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Details

Product Status	Not For New Designs
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	CANbus, EBI/EMI, Ethernet, I ² C, LINbus, SCI, SPI, USB
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	78
Program Memory Size	1MB (1M x 8)
Program Memory Type	FLASH
EEPROM Size	32K x 8
RAM Size	128K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 3.6V
Data Converters	A/D 8x10b, 14x12b; D/A 1x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	100-LQFP
Supplier Device Package	100-LFQFP (14x14)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f563nbddfp-v0

Table 1.2 Comparison of Functions for Different Packages in the RX63N/RX631 Group

Functions		RX63N Group				RX631 Group				
Package		177-pin 176-pin	145-pin 144-pin	100-pin	177-pin 176-pin	145-pin 144-pin	100-pin	64-pin LQFP	64-pin TFLGA	48-pin
External bus width	External bus width	32 bits	16 bits		32 bits	16 bits				Not available
	SDRAM area controller	Available		Not available	Available					Not available
DMA	DMA controller	Ch. 0 to 3				Ch. 0 to 3				
	EXDMA controller	Ch. 0 and 1			Ch. 0 and 1			Not available		
	Data transfer controller	Available				Available				
Timers	16-bit timer pulse unit	Ch. 0 to 11	Ch. 0 to 5		Ch. 0 to 11			Ch. 0 to 5		
	Multi-function timer pulse unit 2	Ch. 0 to 5				Ch. 0 to 5				
	Port output enable 2	Available				Available				
	Programmable pulse generator	Ch. 0 and 1				Ch. 0 and 1				
	8-bit timers	Ch. 0 to 3				Ch. 0 to 3				
	Compare match timer	Ch. 0 to 3				Ch. 0 to 3				
	Realtime clock	Available				Available				Not available
	Watchdog timer	Available				Available				
	Independent watchdog timer	Available				Available				
	Communicatio n function	Ethernet controller	Available				Not available			
DMA controller for Ethernet controller		Available				Not available				
USB 2.0 host/function module		Ch. 0 and 1	Ch.0		Ch. 0 and 1		Ch.0	Ch. 0 and 1	Ch.0	
Serial communications interfaces (SClc)		Ch. 0 to 11	Ch. 0 to 3, 5, 6, 8 and 9		Ch. 0 to 11	Ch. 0 to 3, 5, 6, 8 and 9	Ch. 1, 5, 6, 8 and 9	Ch. 1, 5, 6, and 8		
Serial communications interfaces (SCld)		Ch. 12				Ch. 12				
I ² C bus interfaces		Ch. 0 to 3	Ch.0 and 2		Ch. 0 to 3	Ch.0 and 2	Ch.2			
IEBus		Available				Available				
Serial peripheral interfaces		Ch.0 to 2	Ch. 0 and 1		Ch.0 to 2	Ch. 0 and 1				
CAN module		For 1.5 M or more: Ch. 0 to 2, For 1 M or less: Ch. 0 and 1	Ch. 0 and 1		For 1.5 M or more: Ch. 0 to 2, For 1 M or less: Ch. 0 and 1	Ch. 0 and 1	Ch.1			
Parallel data capture unit (PDC)		Not available				Available				Not available
12-bit A/D converter (channel)		AN000 to 020		AN000 to 013	AN000 to 020		AN000 to 013	AN000 to 004, 006, 008 to 013		AN000 to 002, 006, 009 to 012
10-bit A/D converter (channel)		AN0 to 7			AN0 to 7			Not available		
D/A converter		Ch. 0 and 1	Ch.1		Ch. 0 and 1	Ch.1		Ch.1		Not available
Temperature sensor		Available				Available				
CRC calculator		Available				Available				
Unique ID		Available (only for the G version)								
Off-board programming (parallel programmer mode)				Available				Not available		
Sub-clock oscillator (for low clock loads)				Available				Not available		
Sub-clock oscillator (for standard clock loads)				Available				Not available		
Battery backup function				Available				Not available		
I/O port switching function		Not available			Not available			Available		

Table 1.3 List of Products (7/8)

Group	Part No.	Package	ROM Capacity	RAM Capacity	E2 Data Flash	Operating Frequency (Max.)	Operating Temp. Range
RX631 (D version)	R5F5631NDDFM	PLQP0064KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MCDFM	PLQP0064KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MDDFM	PLQP0064KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PCDFL	PLQP0048KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PDDFL	PLQP0048KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631NCDFL	PLQP0048KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631NDDFL	PLQP0048KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MCDFL	PLQP0048KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MDDFL	PLQP0048KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDLC	PTLG0177KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDLC	PTLG0177KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDLC	PTLG0177KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDBG	PLBG0176GA-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDBG	PLBG0176GA-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDBG	PLBG0176GA-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDFC	PLQP0176KB-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDFC	PLQP0176KB-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDFC	PLQP0176KB-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDLK	PTLG0145KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDLK	PTLG0145KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDLK	PTLG0145KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318SDFB	PLQP144KA-A*1	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317SDFB	PLQP144KA-A*1	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316SDFB	PLQP144KA-A*1	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631PFDLH	PTLG0064JA-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631MFDLH	PTLG0064JA-A*1	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5S56310CDFC	PLQP0176KB-A	0 bytes	128 Kbytes	0 bytes	100 MHz	-40 to +85°C
RX631 (G version) *2	R5F5631FDGFC	PLQP0176KB-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631KDGFC	PLQP0176KB-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631EDGFC	PLQP0176KB-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631DDGFC	PLQP0176KB-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631YDGFC	PLQP0176KB-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631WDGFC	PLQP0176KB-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631BDGFC	PLQP0176KB-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631ADGFC	PLQP0176KB-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318SGFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318DGFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317SGFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317DGFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316SGFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316DGFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631FDGFB	PLQP0144KA-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631KDGFB	PLQP0144KA-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631EDGFB	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631JDGFB	PLQP0144KA-A	1.5 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C

Table 1.6 List of Pin and Pin Functions (176-Pin LQFP) (3/5)

Pin Number	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timer (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SCIC, SCID, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD, AD, DA
72		P50	WR0#/WR#		TXD2/SMOSI2/SSDA2/ SSLB1		
73	VSS						
74		P83	EDACK1	MTIOC4C	ET_CRS/RMII_CRS_DV/ CTS10#/RTS10#/SS10#		
75	VCC						
76		PC7	A23/CS0#	MTIOC3A/MTCLKB/ TIOCB6/TMO2/PO31	ET_COL/TXD8/SMOSI8/ SSDA8/MISOA	IRQ14	
77		PC6	A22/CS1#	MTIOC3C/MTCLKA/ TIOCA6/TMCI2/PO30	ET_ETXD3/RXD8/ SMISO8/SSCL8/MOSIA	IRQ13	
78		PC5	A21/CS2#/ WAIT#	MTIOC3B/MTCLKD/ TIOCD6/TCLKF/TMRI2/ PO29	ET_ETXD2/SCK8/ RSPCKA		
79		P82	EDREQ1	MTIOC4A/PO28	ET_ETXD1/RMII_TXD1/ TXD10/SMOSI10/SSDA10		
80		P81	EDACK0	MTIOC3D/PO27	ET_ETXD0/RMII_TXD0/ RXD10/SMISO10/SSCL10		
81		P80	EDREQ0	MTIOC3B/PO26	ET_TX_EN/ RMII_TXD_EN/SCK10		
82		PC4	A20/CS3#	MTIOC3D/MTCLKC/ TIOCC6/TCLKE/TMCI1/ PO25/POE0#	ET_TX_CLK/SCK5/ CTS8#/RTS8#/SS8#/ SSLA0		
83		PC3	A19	MTIOC4D/TCLKB/PO24	ET_TX_ER/TXD5/ SMOSI5/SSDA5/IETXD		
84		P77	CS7#	PO23	ET_RX_ER/RMII_RX_ER/ TXD11/SMOSI11/SSDA11		
85		P76	CS6#	PO22	ET_RX_CLK/REF50CK/ RXD11/SMISO11/SSCL11		
86		PC2	A18	MTIOC4B/TCLKA/PO21	ET_RX_DV/RXD5/ SMISO5/SSCL5/SSLA3/ IERXD		
87		P75	CS5#	PO20	ET_ERXD0/RMII_RXD0/ SCK11		
88		P74	CS4#	PO19	ET_ERXD1/RMII_RXD1/ CTS11#/RTS11#/SS11#		
89		PC1	A17	MTIOC3A/TCLKD/PO18	ET_ERXD2/SCK5/SSLA2/ SDA3	IRQ12	
90	VCC						
91		PC0	A16	MTIOC3C/TCLKC/PO17	ET_ERXD3/CTS5#/ RTS5#/SS5#/SSLA1/ SCL3	IRQ14	
92	VSS						
93		P73	CS3#	PO16	ET_WOL		
94		PB7	A15	MTIOC3B/TIOCB5/PO31	ET_CRS/RMII_CRS_DV/ TXD9/SMOSI9/SSDA9		
95		PB6	A14	MTIOC3D/TIOCA5/PO30	ET_ETXD1/RMII_TXD1/ RXD9/SMISO9/SSCL9		
96		PB5	A13	MTIOC2A/MTIOC1B/ TIOCB4/TMRI1/PO29/ POE1#	ET_ETXD0/RMII_TXD0/ SCK9		
97		PB4	A12	TIOCA4/PO28	ET_TX_EN/ RMII_TXD_EN/CTS9#/ RTS9#/SS9#		
98		PB3	A11	MTIOC0A/MTIOC4A/ TIOCD3/TCLKD/TMO0/ PO27/POE3#	ET_RX_ER/RMII_RX_ER/ SCK4/SCK6		
99		PB2	A10	TIOCC3/TCLKC/PO26	ET_RX_CLK/REF50CK/ CTS4#/RTS4#/CTS6#/ RTS6#/SS4#/SS6#		

Table 1.8 List of Pins and Pin Functions (144-Pin LQFP) (1/5)

Pin No. 144-pin LQFP	Power Supply Clock System Control	I/O Port	Bus EXDMAC SDRAMC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB, and PDC)	Interrupt	S12AD AD DA
1	AVSS0						
2		P05				IRQ13	DA1
3	VREFH						
4		P03				IRQ11	DA0
5	VREFL						
6		P02		TMC11	SCK6	IRQ10	AN020
7		P01		TMC10	RXD6/SMISO6/SSCL6	IRQ9	AN019
8		P00		TMR10	TXD6/SMOSI6/SSDA6	IRQ8	AN018
9		PF5				IRQ4	
10	EMLE						
11		PJ5					
12	VSS						
13		PJ3		MTIOC3C	CTS6#/RTS6#/CTS0#/ RTS0#/SS6#/SS0#		
14	VCL						
15	VBATT						
16	MD/FINED						
17	XCIN						
18	XCOUT						
19	RES#						
20	XTAL	P37					
21	VSS						
22	EXTAL	P36					
23	VCC						
24		P35				NMI	
25	TRST#	P34		MTIOC0A/TMC13/ PO12/POE2#	SCK6/SCK0/ USB0_DPRPD	IRQ4	
26		P33		MTIOC0D/TIOC0D/ TMR13/PO11/POE3#	RXD6/RXD0/SMISO6/ SMISO0/SSCL6/ SSCL0/CRX0/PCKO	IRQ3-DS	
27		P32		MTIOC0C/TIOC0C/ TMO3/PO10/RTCOUT/ RTCIC2	TXD6/TXD0/SMOSI6/ SMOSI0/SSDA6/ SSDA0/CTX0/ USB0_VBUSEN/ VSYNC	IRQ2-DS	
28	TMS	P31		MTIOC4D/TMC12/PO9/ RTCIC1	CTS1#/RTS1#/SS1#/ SSLB0/USB0_DPUPE	IRQ1-DS	
29	TDI	P30		MTIOC4B/TMR13/PO8/ RTCIC0/POE8#	RXD1/SMISO1/SSCL1/ MISOB/USB0_DRPD	IRQ0-DS	
30	TCK/FINEC	P27	CS7#	MTIOC2B/TMC13/PO7	SCK1/RSPCKB		
31	TDO	P26	CS6#	MTIOC2A/TMO1/PO6	TXD1/CTS3#/RTS3#/ SMOSI1/SS3#/SSDA1/ MOSIB		
32		P25	CS5#/EDACK1	MTIOC4C/MTCLKB/ TIOCA4/PO5	RXD3/SMISO3/SSCL3/ USB0_DPRPD/HSYNC		ADTRG0#
33		P24	CS4#/EDREQ1	MTIOC4A/MTCLKA/ TIOCB4/TMR11/PO4	SCK3/USB0_VBUSEN/ PIXCLK		
34		P23	EDACK0	MTIOC3D/MTCLKD/ TIOC3D/PO3	TXD3/CTS0#/RTS0#/ SMOSI3/SS0#/SSDA3/ USB0_DPUPE/PIXD7		
35		P22	EDREQ0	MTIOC3B/MTCLKC/ TIOCC3/TMO0/PO2	SCK0/USB0_DRPD/ PIXD6		

Table 1.9 List of Pins and Pin Functions (100-Pin TFLGA) (5/5)

Pin No. 100-pin TFLGA	Power Supply Clock System Control	I/O Port	Bus EXDMAC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SCIC, SCID, RSPI, RIIC, CAN, IEB, USB)	Interrupt	S12AD AD DA
K2		P22	EDREQ0	MTIOC3B/ MTCLKC/ TIOCC3/TMO0/ PO2	SCK0/USB0_DRPD		
K3		P20		MTIOC1A/ TIOCB3/ TMRI0/PO0	TXD0/SMOSI0/ SSDA0/USB0_ID	IRQ8	
K4		P14		MTIOC3A/ MTCLKA/ TIOCB5/ TCLKA/TMRI2/ PO15	CTS1#/RTS1#/ SS1#/CTX1/ USB0_DPUPE/ USB0_OVRCURA	IRQ4	
K5					USB0_DM		
K6					USB0_DP		
K7		P51	WR1#/BC1#/ WAIT#		SCK2/SSLB2		
K8		PC5	A21/CS2#/ WAIT#	MTIOC3B/ MTCLKD/ TMRI2/PO29	SCK8/RSPCKA/ ET_ETXD2		
K9		PC3	A19	MTIOC4D/ TCLKB/PO24	TXD5/SMOSI5/ SSDA5/IETXD/ ET_TX_ER		
K10		PC2	A18	MTIOC4B/ TCLKA/PO21	RXD5/SMISO5/ SSCL5/SSLA3/ IERXD/ET_RX_DV		

Note 1. Enabled only for the ROM capacity of 768 Kbytes or more.

Note 2. The BCLK function is multiplexed with the I/O port function for pin P53, so the port function is not available if the external bus is enabled.

Table 1.13 List of Pins and Pin Functions (48-Pin LQFP) (2/2)

Pin Number 48-Pin LQFP	Power Supply Clock System Control	I/O Port	Timer (MTU2a, TPUa, TMR, PPG, POE2a)	Communications (SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB)	Interrupt	S12ADa, DAa
29		PB0/ PC0	MTIC5W/TIOCA3/PO24	RXD6/SMISO6/SSCL6/ RSPCKA	IRQ12	
30	VSS					
31		PA6	MTIC5V/MTCLKB/TIOCA2/ TMC13/PO22/POE2#	CTS5#/RTS5#/SS5#/ MOSIA		
32		PA4	MTIC5U/MTCLKA/ TIOCA1/TMRI0/PO20	TXD5/SMOSI5/SSDA5/ SSLA0	IRQ5-DS	
33		PA3	MTIOC0D/MTCLKD/ TIOC0D/TCLKB/PO19	RXD5/SMISO5/SSCL5	IRQ6-DS	
34		PA1	MTIOC0B/MTCLKC/ TIOCB0/PO17	SCK5/SSLA2	IRQ11	
35		PE4	MTIOC4D/MTIOC1A/ PO28	SSLB0		AN012
36		PE3	MTIOC4B/PO26/POE8#	CTS12#/RTS12#/SS12#/ MISOB		AN011
37		PE2	MTIOC4A/PO23	RXD12/SMISO12/SSCL12/ RXDX12/ SSLB3/MOSIB	IRQ7-DS	AN010
38		PE1	MTIOC4C/PO18	TXD12/SMISO12/SSDA12/ TXDX12/SIOX12/SSLB2/ RSPCKB		AN009
39	VREFL					
40		P46			IRQ14-DS	AN006
41	VREFH					
42		P42			IRQ10-DS	AN002
43		P41			IRQ9-DS	AN001
44	VREFL0					
45		P40			IRQ8-DS	AN000
46	VREFH0					
47	AVCC0					
48	AVSS0					

Table 4.1 List of I/O Registers (Address Order) (11/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 71EEh	ICU	DTC activation enable register 238	DTCER238	8	8	2	ICLK	ICUb
0008 71EFh	ICU	DTC activation enable register 239	DTCER239	8	8	2	ICLK	
0008 71F1h	ICU	DTC activation enable register 241	DTCER241	8	8	2	ICLK	
0008 71F2h	ICU	DTC activation enable register 242	DTCER242	8	8	2	ICLK	
0008 71F4h	ICU	DTC activation enable register 244	DTCER244	8	8	2	ICLK	
0008 71F5h	ICU	DTC activation enable register 245	DTCER245	8	8	2	ICLK	
0008 71F7h	ICU	DTC activation enable register 247	DTCER247	8	8	2	ICLK	
0008 71F8h	ICU	DTC activation enable register 248	DTCER248	8	8	2	ICLK	
0008 71FAh	ICU	DTC activation enable register 250	DTCER250	8	8	2	ICLK	
0008 71FBh	ICU	DTC activation enable register 251	DTCER251	8	8	2	ICLK	
0008 7202h	ICU	Interrupt request enable register 02	IER02	8	8	2	ICLK	
0008 7203h	ICU	Interrupt request enable register 03	IER03	8	8	2	ICLK	
0008 7204h	ICU	Interrupt request enable register 04	IER04	8	8	2	ICLK	
0008 7205h	ICU	Interrupt request enable register 05	IER05	8	8	2	ICLK	
0008 7206h	ICU	Interrupt request enable register 06	IER06	8	8	2	ICLK	
0008 7207h	ICU	Interrupt request enable register 07	IER07	8	8	2	ICLK	
0008 7208h	ICU	Interrupt request enable register 08	IER08	8	8	2	ICLK	
0008 7209h	ICU	Interrupt request enable register 09	IER09	8	8	2	ICLK	
0008 720Bh	ICU	Interrupt request enable register 0B	IER0B	8	8	2	ICLK	
0008 720Ch	ICU	Interrupt request enable register 0C	IER0C	8	8	2	ICLK	
0008 720Dh	ICU	Interrupt request enable register 0D	IER0D	8	8	2	ICLK	
0008 720Eh	ICU	Interrupt request enable register 0E	IER0E	8	8	2	ICLK	
0008 720Fh	ICU	Interrupt request enable register 0F	IER0F	8	8	2	ICLK	
0008 7210h	ICU	Interrupt request enable register 10	IER10	8	8	2	ICLK	
0008 7211h	ICU	Interrupt request enable register 11	IER11	8	8	2	ICLK	
0008 7212h	ICU	Interrupt request enable register 12	IER12	8	8	2	ICLK	
0008 7213h	ICU	Interrupt request enable register 13	IER13	8	8	2	ICLK	
0008 7214h	ICU	Interrupt request enable register 14	IER14	8	8	2	ICLK	
0008 7215h	ICU	Interrupt request enable register 15	IER15	8	8	2	ICLK	
0008 7216h	ICU	Interrupt request enable register 16	IER16	8	8	2	ICLK	
0008 7217h	ICU	Interrupt request enable register 17	IER17	8	8	2	ICLK	
0008 7218h	ICU	Interrupt request enable register 18	IER18	8	8	2	ICLK	
0008 7219h	ICU	Interrupt request enable register 19	IER19	8	8	2	ICLK	
0008 721Ah	ICU	Interrupt request enable register 1A	IER1A	8	8	2	ICLK	
0008 721Bh	ICU	Interrupt request enable register 1B	IER1B	8	8	2	ICLK	
0008 721Ch	ICU	Interrupt request enable register 1C	IER1C	8	8	2	ICLK	
0008 721Dh	ICU	Interrupt request enable register 1D	IER1D	8	8	2	ICLK	
0008 721Eh	ICU	Interrupt request enable register 1E	IER1E	8	8	2	ICLK	
0008 721Fh	ICU	Interrupt request enable register 1F	IER1F	8	8	2	ICLK	
0008 72E0h	ICU	Software interrupt activation register	SWINTR	8	8	2	ICLK	
0008 72F0h	ICU	Fast interrupt set register	FIR	16	16	2	ICLK	
0008 7300h	ICU	Interrupt source priority register 000	IPR000	8	8	2	ICLK	
0008 7301h	ICU	Interrupt source priority register 001	IPR001	8	8	2	ICLK	
0008 7302h	ICU	Interrupt source priority register 002	IPR002	8	8	2	ICLK	
0008 7303h	ICU	Interrupt source priority register 003	IPR003	8	8	2	ICLK	
0008 7304h	ICU	Interrupt source priority register 004	IPR004	8	8	2	ICLK	
0008 7305h	ICU	Interrupt source priority register 005	IPR005	8	8	2	ICLK	
0008 7306h	ICU	Interrupt source priority register 006	IPR006	8	8	2	ICLK	
0008 7307h	ICU	Interrupt source priority register 007	IPR007	8	8	2	ICLK	
0008 7320h	ICU	Interrupt source priority register 032	IPR032	8	8	2	ICLK	
0008 7321h	ICU	Interrupt source priority register 033	IPR033	8	8	2	ICLK	

Table 4.1 List of I/O Registers (Address Order) (18/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 8200h	TMR0	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	TMR
0008 8201h	TMR1	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8202h	TMR0	Timer control/status register	TCSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8203h	TMR1	Timer control/status register	TCSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8204h	TMR0	Time constant register A	TCORA	8	8	2, 3 PCLKB	2 ICLK	
0008 8205h	TMR1	Time constant register A	TCORA	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 8206h	TMR0	Time constant register B	TCORB	8	8	2, 3 PCLKB	2 ICLK	
0008 8207h	TMR1	Time constant register B	TCORB	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 8208h	TMR0	Timer counter	TCNT	8	8	2, 3 PCLKB	2 ICLK	
0008 8209h	TMR1	Timer counter	TCNT	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 820Ah	TMR0	Timer counter control register	TCCR	8	8	2, 3 PCLKB	2 ICLK	
0008 820Bh	TMR1	Timer counter control register	TCCR	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 8210h	TMR2	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8211h	TMR3	Timer control register	TCR	8	8	2, 3 PCLKB	2 ICLK	
0008 8212h	TMR2	Timer control/status register	TCSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8213h	TMR3	Timer control/status register	TCSR	8	8	2, 3 PCLKB	2 ICLK	
0008 8214h	TMR2	Time constant register A	TCORA	8	8	2, 3 PCLKB	2 ICLK	
0008 8215h	TMR3	Time constant register A	TCORA	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 8216h	TMR2	Time constant register B	TCORB	8	8	2, 3 PCLKB	2 ICLK	
0008 8217h	TMR3	Time constant register B	TCORB	8	8	2, 3 PCLKB	2 ICLK	
0008 8218h	TMR2	Timer counter	TCNT	8	8	2, 3 PCLKB	2 ICLK	
0008 8219h	TMR3	Timer counter	TCNT	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 821Ah	TMR2	Timer counter control register	TCCR	8	8	2, 3 PCLKB	2 ICLK	
0008 821Bh	TMR3	Timer counter control register	TCCR	8	8 ⁵	2, 3 PCLKB	2 ICLK	
0008 8280h	CRC	CRC control register	CRCCR	8	8	2, 3 PCLKB	2 ICLK	CRC
0008 8281h	CRC	CRC data input register	CRCDIR	8	8	2, 3 PCLKB	2 ICLK	
0008 8282h	CRC	CRC data output register	CRCDOR	16	16	2, 3 PCLKB	2 ICLK	
0008 8300h	RIIC0	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	RIIC
0008 8301h	RIIC0	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8302h	RIIC0	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8303h	RIIC0	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8304h	RIIC0	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8305h	RIIC0	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8306h	RIIC0	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8307h	RIIC0	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8308h	RIIC0	I ² C bus status register 1	ICSR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8309h	RIIC0	I ² C bus status register 2	ICSR2	8	8	2, 3 PCLKB	2 ICLK	
0008 830Ah	RIIC0	Slave address register L0	SARL0	8	8	2, 3 PCLKB	2 ICLK	
0008 830Ah	RIIC0	Timeout Internal Counter L	TMOCNTL	8	8	2, 3 PCLKB	2 ICLK	
0008 830Bh	RIIC0	Slave address register U0	SARU0	8	8	2, 3 PCLKB	2 ICLK	
0008 830Bh	RIIC0	Timeout Internal Counter U	TMOCNTU	8	8	2, 3 PCLKB	2 ICLK	
0008 830Ch	RIIC0	Slave address register L1	SARL1	8	8	2, 3 PCLKB	2 ICLK	
0008 830Dh	RIIC0	Slave address register U1	SARU1	8	8	2, 3 PCLKB	2 ICLK	
0008 830Eh	RIIC0	Slave address register L2	SARL2	8	8	2, 3 PCLKB	2 ICLK	
0008 830Fh	RIIC0	Slave address register U2	SARU2	8	8	2, 3 PCLKB	2 ICLK	
0008 8310h	RIIC0	I ² C bus bit rate low-level register	ICBRL	8	8	2, 3 PCLKB	2 ICLK	
0008 8311h	RIIC0	I ² C bus bit rate high-level register	ICBRH	8	8	2, 3 PCLKB	2 ICLK	
0008 8312h	RIIC0	I ² C bus transmit data register	ICDRT	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (26/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 A0A6h	SCI5	Smart card mode register	SCMR	8	8	2, 3 PCLKB	2 ICLK	SCIc, SCId
0008 A0A7h	SCI5	Serial extended mode register	SEMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0A8h	SCI5	Noise filter setting register	SNFR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0A9h	SCI5	I ² C mode register 1	SIMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 A0AAh	SCI5	I ² C mode register 2	SIMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 A0ABh	SCI5	I ² C mode register 3	SIMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 A0ACh	SCI5	I ² C status register	SISR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0ADh	SCI5	SPI mode register	SPMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C0h	SCI6	Serial mode register	SMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C1h	SCI6	Bit rate register	BRR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C2h	SCI6	Serial control register	SCR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C3h	SCI6	Transmit data register	TDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C4h	SCI6	Serial status register	SSR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C5h	SCI6	Receive data register	RDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C6h	SCI6	Smart card mode register	SCMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C7h	SCI6	Serial extended mode register	SEMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C8h	SCI6	Noise filter setting register	SNFR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0C9h	SCI6	I ² C mode register 1	SIMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 A0CAh	SCI6	I ² C mode register 2	SIMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 A0CBh	SCI6	I ² C mode register 3	SIMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 A0CCh	SCI6	I ² C status register	SISR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0CDh	SCI6	SPI mode register	SPMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E0h	SCI7	Serial mode register	SMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E1h	SCI7	Bit rate register	BRR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E2h	SCI7	Serial control register	SCR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E3h	SCI7	Transmit data register	TDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E4h	SCI7	Serial status register	SSR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E5h	SCI7	Receive data register	RDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E6h	SCI7	Smart card mode register	SCMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E7h	SCI7	Serial extended mode register	SEMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E8h	SCI7	Noise filter setting register	SNFR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0E9h	SCI7	I ² C mode register 1	SIMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 A0EAh	SCI7	I ² C mode register 2	SIMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 A0EBh	SCI7	I ² C mode register 3	SIMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 A0ECh	SCI7	I ² C status register	SISR	8	8	2, 3 PCLKB	2 ICLK	
0008 A0EDh	SCI7	SPI mode register	SPMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A100h	SCI8	Serial mode register	SMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A101h	SCI8	Bit rate register	BRR	8	8	2, 3 PCLKB	2 ICLK	
0008 A102h	SCI8	Serial control register	SCR	8	8	2, 3 PCLKB	2 ICLK	
0008 A103h	SCI8	Transmit data register	TDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A104h	SCI8	Serial status register	SSR	8	8	2, 3 PCLKB	2 ICLK	
0008 A105h	SCI8	Receive data register	RDR	8	8	2, 3 PCLKB	2 ICLK	
0008 A106h	SCI8	Smart card mode register	SCMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A107h	SCI8	Serial extended mode register	SEMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A108h	SCI8	Noise filter setting register	SNFR	8	8	2, 3 PCLKB	2 ICLK	
0008 A109h	SCI8	I ² C mode register 1	SIMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 A10Ah	SCI8	I ² C mode register 2	SIMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 A10Bh	SCI8	I ² C mode register 3	SIMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 A10Ch	SCI8	I ² C status register	SISR	8	8	2, 3 PCLKB	2 ICLK	
0008 A10Dh	SCI8	SPI mode register	SPMR	8	8	2, 3 PCLKB	2 ICLK	
0008 A120h	SCI9	Serial mode register	SMR	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (34/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 C1B1h	MPC	PE1 pin function control register	PE1PFS	8	8	2, 3 PCLKB	2 ICLK	MPC
0008 C1B2h	MPC	PE2 pin function control register	PE2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B3h	MPC	PE3 pin function control register	PE3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B4h	MPC	PE4 pin function control register	PE4PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B5h	MPC	PE5 pin function control register	PE5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B6h	MPC	PE6 pin function control register	PE6PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B7h	MPC	PE7 pin function control register	PE7PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B8h	MPC	PF0 pin function control register	PF0PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B9h	MPC	PF1 pin function control register	PF1PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1BAh	MPC	PF2 pin function control register	PF2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1BDh	MPC	PF5 pin function control register	PF5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1D3h	MPC	PJ3 pin function control register	PJ3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C280h	SYSTEM	Deep standby control register	DPSBYCR	8	8	4, 5 PCLKB	2, 3 ICLK	Low Power Consumption
0008 C282h	SYSTEM	Deep standby interrupt enable register 0	DPSIER0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C283h	SYSTEM	Deep standby interrupt enable register 1	DPSIER1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C284h	SYSTEM	Deep standby interrupt enable register 2	DPSIER2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C285h	SYSTEM	Deep standby interrupt enable register 3	DPSIER3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C286h	SYSTEM	Deep standby interrupt flag register 0	DPSIFR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C287h	SYSTEM	Deep standby interrupt flag register 1	DPSIFR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C288h	SYSTEM	Deep standby interrupt flag register 2	DPSIFR2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C289h	SYSTEM	Deep standby interrupt flag register 3	DPSIFR3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Ah	SYSTEM	Deep standby interrupt edge register 0	DPSIEGR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Bh	SYSTEM	Deep standby interrupt edge register 1	DPSIEGR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Ch	SYSTEM	Deep standby interrupt edge register 2	DPSIEGR2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Dh	SYSTEM	Deep standby interrupt edge register 3	DPSIEGR3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C290h	SYSTEM	Reset status register 0	RSTSR0	8	8	4, 5 PCLKB	2, 3 ICLK	Resets
0008 C291h	SYSTEM	Reset status register 1	RSTSR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C293h	SYSTEM	Main clock oscillator forced oscillation control register	MOFCR	8	8	4, 5 PCLKB	2, 3 ICLK	Clock Generation Circuit
0008 C294h	SYSTEM	High-speed on-chip oscillator power supply control register	HOCOPCR	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C296h	FLASH	Flash write erase protection register	FWEPROR	8	8	4, 5 PCLKB	2, 3 ICLK	ROM
0008 C297h	SYSTEM	Voltage monitoring circuit control register	LVCMPCR	8	8	4, 5 PCLKB	2, 3 ICLK	LVDA
0008 C298h	SYSTEM	Voltage detection level select register	LVDLVL	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C29Ah	SYSTEM	Voltage monitoring 1 circuit control register 0	LVD1CR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C29Bh	SYSTEM	Voltage monitoring 2 circuit control register 0	LVD2CR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C2A0h to 0008 C2BFh	SYSTEM	Deep standby backup register 0 to 31	DPSBKR0 to 31	8	8	4, 5 PCLKB	2, 3 ICLK	Low Power Consumption
0008 C300h	ICU	Group 0 interrupt source register	GRP00	32	32	1 to 2PCLKB	2 ICLK	ICUb
0008 C304h	ICU	Group 1 interrupt source register	GRP01	32	32	1 to 2PCLKB	2 ICLK	
0008 C308h	ICU	Group 2 interrupt source register	GRP02	32	32	1 to 2PCLKB	2 ICLK	
0008 C30Ch	ICU	Group 3 interrupt source register	GRP03	32	32	1 to 2PCLKB	2 ICLK	
0008 C310h	ICU	Group 4 interrupt source register	GRP04	32	32	1 to 2PCLKB	2 ICLK	
0008 C314h	ICU	Group 5 interrupt source register	GRP05	32	32	1 to 2PCLKB	2 ICLK	
0008 C318h	ICU	Group 6 interrupt source register	GRP06	32	32	1 to 2PCLKB	2 ICLK	
0008 C330h	ICU	Group 12 interrupt source register	GRP12	32	32	1 to 2PCLKB	2 ICLK	
0008 C340h	ICU	Group 0 interrupt enable register	GEN00	32	32	1 to 2PCLKB	2 ICLK	

5.2 DC Characteristics

Table 5.2 DC Characteristics (1)

Conditions: $V_{CC} = AV_{CC0} = V_{REFH} = V_{CC_USB} = 2.7$ to 3.6 V, $V_{REFH0} = 2.7$ V to AV_{CC0} ,
 $V_{SS} = AV_{SS0} = V_{REFL}/V_{REFL0} = V_{SS_USB} = 0$ V, $T_a = T_{opr}$

Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Schmitt trigger input voltage	IRQ input pin*1	V_{IH}	$V_{CC} \times 0.8$	—	$V_{CC} + 0.3$	V
	MTU input pin*1	V_{IL}	-0.3	—	$V_{CC} \times 0.2$	
	TMR input pin*1	ΔV_T	$V_{CC} \times 0.06$	—	—	
	SCI input pin*1					
	ADTRG# input pin*1					
	RES#, NMI					
	RIIC input pin (except for SMBus)	V_{IH}	$V_{CC} \times 0.7$	—	5.8	
		V_{IL}	-0.3	—	$V_{CC} \times 0.3$	
		ΔV_T	$V_{CC} \times 0.05$	—	—	
	Ports for 5 V tolerant*2	V_{IH}	$V_{CC} \times 0.8$	—	5.8	
		V_{IL}	-0.3	—	$V_{CC} \times 0.2$	
Input high voltage (except for Schmitt trigger input pin)	Other input pins excluding ports for 5 V tolerant*3	V_{IH}	$V_{CC} \times 0.8$	—	$V_{CC} + 0.3$	V
		V_{IL}	-0.3	—	$V_{CC} \times 0.2$	
		V_{IH}	$V_{CC} \times 0.9$	—	$V_{CC} + 0.3$	
		V_{IL}	$V_{CC} \times 0.8$	—	$V_{CC} + 0.3$	
		V_{IH}	2.3	—	$V_{CC} + 0.3$	
		V_{IL}	—	—	$V_{CC} + 0.3$	
		V_{IH}	$V_{CC} \times 0.7$	—	$V_{CC} + 0.3$	
Input low voltage (except for Schmitt trigger input pin)	MD pin, EMLE	V_{IL}	2.1	—	$V_{CC} + 0.3$	V
	EXTAL, RSPI, EXDMAC, WAIT#, TCK	V_{IL}	—	—	$V_{CC} + 0.3$	
	ETHERC	V_{IL}	—	—	$V_{CC} + 0.3$	
	XCIN	V_{IL}	—	—	$V_{CC} + 0.3$	
	D0 to D31	V_{IL}	—	—	$V_{CC} + 0.3$	
	RIIC (SMBus)	V_{IL}	—	—	$V_{CC} + 0.3$	
Input low voltage (except for Schmitt trigger input pin)	MD pin, EMLE	V_{IL}	-0.3	—	$V_{CC} \times 0.1$	V
	EXTAL, RSPI, ETHERC, EXDMAC, WAIT#, TCK	V_{IL}	-0.3	—	$V_{CC} \times 0.2$	
	XCIN	V_{IL}	-0.3	—	—	
	D0 to D31	V_{IL}	-0.3	—	$V_{CC} \times 0.3$	
	RIIC (SMBus)	V_{IL}	-0.3	—	0.8	

Note 1. V_{IH} characteristics of the pins which are multiplexed with pin functions having 5-V tolerance are those of the pin functions for 5-V tolerance.

Note 2. Ports 07, 12 to 17, 20, 21, 30 to 33, 67, and C0 to C3 are 5 V tolerant.

Note 3. For P32, P31, P30, input as follows when the V_{BATT} power supply is selected.

V_{IH} Min. = $V_{BATT} \times 0.8$, V_{IH} Max. = $V_{BATT} + 0.3$, V_{IL} Min. = -0.3 , V_{IL} Max. = $V_{BATT} \times 0.2$

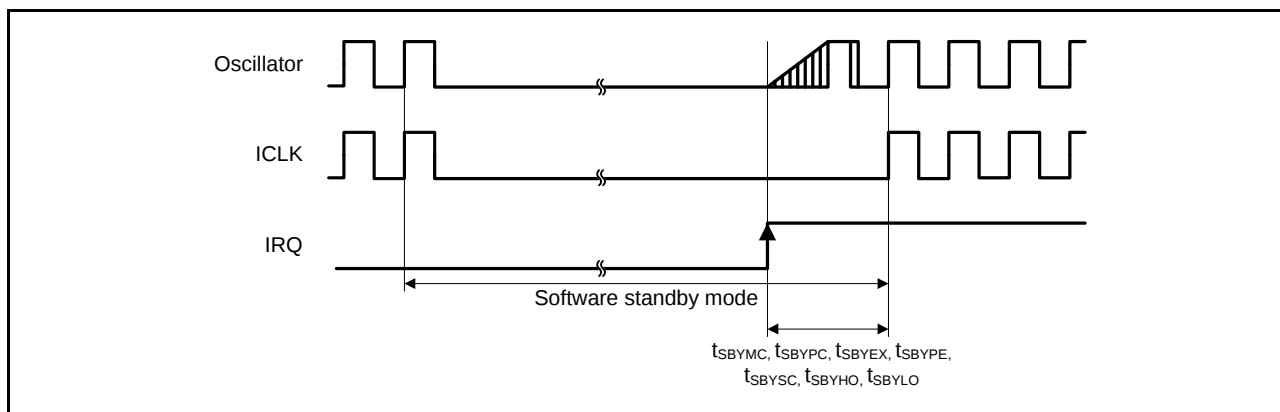


Figure 5.13 Software Standby Mode Cancellation Timing

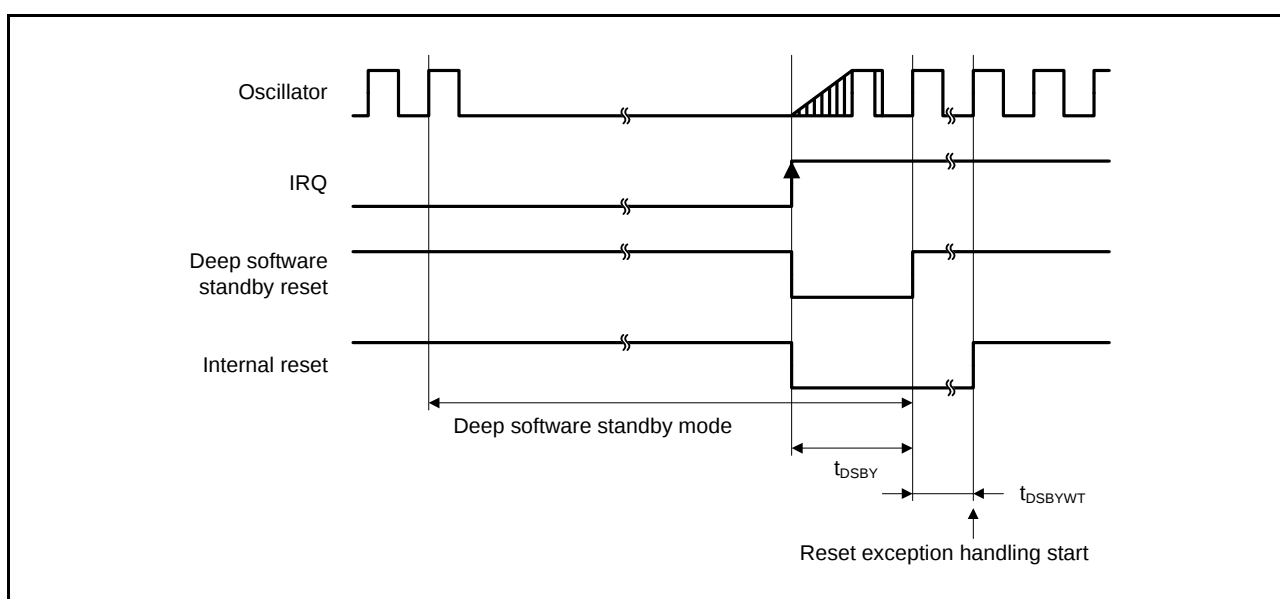


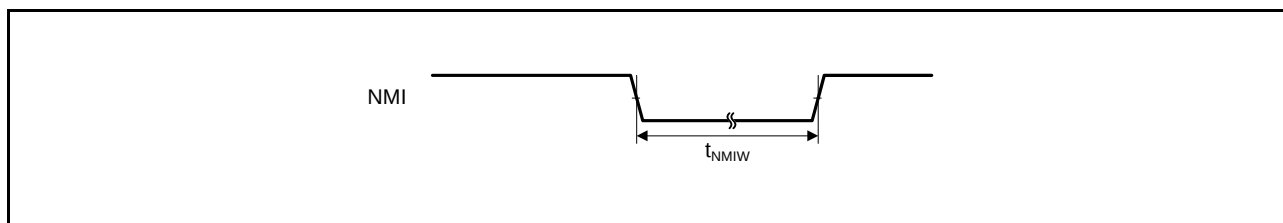
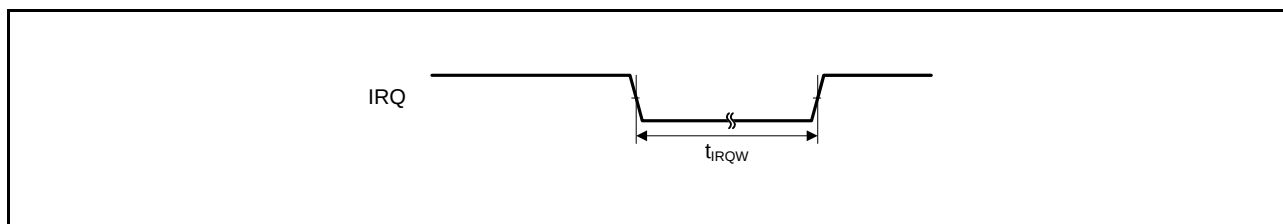
Figure 5.14 Deep Software Standby Mode Cancellation Timing

5.3.4 Control Signal Timing

Table 5.15 Control Signal Timing

Conditions: $V_{CC} = AVCC0 = VREFH = V_{CC_USB} = V_{BATT} = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V, $T_a = T_{opr}$

Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
NMI pulse width	t_{NMIW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.15
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.15
IRQ pulse width	t_{IRQW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.16
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.16

**Figure 5.15** NMI Interrupt Input Timing**Figure 5.16** IRQ Interrupt Input Timing

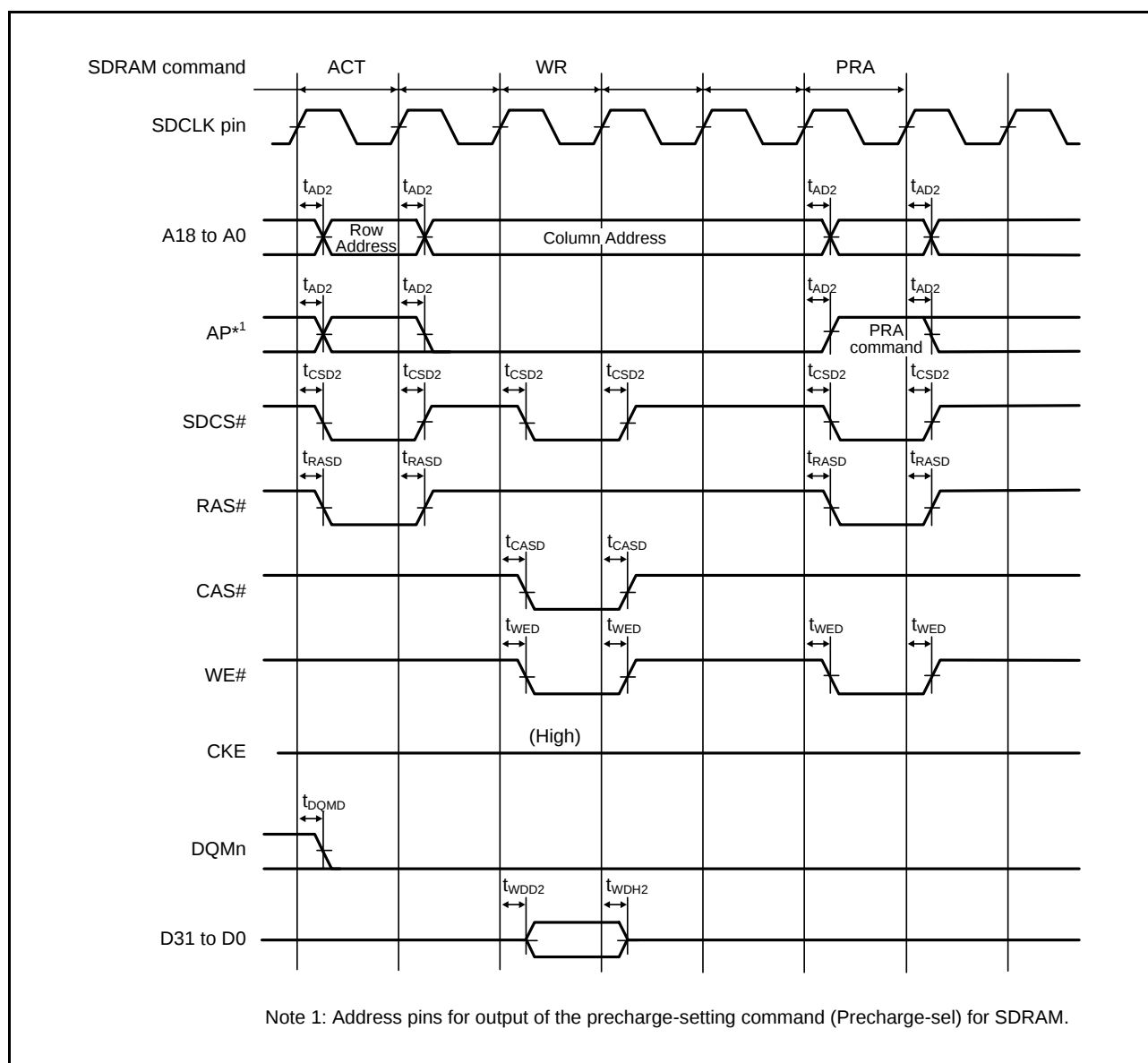
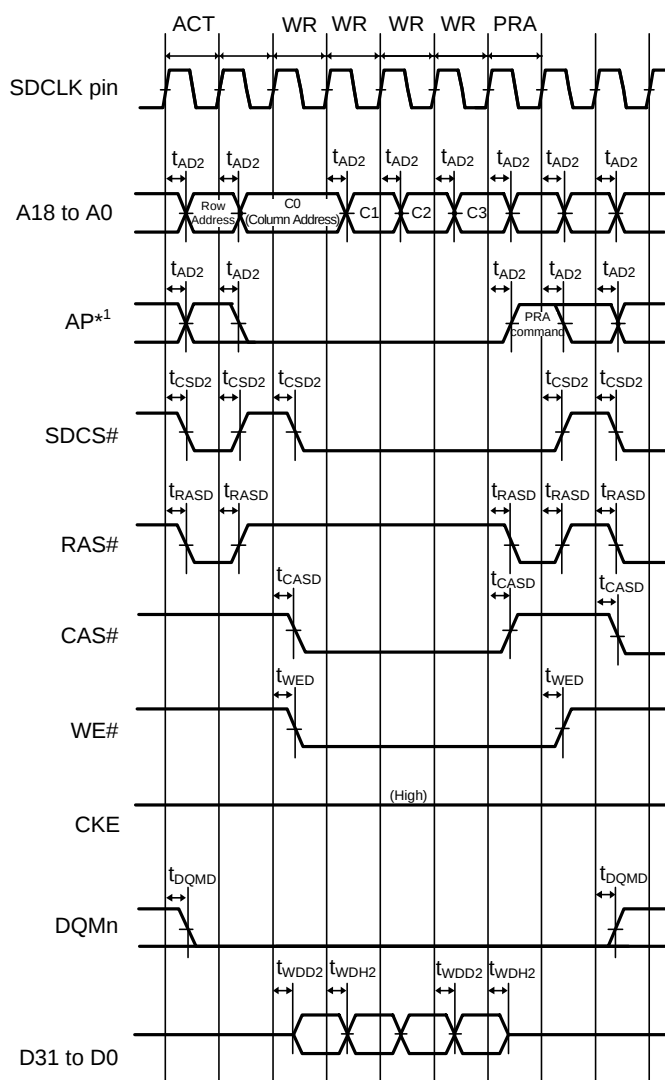
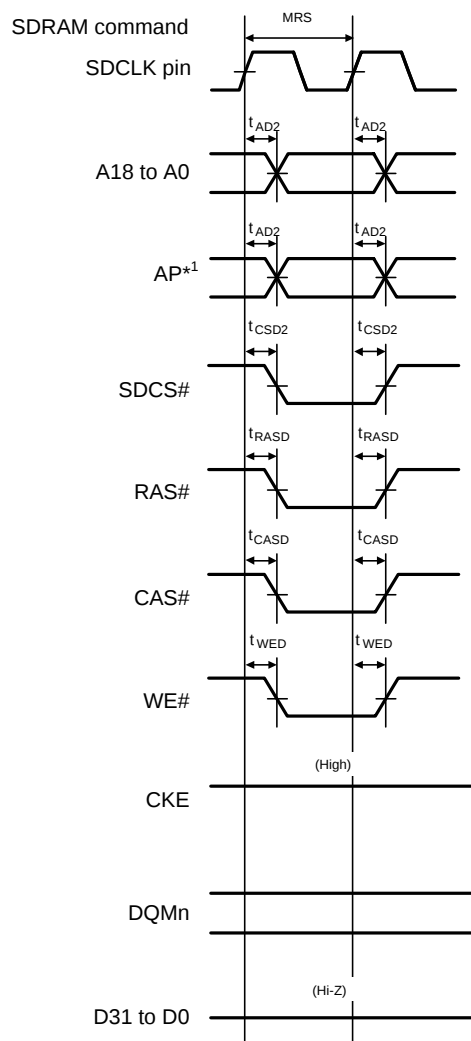


Figure 5.25 SDRAM Space Single Write Bus Timing



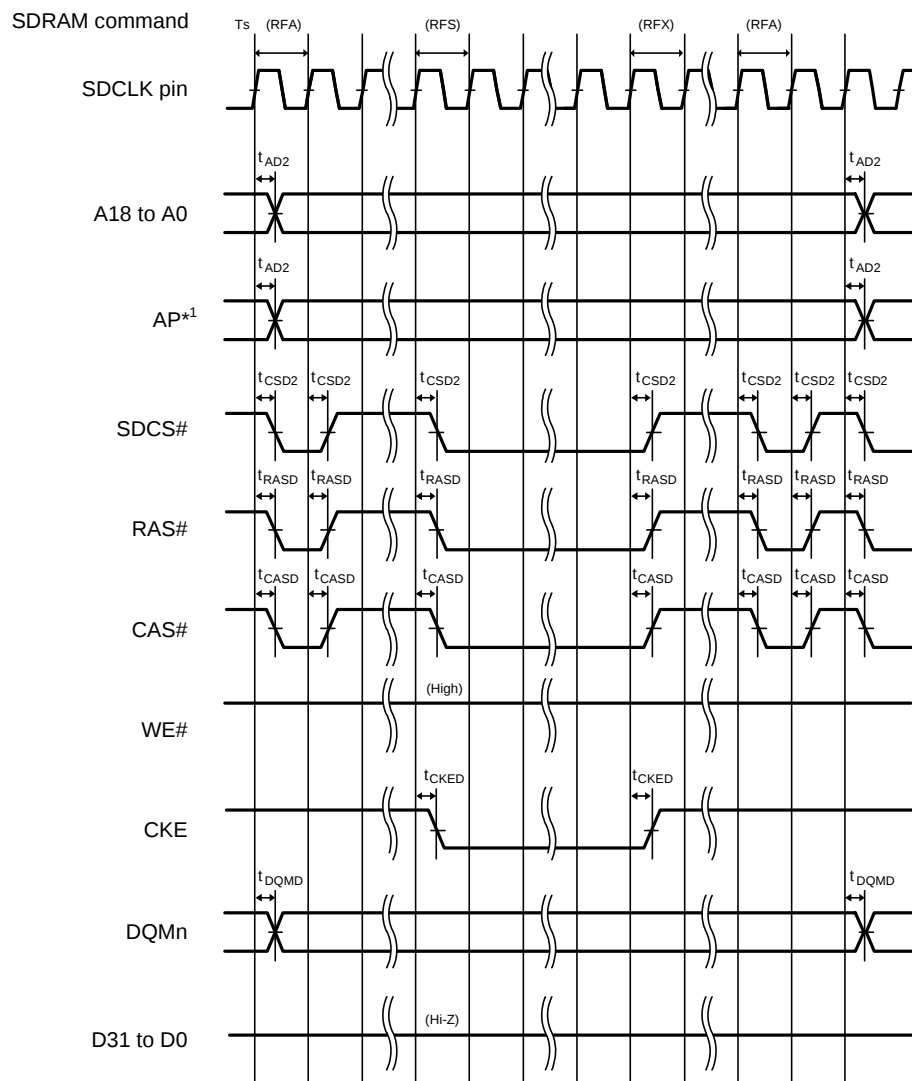
Note 1: Address pins for output of the precharge-setting command (Precharge-sel) for SDRAM.

Figure 5.27 SDRAM Space Multiple Write Bus Timing



Note 1: Address pins for output of the precharge-setting command (Precharge-sel) for SDRAM.

Figure 5.29 SDRAM Space Mode Register Set Bus Timing



Note 1: Address pins for output of the precharge-setting command (Precharge-sel) for SDRAM.

Figure 5.30 SDRAM Space Self-Refresh Bus Timing

Table 5.21 Timing of On-Chip Peripheral Modules (3)

Conditions: $V_{CC} = AVCC0 = VREFH = VCC_USB = 2.7$ to 3.6 V*1, $VREFH0 = 2.7$ V to $AVCC0$ *1,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V,
 $PCLK = 8$ to 50 MHz,
 $T_a = T_{opr}$
 High drive output is selected by the drive capacity control register.

Item				Symbol	Min.	Max.	Unit*2	Test Conditions
RSPI	Data output delay time	Master	Packages with 177 to 144 pins	t_{OD}	—	18	ns	Figure 5.43 to Figure 5.46 C = 30pF
			Packages with 100 pins or less		—	30		
		Slave	Packages with 177 to 144 pins		—	$3 \times t_{Pcyc} + 40$		
			Packages with 100 pins or less		—	$3 \times t_{Pcyc} + 50$		
	Data output hold time	Master		t_{OH}	0	—	ns	
		Slave			0	—		
	Successive transmission delay time	Master		t_{TD}	$t_{SPcyc} + 2 \times t_{Pcyc}$	$8 \times t_{SPcyc} + 2 \times t_{Pcyc}$	ns	
		Slave			$4 \times t_{Pcyc}$	—		
	MOSI and MISO rise/fall time	Output	Packages with 177 to 144 pins	t_{Dr}, t_{Df}	—	5	ns	
			Packages with 100 pins or less		—	10		
		Input			—	1	μs	
	SSL rise/fall time	Output	Packages with 177 to 144 pins	t_{SSLr}, t_{SSLf}	—	5	ns	
			Packages with 100 pins or less		—	10		
		Input			—	1	μs	
Slave access time				t_{SA}	—	4	t_{Pcyc}	Figure 5.45 and Figure 5.46 C = 30pF
Slave output release time				t_{REL}	—	3	t_{Pcyc}	

Note 1. When operation at 3.0 V or a lower voltage is needed, please contact a Renesas sales office.

Note 2. t_{Pcyc} : PCLK cycle

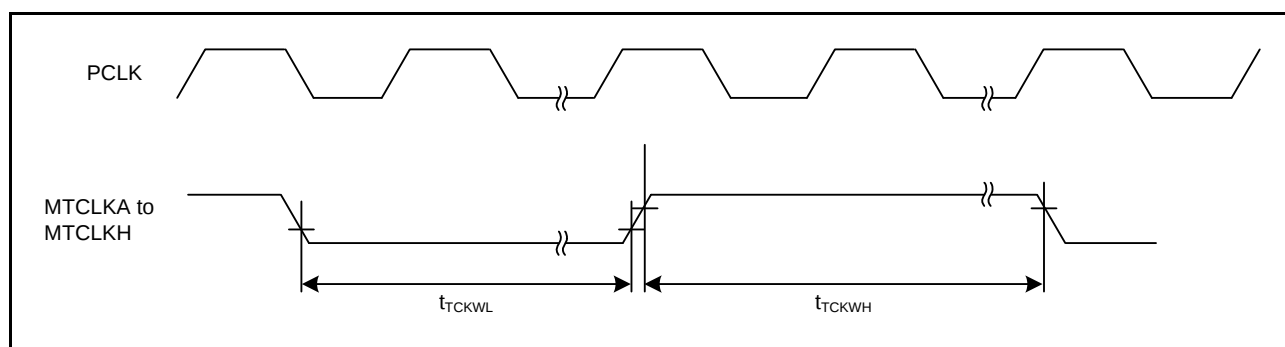


Figure 5.36 MTU Clock Input Timing

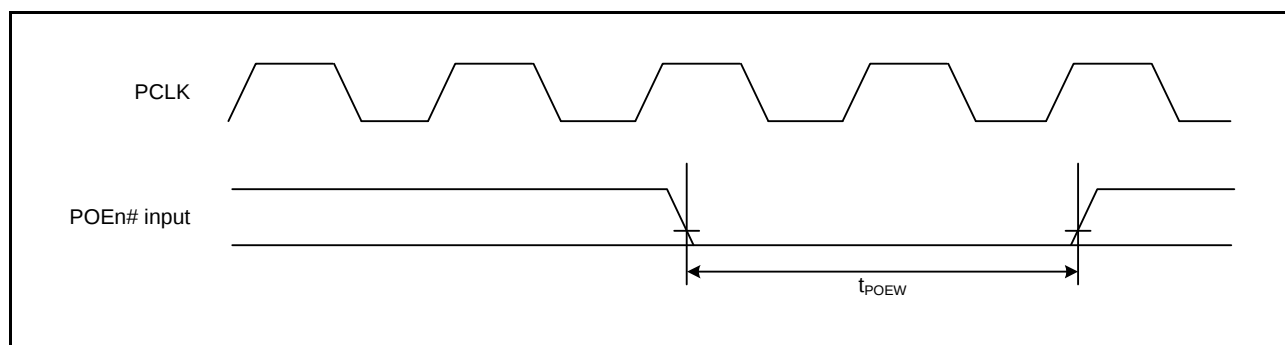


Figure 5.37 POE# Input Timing

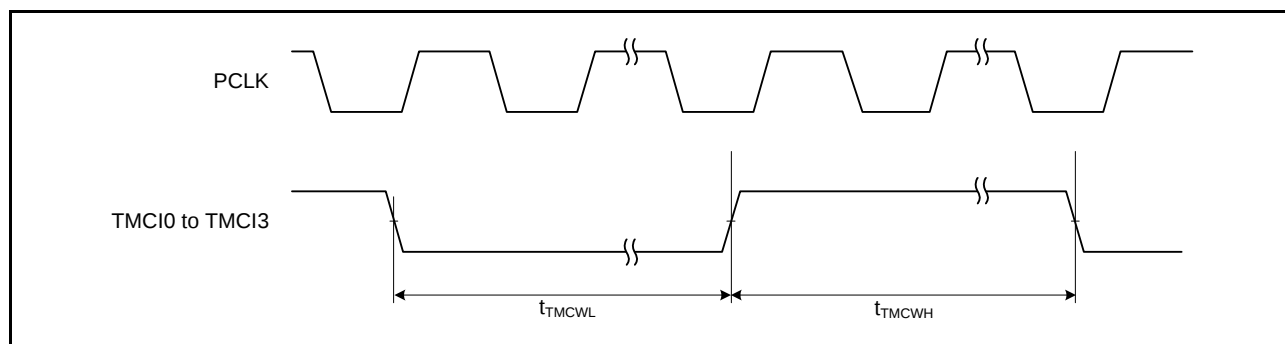


Figure 5.38 8-Bit Timer Clock Input Timing

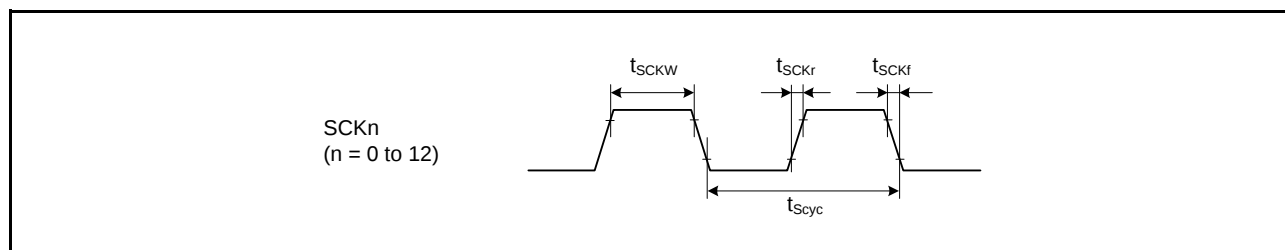


Figure 5.39 SCK Clock Input Timing

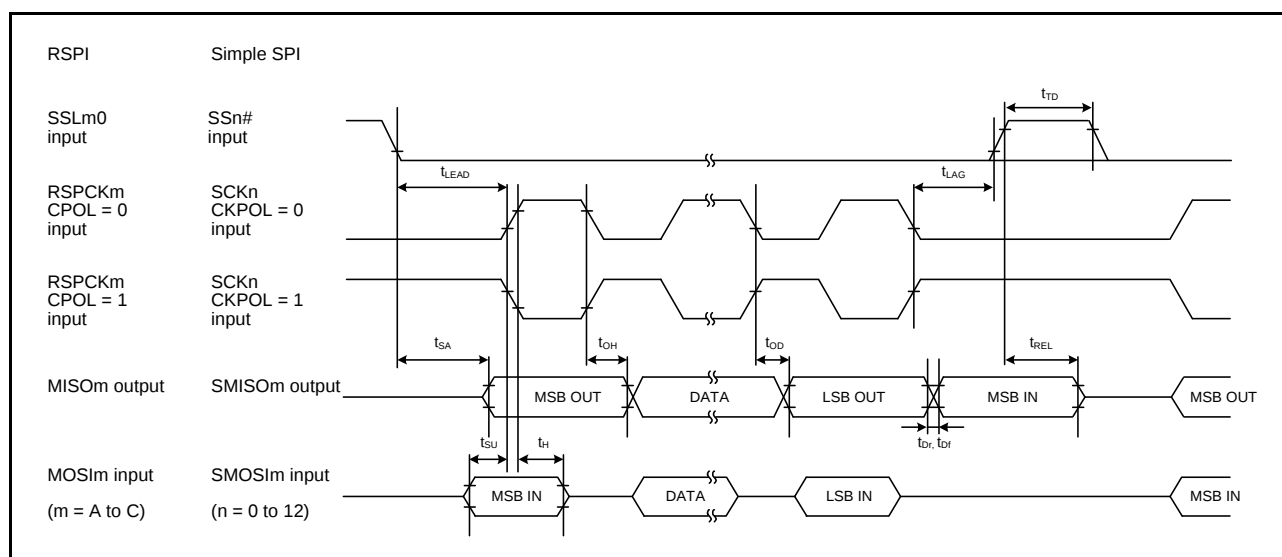


Figure 5.45 RSPi Timing (Slave, CPHA = 0) and Simple SPI Timing (Slave, CKPH = 1)

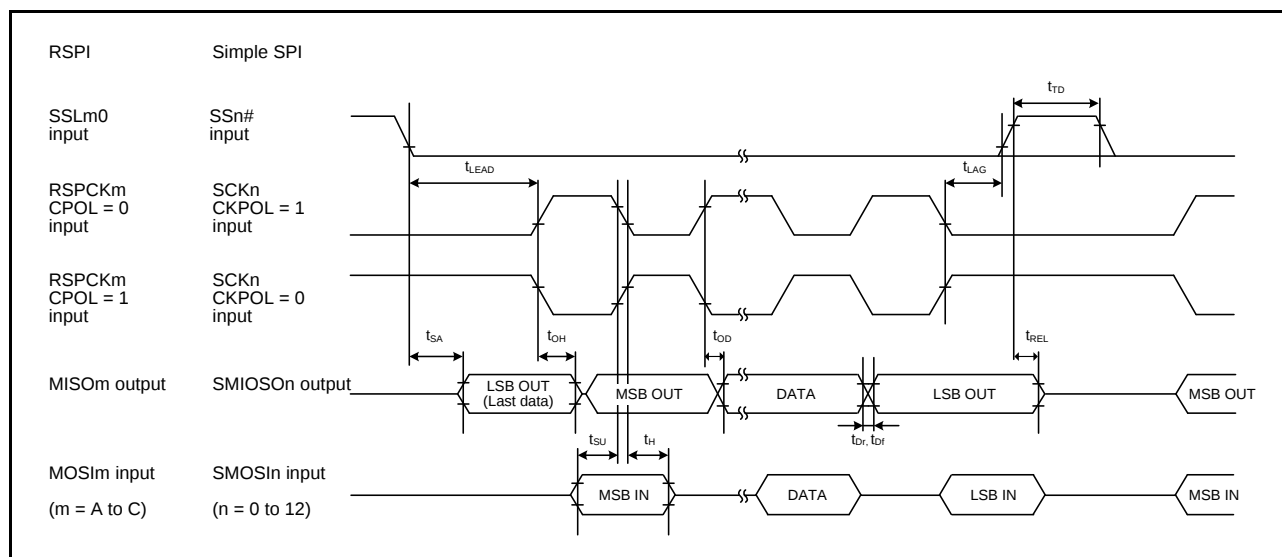


Figure 5.46 RSPi Timing (Slave, CPHA = 1) and Simple SPI Timing (Slave, CKPH = 0)