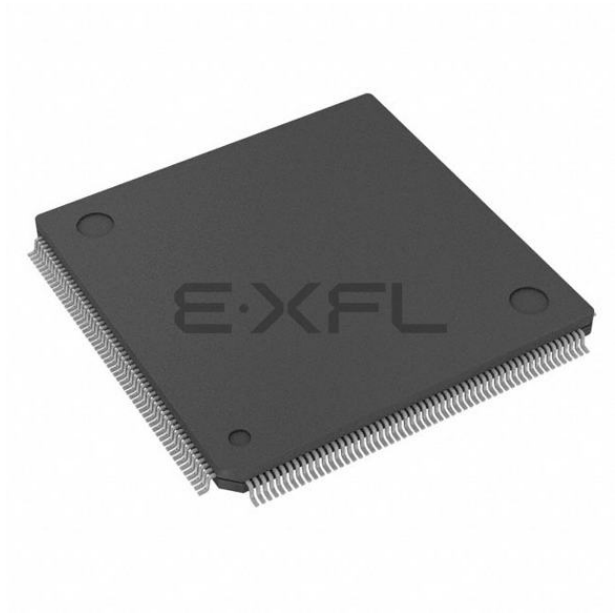

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"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable 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®-M4F
Core Size	32-Bit Single-Core
Speed	200MHz
Connectivity	CANbus, CSIO, EBI/EMI, I²C, LINbus, SD, SPI, UART/USART
Peripherals	DMA, I²S, LVD, POR, PWM, WDT
Number of I/O	190
Program Memory Size	2MB (2M x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	256K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 32x12b; D/A 2x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	216-LQFP
Supplier Device Package	216-LQFP (24x24)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/s6e2c4al0agl2000a

Pin No				Pin Name	I/O circuit type	Pin state type
LQQ216	LQP176	LQS144	LBE192			
44	34	29	J3	P38 ADTG_2 DTTI0X_0 S_WP_0	E	I
45	35	30	J2	P39 SIN2_1 RTO00_0 (PPG00_0) TIOA0_1 AIN3_1 INT16_1 S_CD_0 MAD24_0	G	K
46	36	31	K1	P3A SOT2_1 (SDA2_1) RTO01_0 (PPG00_0) TIOA1_1 BIN3_1 INT17_1 MAD23_0	G	K
47	37	32	K2	P3B SCK2_1 (SCL2_1) RTO02_0 (PPG02_0) TIOA2_1 ZIN3_1 INT18_1 MAD22_0 MNALE_0	G	K
48	38	33	K3	P3C SIN13_0 RTO03_0 (PPG02_0) TIOA3_1 INT19_1 MAD21_0 MNCLE_0	G	K
49	39	34	K4	P3D SOT13_0 (SDA13_0) RTO04_0 (PPG04_0) TIOA4_1 MAD20_0 MNWEX_0	G	I
50	40	35	L1	P3E SCK13_0 (SCL13_0) RTO05_0 (PPG04_0) TIOA5_1 MAD19_0 MNREX_0	G	I

Pin No				Pin Name	I/O circuit type	Pin state type
LQQ216	LQP176	LQS144	LBE192			
60	50	42	M4	P44 SOT15_0 (SDA15_0) RTO14_0 (PPG14_0) TIOA4_0 MCSX3_0	G	I
61	51	43	N4	P45 SCK15_0 (SCL15_0) RTO15_0 (PPG14_0) TIOA5_0 MCSX2_0	G	I
62	52	44	P2	C	-	-
63	53	45	P3	VSS	-	-
64	54	46	P4	VCC	-	-
65	-	-	-	P4A SIN12_1 AIN0_1 INT04_2	E	K
66	-	-	-	P4B SOT12_1 (SDA12_1) BIN0_1	E	I
67	-	-	-	P4C SCK12_1 (SCL12_1) ZIN0_1	E	I
68	-	-	-	P4D SCS72_1 RX2_2 INT05_2	E	K
69	-	-	-	P4E SCS73_1 TX2_2	E	I
70	55	47	L5	P7D SCK1_1 (SCL1_1) RX2_0 DTTI1X_0 INT05_0 WKUP2 MCSX1_0	L	Q
71	56	48	M5	P7E ADTG_7 TX2_0 FRCK1_0 MCSX0_0	L	I
72	57	49	N5	INITX	B	C
73	58	50	P5	P46 X0A	P	S
74	59	51	P6	P47 X1A	Q	T
75	60	52	P8	VBAT	-	-
76	61	53	N6	P48 VREGCTL	O	U

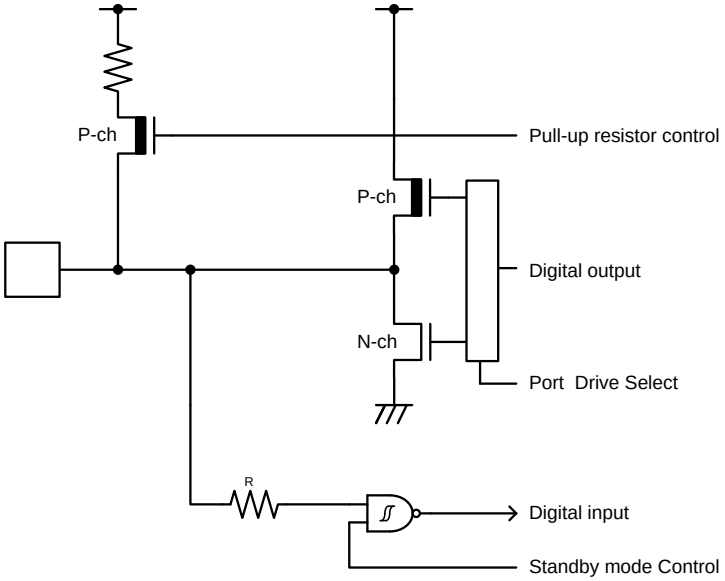
Module	Pin name	Function	Pin No			
			LQQ 216	LQP 176	LQS 144	LBE 192
External Bus	MNALE_0	External bus interface ALE signal to control NAND Flash output pin	47	37	32	K2
	MNCLE_0	External bus interface CLE signal to control NAND Flash output pin	48	38	33	K3
	MNREX_0	External bus interface read enable signal to control NAND Flash	50	40	35	L1
	MNWEX_0	External bus interface write enable signal to control NAND Flash	49	39	34	K4
	MOEX_0	External bus interface read enable signal for SRAM	209	169	137	C5
	MWEX_0	External bus interface write enable signal for SRAM	210	170	138	B4
	MSDCLK_0	SDRAM interface SDRAM clock output pin	90	75	-	L9
	MSDCKE_0	SDRAM interface SDRAM clock enable output pin	89	74	-	M9
	MRASX_0	SDRAM interface SDRAM row active output pin	85	70	-	N8
	MCASX_0	SDRAM interface SDRAM column active output pin	86	71	-	M8
	MSDWEX_0	SDRAM interface SDRAM write enable output pin	87	72	-	N9
External Interrupt	INT00_0	External interrupt request 00 input pin	2	2	2	B2
	INT00_1		38	28	23	H3
	INT00_2		19	-	-	-
	INT01_0	External interrupt request 01 input pin	7	7	7	D1
	INT01_1		41	31	26	H6
	INT01_2		51	41	-	L2
	INT02_0	External interrupt request 02 input pin	14	13	10	E5
	INT02_1		42	32	27	J5
	INT02_2		26	-	-	-
	INT03_0	External interrupt request 03 input pin	17	16	13	F3
	INT03_1		43	33	28	J4
	INT03_2		34	24	-	G6
	INT04_0	External interrupt request 04 input pin	59	49	41	L4
	INT04_1		100	83	67	M11
	INT04_2		65	-	-	-
	INT05_0	External interrupt request 05 input pin	70	55	47	L5
	INT05_1		86	71	-	M8
	INT05_2		68	-	-	-

Module	Pin name	Function	Pin No			
			LQQ 216	LQP 176	LQS 144	LBE 192
GPIO	PA0	General-purpose I/O port A	2	2	2	B2
	PA1		3	3	3	C2
	PA2		4	4	4	C3
	PA3		5	5	5	D5
	PA4		6	6	6	D2
	PA5		7	7	7	D1
	PA6		8	8	8	D3
	PA7		9	9	9	D4
	PA8		14	13	10	E5
	PA9		15	14	11	F1
	PAA		16	15	12	F2
	PAB		17	16	13	F3
	PAC		18	17	14	F4
	PAD		23	18	15	F5
	PAE		24	19	16	F6
	PAF		25	20	17	G2
	PB0	General-purpose I/O port B	126	102	-	J10
	PB1		127	103	-	J9
	PB2		128	104	-	H10
	PB3		129	105	-	J14
	PB4		138	112	-	G13
	PB5		139	113	-	F14
	PB6		140	114	-	G12
	PB7		141	115	-	G11
	PB8		119	-	-	-
	PB9		120	-	-	-
	PBA		121	-	-	-
	PBB		122	-	-	-
	PBC		148	-	-	-
	PBD		149	-	-	-
	PBE		150	-	-	-
	PBF		151	-	-	-

Module	Pin name	Function	Pin No			
			LQQ 216	LQP 176	LQS 144	LBE 192
GPIO	PC0	General-purpose I/O port C	177	145	115	C9
	PC1		178	146	116	B8
	PC2		179	147	117	D9
	PC3		180	148	118	E9
	PC4		181	149	119	F9
	PC5		182	150	120	C8
	PC6		183	151	121	D8
	PC7		184	152	122	E8
	PC8		185	153	123	A10
	PC9		186	154	124	F8
	PCA		187	155	125	B7
	PCB		190	158	128	A7
	PCC		191	159	129	C7
	PCD		192	160	130	A6
	PCE		193	161	131	D7
	PCF		194	162	132	E7
	PD0	General-purpose I/O port D	195	163	133	F7
	PD1		196	164	134	B6
	PD2		197	165	135	C6
	PE0	General-purpose I/O port E	104	84	68	N13
	PE2		106	86	70	P12
	PE3		107	87	71	P13
	PF0	General-purpose I/O port F	78	63	-	K5
	PF1		79	64	-	K6
	PF2		85	70	-	N8
	PF3		86	71	-	M8
	PF4		87	72	-	N9
	PF5		88	73	-	P9
	PF6		89	74	-	M9
	PF7		90	75	-	L9
	PF8		94	-	-	-
	PF9		95	-	-	-
	PFA		101	-	-	-
	PFB		102	-	-	-
	PFC		103	-	-	-

Module	Pin name	Function	Pin No			
			LQQ 216	LQP 176	LQS 144	LBE 192
Multi-function serial 8	SIN8_0	Multi-function serial interface ch.8 input pin	91	76	60	K9
	SIN8_1		138	112	-	G13
	SOT8_0 (SDA8_0)	Multi-function serial interface ch.8 output pin. This pin operates as SOT8 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA8 when it is used in an I²C (operation mode 4).	92	77	61	P10
	SOT8_1 (SDA8_1)		139	113	-	F14
	SCK8_0 (SCL8_0)	Multi-function serial interface ch.8 clock I/O pin. This pin operates as SCK8 when it is used in a CSIO (operation modes 2) and as SCL8 when it is used in an I²C (operation mode 4).	93	78	62	N10
	SCK8_1 (SCL8_1)		140	114	-	G12
Multi-function serial 9	SIN9_0	Multi-function serial interface ch.9 input pin	82	67	57	L8
	SIN9_1		120	-	-	-
	SOT9_0 (SDA9_0)	Multi-function serial interface ch.9 output pin. This pin operates as SOT9 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA9 when it is used in an I²C (operation mode 4).	83	68	58	K8
	SOT9_1 (SDA9_1)		121	-	-	-
	SCK9_0 (SCL9_0)	Multi-function serial interface ch.9 clock I/O pin. This pin operates as SCK9 when it is used in a CSIO (operation modes 2) and as SCL9 when it is used in an I²C (operation mode 4).	84	69	59	J8
	SCK9_1 (SCL9_1)		122	-	-	-
Multi-function serial 10	SIN10_0	Multi-function serial interface ch.10 input pin	114	94	78	L11
	SIN10_1		51	41	-	L2
	SOT10_0 (SDA10_0)	Multi-function serial interface ch.10 output pin. This pin operates as SOT10 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA10 when it is used in an I²C (operation mode 4).	115	95	79	K13
	SOT10_1 (SDA10_1)		52	42	-	L3
	SCK10_0 (SCL10_0)	Multi-function serial interface ch.10 clock I/O pin. This pin operates as SCK10 when it is used in a CSIO (operation modes 2) and as SCL10 when it is used in an I²C (operation mode 4).	116	96	80	K12
	SCK10_1 (SCL10_1)		53	43	-	M2
Multi-function serial 11	SIN11_0	Multi-function serial interface ch.11 input pin	123	99	83	J13
	SIN11_1		26	-	-	-
	SOT11_0 (SDA11_0)	Multi-function serial interface ch.11 output pin. This pin operates as SOT11 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA11 when it is used in an I²C (operation mode 4).	124	100	84	J12
	SOT11_1 (SDA11_1)		27	-	-	-
	SCK11_0 (SCL11_0)	Multi-function serial interface ch.11 clock I/O pin. This pin operates as SCK11 when it is used in a CSIO (operation modes 2) and as SCL11 when it is used in an I²C (operation mode 4).	125	101	85	J11
	SCK11_1 (SCL11_1)		28	-	-	-

Module	Pin name	Function	Pin No			
			LQQ 216	LQP 176	LQS 144	LBE 192
Multi-function serial 12	SIN12_0	Multi-function serial interface ch.12 input pin	133	109	89	G14
	SIN12_1		65	-	-	-
	SOT12_0 (SDA12_0)	Multi-function serial interface ch.12 output pin. This pin operates as SOT12 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA12 when it is used in an I²C (operation mode 4).	134	110	90	H13
	SOT12_1 (SDA12_1)		66	-	-	-
	SCK12_0 (SCL12_0)	Multi-function serial interface ch.12 clock I/O pin. This pin operates as SCK12 when it is used in a CSIO (operation modes 2) and as SCL12 when it is used in an I²C (operation mode 4).	135	111	91	H11
	SCK12_1 (SCL12_1)		67	-	-	-
Multi-function serial 13	SIN13_0	Multi-function serial interface ch.13 input pin	48	38	33	K3
	SIN13_1		206	-	-	-
	SOT13_0 (SDA13_0)	Multi-function serial interface ch.13 output pin. This pin operates as SOT13 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA13 when it is used in an I²C (operation mode 4).	49	39	34	K4
	SOT13_1 (SDA13_1)		205	-	-	-
	SCK13_0 (SCL13_0)	Multi-function serial interface ch.13 clock I/O pin. This pin operates as SCK13 when it is used in a CSIO (operation modes 2) and as SCL13 when it is used in an I²C (operation mode 4).	50	40	35	L1
	SCK13_1 (SCL13_1)		204	-	-	-
Multi-function serial 14	SIN14_0	Multi-function serial interface ch.14 input pin	30	21	18	G3
	SIN14_1		201	-	-	-
	SOT14_0 (SDA14_0)	Multi-function serial interface ch.14 output pin. This pin operates as SOT14 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA14 when it is used in an I²C (operation mode 4).	31	22	19	G4
	SOT14_1 (SDA14_1)		200	-	-	-
	SCK14_0 (SCL14_0)	Multi-function serial interface ch.14 clock I/O pin. This pin operates as SCK14 when it is used in a CSIO (operation modes 2) and as SCL14 when it is used in an I²C (operation mode 4).	32	23	20	G5
	SCK14_1 (SCL14_1)		199	-	-	-
Multi-function serial 15	SIN15_0	Multi-function serial interface ch.15 input pin	59	49	41	L4
	SIN15_1		19	-	-	-
	SOT15_0 (SDA15_0)	Multi-function serial interface ch.15 output pin. This pin operates as SOT15 when it is used in a UART/CSIO/LIN (operation modes 0 to 3) and as SDA15 when it is used in an I²C (operation mode 4).	60	50	42	M4
	SOT15_1 (SDA15_1)		20	-	-	-
	SCK15_0 (SCL15_0)	Multi-function serial interface ch.15 clock I/O pin. This pin operates as SCK15 when it is used in a CSIO (operation modes 2) and as SCL15 when it is used in an I²C (operation mode 4).	61	51	43	N4
	SCK15_1 (SCL15_1)		21	-	-	-

Type	Circuit	Remarks
S		・CMOS level output ・(It is possible to select by port drive capability. Select register [PDSR]) ・CMOS level hysteresis input ・Pull-up resistor control ・Standby mode control ・Pull-up resistor: approximately 50 kΩ ・I_{OH} = -10 mA, I_{OL} = 10 mA (PDSR = 1) ・I_{OH} = -4 mA, I_{OL} = 4 mA (PDSR = 0) ・When this pin is used as an I^2C pin, the digital output P-ch transistor is always off.

Latch-Up

Semiconductor devices are constructed by the formation of p-type and n-type areas on a substrate. When subjected to abnormally high voltages, internal parasitic pnpn junctions (called thyristor structures) may be formed, causing large current levels in excess of several hundred milliamps to flow continuously at the power supply pin. This condition is called latch-up.

CAUTION: The occurrence of latch-up not only causes loss of reliability in the semiconductor device, but can cause injury or damage from high heat, smoke or flame. To prevent this from happening, do the following:

1. Be sure that voltages applied to pins do not exceed the absolute maximum ratings. This should include attention to abnormal noise, surge levels, etc.
2. Be sure that abnormal current flows do not occur during the power-on sequence.

Observance of Safety Regulations and Standards

Most countries in the world have established standards and regulations regarding safety, protection from electromagnetic interference, etc. Customers are requested to observe applicable regulations and standards in the design of products.

Fail-Safe Design

As previously mentioned, all semiconductor devices have inherent rates of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

Precautions Related to Usage of Devices

Spansion semiconductor devices are intended for use in standard applications (computers, office automation and other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.).

CAUTION: Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.

6.2 Precautions for Package Mounting

Package mounting may be either lead insertion type or surface mount type. In either case, for heat resistance during soldering, you should only mount under Cypress's recommended conditions. For detailed information about mount conditions, contact your sales representative.

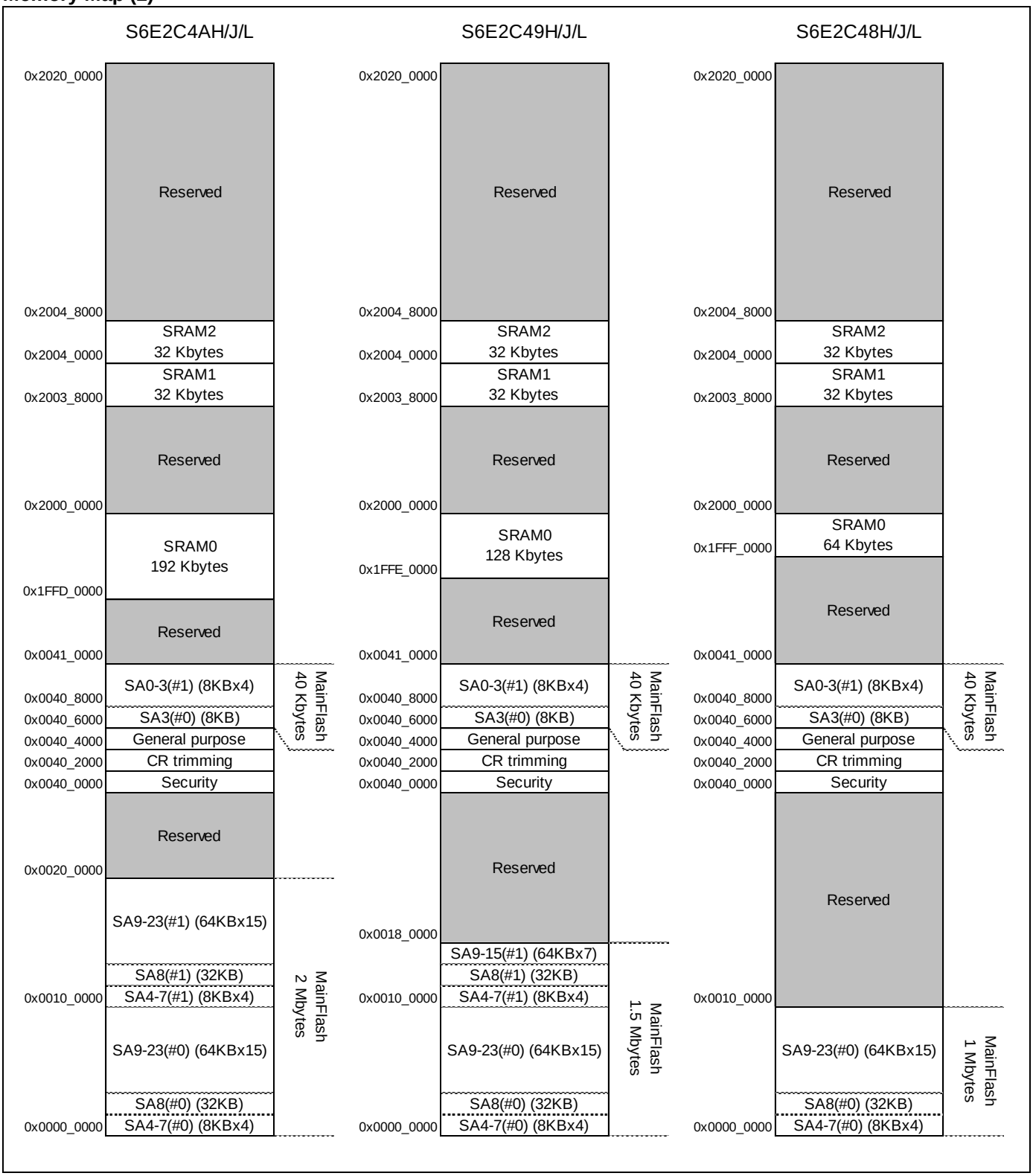
Lead Insertion Type

Mounting of lead insertion type packages onto printed circuit boards may be done by two methods: direct soldering on the board, or mounting by using a socket.

Direct mounting onto boards normally involves processes for inserting leads into through-holes on the board and using the flow soldering (wave soldering) method of applying liquid solder. In this case, the soldering process usually causes leads to be subjected to thermal stress in excess of the absolute ratings for storage temperature. Mounting processes should conform to Cypress recommended mounting conditions.

If socket mounting is used, differences in surface treatment of the socket contacts and IC lead surfaces can lead to contact deterioration after long periods. For this reason it is recommended that the surface treatment of socket contacts and IC leads be verified before mounting.

Memory Map (2)



* See S6E2CC/S6E2C5/S6E2C4/S6E2C3/S6E2C2/S6E2C1 Series Flash Programming Manual to confirm the detail of flash Memory.

Table 12-8 Typical and Maximum Current Consumption in Stop Mode, Timer Mode and RTC Mode

Parameter	Symbol	Pin Name	Conditions	Frequency	Value		Unit	Remarks
					Typ*1	Max*2		
Power supply current	I_{CCH}	VCC	Stop mode	-	0.56	3.01	mA	*3, *4 T_A = +25°C
					-	27.03	mA	*3, *4 T_A = +85°C
					-	39.92	mA	*3, *4 T_A = +105°C
	I_{CCT}		Timer mode*5 (main oscillation)	4 MHz	1.40	3.85	mA	*3, *4 T_A = +25°C
					-	27.87	mA	*3, *4 T_A = +85°C
					-	40.76	mA	*3, *4 T_A = +105°C
			Timer mode (built-in High-speed CR)	4 MHz	0.95	3.40	mA	*3, *4 T_A = +25°C
					-	27.42	mA	*3, *4 T_A = +85°C
					-	40.31	mA	*3, *4 T_A = +105°C
			Timer mode*6 (sub oscillation)	32 kHz	0.57	3.02	mA	*3, *4 T_A = +25°C
					-	27.04	mA	*3, *4 T_A = +85°C
					-	39.93	mA	*3, *4 T_A = +105°C
			Timer mode (built-in low-speed CR)	100 kHz	0.58	3.03	mA	*3, *4 T_A = +25°C
					-	27.05	mA	*3, *4 T_A = +85°C
					-	39.94	mA	*3, *4 T_A = +105°C
	I_{CCR}		RTC mode*6 (sub oscillation)	32 kHz	0.57	3.02	mA	*3, *4 T_A = +25°C
					-	27.04	mA	*3, *4 T_A = +85°C
					-	39.93	mA	*3, *4 T_A = +105°C

*1: V_{CC} = 3.3V

*2: V_{CC} = 5.5V

*3: When all ports are fixed

*4: When LVD is off

*5: When using the crystal oscillator of 4 MHz (including the current consumption of the oscillation circuit)

*6: When using the crystal oscillator of 32 kHz (including the current consumption of the oscillation circuit)

Table 12-9 Typical and Maximum Current Consumption in Deep Standby Stop Mode, Deep Standby RTC Mode and VBAT

Parameter	Symbol	Pin Name	Conditions	Frequency	Value		Unit	Remarks
					Typ*1	Max*2		
Power supply current	I_{CCHD}	VCC	Deep standby Stop mode (When RAM is off)	-	96	248	µA	*3, *4 T_A = +25°C
					-	3009	µA	*3, *4 T_A = +85°C
					-	3889	µA	*3, *4 T_A = +105°C
			Deep standby Stop mode (When RAM is on)	-	106	259	µA	*3, *4 T_A = +25°C
					-	3020	µA	*3, *4 T_A = +85°C
					-	3900	µA	*3, *4 T_A = +105°C
	I_{CCRD}		Deep standby RTC mode (When RAM is off)	32 kHz	96	248	µA	*3, *4 T_A = +25°C
					-	3009	µA	*3, *4 T_A = +85°C
					-	3889	µA	*3, *4 T_A = +105°C
			Deep standby RTC mode (When RAM is on)		106	259	µA	*3, *4 T_A = +25°C
					-	3020	µA	*3, *4 T_A = +85°C
					-	3900	µA	*3, *4 T_A = +105°C
	I_{CCVBAT}	VBAT	RTC stop*6	-	0.0058	0.1	µA	*3, *4, *5 T_A = +25°C
					-	1.4	µA	*3, *4, *5 T_A = +85°C
					-	3.3	µA	*3, *4, *5 T_A = +105°C
			RTC operation*6		1.0	1.8	µA	*3, *4 T_A = +25°C
					-	3.2	µA	*3, *4 T_A = +85°C
					-	5.1	µA	*3, *4 T_A = +105°C

*1: V_{CC} = 3.3 V

*2: V_{CC} = 5.5 V

*3: When all ports are fixed

*4: When LVD is off

*5: When sub oscillation is off

*6: In the case of setting RTC after VCC power on

12.4.4 Operating Conditions of Main PLL (in the Case of Using Main Clock for Input Clock of PLL)

(V_{CC} = 2.7V to 5.5V, V_{SS} = 0V)

Parameter	Symbol	Value			Unit	Remarks
		Min	Typ	Max		
PLL oscillation stabilization wait time*1 (lock up time)	t_{LOCK}	100	-	-	µs	
PLL input clock frequency	f_{PLLI}	4	-	16	MHz	
PLL multiplication rate	-	13	-	100	multiplier	
PLL macro oscillation clock frequency	f_{PLLO}	200	-	400	MHz	
Main PLL clock frequency*2	f_{CLKPLL}	-	-	200	MHz	

*1: Time from when the PLL starts operating until the oscillation stabilizes

*2: For more information about Main PLL clock (CLKPLL), see Chapter 2-1: Clock in FM4 Family Peripheral Manual Main Part (002-04856).

12.4.5 Operating Conditions of I²S PLL (in the Case of Using Main Clock for Input Clock of PLL)

(V_{CC} = 2.7V to 5.5V, V_{SS} = 0V)

Parameter	Symbol	Value			Unit	Remarks
		Min	Typ	Max		
PLL oscillation stabilization wait time*1 (lock up time)	t_{LOCK}	100	-	-	µs	
PLL input clock frequency	f_{PLLI}	4	-	16	MHz	
PLL multiplication rate	-	13	-	100	multiplier	
PLL macro oscillation clock frequency	f_{PLLO}	200	-	400	MHz	USB
				384	MHz	I²S
I²S clock frequency *2	f_{CLKPLL}	-	-	12.288	MHz	After the M frequency division

*1: Time from when the PLL starts operating until the oscillation stabilizes

*2: For more information about I²S clock, see Chapter 7-1: I²S Clock Generation in FM4 Family Peripheral Manual Communication Macro Part (002-04862).

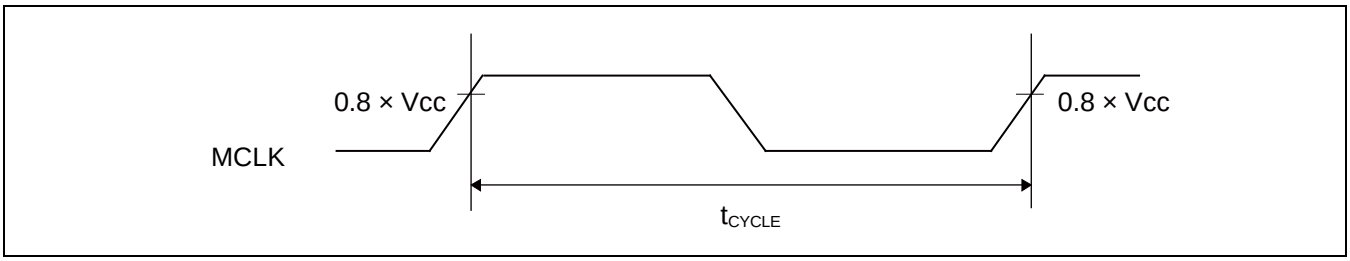
12.4.10 External Bus Timing

External Bus Clock Output Characteristics

Parameter	Symbol	Pin Name	Conditions	Value		Unit	Remarks
				Min	Typ		
Output frequency	t_{CYCLE}	MCLKOUT *1		-	50 *2	MHz	

*1: The external bus clock (MCLKOUT) is a divided clock of HCLK.
For more information about setting of clock divider, see Chapter 14: External Bus Interface in FM4 Family Peripheral Manual Main Part (002-04856).

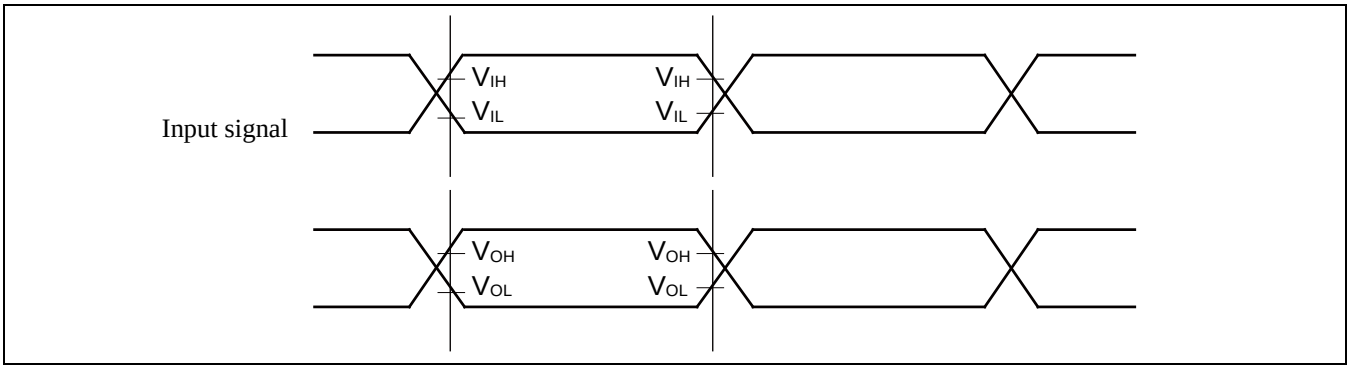
*2: Generate MCLKOUT at setting more than four divisions when the AHB bus clock exceeds 100 MHz.



External Bus Signal I/O Characteristics

(V_{CC} = 2.7V to 5.5V, V_{SS} = 0V)

Parameter	Symbol	Conditions	Value	Unit	Remarks
Signal input characteristics	V_{IH}	-	0.8 × V_{CC}	V	
	V_{IL}		0.2 × V_{CC}	V	
Signal output characteristics	V_{OH}		0.8 × V_{CC}	V	
	V_{OL}		0.2 × V_{CC}	V	

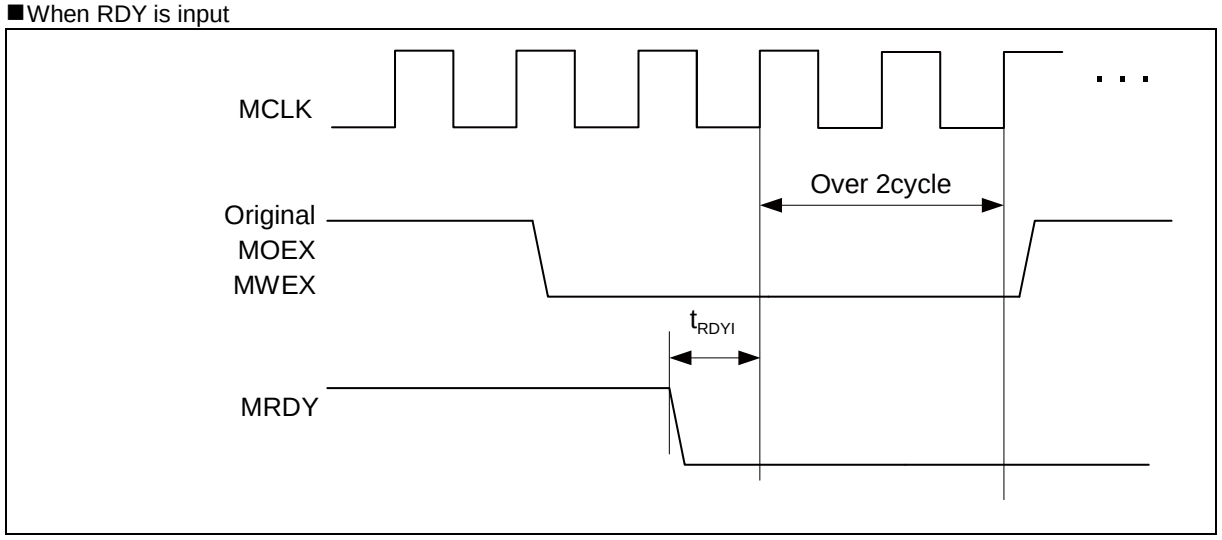


External Ready Input Timing

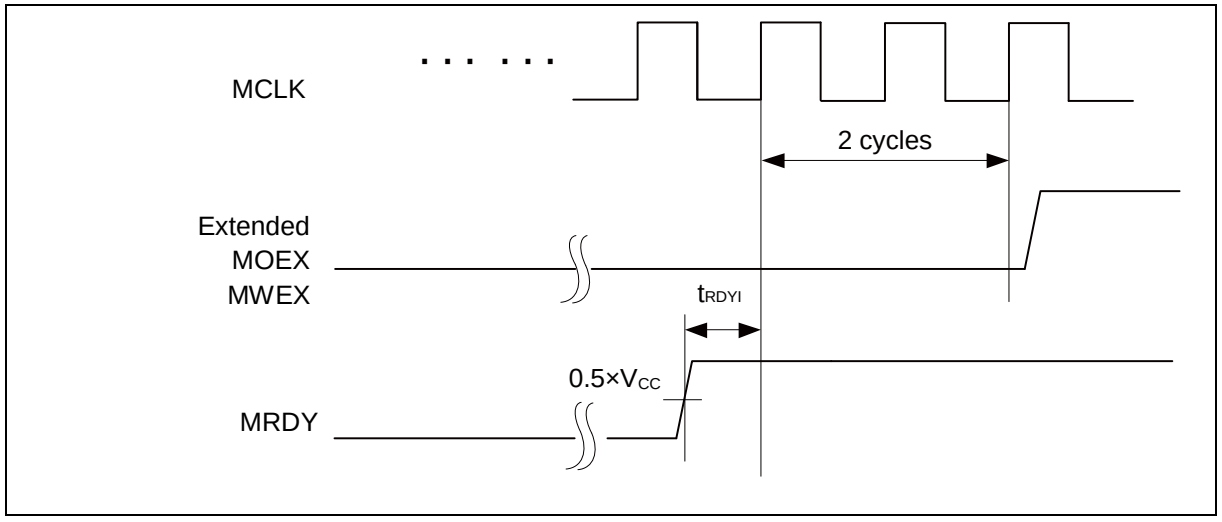
(V_{CC} = 2.7V to 5.5V, V_{SS} = 0V)

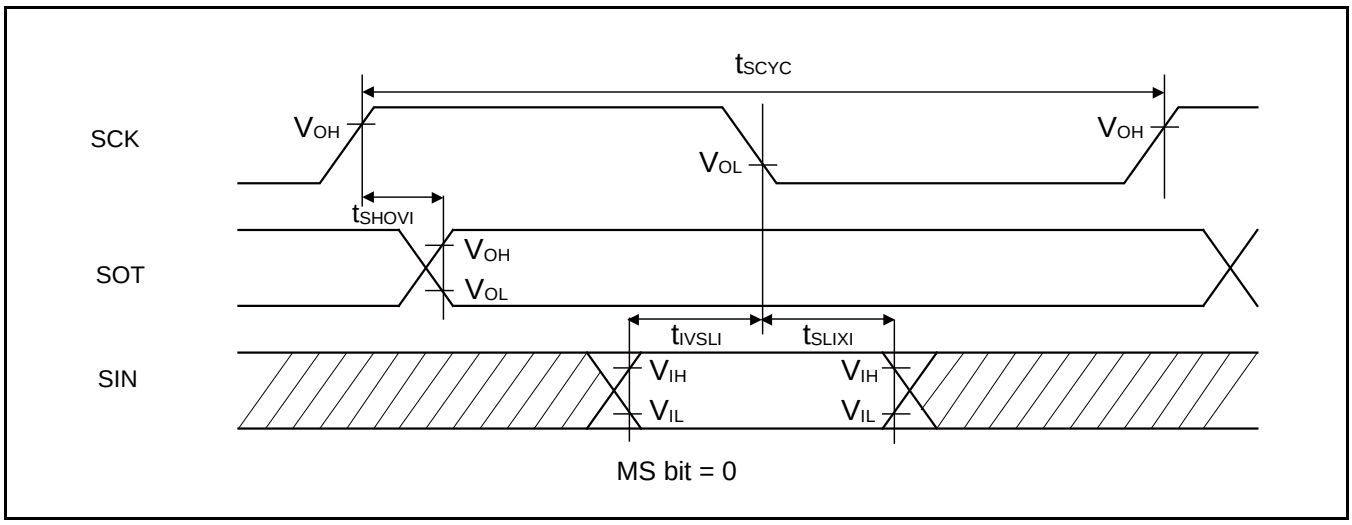
Parameter	Symbol	Pin Name	Conditions	Value		Unit	Remarks
				Min	Max		
MCLK↑ MRDY input setup time	t_{RDYI}	MCLK, MRDY	-	19	-	ns	

■When RDY is input

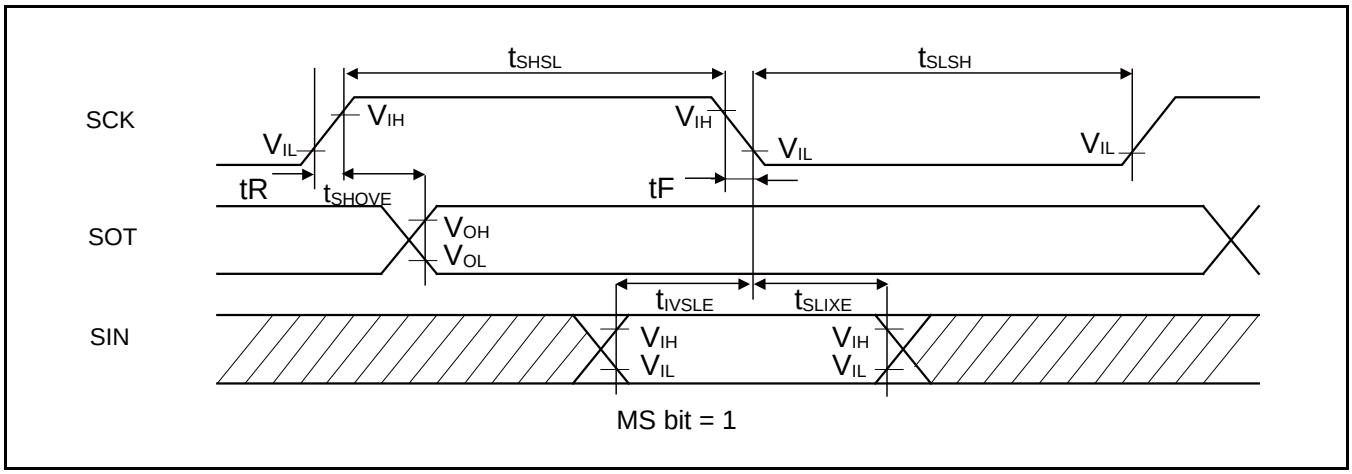


■When RDY is released

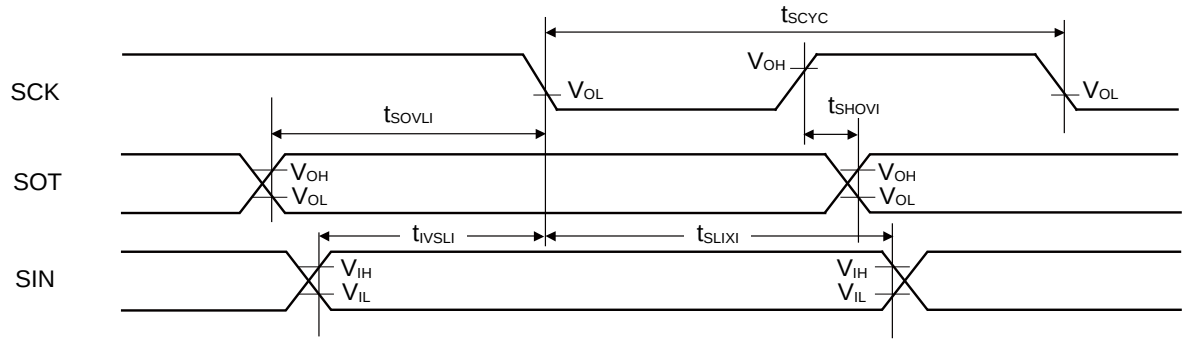




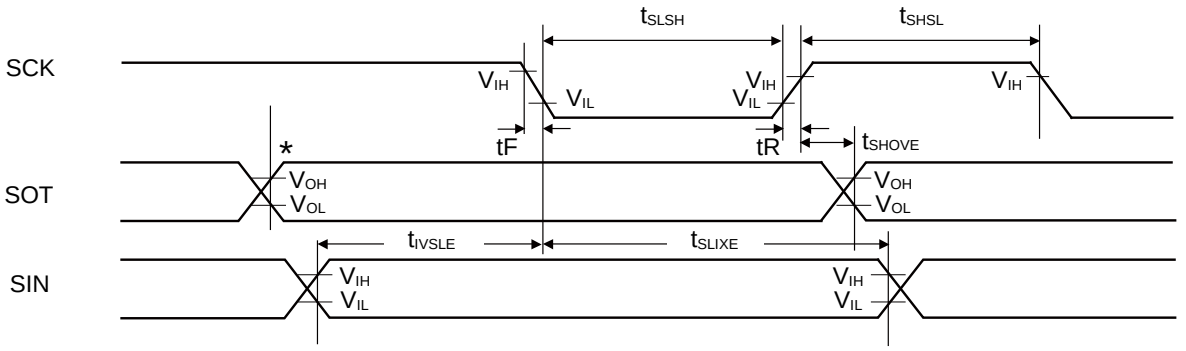
MS bit = 0



MS bit = 1

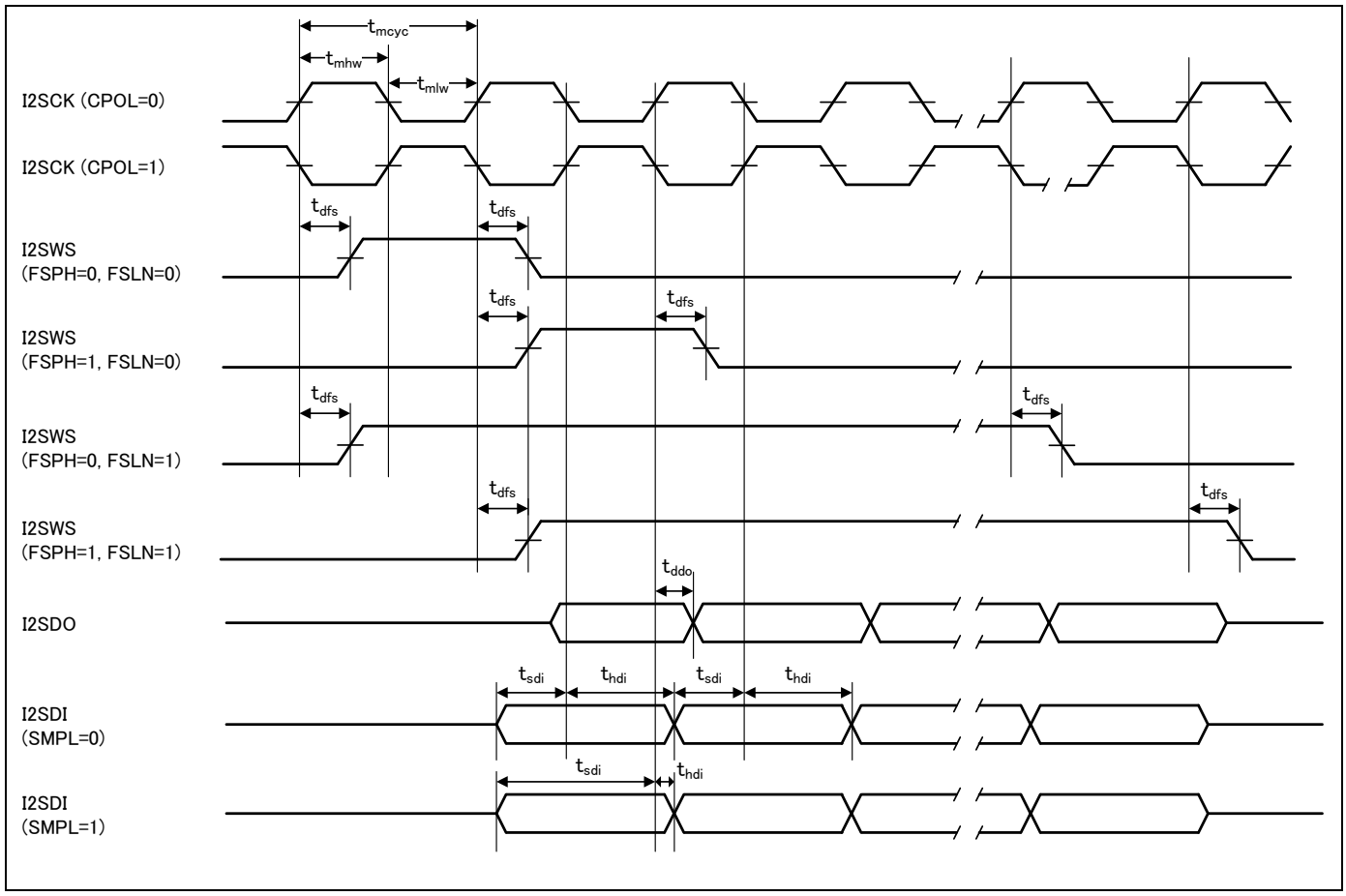


MS bit = 0



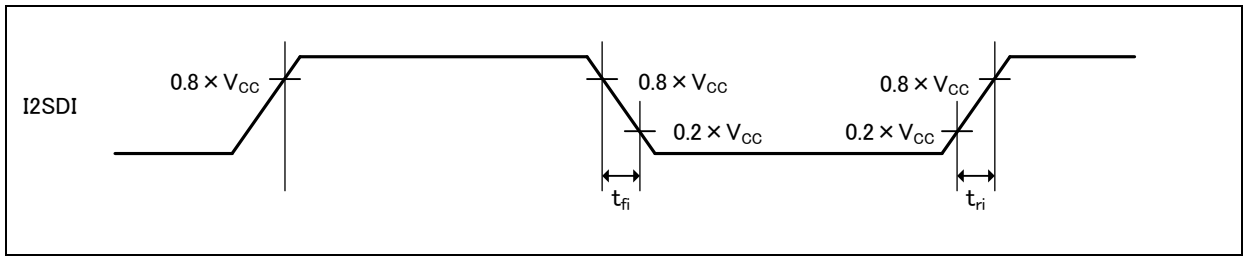
MS bit = 1

*: Changes when writing to TDR register

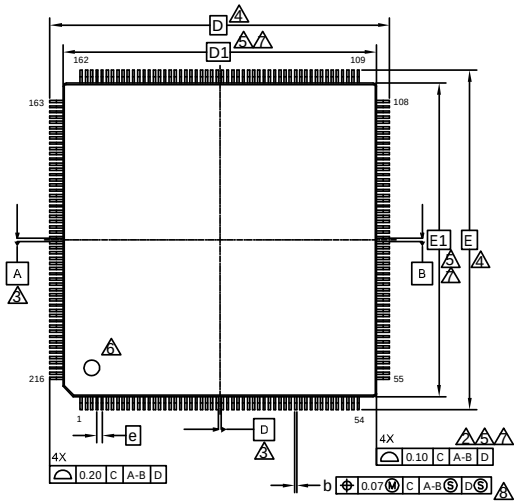


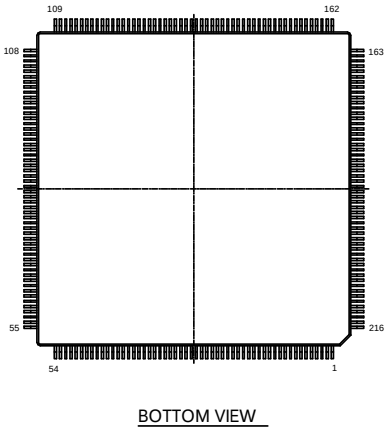
Note:

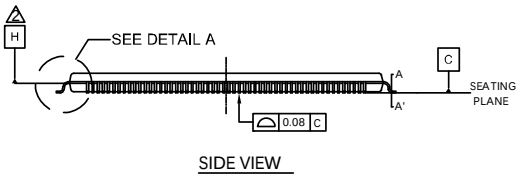
- *See Chapter7-2: I²S (Inter-IC Sound bus) Interface in FM4 Family Peripheral Manual Communication Macro Part (002-04862) for the details of CPOL, FSPH, FSLIN, and SMPL.*

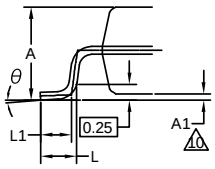


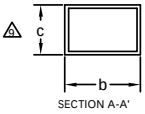
Package Type	Package Code
LQFP 216	LQQ 216











SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	—	—	1.70
A1	0.05	—	0.15
b	0.13	0.18	0.23
c	0.09	—	0.20
D	26.00 BSC.		
D1	24.00 BSC.		
e	0.40 BSC		
E	26.00 BSC.		
E1	24.00 BSC.		
L	0.45	0.60	0.75
L1	0.30	0.50	0.70
θ	0°	—	8°

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DATUM PLANE H IS LOCATED AT THE BOTTOM OF THE MOLD PARTING LINE COINCIDENT WITH WHERE THE LEAD EXITS THE BODY.
3. DATUMS A-B AND D TO BE DETERMINED AT DATUM PLANE H.
4. TO BE DETERMINED AT SEATING PLANE C.
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25mm PRE SIDE. DIMENSIONS D1 AND E1 INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.
6. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
7. REGARDLESS OF THE RELATIVE SIZE OF THE UPPER AND LOWER BODY SECTIONS. DIMENSIONS D1 AND E1 ARE DETERMINED AT THE LARGEST FEATURE OF THE BODY EXCLUSIVE OF MOLD FLASH AND GATE BURRS. BUT INCLUDING ANY MISMATCH BETWEEN THE UPPER AND LOWER SECTIONS OF THE MOLDER BODY.
8. DIMENSION b DOES NOT INCLUDE DAMBER PROTRUSION. THE DAMBAR PROTRUSION (S) SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED b MAXIMUM BY MORE THAN 0.08mm. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE LEAD FOOT.
9. THESE DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10mm AND 0.25mm FROM THE LEAD TIP.
10. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.

002-15153 **

PACKAGE OUTLINE, 216 LEAD LQFP
24.0X24.0X1.7 MM LQQ216 REV**

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