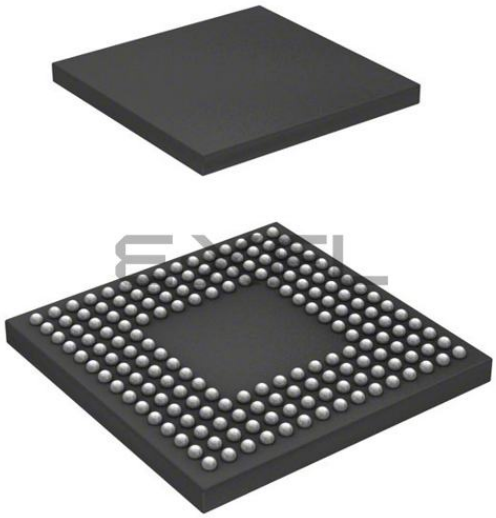
Renesas Electronics America Inc - R5F56104WNBG#U0 Datasheet



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Applications of "Embedded - Microcontrollers"

Details	
Product Status	Not For New Designs
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	EBI/EMI, I²C, SCI
Peripherals	DMA, POR, PWM, WDT
Number of I/O	140
Program Memory Size	768KB (768K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	128K x 8
Voltage - Supply (Vcc/Vdd)	3V ~ 3.6V
Data Converters	A/D 16x10b; D/A 2x10b
Oscillator Type	External
Operating Temperature	-20°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	176-LFBGA
Supplier Device Package	176-LFBGA (13x13)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f56104wnbg-u0

Classification	Module/Function	Description
Interrupt	Interrupt control unit	• Peripheral function interrupts: 116 • External interrupts: 16 (pins IRQ15 to IRQ0) • Non-maskable interrupt: 1 (the NMI pin) • Eight priority orders specifiable
External bus extension		• The external address space can be divided into eight areas (CS0 to CS7), each of which is independently controllable. Capacity of each area: 16 Mbytes Chip-select signals (CS0# to CS7#) can be output for each area. 8-bit or 16-bit bus space can be specified for each area. The data arrangement is selectable as little endian or big endian for each area. (only for data) • Separate bus system • Wait control • Write buffer programming
DMA	DMA controller	• 4-channel DMA transfer available • Activation sources: Software trigger, external interrupts, and interrupt requests from peripheral functions
	Data transfer controller	• Three transfer modes: Normal transfer, repeat transfer, and block transfer • Activated by interrupt requests (chain transfer enabled)
I/O ports	Programmable I/O ports	• I/O pins: 117 (144-pin LQFP), 140 (176-pin LFBGA) • Pull-up resistors: 40 • Open-drain outputs: 16 • 5-V tolerance: 10
Timer	16-bit timer pulse unit	• (16 bits x 6 channels) x 2 units • Up to 16 pulse inputs and outputs • Select from among 7 or 8 counter-input clocks for each channel • Input capture/output compare function • Maximum of 15-phase PWM output possible in PWM mode • Buffered operation, phase counting mode (two-phase encoder input), and cascaded operation (32 bits x 2 channels) settable for each channel • PPG output trigger can be generated • Conversion start trigger for the A/D converter can be generated
	Programmable pulse generator	• (4 bits x 4 groups) x 2 units • Provides pulse outputs by using the TPU output as a trigger • Maximum of 32-bit pulse output possible
	8-bit timer	• (8 bits x 2 channels) x 2 units • Select from among 8 clock sources (7 internal clocks and 1 external clock) • Allows the output of pulse trains with a desired duty cycle or PWM signals • Cascading of 2 channels enables it to be used as a 16-bit timer • Generation of trigger to start A/D converter conversion • Capable of generating baud rate clock for SCI5 and SCI6
	Compare match timer	• (16 bits x 2 channels) x 2 units • Select from among 4 counter-input clocks

1.2 List of Products

Table 1.2 is the list of products, and figure 1.1 shows how to read the product part no.

Table 1.2 List of Products

Part No.	Package	ROM Capacity	RAM Capacity	Data Flash	Operating Frequency (Max.)
R5F56108VNFP	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56108VDFP	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56108WNBG	PLBG0176GA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56108WDBG	PLBG0176GA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56107VNFP	PLQP0144KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56107VDFP	PLQP0144KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56107WNBG	PLBG0176GA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56107WDBG	PLBG0176GA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56106VNFP	PLQP0144KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz
R5F56106VDFP	PLQP0144KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz
R5F56106WNBG	PLBG0176GA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz
R5F56106WDBG	PLBG0176GA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz
R5F56104VNFP	PLQP0144KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56104VDFP	PLQP0144KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56104WNBG	PLBG0176GA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz
R5F56104WDBG	PLBG0176GA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz

Pin No. 176-Pin LFBGA	Power Supply Clock System Control	I/O Port	Interrupt	External Bus	Timer	Communi-cation	Analog	On-Chip Emulator
M6		P37			PO15/ TIOCA2/ TIOCB2/ TCLKD-A			
M7		P57		WAIT#				TRDATA3
M8		P83						
M9		P81						TRSYNC
M10		P51		WR1#/BC1#				
M11		PH4						
M12		PC7		A23/ CS4#-D/ CS7#-D		TxD5		
M13	VSS							
M14		PC0		A16				
M15		PB6		A14	PO30/ TIOCA11			
N1		P25			PO5/ TIOCA4/ TMCI1	RxD1		
N2		P24			PO4/ TIOCA4/ TIOCB4/ TMRI1			
N3		P20			PO0/ TIOCA3/ TIOCB3/ TMRI0	TxD0		
N4		P16	IRQ6-B		TCLKC-B	RxD3/SDA0		
N5		P12	IRQ2-B			RxD2		
N6		P36			PO14/ TIOCA2			
N7		P56						TRDATA2
N8	VSS							
N9		P80						
N10		P50		WR0#/WR#				
N11	VSS							
N12		P76	IRQ14-A					
N13		PH2						
N14		PC2		A18				
N15		PC1		A17				
P1		P23			PO3/ TIOCC3/ TIOCD3			

Pin No. 144-Pin LQFP	Power Supply Clock System Control	I/O Port	Interrupt	External Bus	Timer	Communi-cation	Analog	On-Chip Emulator
85		PB1		A9	PO25/ TIOCA9/ TIOCB9			
86		P74					ADTRG3#	
87		P73						
88		P72						
89		P71		CS4#-C/ CS5#-C/ CS6#-C/ CS7#-C				
90		P70		CS3#-B			ADTRG2#	
91	VCC							
92		PB0		A8	PO24/ TIOCA9			
93	VSS							
94		PA7		A7	PO23/ TIOCA8/ TIOCB8/ TCLKH			
95		PA6		A6	PO22/ TIOCA8			
96		PA5		A5	PO21/ TIOCA7/ TIOCB7/ TCLKG			
97		PA4		A4	PO20/ TIOCA7			
98		PA3		A3	PO19/ TIOCC6/ TIOCD6/ TCLKF			
99		PA2		A2	PO18/ TIOCC6/ TCLKE			
100		PA1		A1	PO17/ TIOCA6/ TIOCB6			
101		PA0		A0/BC0#	PO16/ TIOCA6			
102		PE7	IRQ7-A	D15				
103		PE6	IRQ6-A	D14				
104		PE5	IRQ5-A	D13				
105		PE4		D12				
106		PE3		D11				
107		PE2		D10				

3.2 External Address Space

The external address space is divided into up to 8 areas, each corresponding to the CSi# signal output from a CSi# (i = 0 to 7) pin. Figure 4.5 shows the address ranges corresponding to the individual CSi# signals (CSi areas, i = 0 to 7) in on-chip ROM disabled external extended mode.

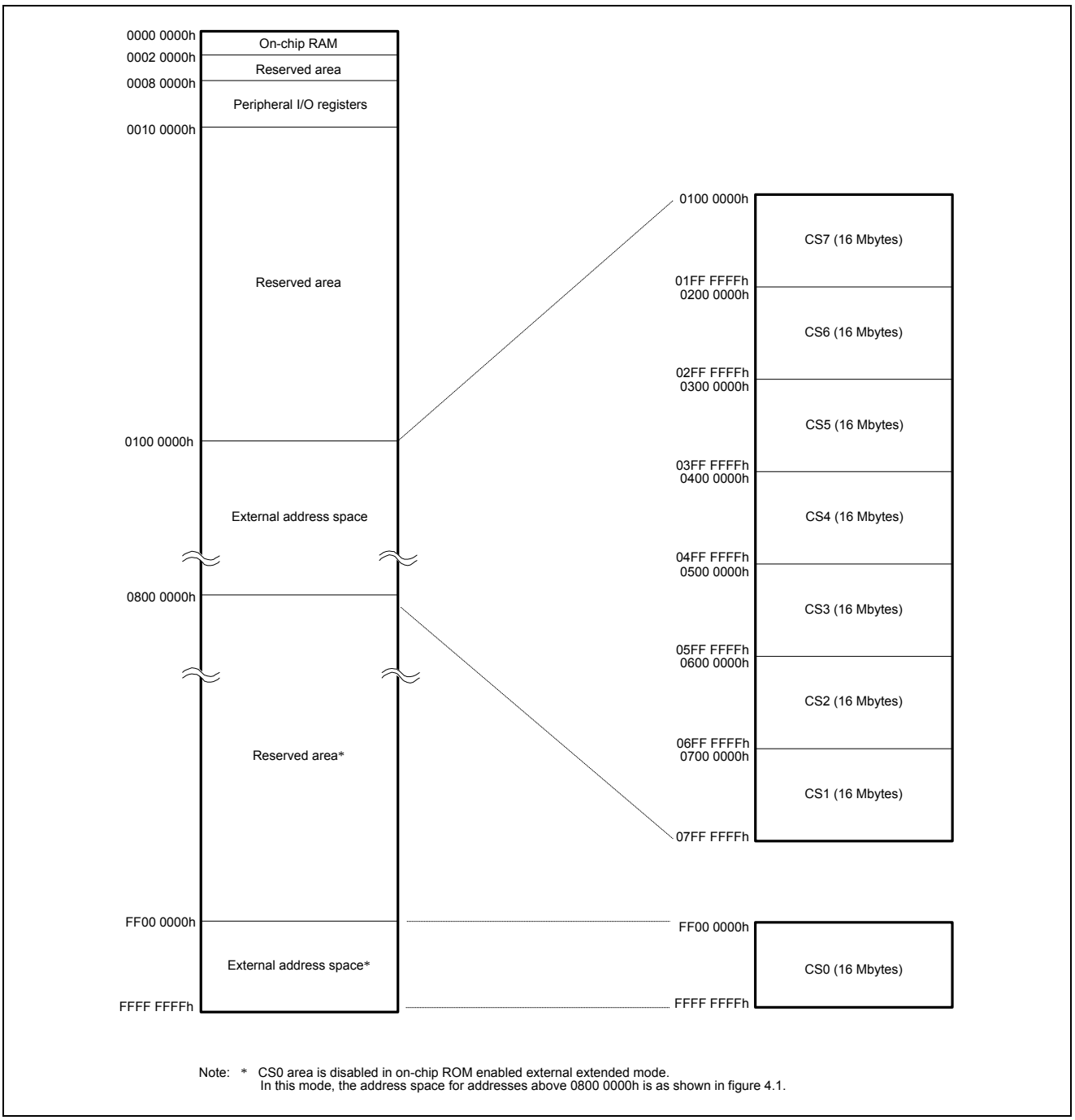


Figure 3.5 Correspondence between External Address Spaces and CSi Areas (In On-Chip ROM Disabled External Extended Mode)

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 71E3h	ICU	Interrupt request destination setting register 227	ISELR227	8	8	2 ICLK
0008 71E4h	ICU	Interrupt request destination setting register 228	ISELR228	8	8	2 ICLK
0008 71E7h	ICU	Interrupt request destination setting register 231	ISELR231	8	8	2 ICLK
0008 71E8h	ICU	Interrupt request destination setting register 232	ISELR232	8	8	2 ICLK
0008 71EBh	ICU	Interrupt request destination setting register 235	ISELR235	8	8	2 ICLK
0008 71ECh	ICU	Interrupt request destination setting register 236	ISELR236	8	8	2 ICLK
0008 71EFh	ICU	Interrupt request destination setting register 239	ISELR239	8	8	2 ICLK
0008 71F0h	ICU	Interrupt request destination setting register 240	ISELR240	8	8	2 ICLK
0008 71F7h	ICU	Interrupt request destination setting register 247	ISELR247	8	8	2 ICLK
0008 71F8h	ICU	Interrupt request destination setting register 248	ISELR248	8	8	2 ICLK
0008 71FBh	ICU	Interrupt request destination setting register 251	ISELR251	8	8	2 ICLK
0008 71FCh	ICU	Interrupt request destination setting register 252	ISELR252	8	8	2 ICLK
0008 71FDh	ICU	Interrupt request destination setting register 253	ISELR253	8	8	2ICLK
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 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 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 7300h	ICU	Interrupt priority register 00	IPR00	8	8	2 ICLK
0008 7301h	ICU	Interrupt priority register 01	IPR01	8	8	2 ICLK
0008 7302h	ICU	Interrupt priority register 02	IPR02	8	8	2 ICLK
0008 7304h	ICU	Interrupt priority register 04	IPR04	8	8	2 ICLK
0008 7305h	ICU	Interrupt priority register 05	IPR05	8	8	2 ICLK
0008 7306h	ICU	Interrupt priority register 06	IPR06	8	8	2 ICLK
0008 7307h	ICU	Interrupt priority register 07	IPR07	8	8	2 ICLK
0008 7320h	ICU	Interrupt priority register 20	IPR20	8	8	2 ICLK

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 7321h	ICU	Interrupt priority register 21	IPR21	8	8	2 ICLK
0008 7322h	ICU	Interrupt priority register 22	IPR22	8	8	2 ICLK
0008 7323h	ICU	Interrupt priority register 23	IPR23	8	8	2 ICLK
0008 7324h	ICU	Interrupt priority register 24	IPR24	8	8	2 ICLK
0008 7325h	ICU	Interrupt priority register 25	IPR25	8	8	2 ICLK
0008 7326h	ICU	Interrupt priority register 26	IPR26	8	8	2 ICLK
0008 7327h	ICU	Interrupt priority register 27	IPR27	8	8	2 ICLK
0008 7328h	ICU	Interrupt priority register 28	IPR28	8	8	2 ICLK
0008 7329h	ICU	Interrupt priority register 29	IPR29	8	8	2 ICLK
0008 732Ah	ICU	Interrupt priority register 2A	IPR2A	8	8	2 ICLK
0008 732Bh	ICU	Interrupt priority register 2B	IPR2B	8	8	2 ICLK
0008 732Ch	ICU	Interrupt priority register 2C	IPR2C	8	8	2 ICLK
0008 732Dh	ICU	Interrupt priority register 2D	IPR2D	8	8	2 ICLK
0008 732Eh	ICU	Interrupt priority register 2E	IPR2E	8	8	2 ICLK
0008 732Fh	ICU	Interrupt priority register 2F	IPR2F	8	8	2 ICLK
0008 7340h	ICU	Interrupt priority register 40	IPR40	8	8	2 ICLK
0008 7344h	ICU	Interrupt priority register 44	IPR44	8	8	2 ICLK
0008 7345h	ICU	Interrupt priority register 45	IPR45	8	8	2 ICLK
0008 7346h	ICU	Interrupt priority register 46	IPR46	8	8	2 ICLK
0008 7347h	ICU	Interrupt priority register 47	IPR47	8	8	2 ICLK
0008 734Ch	ICU	Interrupt priority register 4C	IPR4C	8	8	2 ICLK
0008 734Dh	ICU	Interrupt priority register 4D	IPR4D	8	8	2 ICLK
0008 734Eh	ICU	Interrupt priority register 4E	IPR4E	8	8	2 ICLK
0008 734Fh	ICU	Interrupt priority register 4F	IPR4F	8	8	2 ICLK
0008 7350h	ICU	Interrupt priority register 50	IPR50	8	8	2 ICLK
0008 7351h	ICU	Interrupt priority register 51	IPR51	8	8	2 ICLK
0008 7352h	ICU	Interrupt priority register 52	IPR52	8	8	2 ICLK
0008 7353h	ICU	Interrupt priority register 53	IPR53	8	8	2 ICLK
0008 7354h	ICU	Interrupt priority register 54	IPR54	8	8	2 ICLK
0008 7355h	ICU	Interrupt priority register 55	IPR55	8	8	2 ICLK
0008 7356h	ICU	Interrupt priority register 56	IPR56	8	8	2 ICLK
0008 7357h	ICU	Interrupt priority register 57	IPR57	8	8	2 ICLK
0008 7358h	ICU	Interrupt priority register 58	IPR58	8	8	2 ICLK
0008 7359h	ICU	Interrupt priority register 59	IPR59	8	8	2 ICLK
0008 735Ah	ICU	Interrupt priority register 5A	IPR5A	8	8	2 ICLK
0008 735Bh	ICU	Interrupt priority register 5B	IPR5B	8	8	2 ICLK
0008 735Ch	ICU	Interrupt priority register 5C	IPR5C	8	8	2 ICLK
0008 735Dh	ICU	Interrupt priority register 5D	IPR5D	8	8	2 ICLK
0008 735Eh	ICU	Interrupt priority register 5E	IPR5E	8	8	2 ICLK
0008 735Fh	ICU	Interrupt priority register 5F	IPR5F	8	8	2 ICLK
0008 7360h	ICU	Interrupt priority register 60	IPR60	8	8	2 ICLK
0008 7361h	ICU	Interrupt priority register 61	IPR61	8	8	2 ICLK
0008 7362h	ICU	Interrupt priority register 62	IPR62	8	8	2 ICLK
0008 7363h	ICU	Interrupt priority register 63	IPR63	8	8	2 ICLK
0008 7368h	ICU	Interrupt priority register 68	IPR68	8	8	2 ICLK

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 7369h	ICU	Interrupt priority register 69	IPR69	8	8	2 ICLK
0008 736Ah	ICU	Interrupt priority register 6A	IPR6A	8	8	2 ICLK
0008 736Bh	ICU	Interrupt priority register 6B	IPR6B	8	8	2 ICLK
0008 7370h	ICU	Interrupt priority register 70	IPR70	8	8	2 ICLK
0008 7371h	ICU	Interrupt priority register 71	IPR71	8	8	2 ICLK
0008 7372h	ICU	Interrupt priority register 72	IPR72	8	8	2 ICLK
0008 7373h	ICU	Interrupt priority register 73	IPR73	8	8	2 ICLK
0008 7380h	ICU	Interrupt priority register 80	IPR80	8	8	2 ICLK
0008 7381h	ICU	Interrupt priority register 81	IPR81	8	8	2 ICLK
0008 7382h	ICU	Interrupt priority register 82	IPR82	8	8	2 ICLK
0008 7383h	ICU	Interrupt priority register 83	IPR83	8	8	2 ICLK
0008 7384h	ICU	Interrupt priority register 84	IPR84	8	8	2 ICLK
0008 7385h	ICU	Interrupt priority register 85	IPR85	8	8	2 ICLK
0008 7386h	ICU	Interrupt priority register 86	IPR86	8	8	2 ICLK
0008 7388h	ICU	Interrupt priority register 88	IPR88	8	8	2 ICLK
0008 7389h	ICU	Interrupt priority register 89	IPR89	8	8	2 ICLK
0008 738Ah	ICU	Interrupt priority register 8A	IPR8A	8	8	2 ICLK
0008 738Bh	ICU	Interrupt priority register 8B	IPR8B	8	8	2 ICLK
0008 738Ch	ICU	Interrupt priority register 8C	IPR8C	8	8	2 ICLK
0008 738Dh	ICU	Interrupt priority register 8D	IPR8D	8	8	2 ICLK
0008 738Eh	ICU	Interrupt priority register 8E	IPR8E	8	8	2 ICLK
0008 738Fh	ICU	Interrupt priority register 8F	IPR8F	8	8	2 ICLK
0008 73F0h	ICU	Fast interrupt register	FIR	16	16	2 ICLK
0008 7400h	DTC	DTC control register	DTCCR	8	8	2 ICLK
0008 7404h	DTC	DTC vector base register	DTCVBR	32	32	2 ICLK
0008 7408h	DTC	DTC address mode register	DTCADMOD	8	8	2 ICLK
0008 740Ch	DTC	DTC module start register	DTCST	8	8	2 ICLK
0008 8000h	CMT (unit 0)	Compare match timer start register 0	CMSTR0	16	16	2 to 3 PCLK *7
0008 8002h	CMT0	Compare match timer control register	CMCR	16	16	2 to 3 PCLK *7
0008 8004h	CMT0	Compare match timer counter	CMCNT	16	16	2 to 3 PCLK *7
0008 8006h	CMT0	Compare match timer constant register	CMCOR	16	16	2 to 3 PCLK *7
0008 8008h	CMT1	Compare match timer control register	CMCR	16	16	2 to 3 PCLK *7
0008 800Ah	CMT1	Compare match timer counter	CMCNT	16	16	2 to 3 PCLK *7
0008 800Ch	CMT1	Compare match timer constant register	CMCOR	16	16	2 to 3 PCLK *7
0008 8010h	CMT (unit 1)	Compare match timer start register 1	CMSTR1	16	16	2 to 3 PCLK *7
0008 8012h	CMT2	Compare match timer control register	CMCR	16	16	2 to 3 PCLK *7
0008 8014h	CMT2	Compare match timer counter	CMCNT	16	16	2 to 3 PCLK *7
0008 8016h	CMT2	Compare match timer constant register	CMCOR	16	16	2 to 3 PCLK *7
0008 8018h	CMT3	Compare match timer control register	CMCR	16	16	2 to 3 PCLK *7
0008 801Ah	CMT3	Compare match timer counter	CMCNT	16	16	2 to 3 PCLK *7
0008 801Ch	CMT3	Compare match timer constant register	CMCOR	16	16	2 to 3 PCLK *7
0008 8028h	WDT	Timer control/status register	TCSR	8	8	2 to 3 PCLK *7
0008 8028h	WDT	Write window A register	WINA	16	16	2 to 3 PCLK *7
0008 8029h	WDT	Timer counter	TCNT	8	8	2 to 3 PCLK *7
0008 802Ah	WDT	Write window B register	WINB	16	16	2 to 3 PCLK *7

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 802Bh	WDT	Reset control/status register	RSTCSR	8	8	2 to 3 PCLK *7
0008 8040h	AD0	A/D data register A	ADDRA	16	16	2 to 3 PCLK *7
0008 8042h	AD0	A/D data register B	ADDRB	16	16	2 to 3 PCLK *7
0008 8044h	AD0	A/D data register C	ADDRC	16	16	2 to 3 PCLK *7
0008 8046h	AD0	A/D data register D	ADDRD	16	16	2 to 3 PCLK *7
0008 8050h	AD0	A/D control/status register	ADCSR	8	8	2 to 3 PCLK *7
0008 8051h	AD0	A/D control register	ADCR	8	8	2 to 3 PCLK *7
0008 8052h	AD0	ADDRy format select register	ADDPR	8	8	2 to 3 PCLK *7
0008 8053h	AD0	A/D sampling state register	ADSSTR	8	8	2 to 3 PCLK *7
0008 8060h	AD1	A/D data register A	ADDRA	16	16	2 to 3 PCLK *7
0008 8062h	AD1	A/D data register B	ADDRB	16	16	2 to 3 PCLK *7
0008 8064h	AD1	A/D data register C	ADDRC	16	16	2 to 3 PCLK *7
0008 8066h	AD1	A/D data register D	ADDRD	16	16	2 to 3 PCLK *7
0008 8070h	AD1	A/D control/status register	ADCSR	8	8	2 to 3 PCLK *7
0008 8071h	AD1	A/D control register	ADCR	8	8	2 to 3 PCLK *7
0008 8072h	AD1	ADDRy format select register	ADDPR	8	8	2 to 3 PCLK *7
0008 8073h	AD1	A/D sampling state register	ADSSTR	8	8	2 to 3 PCLK *7
0008 8080h	AD2	A/D data register A	ADDRA	16	16	2 to 3 PCLK *7
0008 8082h	AD2	A/D data register B	ADDRB	16	16	2 to 3 PCLK *7
0008 8084h	AD2	A/D data register C	ADDRC	16	16	2 to 3 PCLK *7
0008 8086h	AD2	A/D data register D	ADDRD	16	16	2 to 3 PCLK *7
0008 8090h	AD2	A/D control/status register	ADCSR	8	8	2 to 3 PCLK *7
0008 8091h	AD2	A/D control register	ADCR	8	8	2 to 3 PCLK *7
0008 8092h	AD2	ADDRy format select register	ADDPR	8	8	2 to 3 PCLK *7
0008 8093h	AD2	A/D sampling state register	ADSSTR	8	8	2 to 3 PCLK *7
0008 80A0h	AD3	A/D data register A	ADDRA	16	16	2 to 3 PCLK *7
0008 80A2h	AD3	A/D data register B	ADDRB	16	16	2 to 3 PCLK *7
0008 80A4h	AD3	A/D data register C	ADDRC	16	16	2 to 3 PCLK *7
0008 80A6h	AD3	A/D data register D	ADDRD	16	16	2 to 3 PCLK *7
0008 80B0h	AD3	A/D control/status register	ADCSR	8	8	2 to 3 PCLK *7
0008 80B1h	AD3	A/D control register	ADCR	8	8	2 to 3 PCLK *7
0008 80B2h	AD3	ADDRy format select register	ADDPR	8	8	2 to 3 PCLK *7
0008 80B3h	AD3	A/D sampling state register	ADSSTR	8	8	2 to 3 PCLK *7
0008 80C0h	D/A	D/A data register 0	DADR0	16	16	2 to 3 PCLK *7
0008 80C2h	D/A	D/A data register 1	DADR1	16	16	2 to 3 PCLK *7
0008 80C4h	D/A	D/A control register	DACR	8	8	2 to 3 PCLK *7
0008 80C5h	D/A	DADRy format select register	DADPR	8	8	2 to 3 PCLK *7
0008 8100h	TPU (unit 0)	Timer start register	TSTRA	8	8	2 to 3 PCLK *7
0008 8101h	TPU (unit 0)	Timer synchronous register	TSYRA	8	8	2 to 3 PCLK *7
0008 8110h	TPU0	Timer control register	TCR	8	8	2 to 3 PCLK *7
0008 8111h	TPU0	Timer mode register	TMDR	8	8	2 to 3 PCLK *7
0008 8112h	TPU0	Timer I/O control register H	TIORH	8	8	2 to 3 PCLK *7
0008 8113h	TPU0	Timer I/O control register L	TIORL	8	8	2 to 3 PCLK *7
0008 8114h	TPU0	Timer interrupt enable register	TIER	8	8	2 to 3 PCLK *7
0008 8115h	TPU0	Timer status register	TSR	8	8	2 to 3 PCLK *7

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 825Fh	SCI3	Serial extended mode register	SEMR	8	8	2 to 3 PCLK *7
0008 8260h	SCI4	Serial mode register	SMR*6	8	8	2 to 3 PCLK *7
0008 8261h	SCI4	Bit rate register	BRR	8	8	2 to 3 PCLK *7
0008 8262h	SCI4	Serial control register	SCR*6	8	8	2 to 3 PCLK *7
0008 8263h	SCI4	Transmit data register	TDR	8	8	2 to 3 PCLK *7
0008 8264h	SCI4	Serial status register	SSR*6	8	8	2 to 3 PCLK *7
0008 8265h	SCI4	Receive data register	RDR	8	8	2 to 3 PCLK *7
0008 8266h	SCI4	Smart card mode register	SCMR	8	8	2 to 3 PCLK *7
0008 8267h	SCI4	Serial extended mode register	SEMR	8	8	2 to 3 PCLK *7
0008 8268h	SCI5	Serial mode register	SMR*6	8	8	2 to 3 PCLK *7
0008 8269h	SCI5	Bit rate register	BRR	8	8	2 to 3 PCLK *7
0008 826Ah	SCI5	Serial control register	SCR*6	8	8	2 to 3 PCLK *7
0008 826Bh	SCI5	Transmit data register	TDR	8	8	2 to 3 PCLK *7
0008 826Ch	SCI5	Serial status register	SSR*6	8	8	2 to 3 PCLK *7
0008 826Dh	SCI5	Receive data register	RDR	8	8	2 to 3 PCLK *7
0008 826Eh	SCI5	Smart card mode register	SCMR	8	8	2 to 3 PCLK *7
0008 826Fh	SCI5	Serial extended mode register	SEMR	8	8	2 to 3 PCLK *7
0008 8270h	SCI6	Serial mode register	SMR*6	8	8	2 to 3 PCLK *7
0008 8271h	SCI6	Bit rate register	BRR	8	8	2 to 3 PCLK *7
0008 8272h	SCI6	Serial control register	SCR*6	8	8	2 to 3 PCLK *7
0008 8273h	SCI6	Transmit data register	TDR	8	8	2 to 3 PCLK *7
0008 8274h	SCI6	Serial status register	SSR*6	8	8	2 to 3 PCLK *7
0008 8275h	SCI6	Receive data register	RDR	8	8	2 to 3 PCLK *7
0008 8276h	SCI6	Smart card mode register	SCMR	8	8	2 to 3 PCLK *7
0008 8277h	SCI6	Serial extended mode register	SEMR	8	8	2 to 3 PCLK *7
0008 8280h	CRC	CRC control register	CRCCR	8	8	2 to 3 PCLK *7
0008 8281h	CRC	CRC data input register	CRCDIR	8	8	2 to 3 PCLK *7
0008 8282h	CRC	CRC data output register	CRCDOR	16	16	2 to 3 PCLK *7
0008 8300h	RIIC0	I^2C bus control register 1	ICCR1	8	8	2 to 3 PCLK *7
0008 8301h	RIIC0	I^2C bus control register 2	ICCR2	8	8	2 to 3 PCLK *7
0008 8302h	RIIC0	I^2C bus mode register 1	ICMR1	8	8	2 to 3 PCLK *7
0008 8303h	RIIC0	I^2C bus mode register 2	ICMR2	8	8	2 to 3 PCLK *7
0008 8304h	RIIC0	I^2C bus mode register 3	ICMR3	8	8	2 to 3 PCLK *7
0008 8305h	RIIC0	I^2C bus function enable register	ICFER	8	8	2 to 3 PCLK *7
0008 8306h	RIIC0	I^2C bus status enable register	ICSER	8	8	2 to 3 PCLK *7
0008 8307h	RIIC0	I^2C bus interrupt enable register	ICIER	8	8	2 to 3 PCLK *7
0008 8308h	RIIC0	I^2C bus status register 1	ICSR1	8	8	2 to 3 PCLK *7
0008 8309h	RIIC0	I^2C bus status register 2	ICSR2	8	8	2 to 3 PCLK *7
0008 830Ah	RIIC0	Slave address register L0	SARL0	8	8	2 to 3 PCLK *7
0008 830Ah	RIIC0	Internal control for timeout L	TMOCNTL	16	16	2 to 3 PCLK *7
0008 830Bh	RIIC0	Slave address register U0	SARU0	8	8	2 to 3 PCLK *7
0008 830Bh	RIIC0	Internal control for timeout U	TMOCNTU	16	16	2 to 3 PCLK *7
0008 830Ch	RIIC0	Slave address register L1	SARL1	8	8	2 to 3 PCLK *7
0008 830Dh	RIIC0	Slave address register U1	SARU1	8	8	2 to 3 PCLK *7
0008 830Eh	RIIC0	Slave address register L2	SARL2	8	8	2 to 3 PCLK *7

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 830Fh	RIIC0	Slave address register U2	SARU2	8	8	2 to 3 PCLK *7
0008 8310h	RIIC0	I²C bus bit rate low-level register	ICBRL	8	8	2 to 3 PCLK *7
0008 8311h	RIIC0	I²C bus bit rate high-level register	ICBRH	8	8	2 to 3 PCLK *7
0008 8312h	RIIC0	I²C bus transmit data register	ICDRT	8	8	2 to 3 PCLK *7
0008 8313h	RIIC0	I²C bus receive data register	ICDRR	8	8	2 to 3 PCLK *7
0008 8320h	RIIC1	I²C bus control register 1	ICCR1	8	8	2 to 3 PCLK *7
0008 8321h	RIIC1	I²C bus control register 2	ICCR2	8	8	2 to 3 PCLK *7
0008 8322h	RIIC1	I²C bus mode register 1	ICMR1	8	8	2 to 3 PCLK *7
0008 8323h	RIIC1	I²C bus mode register 2	ICMR2	8	8	2 to 3 PCLK *7
0008 8324h	RIIC1	I²C bus mode register 3	ICMR3	8	8	2 to 3 PCLK *7
0008 8325h	RIIC1	I²C bus function enable register	ICFER	8	8	2 to 3 PCLK *7
0008 8326h	RIIC1	I²C bus status enable register	ICSER	8	8	2 to 3 PCLK *7
0008 8327h	RIIC1	I²C bus interrupt enable register	ICIER	8	8	2 to 3 PCLK *7
0008 8328h	RIIC1	I²C bus status register 1	ICSR1	8	8	2 to 3 PCLK *7
0008 8329h	RIIC1	I²C bus status register 2	ICSR2	8	8	2 to 3 PCLK *7
0008 832Ah	RIIC1	Slave address register L0	SARL0	8	8	2 to 3 PCLK *7
0008 832Ah	RIIC1	Internal control for timeout L	TMOCNTL	16	16	2 to 3 PCLK *7
0008 832Bh	RIIC1	Slave address register U0	SARU0	8	8	2 to 3 PCLK *7
0008 832Bh	RIIC1	Internal control for timeout U	TMOCNTU	16	16	2 to 3 PCLK *7
0008 832Ch	RIIC1	Slave address register L1	SARL1	8	8	2 to 3 PCLK *7
0008 832Dh	RIIC1	Slave address register U1	SARU1	8	8	2 to 3 PCLK *7
0008 832Eh	RIIC1	Slave address register L2	SARL2	8	8	2 to 3 PCLK *7
0008 832Fh	RIIC1	Slave address register U2	SARU2	8	8	2 to 3 PCLK *7
0008 8330h	RIIC1	I²C bus bit rate low-level register	ICBRL	8	8	2 to 3 PCLK *7
0008 8331h	RIIC1	I²C bus bit rate high-level register	ICBRH	8	8	2 to 3 PCLK *7
0008 8332h	RIIC1	I²C bus transmit data register	ICDRT	8	8	2 to 3 PCLK *7
0008 8333h	RIIC1	I²C bus receive data register	ICDRR	8	8	2 to 3 PCLK *7
0008 C000h	P0	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C001h	P1	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C002h	P2	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C003h	P3	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C004h	P4	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C005h	P5	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C006h	P6	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C007h	P7	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C008h	P8	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C009h	P9	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Ah	PA	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Bh	PB	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Ch	PC	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Dh	PD	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Eh	PE	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C00Fh	PF	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C010h	PG	Data direction register	DDR	8	8	2 to 3 PCLK *7
0008 C011h	PH	Data direction register	DDR	8	8	2 to 3 PCLK *7

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 C020h	P0	Data register	DR	8	8	2 to 3 PCLK *7
0008 C021h	P1	Data register	DR	8	8	2 to 3 PCLK *7
0008 C022h	P2	Data register	DR	8	8	2 to 3 PCLK *7
0008 C023h	P3	Data register	DR	8	8	2 to 3 PCLK *7
0008 C024h	P4	Data register	DR	8	8	2 to 3 PCLK *7
0008 C025h	P5	Data register	DR	8	8	2 to 3 PCLK *7
0008 C026h	P6	Data register	DR	8	8	2 to 3 PCLK *7
0008 C027h	P7	Data register	DR	8	8	2 to 3 PCLK *7
0008 C028h	P8	Data register	DR	8	8	2 to 3 PCLK *7
0008 C029h	P9	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Ah	PA	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Bh	PB	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Ch	PC	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Dh	PD	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Eh	PE	Data register	DR	8	8	2 to 3 PCLK *7
0008 C02Fh	PF	Data register	DR	8	8	2 to 3 PCLK *7
0008 C030h	PG	Data register	DR	8	8	2 to 3 PCLK *7
0008 C031h	PH	Data register	DR	8	8	2 to 3 PCLK *7
0008 C040h	P0	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C041h	P1	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C042h	P2	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C043h	P3	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C044h	P4	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C045h	P5	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C046h	P6	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C047h	P7	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C048h	P8	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C049h	P9	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Ah	PA	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Bh	PB	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Ch	PC	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Dh	PD	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Eh	PE	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C04Fh	PF	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C050h	PG	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C051h	PH	Port register	PORT	8	8	2 to 3 PCLK *7
0008 C060h	P0	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C061h	P1	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C062h	P2	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C063h	P3	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C064h	P4	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C065h	P5	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C066h	P6	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C067h	P7	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C068h	P8	Input buffer control register	ICR	8	8	2 to 3 PCLK *7

Address	Module Abbreviation	Register Name	Register Abbreviation	Number of Bits	Access Size	Number of Access Cycles
0008 C069h	P9	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Ah	PA	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Bh	PB	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Ch	PC	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Dh	PD	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Eh	PE	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C06Fh	PF	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C070h	PG	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C071h	PH	Input buffer control register	ICR	8	8	2 to 3 PCLK *7
0008 C082h	P2	Open drain control register	ODR	8	8	2 to 3 PCLK *7
0008 C08Ch	PC	Open drain control register	ODR	8	8	2 to 3 PCLK *7
0008 C0CAh	PA	Pull-Up resistor control register	PCR	8	8	2 to 3 PCLK *7
0008 C0CBh	PB	Pull-Up resistor control register	PCR	8	8	2 to 3 PCLK *7
0008 C0CCh	PC	Pull-Up resistor control register	PCR	8	8	2 to 3 PCLK *7
0008 C0CDh	PD	Pull-Up resistor control register	PCR	8	8	2 to 3 PCLK *7
0008 C0CEh	PE	Pull-Up resistor control register	PCR	8	8	2 to 3 PCLK *7
0008 C100h	I/O PORT	Port function control register 0	PFCR0	8	8	2 to 3 PCLK *7
0008 C101h	I/O PORT	Port function control register 1	PFCR1	8	8	2 to 3 PCLK *7
0008 C102h	I/O PORT	Port function control register 2	PFCR2	8	8	2 to 3 PCLK *7
0008 C103h	I/O PORT	Port function control register 3	PFCR3	8	8	2 to 3 PCLK *7
0008 C104h	I/O PORT	Port function control register 4	PFCR4	8	8	2 to 3 PCLK *7
0008 C105h	I/O PORT	Port function control register 5	PFCR5	8	8	2 to 3 PCLK *7
0008 C106h	I/O PORT	Port function control register 6	PFCR6	8	8	2 to 3 PCLK *7
0008 C107h	I/O PORT	Port function control register 7	PFCR7	8	8	2 to 3 PCLK *7
0008 C108h	I/O PORT	Port function control register 8	PFCR8	8	8	2 to 3 PCLK *7
0008 C109h	I/O PORT	Port function control register 9	PFCR9	8	8	2 to 3 PCLK *7
0008 C280h	SYSTEM	Deep standby control register	DPSBYCR	8	8	4 to 5 PCLK *7
0008 C281h	SYSTEM	Deep standby wait control register	DPSWCR	8	8	4 to 5 PCLK *7
0008 C282h	SYSTEM	Deep standby interrupt enable register	DPSIER	8	8	4 to 5 PCLK *7
0008 C283h	SYSTEM	Deep standby interrupt flag register	DPSIFR	8	8	4 to 5 PCLK *7
0008 C284h	SYSTEM	Deep standby interrupt edge register	DPSIEGR	8	8	4 to 5 PCLK *7
0008 C285h	SYSTEM	Reset status register	RSTSR	8	8	4 to 5 PCLK *7
0008 C289h	FLASH	Flash write erase protection register	FWEPROR	8	8	4 to 5 PCLK *7
0008 C290h	SYSTEM	Deep standby backup register 0	DPSBKR0	8	8	4 to 5 PCLK *7
0008 C291h	SYSTEM	Deep standby backup register 1	DPSBKR1	8	8	4 to 5 PCLK *7
0008 C292h	SYSTEM	Deep standby backup register 2	DPSBKR2	8	8	4 to 5 PCLK *7
0008 C293h	SYSTEM	Deep standby backup register 3	DPSBKR3	8	8	4 to 5 PCLK *7
0008 C294h	SYSTEM	Deep standby backup register 4	DPSBKR4	8	8	4 to 5 PCLK *7
0008 C295h	SYSTEM	Deep standby backup register 5	DPSBKR5	8	8	4 to 5 PCLK *7
0008 C296h	SYSTEM	Deep standby backup register 6	DPSBKR6	8	8	4 to 5 PCLK *7
0008 C297h	SYSTEM	Deep standby backup register 7	DPSBKR7	8	8	4 to 5 PCLK *7
0008 C298h	SYSTEM	Deep standby backup register 8	DPSBKR8	8	8	4 to 5 PCLK *7
0008 C299h	SYSTEM	Deep standby backup register 9	DPSBKR9	8	8	4 to 5 PCLK *7
0008 C29Ah	SYSTEM	Deep standby backup register 10	DPSBKR10	8	8	4 to 5 PCLK *7
0008 C29Bh	SYSTEM	Deep standby backup register 11	DPSBKR11	8	8	4 to 5 PCLK *7

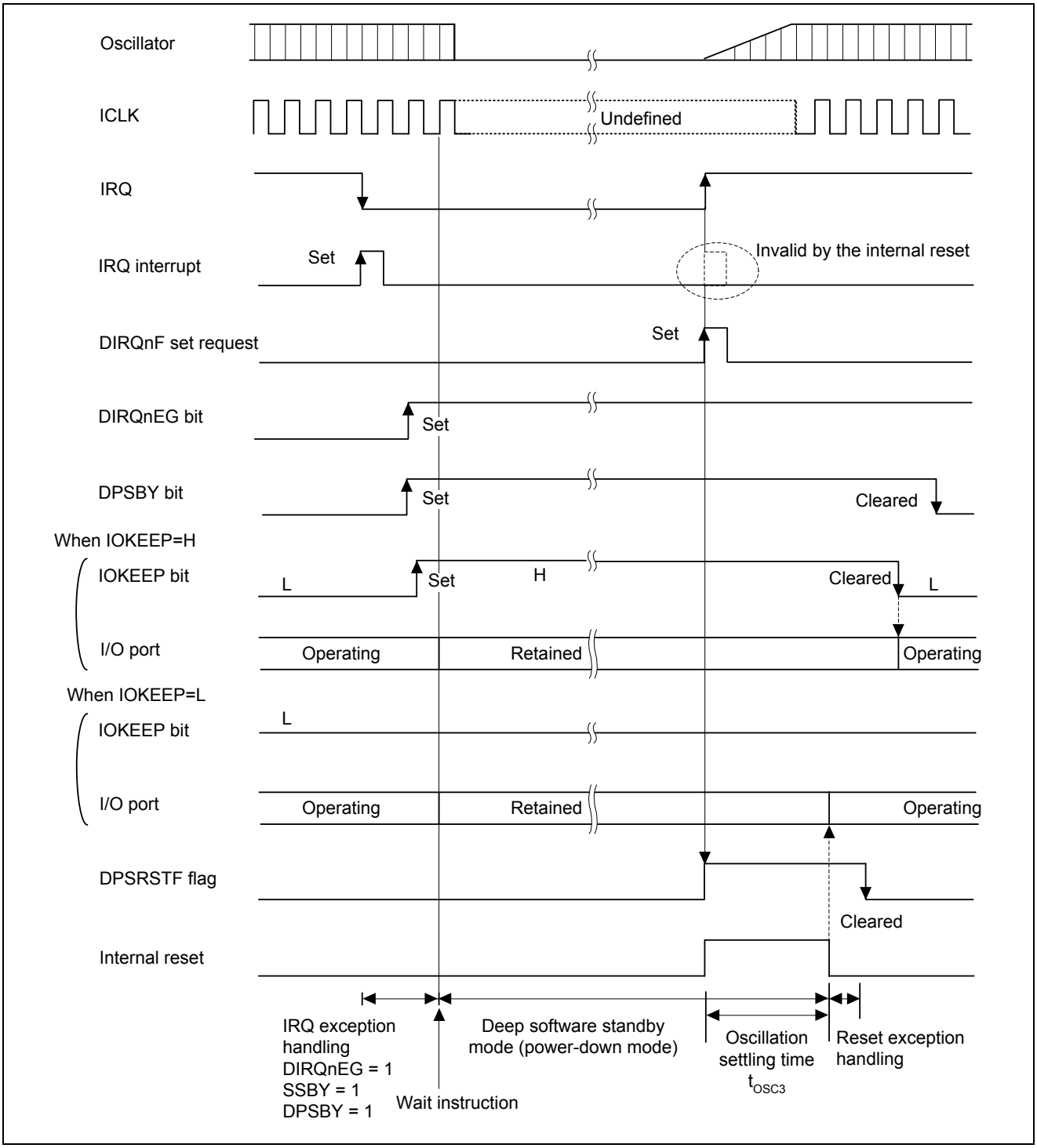


Figure 5.3 Oscillation Settling Timing after Deep Software Standby Mode

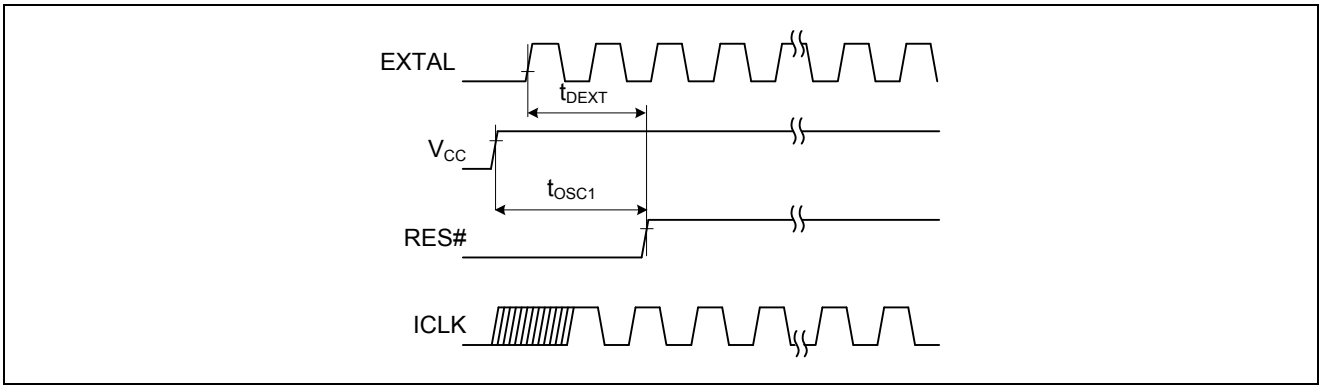


Figure 5.4 Oscillation Settling Timing

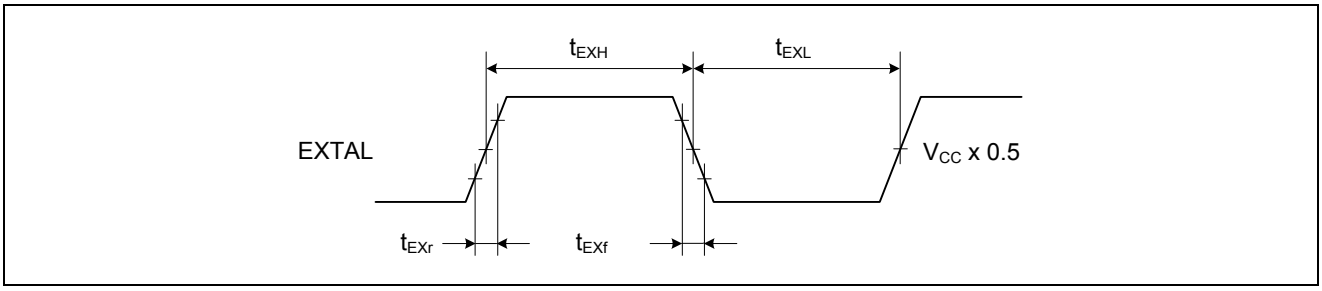


Figure 5.5 External Input Clock Timing

5.3.2 Control Signal Timing

Table 5.6 Control Signal Timing

Conditions: V_{CC} = $PLLV_{CC}$ = AV_{CC} = 3.0 to 3.6 V, V_{REFH} = 3.0 V to AV_{CC}, V_{SS} = $PLLV_{SS}$ = V_{REFL} = 0 V
ICLK = 8 to 100 MHz, BCLK = 8 to 25 MHz
T_a = -20 to +85°C (regular specifications), T_a = -40 to +85°C (wide-range specifications)

Item	Symbol	Min.	Max.	Unit	Test Conditions
RES# pulse width (except for ROM, data flash programming/erasure)	t_{RESW}*1	20	—	t_{cyc}	Figure 5.6
		1.5	—	μs	
Internal reset time (during ROM, data flash programming/erasure)	t_{RESW2} *2	35	—	μs	
NMI pulse width	t_{NMIW}	200	—	ns	Figure 5.7
IRQ pulse width	t_{IRQW}	200	—	ns	Figure 5.8

Notes: 1. Both the time and the number of cycles should satisfy the specifications.
2. This is to specify the FCU reset and the WDT reset.

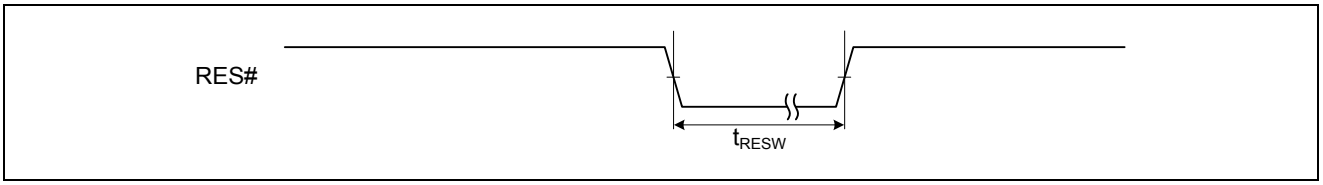


Figure 5.6 Reset Input Timing

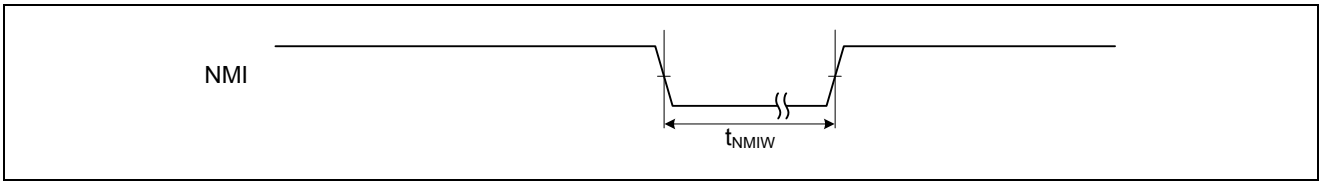


Figure 5.7 NMI Interrupt Input Timing

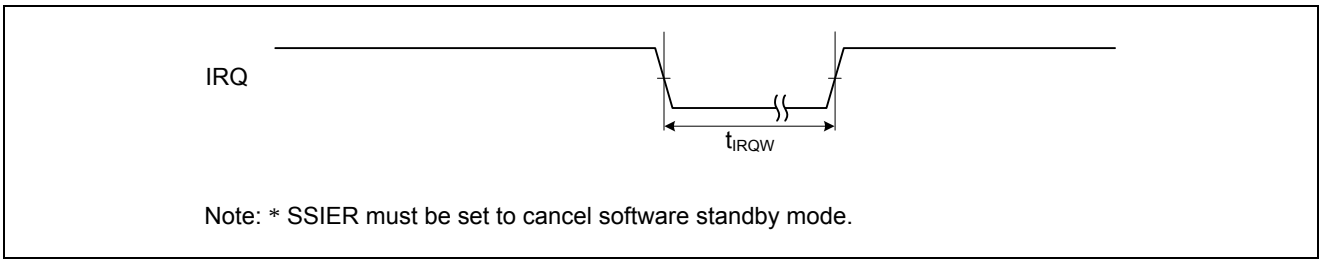


Figure 5.8 IRQ Interrupt Input Timing

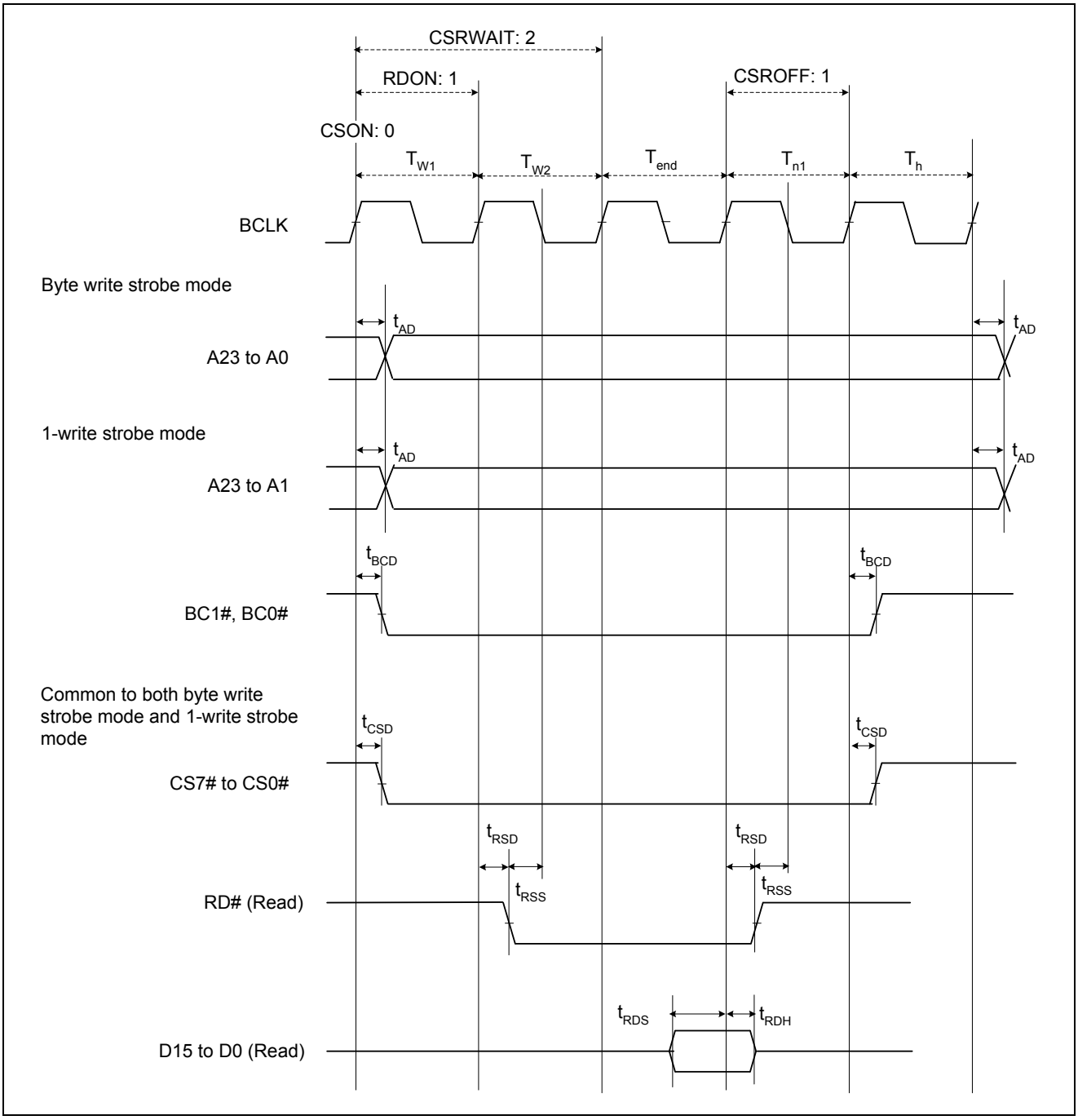


Figure 5.9 External Bus Timing/Normal Read Cycle (Bus Clock Synchronized)

Table 5.8 Timing of On-Chip Peripheral Modules (3)

Conditions: V_{CC} = $PLLV_{CC}$ = AV_{CC} = 3.0 to 3.6 V, V_{REFH} = 3.0 V to AV_{CC}, V_{SS} = $PLLV_{SS}$ = V_{REFL} = 0 V,
T_a = -20 to +85°C (regular specifications), T_a = -40 to +85°C (wide-range specifications)

Item		Symbol	Min. *1*2	Max.	Unit	Test Conditions
RIIC (Fast-mode+) ICFER.FMPE = 1	SCL input cycle time	t_{SCL}	8(10) x (1/PCLK) + 240	—	ns	Figure 5.25
	SCL input high pulse width	t_{SCLH}	3(5) x (1/PCLK) + 120	—	ns	
	SCL input low pulse width	t_{SCLL}	5 x (1/PCLK) + 120	—	ns	
	SCL, SDA input rising time	t_{Sr}	—	120	ns	
	SCL, SDA input falling time	t_{Sf}	—	120	ns	
	SCL, SDA input spike pulse removal time	t_{SP}	0	4 x (1/PCLK)	ns	
	SDA input bus free time	t_{BUF}	5 x (1/PCLK) + 120	—	ns	
	Start condition input hold time	t_{STAH}	3(5) x (1/PCLK) + 120	—	ns	
	Re-start condition input setup time	t_{STAS}	5 x (1/PCLK) + 120	—	ns	
	Stop condition input setup time	t_{STOS}	3(5) x (1/PCLK) + 120	—	ns	
	Data input setup time	t_{SDAS}	50	—	ns	
	Data input hold time	t_{SDAH}	0	—	ns	
	SCL, SDA capacitive load	C_b	—	550	pF	
Boundary scan (176-pin LFBGA)	TCK clock cycle time	tTCKcyc	100	—	ns	Figure 5.26
	TCK clock high level pulse width	tTCKH	45	—	ns	
	TCK clock low level pulse width	tTCKL	45	—	ns	
	TCK clock rising time	tTCKr	—	5	ns	
	TCK clock falling time	tTCKf	—	5	ns	
	TRST# pulse width	tTRSTW	20	—	Tcyc	Figure 5.27
	TMS setup time	tTMSS	20	—	ns	Figure 5.28
	TMS hold time	tTMSH	20	—	ns	
	TDI setup time	tTDIS	20	—	ns	
	TDI hold time	tTDIH	20	—	ns	
	TDO data delay time	tTDOD	—	40	ns	

Notes:1. The value in parentheses is used when ICMR3.NF[1:0] are set to 11b while a digital filter is enabled with ICFER.NFE = 1.

2. Cb indicates the total capacity of the bus line.

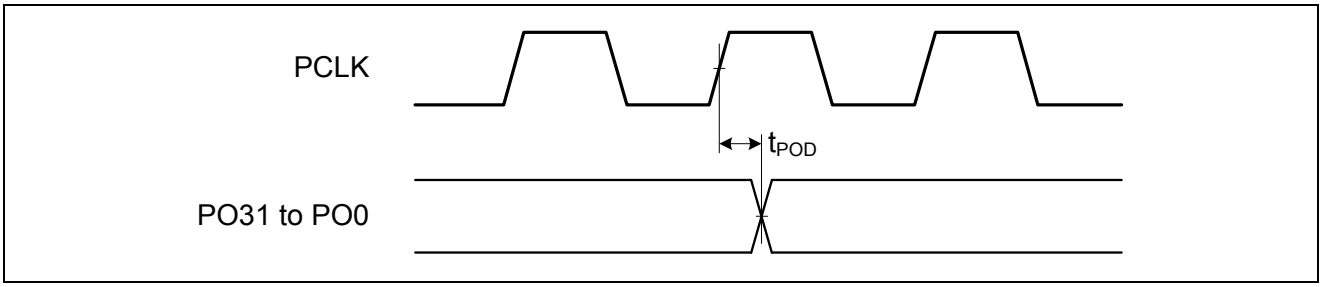


Figure 5.17 PPG Output Timing

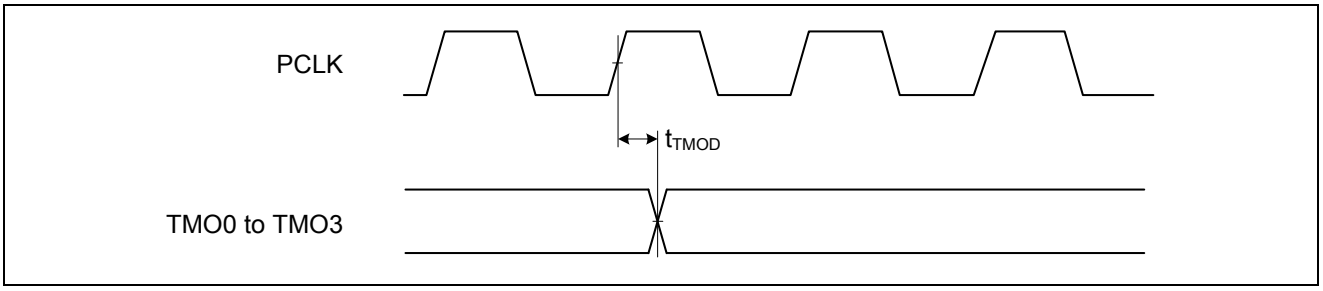


Figure 5.18 8-Bit Timer Output Timing

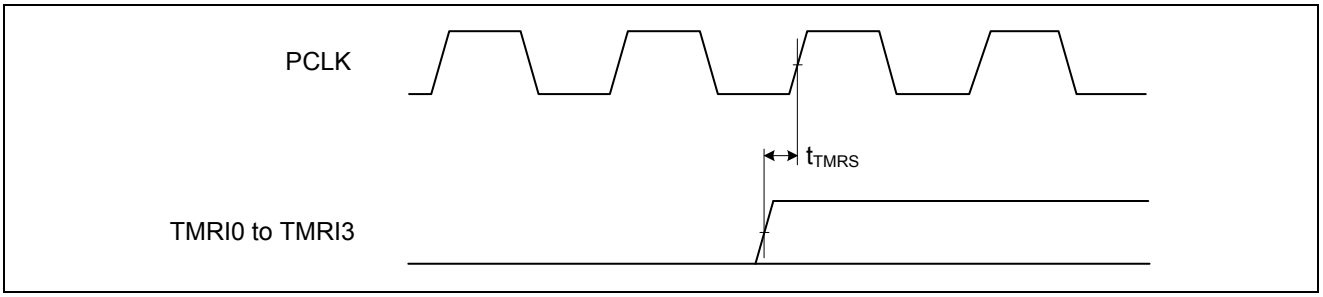


Figure 5.19 8-Bit Timer Reset Input Timing

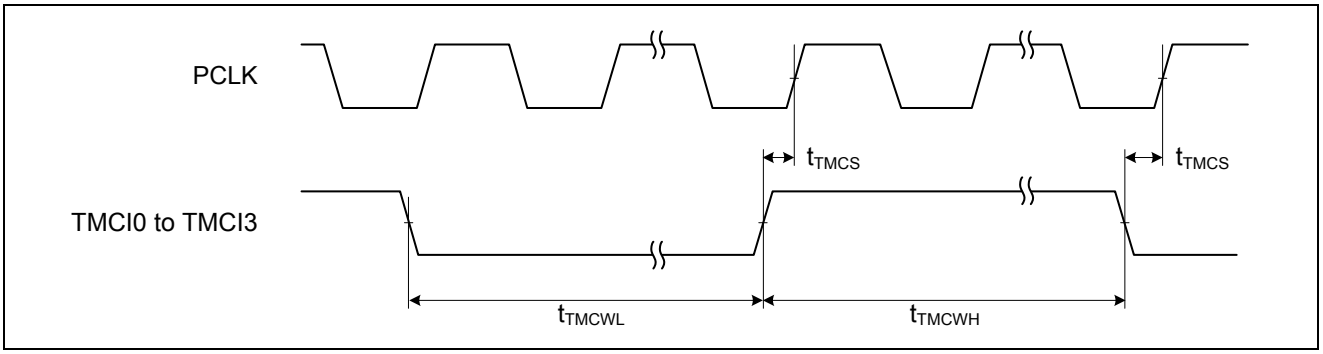
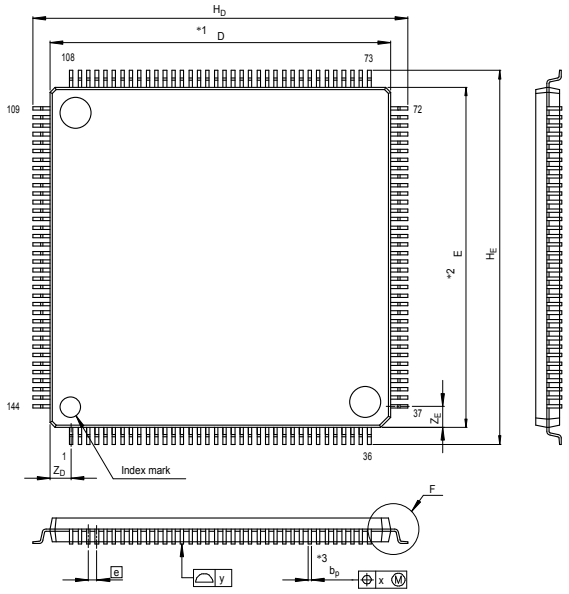
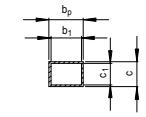


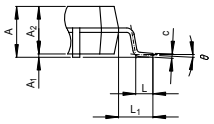
Figure 5.20 8-Bit Timer Clock Input Timing

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-LQFP144-20x20-0.50	PLQP0144KA-A	144P6Q-A / FP-144L / FP-144LV	1.2g





Terminal cross section



Detail F

NOTE)
1. DIMENSIONS "*1" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	19.9	20.0	20.1
E	19.9	20.0	20.1
A_2	—	1.4	—
H_D	21.8	22.0	22.2
H_E	21.8	22.0	22.2
A	—	—	1.7
A_1	0.05	0.1	0.15
b_p	0.17	0.22	0.27
b_1	—	0.20	—
c	0.09	0.145	0.20
c_1	—	0.125	—
θ	0°	—	8°
e	—	0.5	—
x	—	—	0.08
y	—	—	0.10
Z_D	—	1.25	—
Z_E	—	1.25	—
L	0.35	0.5	0.65
L_1	—	1.0	—

144-pin LQFP (PLQP0144KA-A)