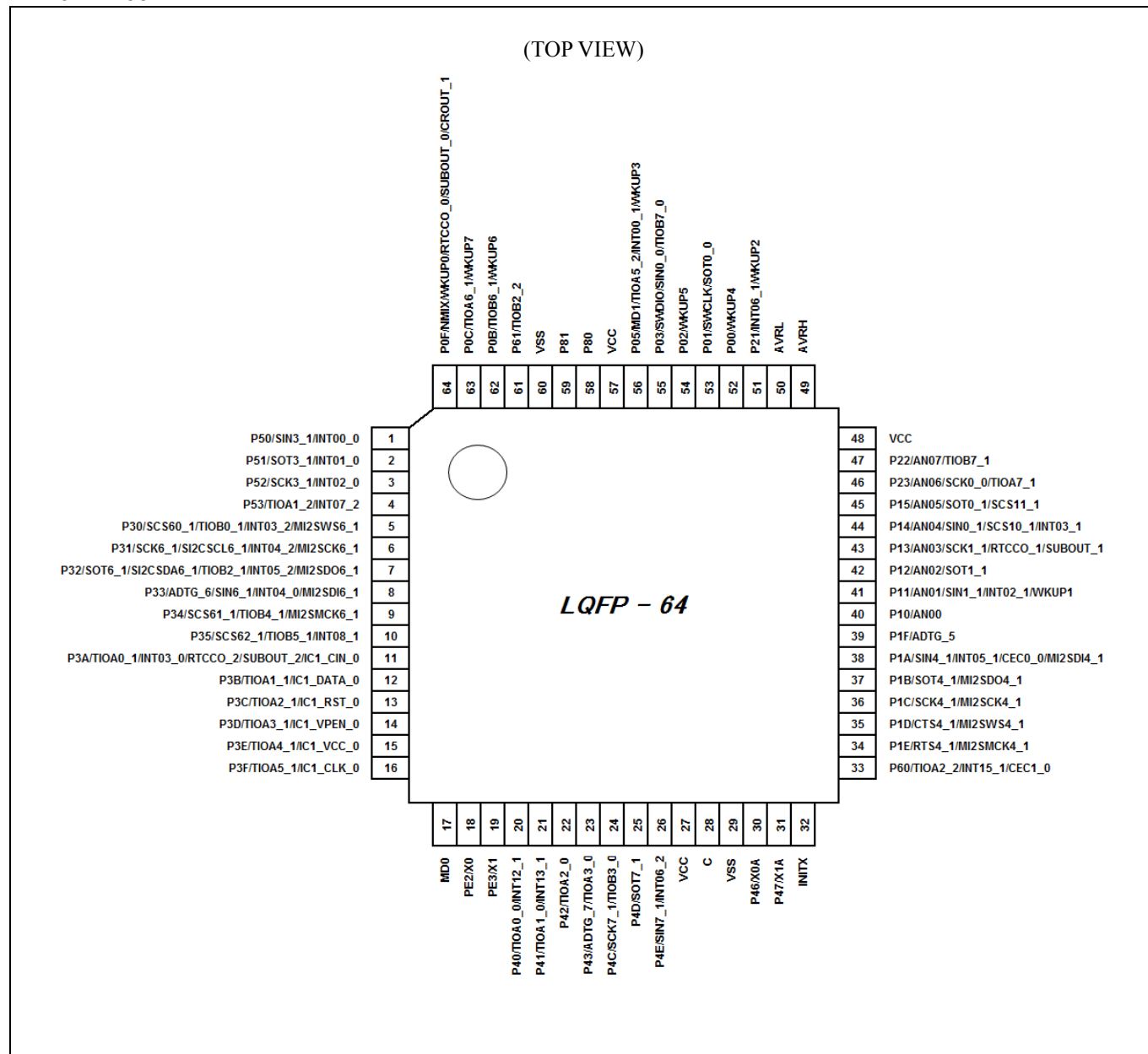
### Applications of "[Embedded - Microcontrollers](#)"

#### Details

Product Status	Active
Core Processor	ARM® Cortex®-M0+
Core Size	32-Bit Single-Core
Speed	40MHz
Connectivity	CSIO, I <sup>2</sup> C, LINbus, SmartCard, UART/USART
Peripherals	I <sup>2</sup> S, LVD, POR, PWM, WDT
Number of I/O	24
Program Memory Size	128KB (128K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	16K x 8
Voltage - Supply (Vcc/Vdd)	1.65V ~ 3.6V
Data Converters	A/D 6x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	32-LQFP
Supplier Device Package	32-LQFP (7x7)
Purchase URL	<a href="https://www.e-xfl.com/product-detail/infineon-technologies/s6e1c12b0agp20000">https://www.e-xfl.com/product-detail/infineon-technologies/s6e1c12b0agp20000</a>

## 3. Pin Assignment

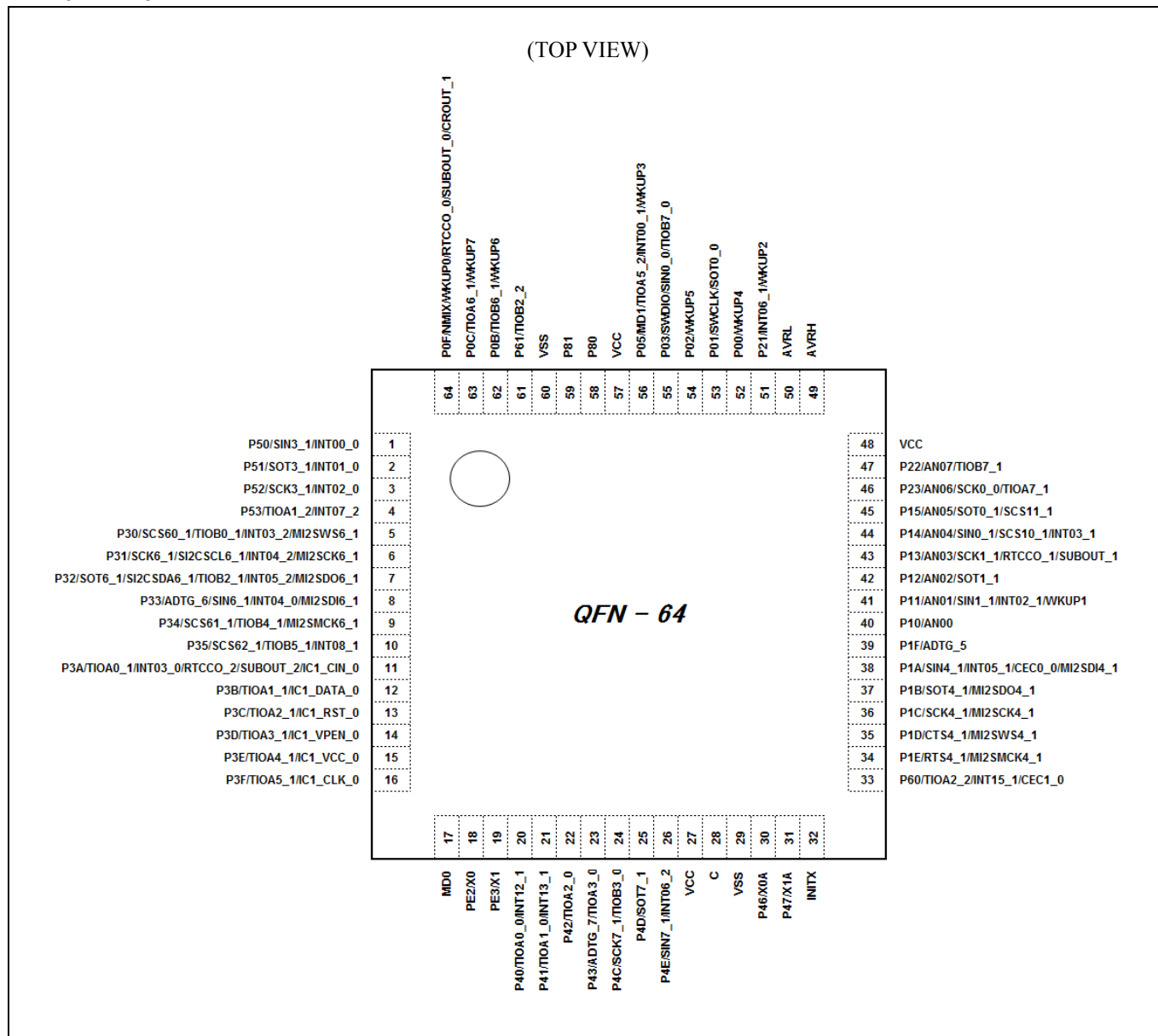
### FPT-64P-M38



#### 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.

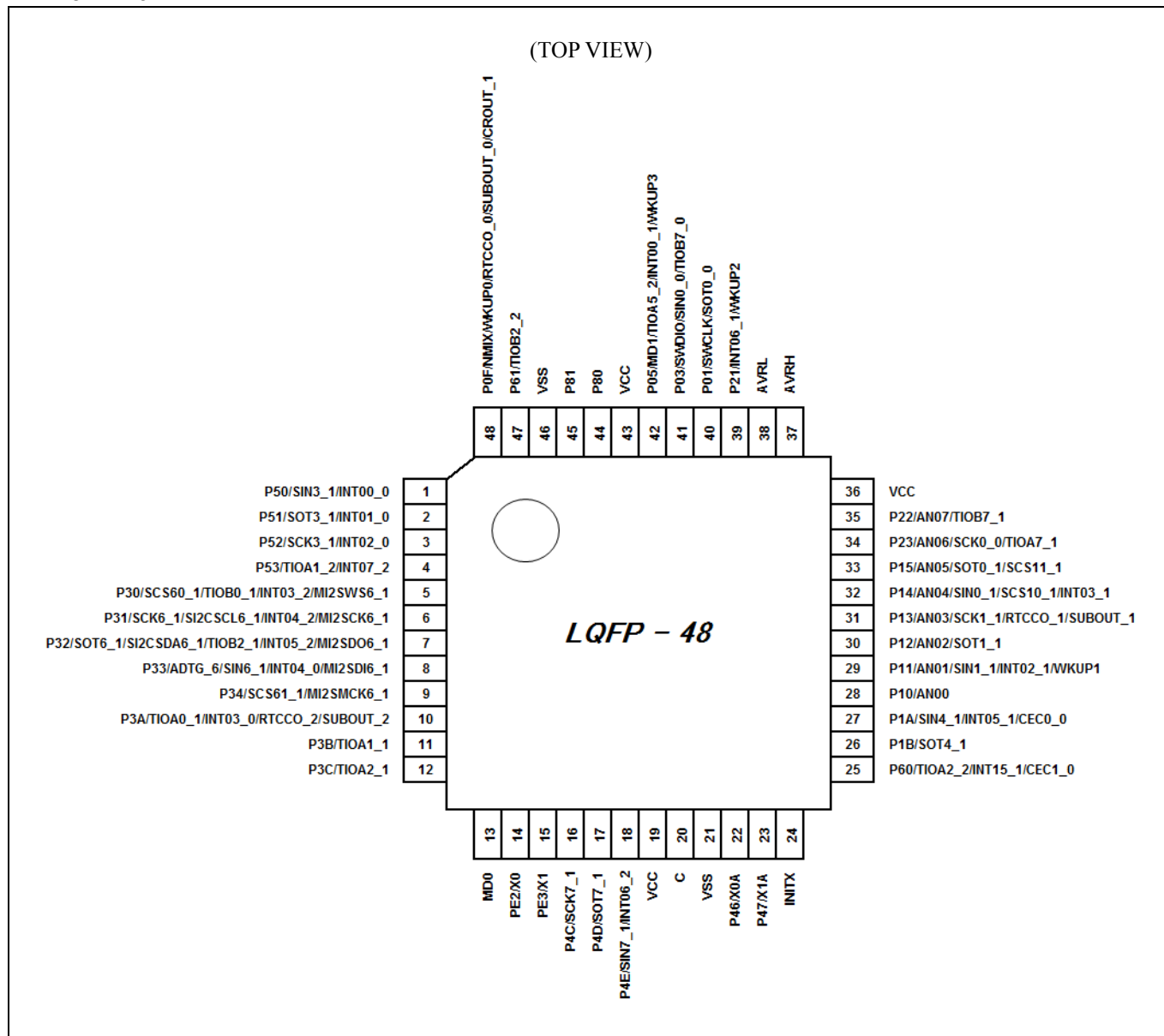
## LCC-64P-M25



### Note:

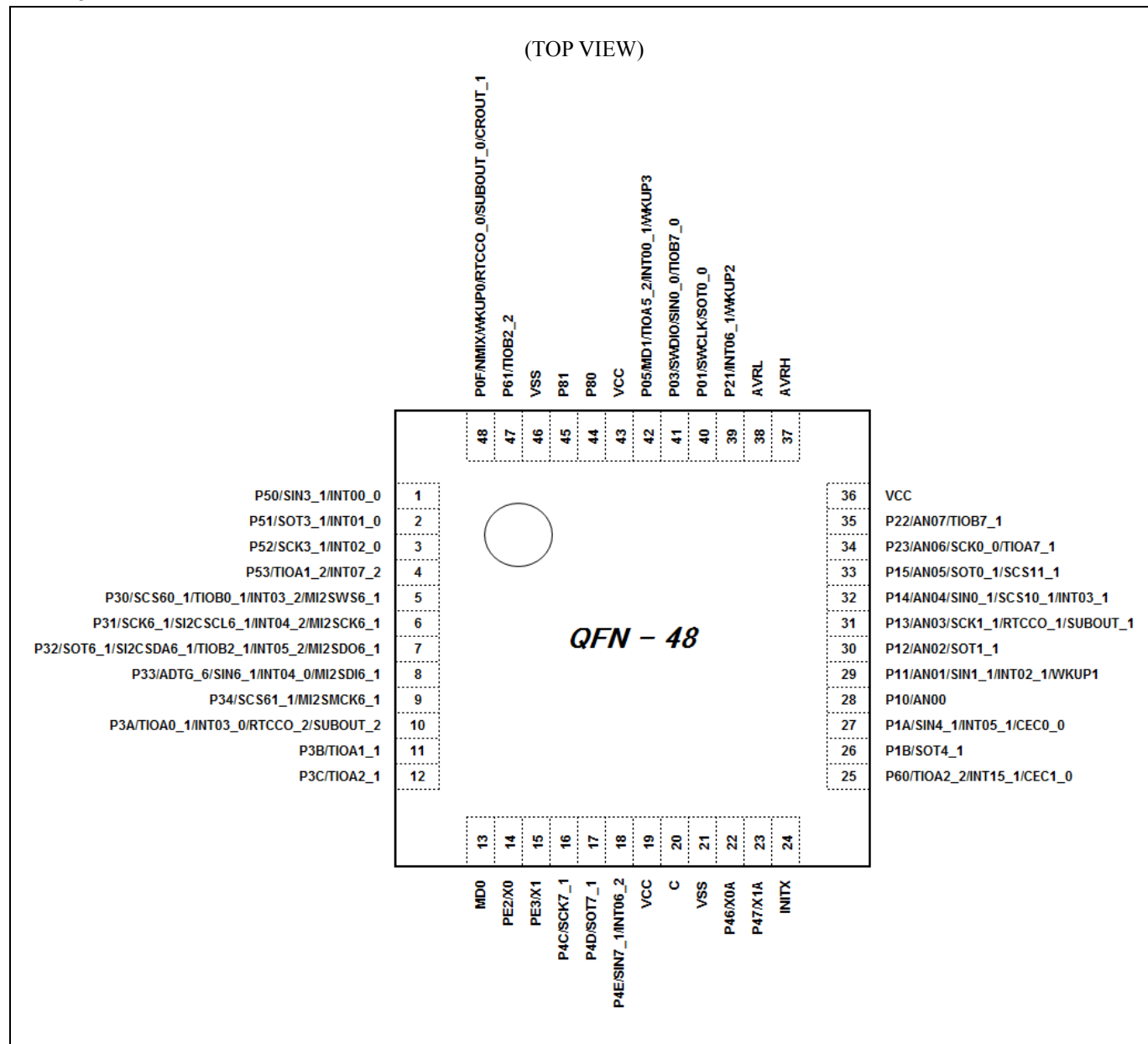
- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

## FPT-48P-M49



### Note:

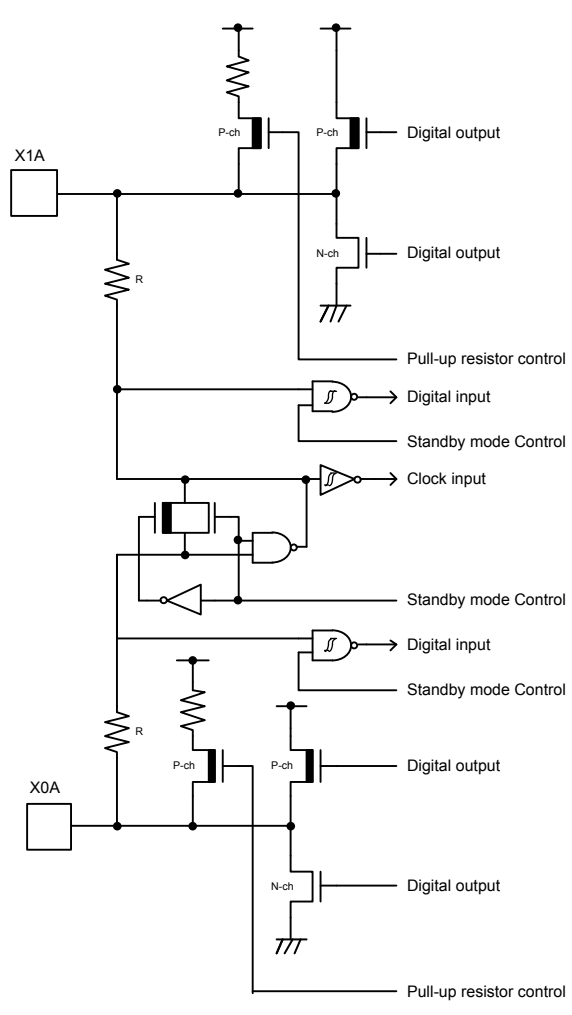
- The number after the underscore ("\_") in a pin name such as XXX\_1 and XXX\_2 indicates the relocated port number. The channel on such pin has multiple functions, each of which has its own pin name. Use the Extended Port Function Register (EPFR) to select the pin to be used.

**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.

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		
			MI2SDI6_1		
-	-	7	P33	H	K
			ADTG_6		
			SIN6_1		
			INT04_0		
9	-	-	P34	D	K
			SCS61_1		
			TIOB4_1		
			MI2SMCK6_1		
-	9	-	P34	D	K
			SCS61_1		
			MI2SMCK6_1		
10	-	-	P35	D	K
			SCS62_1		
			TIOB5_1		
			INT08_1		
11	-	-	P3A	D	K
			TIOA0_1		
			INT03_0		
			RTCCO_2		
			SUBOUT_2		
			IC1_CIN_0		
-	10	-	P3A	D	K
			TIOA0_1		
			INT03_0		
			RTCCO_2		
			SUBOUT_2		
12	-	-	P3B	D	K
			TIOA1_1		
			IC1_DATA_0		
-	11	-	P3B	D	K
			TIOA1_1		
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 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

Type	Circuit	Remarks
C	 <p>The diagram illustrates the internal circuitry for Type C, featuring two channels labeled X1A and X0A. Each channel is connected to a pull-up resistor R. The X1A channel includes a pull-up resistor R connected to a digital output pin, a pull-up resistor R connected to a digital input pin, a pull-up resistor control, a digital input, a standby mode control, and a clock input. The X0A channel includes a pull-up resistor R connected to a digital output pin, a pull-up resistor R connected to a digital input pin, a pull-up resistor control, a digital input, a standby mode control, and a clock input. The circuit uses P-ch and N-ch MOSFETs, a pull-up resistor control, a digital input, a standby mode control, and a clock input.</p>	<p>It is possible to select the sub oscillation / GPIO function</p> <p>When the sub oscillation is selected.</p> <ul style="list-style-type: none"> <li>• Oscillation feedback resistor : Approximately 5MΩ</li> <li>• With Standby mode control</li> </ul> <p>When the GPIO is selected.</p> <ul style="list-style-type: none"> <li>• CMOS level output.</li> <li>• CMOS level hysteresis input</li> <li>• With pull-up resistor control</li> <li>• With standby mode control</li> <li>• Pull-up resistor : Approximately 33kΩ</li> </ul> <p><math>I_{OH} = -4mA</math>, <math>I_{OL} = 4mA</math></p>



## Type

This indicates a pin status type that is shown in “pin list table” in “4. List of Pin Functions”

## Selected Pin function

This indicates a pin function that is selected by user program.

## CPU state

This indicates a state of the CPU that is shown below.

- (1) Reset state.  
CPU is initialized by Power-on reset or a reset due to low Power voltage supply.
- (2) Reset state.  
CPU is initialized by INITX input signal or system initialization after power on reset.
- (3) Run mode or SLEEP mode state.
- (4) Timer mode, RTC mode or STOP mode state.  
The standby pin level setting bit (SPL) in the Standby Mode Control Register (STB\_CTL) is set to "0".
- (5) Timer mode, RTC mode or STOP mode state.  
The standby pin level setting bit (SPL) in the Standby Mode Control Register (STB\_CTL) is set to "1".
- (6) Deep standby STOP mode or Deep standby RTC mode state,  
The standby pin level setting bit (SPL) in the Standby Mode Control Register (STB\_CTL) is set to "0"
- (7) Deep standby STOP mode or Deep standby RTC mode state,  
The standby pin level setting bit (SPL) in the Standby Mode Control Register (STB\_CTL) is set to "1"
- (8) Run mode state after returning from Deep Standby mode.  
(I/O state hold function(CONTX) is fixed at 1)

## Each pin status

The meaning of the symbols in the pin status table is as follows.

- |       |   |
|-------|---|
| IS    | Digital output is disabled. (Hi-Z) Pull up register is off. Digital input is shut off by fixed 0.   |
| IE    | Digital output is disabled. (Hi-Z) Pull up register is off. Digital input is not shut off.  |
| IP    | Digital output is disabled. (Hi-Z) Pull up register is defined by the value of the PCR register. Digital input is not shut off.   |
| IE/IS | Digital output is disabled. (Hi-Z) Pull up register is off. Digital input is shut off in case of the OSC stop. Digital input is not shut off in case of the OSC operation.        |
| OE    | The OSC is in operation state. However, it may be stopped in some operation mode of the CPU.<br>For detail, see chapter “Low Power Consumption Mode” in peripheral manual.        |
| OS    | The OSC is in stop state. (Hi-Z)  |
| PC    | Digital output and pull up register is controlled by the register in the GPIO or peripheral function.<br>Digital input is not shut off  |
| CP    | Digital output is controlled by the register in the GPIO or peripheral function. Pull up register is off.<br>Digital input is not shut off.                                       |
| HC    | Digital output and pull up register is maintained the status that is immediately prior to entering the current CPU state. Digital input is not shut off                           |
| HS    | Digital output and pull up register is maintained the status that is immediately prior to entering the current CPU state. Digital input is shut off                               |
| GS    | Digital output and pull up register is copied the GPIO status that is immediately prior to entering the current CPU state and the status is maintained. Digital input is shut off |

## 11.2 Recommended Operating Conditions

 (V<sub>SS</sub> = 0.0 V)

Parameter	Symbol	Conditions	Value		Unit	Remarks
			Min	Max		
Power supply voltage	V <sub>CC</sub>	-	1.65 * <sup>2</sup>	3.6	V	
Analog reference voltage	AVRH	-	2.7	V <sub>CC</sub>	V	V <sub>CC</sub> ≥ 2.7 V
			V <sub>CC</sub>	V <sub>CC</sub>	V	V <sub>CC</sub> < 2.7 V
	AVRL	-	VSS	VSS	V	
Smoothing capacitor	C <sub>S</sub>	-	1	10	μF	For regulator* <sup>1</sup>
Operating temperature	T <sub>a</sub>	-	- 40	+ 105	°C	

\*1: See "C Pin" in "7. Handling Devices" for the connection of the smoothing capacitor.

\*2: In between less than the minimum power supply voltage reset / interrupt detection voltage or more, instruction execution and low voltage detection function by built-in High-speed CR (including Main PLL is used) or built-in Low-speed CR is possible to operate only.

### <WARNING>

1. The recommended operating conditions are required in order to ensure the normal operation of the semiconductor device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.
2. Always use semiconductor devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.
3. No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet.
4. Users considering application outside the listed conditions are advised to contact their representatives beforehand.

## 11.4.6 Reset Input Characteristics

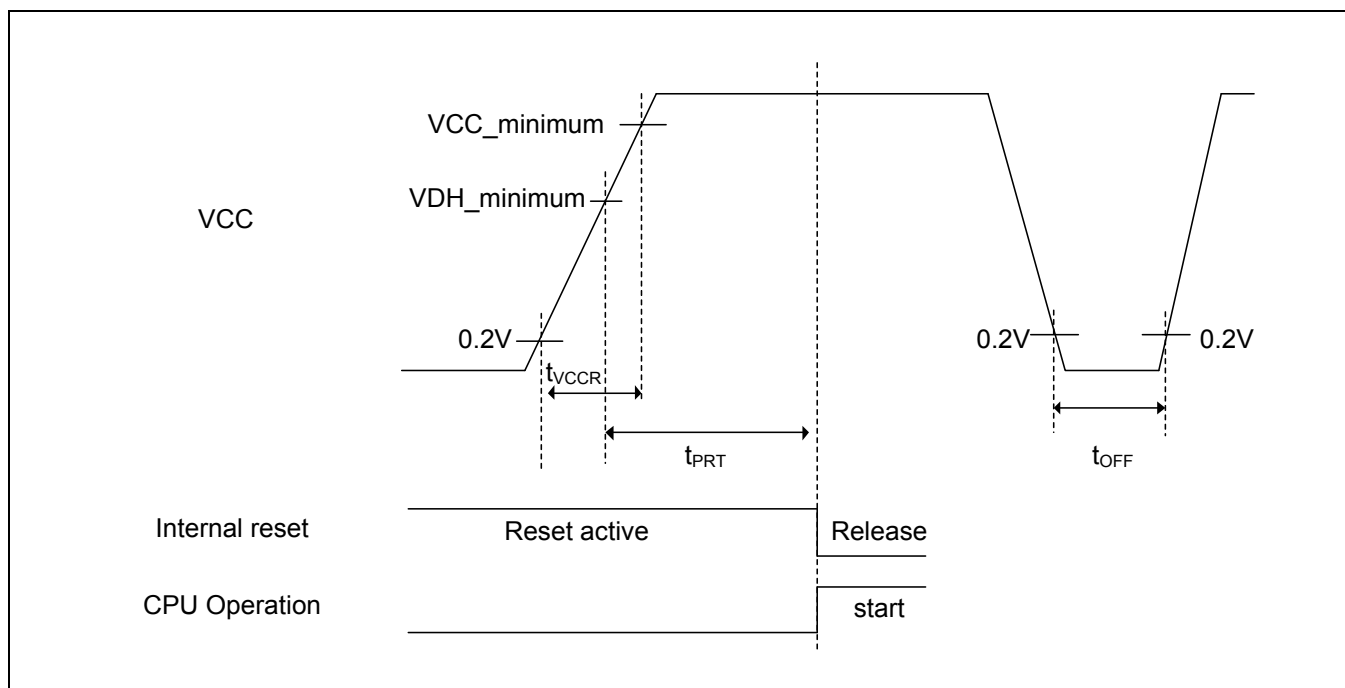
( $V_{CC} = 1.65\text{ V to }3.6\text{ V}$ ,  $V_{SS} = 0\text{ V}$ ,  $T_A = -40^\circ\text{C to }+105^\circ\text{C}$ )

Parameter	Symbol	Pin Name	Conditions	Value		Unit	Remarks
				Min	Max		
Reset input time	$t_{INITX}$	INITX	-	500	-	ns	

## 11.4.7 Power-on Reset Timing

( $V_{CC} = 1.65\text{ V to }3.6\text{ V}$ ,  $V_{SS} = 0\text{ V}$ ,  $T_A = -40^\circ\text{C to }+105^\circ\text{C}$ )

Parameter	Symbol	Pin Name	Value		Unit	Remarks
			Min	Max		
Power supply rising time	$t_{VCCR}$	VCC	0	-	ms	
Power supply shut down time	$t_{OFF}$		1	-	ms	
Time until releasing Power-on reset	$t_{PRT}$		0.43	3.4	ms	



### Glossary

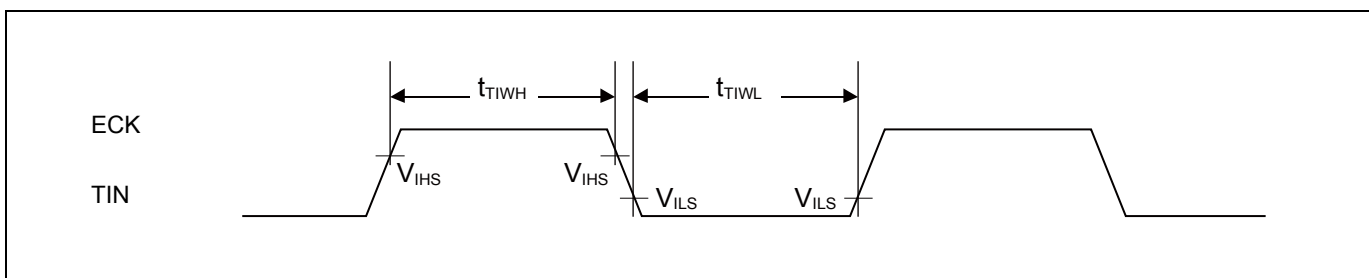
- VCC\_minimum : Minimum  $V_{CC}$  of recommended operating conditions.
  - VDH\_minimum : Minimum detection voltage of Low-Voltage detection reset.
- See "11.6 Low-Voltage Detection Characteristics".

### 11.4.8 Base Timer Input Timing

#### Timer Input Timing

( $V_{CC}$  = 1.65 V to 3.6 V,  $V_{SS}$  = 0 V,  $T_A$  = -40°C to +105°C)

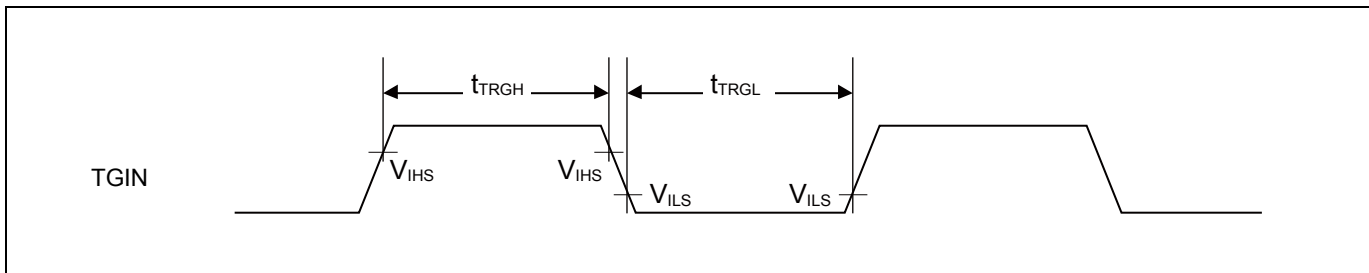
Parameter	Symbol	Pin Name	Conditions	Value		Unit	Remarks
				Min	Max		
Input pulse width	$t_{TIWH}$ , $t_{TIWL}$	TIOAn/TIOBn (when using as ECK, TIN)	-	$2 t_{CYCP}$	-	ns	



#### Trigger Input Timing

( $V_{CC}$  = 1.65 V to 3.6 V,  $V_{SS}$  = 0 V,  $T_A$  = -40°C to +105°C)

Parameter	Symbol	Pin Name	Conditions	Value		Unit	Remarks
				Min	Max		
Input pulse width	$t_{TRGH}$ , $t_{TRGL}$	TIOAn/TIOBn (when using as TGIN)	-	$2 t_{CYCP}$	-	ns	



#### Note:

- $t_{CYCP}$  indicates the APB bus clock cycle time.  
For the number of the APB bus to which the Base Timer has been connected, see "8. Block Diagram".

## 11.4.9 CSIO/SPI/UART Timing

### CSIO (SPI=0, SCINV=0)

( $V_{CC}$  = 1.65 V to 3.6 V,  $V_{SS}$  = 0 V,  $T_A$  = -40°C to +105°C)

Parameter	Symbol	Pin name	Conditions	$V_{CC} < 2.7$ V		$V_{CC} \geq 2.7$ V		Unit
				Min	Max	Min	Max	
Serial clock cycle time	$t_{SCYC}$	SCKx	Master mode	$4 t_{CYCP}$	-	$4 t_{CYCP}$	-	ns
SCK ↓ → SOT delay time	$t_{SLOVI}$	SCKx, SOTx		- 30	+ 30	- 20	+ 20	ns
SIN → SCK ↑ setup time	$t_{IVSHI}$	SCKx, SINx		50	-	36	-	ns
SCK ↑ → SIN hold time	$t_{SHIXI}$	SCKx, SINx		0	-	0	-	ns
Serial clock "L" pulse width	$t_{SLSH}$	SCKx	Slave mode	$2 t_{CYCP} - 10$	-	$2 t_{CYCP} - 10$	-	ns
Serial clock "H" pulse width	$t_{SHSL}$	SCKx		$t_{CYCP} + 10$	-	$t_{CYCP} + 10$	-	ns
SCK ↓ → SOT delay time	$t_{SLOVE}$	SCKx, SOTx		-	50	-	30	ns
SIN → SCK ↑ setup time	$t_{IVSHE}$	SCKx, SINx		10	-	10	-	ns
SCK ↑ → SIN hold time	$t_{SHIXE}$	SCKx, SINx		20	-	20	-	ns
SCK falling time	$t_F$	SCKx		-	5	-	5	ns
SCK rising time	$t_R$	SCKx		-	5	-	5	ns

#### Notes:

- The above AC characteristics are for clock synchronous mode.
- $t_{CYCP}$  represents the APB bus clock cycle time.  
For the number of the APB bus to which Multi-function Serial has been connected, see "8. Block Diagram".
- The characteristics are only applicable when the relocate port numbers are the same.  
For instance, they are not applicable for the combination of SCKx\_0 and SOTx\_1.
- External load capacitance  $C_L$  = 30 pF

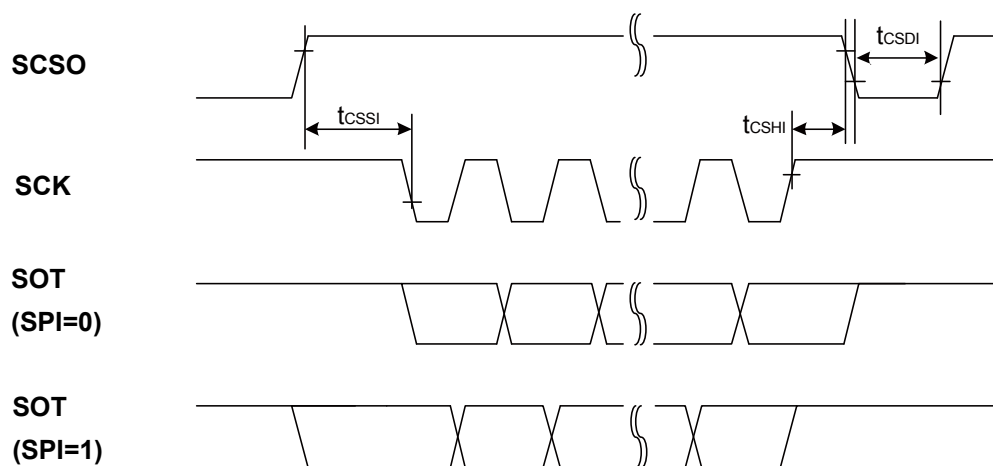
**SPI (SPI=1, SCINV=1)**

 ( $V_{CC} = 1.65\text{ V to }3.6\text{ V}$ ,  $V_{SS} = 0\text{ V}$ ,  $T_A = -40^\circ\text{C to }+105^\circ\text{C}$ )

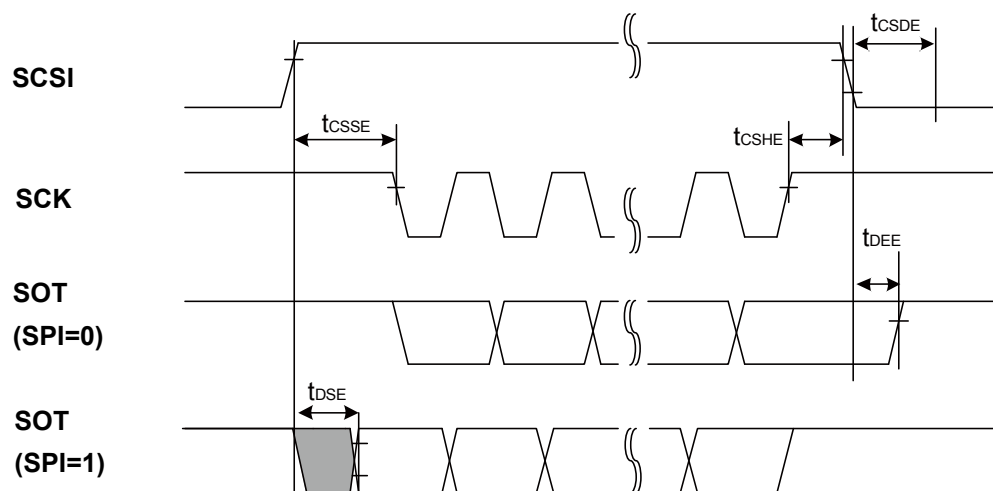
Parameter	Symbol	Pin name	Conditions	$V_{CC} < 2.7\text{ V}$		$V_{CC} \geq 2.7\text{ V}$		Unit
				Min	Max	Min	Max	
Serial clock cycle time	$t_{SCYC}$	SCKx	Master mode	$4\ t_{CYCP}$	-	$4\ t_{CYCP}$	-	ns
SCK ↓ → SOT delay time	$t_{SLOVI}$	SCKx, SOTx		- 30	+ 30	- 20	+ 20	ns
SIN → SCK ↑ setup time	$t_{IVSHI}$	SCKx, SINx		50	-	36	-	ns
SCK ↑ → SIN hold time	$t_{SHIXI}$	SCKx, SINx		0	-	0	-	ns
SOT → SCK ↑ delay time	$t_{SOVHI}$	SCKx, SOTx		$2\ t_{CYCP} - 30$	-	$2\ t_{CYCP} - 30$	-	ns
Serial clock "L" pulse width	$t_{SLSH}$	SCKx	Slave mode	$2\ t_{CYCP} - 10$	-	$2\ t_{CYCP} - 10$	-	ns
Serial clock "H" pulse width	$t_{SHSL}$	SCKx		$t_{CYCP} + 10$	-	$t_{CYCP} + 10$	-	ns
SCK ↓ → SOT delay time	$t_{SLOVE}$	SCKx, SOTx		-	50	-	33	ns
SIN → SCK ↑ setup time	$t_{IVSHE}$	SCKx, SINx		10	-	10	-	ns
SCK ↑ → SIN hold time	$t_{SHIXE}$	SCKx, SINx		20	-	20	-	ns
SCK falling time	$t_F$	SCKx		-	5	-	5	ns
SCK rising time	$t_R$	SCKx		-	5	-	5	ns

**Notes:**

- The above AC characteristics are for clock synchronous mode.
- $t_{CYCP}$  represents the APB bus clock cycle time.  
For the number of the APB bus to which Multi-function Serial has been connected, see "8. Block Diagram".
- The characteristics are only applicable when the relocate port numbers are the same.  
For instance, they are not applicable for the combination of SCKx\_0 and SOTx\_1.
- External load capacitance  $C_L = 30\text{ pF}$



Master mode



Slave mode

## When Using CSIO/SPI Chip Select (SCINV=1, CSLVL=0)

( $V_{CC}$  = 1.65 V to 3.6 V,  $V_{SS}$  = 0 V,  $T_A$  = -40°C to +105°C)

Parameter	Symbol	Conditions	$V_{CC} < 2.7 \text{ V}$		$V_{CC} \geq 2.7 \text{ V}$		Unit
			Min	Max	Min	Max	
SCS $\uparrow$ →SCK $\uparrow$ setup time	$t_{CSSI}$	Master mode	(*1)-50	(*1)+0	(*1)-50	(*1)+0	ns
SCK $\downarrow$ →SCS $\downarrow$ hold time	$t_{CSHI}$		(*2)+0	(*2)+50	(*2)+0	(*2)+50	ns
SCS deselect time	$t_{CSDI}$		(*3)-50	(*3)+50	(*3)-50	(*3)+50	ns
SCS $\uparrow$ →SCK $\uparrow$ setup time	$t_{CSSE}$	Slave mode	$3t_{CYCP}+30$	-	$3t_{CYCP}+30$	-	ns
SCK $\downarrow$ →SCS $\downarrow$ hold time	$t_{CSHE}$		0	-	0	-	ns
SCS deselect time	$t_{CSDE}$		$3t_{CYCP}+30$	-	$3t_{CYCP}+30$	-	ns
SCS $\uparrow$ →SOT delay time	$t_{DSE}$		-	55	-	40	ns
SCS $\downarrow$ →SOT delay time	$t_{DEE}$		0	-	0	-	ns

\*1: CSSU bit value × serial chip select timing operating clock cycle.

\*2: CSHD bit value × serial chip select timing operating clock cycle.

\*3: CSDS bit value × serial chip select timing operating clock cycle.

Irrespective of CSDS bit setting,  $5t_{CYCP}$  or more are required for the period the time when the serial chip select pin becomes inactive to the time when the serial chip select pin becomes active again.

### Notes:

- $t_{CYCP}$  indicates the APB bus clock cycle time.  
For information about the APB bus number which Multi-function Serial is connected to, see "8. Block Diagram".
- For information about CSSU, CSHD, CSDS, serial chip select timing operating clock, see "FM0+ Family Peripheral Manual".
- These characteristics only guarantee the same relocate port number.  
For example, the combination of SCKx\_0 and SCSIx\_1 is not guaranteed.
- When the external load capacitance  $C_L=30 \text{ pF}$ .



## 11.6.2 Low-Voltage Detection Interrupt

(T<sub>A</sub>=−40°C to +105°C)

Parameter	Symbol	Conditions	Value			Unit	Remarks
			Min	Typ	Max		
Detected voltage	VDL	SVHI=00100	1.56	1.70	1.84	V	When voltage drops
Released voltage	VDH		1.61	1.75	1.89	V	When voltage rises
Detected voltage	VDL	SVHI=00101	1.61	1.75	1.89	V	When voltage drops
Released voltage	VDH		1.66	1.80	1.94	V	When voltage rises
Detected voltage	VDL	SVHI=00110	1.66	1.80	1.94	V	When voltage drops
Released voltage	VDH		1.70	1.85	2.00	V	When voltage rises
Detected voltage	VDL	SVHI=00111	1.70	1.85	2.00	V	When voltage drops
Released voltage	VDH		1.75	1.90	2.05	V	When voltage rises
Detected voltage	VDL	SVHI=01000	1.75	1.90	2.05	V	When voltage drops
Released voltage	VDH		1.79	1.95	2.11	V	When voltage rises
Detected voltage	VDL	SVHI=01001	1.79	1.95	2.11	V	When voltage drops
Released voltage	VDH		1.84	2.00	2.16	V	When voltage rises
Detected voltage	VDL	SVHI=01010	1.84	2.00	2.16	V	When voltage drops
Released voltage	VDH		1.89	2.05	2.21	V	When voltage rises
Detected voltage	VDL	SVHI=01011	1.89	2.05	2.21	V	When voltage drops
Released voltage	VDH		1.93	2.10	2.27	V	When voltage rises
Detected voltage	VDL	SVHI=01100	2.30	2.50	2.70	V	When voltage drops
Released voltage	VDH		2.39	2.60	2.81	V	When voltage rises
Detected voltage	VDL	SVHI=01101	2.39	2.60	2.81	V	When voltage drops
Released voltage	VDH		2.48	2.70	2.92	V	When voltage rises
Detected voltage	VDL	SVHI=01110	2.48	2.70	2.92	V	When voltage drops
Released voltage	VDH		2.58	2.80	3.02	V	When voltage rises
Detected voltage	VDL	SVHI=01111	2.58	2.80	3.02	V	When voltage drops
Released voltage	VDH		2.67	2.90	3.13	V	When voltage rises
Detected voltage	VDL	SVHI=10000	2.67	2.90	3.13	V	When voltage drops
Released voltage	VDH		2.76	3.00	3.24	V	When voltage rises
Detected voltage	VDL	SVHI=10001	2.76	3.00	3.24	V	When voltage drops
Released voltage	VDH		2.85	3.10	3.35	V	When voltage rises
Detected voltage	VDL	SVHI=10010	2.85	3.10	3.35	V	When voltage drops
Released voltage	VDH		2.94	3.20	3.46	V	When voltage rises
Detected voltage	VDL	SVHI=10011	2.94	3.20	3.46	V	When voltage drops
Released voltage	VDH		3.04	3.30	3.56	V	When voltage rises
LVD stabilization wait time	T <sub>LVDW</sub>	-	-	-	8160 × t <sub>CYCP</sub> *	μs	
LVD detection delay time	T <sub>LVDL</sub>	-	-	-	200	μs	

\*: t<sub>CYCP</sub> represents the APB1 bus clock cycle time.

**11.7 Flash Memory Write/Erase Characteristics**

 (V<sub>CC</sub>=1.65 V to 3.6 V, T<sub>A</sub>=- 40°C to +105°C)

Parameter		Value			Unit	Remarks
		Min	Typ	Max		
Sector erase time	Large sector	-	1.1	2.7	s	The sector erase time includes the time of writing prior to internal erase.
	Small sector	-	0.3	0.9		
Halfword (16-bit) write time		-	30	528	μs	The halfword (16-bit) write time excludes the system-level overhead.
Chip erase time		-	4.5	11.7	s	The chip erase time includes the time of writing prior to internal erase.

\*: The typical value is immediately after shipment, the maximum value is guarantee value under 10,000 cycle of erase/write.

**Write/Erase Cycle and Data Hold Time**

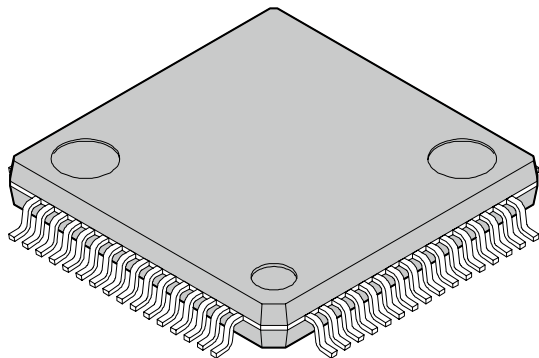
Write/Erase Cycle	Data Hold Time (Year)	Remarks
1,000	20*	
10,000	10*	

\*: This value comes from the technology qualification (using Arrhenius equation to translate high temperature acceleration test result into average temperature value at + 85°C).

## 12. Ordering Information

Part number	On-chip Flash memory	On-Chip SRAM	Package	Packing
	[Kbyte]	[Kbyte]		
S6E1C12D0AGV20000	128	16	Plastic • LQFP (0.50 mm pitch), 64 pins (FPT-64P-M38)	Tray
S6E1C11D0AGV20000	64	12		
S6E1C12C0AGV20000	128	16	Plastic • LQFP (0.50 mm pitch), 48 pins (FPT-48P-M49)	Tray
S6E1C11C0AGV20000	64	12		
S6E1C12B0AGP20000	128	16	Plastic • LQFP (0.80 mm pitch), 32 pins (FPT-32P-M30)	Tray
S6E1C11B0AGP20000	64	12		
S6E1C12D0AGN20000	128	16	Plastic • QFN64 (0.50 mm pitch), 64 pins (LCC-64P-M25)	Tray
S6E1C11D0AGN20000	64	12		
S6E1C12C0AGN20000	128	16	Plastic • QFN48 (0.50 mm pitch), 48 pins (LCC-48P-M74)	Tray
S6E1C11C0AGN20000	64	12		
S6E1C12B0AGN20000	128	16	Plastic • QFN32 (0.50 mm pitch), 32 pins (LCC-32P-M73)	Tray
S6E1C11B0AGN20000	64	12		

64-pin plastic LQFP



(FPT-64P-M38)

Lead pitch

0.50 mm

Package width ×  
package length

10.00 mm × 10.00 mm

Lead shape

Gullwing

Lead bend  
direction

Normal bend

Sealing method

Plastic mold

Mounting height

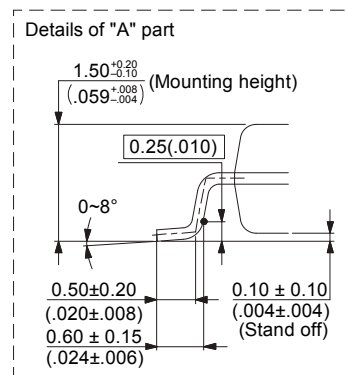
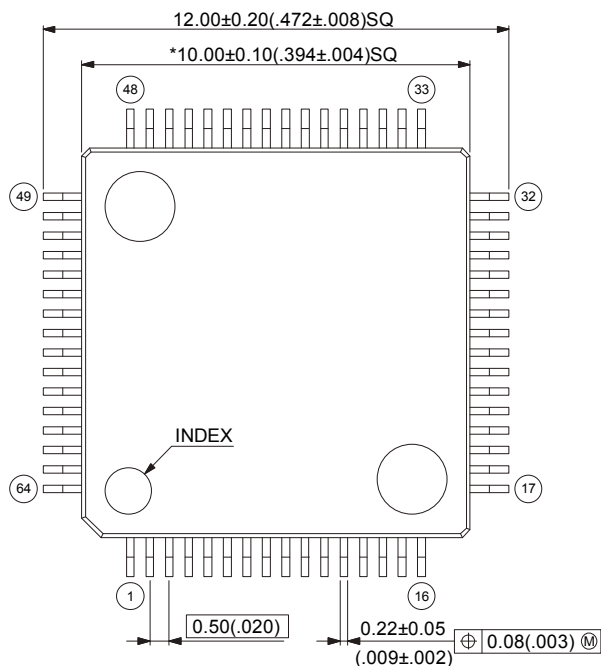
1.70 mm MAX

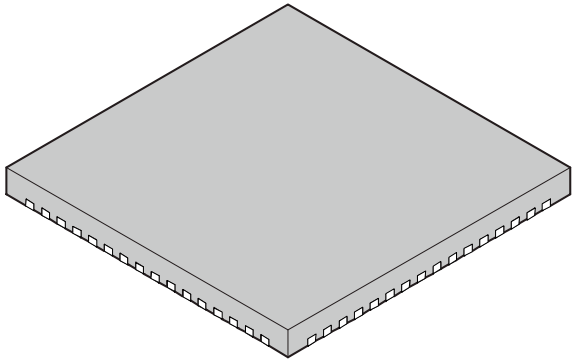
Weight

0.32 g

64-pin plastic LQFP  
(FPT-64P-M38)

Note 1) \* : These dimensions do not include resin protrusion.  
Note 2) Pins width and pins thickness include plating thickness.  
Note 3) Pins width do not include tie bar cutting remainder.



<p>64-pin plastic QFN</p>  <p>(LCC-64P-M25)</p>	Lead pitch	0.50 mm
	Package width × package length	9.00 mm × 9.00 mm
	Sealing method	Plastic mold
	Mounting height	0.80 mm MAX
	Weight	0.21 g

