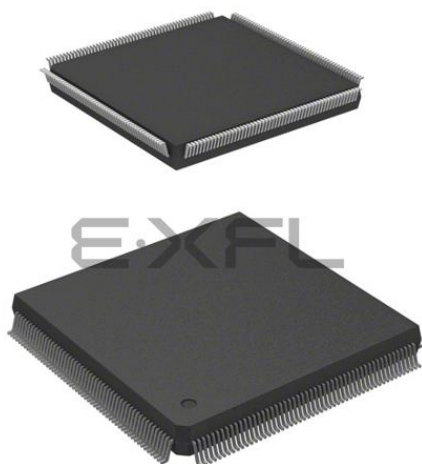




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What is "[Embedded - Microcontrollers](#)"?

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

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

Details

Product Status	Obsolete
Core Processor	FR81S
Core Size	32-Bit Single-Core
Speed	80MHz
Connectivity	CANbus, CSIO, EBI/EMI, LINbus, UART/USART
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	156
Program Memory Size	576KB (576K x 8)
Program Memory Type	FLASH
EEPROM Size	64K x 8
RAM Size	848K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 32x8/10b
Oscillator Type	External
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	208-LQFP
Supplier Device Package	208-LQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb91f592bhspmc-gsk5e1

Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
32	P005	–	O	General-purpose I/O port (3V pin)
	D5	–		External bus · Data bit5 I/O pin
	SCK3_1	–		LIN-UART ch.3 clock I/O pin (1)
	TOT1_2	–		Reload timer ch.1 output pin (2)
	PPG5	–		PPG ch.5 output pin
33	P006	–	O	General-purpose I/O port (3V pin)
	D6	–		External bus · Data bit6 I/O pin
	TOT2_2	–		Reload timer ch.2 output pin (2)
	PPG6	–		PPG ch.6 output pin
34	P007	–	O	General-purpose I/O port (3V pin)
	D7	–		External bus · Data bit7 I/O pin
	TOT3_2	–		Reload timer ch.3 output pin (2)
	PPG7	–		PPG ch.7 output pin
35	P010	–	O	General-purpose I/O port (3V pin)
	D8	–		External bus · Data bit8 I/O pin
38	P011	–	O	General-purpose I/O port (3V pin)
	D9	–		External bus · Data bit9 I/O pin
	ROUT0	–		Display digital R0 output pin
39	P012	–	O	General-purpose I/O port (3V pin)
	D10	–		External bus · Data bit10 I/O pin
	ROUT1	–		Display digital R1 output pin
40	P013	–	O	General-purpose I/O port (3V pin)
	D11	–		External bus · Data bit11 I/O pin
	GOUT0	–		Display digital G0 output pin
41	P014	–	O	General-purpose I/O port (3V pin)
	D12	–		External bus · Data bit12 I/O pin
	GOUT1	–		Display digital G1 output pin
42	P015	–	O	General-purpose I/O port (3V pin)
	D13	–		External bus · Data bit13 I/O pin
	BOUT0	–		Display digital B0 output pin
43	P016	–	O	General-purpose I/O port (3V pin)
	D14	–		External bus · Data bit14 I/O pin
	BOUT1	–		Display digital B1 output pin
44	P017	–	O	General-purpose I/O port (3V pin)
	D15	–		External bus · Data bit15 I/O pin
45	P020	–	O	General-purpose I/O port (3V pin)
	WEX	–		External bus · Write enable output pin
46	P021	–	O	General-purpose I/O port (3V pin)
	CS0X	–		External bus · Chip select 0 output pin
47	P022	–	O	General-purpose I/O port (3V pin)
	CS1X	–		External bus · Chip select 1 output pin
48	P023	–	O	General-purpose I/O port (3V pin)
	REX	–		External bus · Read enable output pin
49	P024	–	O	General-purpose I/O port (3V pin)
50	P025	–	O	General-purpose I/O port (3V pin)
51	P026	–	O	General-purpose I/O port (3V pin)
	A00	–		External bus · Address bit0 output pin
54	P027	–	O	General-purpose I/O port (3V pin)
	A01	–		External bus · Address bit1 output pin

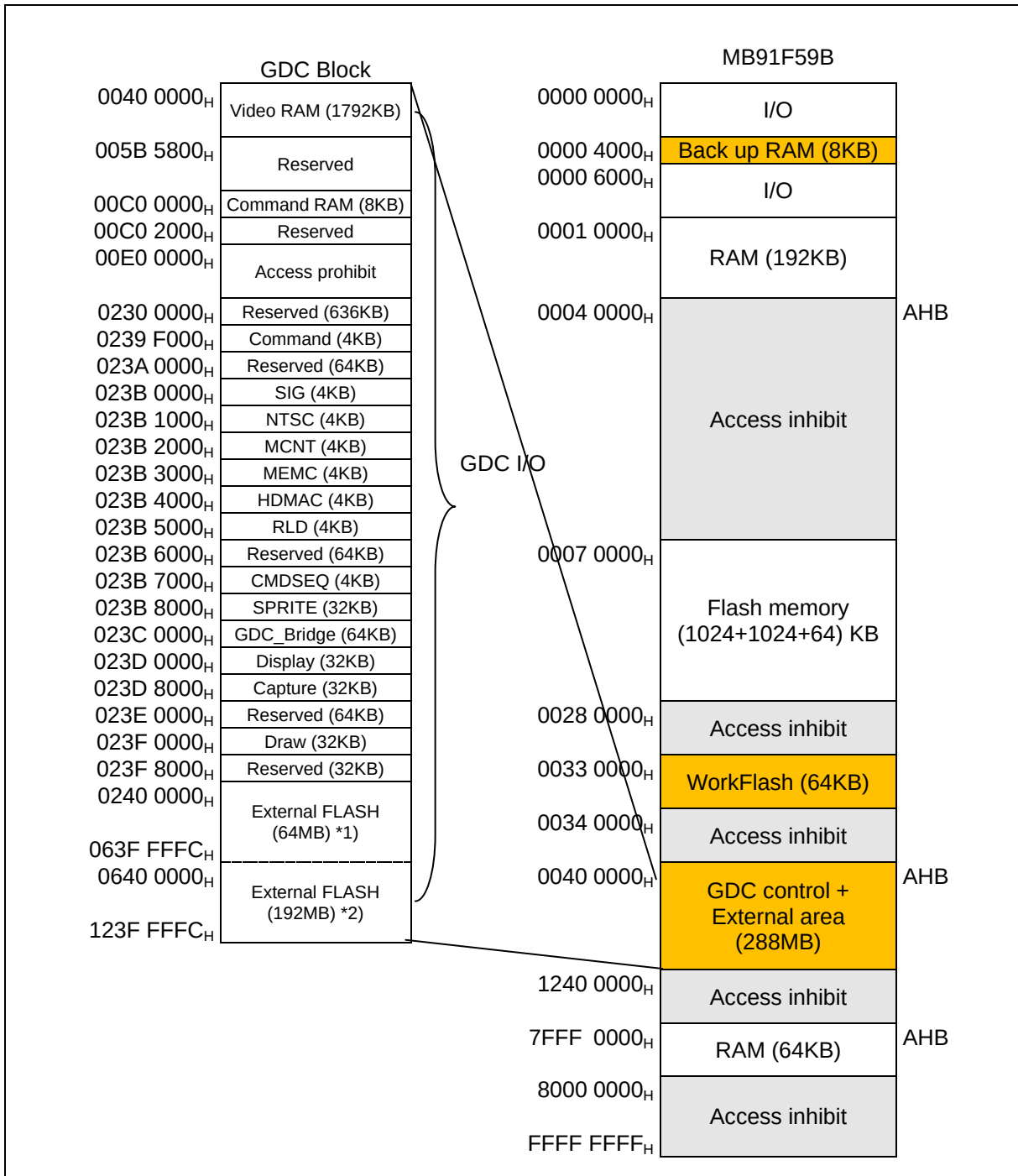
Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
77	P053	–	O	General-purpose I/O port(3V pin)
	A21	–		External bus · Address bit21 output pin
	SPI_DO	–		SPI data output pin
78	P054	–	O	General-purpose I/O port (3V pin)
	A22	–		External bus · Address bit22 output pin
	SPI_DI	–		SPI data input pin
79	P055	–	O	General-purpose I/O port (3V pin)
	A23	–		External bus · Address bit23 output pin
	SPI_SCK	–		SPI clock output pin
80	P056	–	O	General-purpose I/O port (3V pin)
	A24	–		External bus · Address bit24 output pin
	SPI_XCS	–		SPI chip select output pin
81	P057	–	O	General-purpose I/O port (3V pin)
	RDY	–		External bus · Wait input pin
127	P060	–	E	General-purpose I/O port
	PWM1P0	–		SMC ch.0 output pin
	AN8	–		ADC Analog 8 input pin
	SIN10	–		Multi-function serial ch.10 serial data input pin(MB91F59A/B only)
128	P061	–	E	General-purpose I/O port
	PWM1M0	–		SMC ch.0 output pin
	AN9	–		ADC Analog 9 input pin
	SOT10	–		Multi-function serial ch.10 serial data output pin(MB91F59A/B only)
129	P062	–	E	General-purpose I/O port
	PWM2P0	–		SMC ch.0 output pin
	AN10	–		ADC Analog 10 input pin
	UDCZIN1	–		Up/down counter ch.1 ZIN input pin(MB91F59A/B only)
	SCK10	–		Multi-function serial ch.10 clock I/O pin(MB91F59A/B only)
130	P063	–	E	General-purpose I/O port
	PWM2M0	–		SMC ch.0 output pin
	AN11	–		ADC Analog 11 input pin
	UDCBIN1	–		Up/down counter ch.1 BIN input pin(MB91F59A/B only)
131	P064	–	E	General-purpose I/O port
	PWM1P1	–		SMC ch.1 output pin
	AN12	–		ADC Analog 12 input pin
	UDCAIN1	–		Up/down counter ch.1 AIN input pin(MB91F59A/B only)
132	P065	–	E	General-purpose I/O port
	PWM1M1	–		SMC ch.1 output pin
	AN13	–		ADC Analog 13 input pin
	UDCZIN0	–		Up/down counter ch.0 ZIN input pin(MB91F59A/B only)
133	P066	–	E	General-purpose I/O port
	PWM2P1	–		SMC ch.1 output pin
	AN14	–		ADC Analog 14 input pin
	UDCBIN0	–		Up/down counter ch.0 BIN input pin(MB91F59A/B only)

Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
154	P087	–	E	General-purpose I/O port
	PWM2M5	–		SMC ch.5 output pin
	AN31	–		ADC Analog 31 input pin
	ICU4_2	–		Input capture ch.4 input pin (2)
	PPG23	–		PPG ch.23 output pin
157	P090	–	A	General-purpose I/O port
	ADTG	–		A/D convertor external trigger input pin
	PPG0_2	–		PPG ch.0 output pin (2)
	TIN7_1	–		Reload timer ch.7 event input pin (1) (MB91F59A/B only)
98	P091	–	C	General-purpose I/O port
	SGA0	–		Sound generator ch.0 SGA output pin
	SIN2	–		LIN-UART ch.2 serial data input pin
	INT12	–		INT12 External interrupt input pin
	TOT2_1	–		Reload timer ch.2 output pin (1)
	ICU2_1	–		Input capture ch.2 input pin (1)
	PPG6_1	–		PPG ch.6 output pin (1)
99	P092	–	C	General-purpose I/O port
	SGO0	–		Sound generator ch.0 SGO output pin
	SCK2	–		LIN-UART ch.2 clock I/O pin
	INT13	–		INT13 External interrupt input pin
	TOT3_1	–		Reload timer ch.3 output pin (1)
	ICU0_1	–		Input capture ch.0 input pin (1)
	PPG7_1	–		PPG ch.7 output pin (1)
100	P093	–	C	General-purpose I/O port
	SGA1	–		Sound generator ch.1 SGA output pin
	SOT2	–		LIN-UART ch.2 serial data output pin
	INT14	–		INT14 External interrupt input pin
	ICU3_1	–		Input capture ch.3 input pin (1)
	PPG8_1	–		PPG ch.8 output pin (1)
	TIN8_1	–		Reload timer ch.8 event input pin (1) (MB91F59A/B only)
160	P094	–	C	General-purpose I/O port
	SGO1	–		Sound generator ch.1 SGO output pin
	SIN3	–		LIN-UART ch.3 serial data input pin
	INT15	–		INT15 External interrupt input pin
	ICU1_1	–		Input capture ch.1 input pin (1)
	PPG9_1	–		PPG ch.9 output pin (1)
	TIN9_1	–		Reload timer ch.9 event input pin (1) (MB91F59A/B only)
106	P095	–	A	General-purpose I/O port
	TX0	–		CAN transmission data0 output pin
	PPG10_1	–		PPG ch.10 output pin (1)
107	P096	–	A	General-purpose I/O port
	RX0	–		CAN reception data0 input pin
	INT9	–		INT9 External interrupt input pin

Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
93	P131	–	A	General-purpose I/O port
	TRG1	–		PPG trigger 1 input pin (ch.4 to ch.7)
	SIN1	–		Multi-function serial ch.1 serial data input pin
	INT4	–		INT4 External interrupt input pin
	ICU2	–		Input capture ch.2 input pin
	TIOA1	–		Base timer TIOA1 I/O pin
	TOT7	–		Reload timer ch.7 output pin(MB91F59A/B only)
94	P132	–	K	General-purpose I/O port
	SOT1	–		Multi-function serial ch.1 serial data output pin / I ² C ch.1 serial data I/O pin
	INT2	–		INT2 External interrupt input pin
	ICU3	–		Input capture ch.3 input pin
	TIOB0	–		Base timer TIOB0 input pin
	TOT8	–		Reload timer ch.8 output pin(MB91F59A/B only)
95	P133	–	K	General-purpose I/O port
	TRG5	–		PPG trigger 5 input pin (ch.20 to ch.23)
	PPG11_1	–		PPG ch.11 output pin (1)
	SCK1	–		Multi-function serial ch.1 clock I/O pin / I ² C ch.1 clock I/O pin
	INT3	–		INT3 External interrupt input pin
	ICU4	–		Input capture ch.4 input pin
	TIOB1	–		Base timer TIOB1 input pin
	TOT9	–		Reload timer ch.9 output pin(MB91F59A/B only)
96	P134	–	A	General-purpose I/O port
	TRG2	–		PPG trigger 2 input pin (ch.8 to ch.11)
	PPG1_3	–		PPG ch.1 output pin (3)
	INT5	–		INT5 External interrupt input pin
	ICU5	–		Input capture ch.5 input pin
	TOT10	–		Reload timer ch.10 output pin(MB91F59A/B only)
103	DEBUGIF	–	G	DEBUG I/F pin
176	PA2	–	O	General-purpose I/O port (3V pin)
	RIN2	–		Capture R2 input pin (RGB mode)
	VIN0	–		Capture VIN0 input pin (656 mode)
177	PA3	–	O	General-purpose I/O port (3V pin)
	RIN3	–		Capture R3 input pin (RGB mode)
	VIN1	–		Capture VIN1 input pin (656 mode)
178	PA4	–	O	General-purpose I/O port (3V pin)
	RIN4	–		Capture R4 input pin (RGB mode)
	VIN2	–		Capture VIN2 input pin (656 mode)
179	PA5	–	O	General-purpose I/O port (3V pin)
	RIN5	–		Capture R5 input pin (RGB mode)
	VIN3	–		Capture VIN3 input pin (656 mode)
180	PA6	–	O	General-purpose I/O port (3V pin)
	RIN6	–		Capture R6 input pin (RGB mode)
	VIN4	–		Capture VIN4 input pin (656 mode)
181	PA7	–	O	General-purpose I/O port (3V pin)
	RIN7	–		Capture R7 input pin (RGB mode)
	VIN5	–		Capture VIN5 input pin (656 mode)

BGA Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
36	P125	-	A	General-purpose I/O port
	ICU0			Input capture ch.0 input pin
	SCK11			Multi-function serial ch.11 clock I/O pin
	OCU3			Output compare ch.3 output pin
	PPG10_2			PPG ch.10 output pin (2)
	TIN10			Reload timer ch.10 event input pin
37	P123	-	A	General-purpose I/O port
	SIN11			Multi-function serial ch.11 serial data input pin
	OCU1			Output compare ch.1 output pin
	PPG8_2			PPG ch.8 output pin (2)
	TIN8			Reload timer ch.8 event input pin
38	VSS	-	-	GND pin
39	VSS	-	-	GND pin
40	MD3	-	F3	Mode pin 3
41	DEBUGIF	-	G	DEBUG I/F pin
42	TX1	-	C	CAN transmission data1 output pin
	FRCK5			Free-run timer 5 clock input pin
	P110			General-purpose I/O port
	PPG1_2			PPG ch.1 output pin (2)
	TOT8_1			Reload timer ch.8 output pin (1)
43	P091	-	C	General-purpose I/O port
	ICU2_1			Input capture ch.2 input pin (1)
	INT12			INT12 External interrupt input pin
	SIN2			LIN-UART ch.2 serial data input pin
	PPG6_1			PPG ch.6 output pin (1)
	TOT2_1			Reload timer ch.2 output pin (1)
	SGA0			Sound generator ch.0 SGA output pin
44	VSS	-	-	GND pin
45	X0	-	L	Main clock oscillation input pin
46	X1	-	L	Main clock oscillation output pin
47	VSS	-	-	GND pin
48	A23	-	O	External bus · Address bit23 output pin
	P055			General-purpose I/O port (3V pin)
	SPI_SCK			SPI clock output pin
49	A22	-	O	External bus · Address bit22 output pin
	P054			General-purpose I/O port (3V pin)
	SPI_DI			SPI data input pin
50	C_2	-	-	Built-in regulator capacitor connected pin 2

BGA Pin No.	Pin Name	Polarity	I/O Circuit Types ^{*1}	Function ^{*2}
116	MD0	–	P	Mode pin 0
117	MD1	–	P	Mode pin 1
118	P126	–	A	General-purpose I/O port
	INT1			INT1 External interrupt input pin
118	SIN0	–	A	Multi-function serial ch.0 serial data input pin
	TRG0			PPG trigger 0 input pin (ch.0 to ch.3)
119	A24	–	O	External bus · Address bit24 output pin
	P056			General-purpose I/O port (3V pin)
	SPI_XCS			SPI chip select output pin
120	A21	–	O	External bus · Address bit21 output pin
	P053			General-purpose I/O port(3V pin)
	SPI_DO			SPI data output pin
121	VSS	–	–	GND pin
122	A16	–	O	External bus · Address bit16 output pin
	P046			General-purpose I/O port (3V pin)
	QSPI_CS3			HS_SPI SSEL3 Output pin
123	A14	–	O	External bus · Address bit14 output pin
	P044			General-purpose I/O port (3V pin)
	QSPI_CS1			HS_SPI SSEL1 Output pin
124	A11	–	O	External bus · Address bit11 output pin
	P041			General-purpose I/O port (3V pin)
	QSPI_SIO2			HS_SPI SDATA2 I/O pin
125	A08	–	O	External bus · Address bit8 output pin
	P036			General-purpose I/O port (3V pin)
126	A04	–	O	External bus · Address bit4 output pin
	P032			General-purpose I/O port (3V pin)
127	A01	–	O	External bus · Address bit1 output pin
	P027			General-purpose I/O port (3V pin)
128	VSS	–	–	GND pin
129	A00	–	O	External bus · Address bit0 output pin
	P026			General-purpose I/O port (3V pin)
130	REX	–	O	External bus · Read enable output pin
	P023			General-purpose I/O port (3V pin)
131	WEX	–	O	External bus · Write enable output pin
	P020			General-purpose I/O port (3V pin)
132	BOUT0	–	O	Display digital B0 output pin
	D13			External bus · Data bit13 I/O pin
	P015			General-purpose I/O port (3V pin)
133	ROUT0	–	O	Display digital R0 output pin
	D9			External bus · Data bit9 I/O pin
	P011			General-purpose I/O port (3V pin)
134	D6	–	O	External bus · Data bit6 I/O pin
	P006			General-purpose I/O port (3V pin)
	PPG6			PPG ch.6 output pin
	TOT2_2			Reload timer ch.2 output pin (2)
135	D3	–	O	External bus · Data bit3 I/O pin
	P003			General-purpose I/O port (3V pin)
	SIN3_1			LIN-UART ch.3 serial data input pin (1)
	PPG3			PPG ch.3 output pin
	TIN3_2			Reload timer ch.3 event input pin (2)

■ GDC memory map


Note: The GDC area is executed mapping with the little endian.

*1) Parallel interface supports 64MB of memory space from 0240_0000_H to 063F_FFFC_H for External FLASH.

*2) HS-SPI supports additional 192MB of memory space from 0640_0000_H to 123F_FFFF_H.
 (HS-SPI totally supports 256MB of memory space from 0240_0000_H to 123F_FFFF_H for External FLASH)

Address	Address Offset Value / Register Name				Block
	+0	+1	+2	+3	
000090 _H	BT1TMR [R] H 00000000 00000000		BT1TMCR [R/W] H -0000000 00000000		Base timer 1
000094 _H	—	BT1STC [R/W] B 0000-000	—	—	
000098 _H	BT1PCSR/BT1PRL [R/W] H 00000000 00000000		BT1PDUT/BT1PRLH/BT1DTBF [R/W] H 00000000 00000000		
00009C _H	BTSEL01 [R/W] B ----0000	—	BTSSSR [W] B,H -----11		Base timer 0,1
0000A0 _H	ADERH [R/W] B, H, W 00000000 00000000		ADERL [R/W] B, H, W 00000000 00000000		A/D converter
0000A4 _H	ADCS1 [R/W] B, H,W 0000000-	ADCS0 [R/W] B, H,W 00000000	ADCR1 [R] B, H,W -----XX	ADCR0 [R] B, H,W XXXXXXXXXX	
0000A8 _H	ADCT1 [R/W] B, H,W 00010000	ADCT0 [R/W] B, H,W 00101100	ADSCH [R/W] B, H,W ---00000	ADECH [R/W] B, H,W ---00000	
0000AC _H	—	—	—	—	Reserved
0000B0 _H	SCR0/(IBCR0) [R/W] B,H,W 0--00000	SMR0 [R/W] B,H,W 000-0000	SSR0 [R/W] B,H,W 0-000011	ESCR0/(IBSR0) [R/W] B,H,W -0000000	Multi-function serial 0
0000B4 _H	RDR0/(TDR0)[R/W] B,H,W ^{*1} -----0 00000000		BGR0 [R/W] H,W 00000000 00000000		*1: Byte access is possible only for access to lower 8 bits
0000B8 _H	— / (ISMK0) [R/W] B,H,W ----- ^{*2}	— / (ISBA0) [R/W] B,H,W ----- ^{*2}	—	—	*2: Reserved because I ² C mode is not set immediately after reset.
0000BC _H	FCR10 [R/W] B,H,W ---00100	FCR00 [R/W] B,H,W -0000000	FBYTE20 [R/W] B,H,W 00000000	FBYTE10 [R/W] B,H,W 00000000	
0000C0 _H	SCR1/(IBCR1) [R/W] B,H,W 0--00000	SMR1 [R/W] B,H,W 000-0000	SSR1 [R/W] B,H,W 0-000011	ESCR1/(IBSR1) [R/W] B,H,W -0000000	Multi-function serial 1
0000C4 _H	RDR1/(TDR1)[R/W] B,H,W ^{*1} -----0 00000000		BGR1 [R/W] H,W 00000000 00000000		*1: Byte access is possible only for access to lower 8 bits
0000C8 _H	— / (ISMK1) [R/W] B,H,W ----- ^{*2}	— / (ISBA1) [R/W] B,H,W ----- ^{*2}	—	—	*2: Reserved because I ² C mode is not set immediately after reset.
0000CC _H	FCR11 [R/W] B, H, W ---00100	FCR01[R/W] B, H, W -0000000	FBYTE21 [R/W] B,H,W 00000000	FBYTE11[R/W] B,H,W 00000000	
0000D0 _H	SCR2 [R/W] B, H, W 00000000	SMR2 [R/W] B, H, W 00000000	SSR2 [R/W] B, H, W 00001000	RDR2 /TDR2 [R/W] B, H, W 00000000	LIN-UART2
0000D4 _H	ESCR2 [R/W] B, H, W 00000X00	ECCR2 [R/W] B, H, W -0000-XX	BGR2 [R/W] B, H, W -0000000 00000000		
0000D8 _H	SCR3 [R/W] B, H, W 00000000	SMR3 [R/W] B, H, W 00000000	SSR3 [R/W] B, H, W 00001000	RDR3 /TDR3 [R/W] B, H, W 00000000	LIN-UART3
0000DC _H	ESCR3 [R/W] B, H, W 00000X00	ECCR3 [R/W] B, H, W -0000-XX	BGR3 [R/W] B, H, W -0000000 00000000		

Address	Address Offset Value / Register Name				Block
	+0	+1	+2	+3	
000C50 _H	DCCR5[R/W] W 0----000 --00--00 00000000 0-000000				DMA controller [S]
000C54 _H	DCSR5[R/W] H 0-----000		DTCR5[R/W] H 00000000 00000000		
000C58 _H	DSAR5[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C5C _H	DDAR5[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C60 _H	DCCR6[R/W] W 0----000 --00--00 00000000 0-000000				
000C64 _H	DCSR6[R/W] H 0-----000		DTCR6[R/W] H 00000000 00000000		
000C68 _H	DSAR6[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C6C _H	DDAR6[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C70 _H	DCCR7[R/W] W 0----000 --00--00 00000000 0-000000				
000C74 _H	DCSR7[R/W] H 0-----000		DTCR7[R/W] H 00000000 00000000		
000C78 _H	DSAR7[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C7C _H	DDAR7[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C80 _H	DCCR8[R/W] W 0----000 --00--00 00000000 0-000000				
000C84 _H	DCSR8[R/W] H 0-----000		DTCR8[R/W] H 00000000 00000000		
000C88 _H	DSAR8[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C8C _H	DDAR8[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C90 _H	DCCR9[R/W] W 0----000 --00--00 00000000 0-000000				
000C94 _H	DCSR9[R/W] H 0-----000		DTCR9[R/W] H 00000000 00000000		
000C98 _H	DSAR9[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000C9C _H	DDAR9[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CA0 _H	DCCR10[R/W] W 0----000 --00--00 00000000 0-000000				
000CA4 _H	DCSR10[R/W] H 0-----000		DTCR10[R/W] H 00000000 00000000		
000CA8 _H	DSAR10[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				

Address	Address Offset Value / Register Name				Block
	+0	+1	+2	+3	
000CAC _H	DDAR10[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				DMA controller [S]
000CB0 _H	DCCR11[R/W] W 0----000 --00--00 00000000 0-000000				
000CB4 _H	DCSR11[R/W] H 0-----000		DTCR11[R/W] H 00000000 00000000		
000CB8 _H	DSAR11[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CBC _H	DDAR11[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CC0 _H	DCCR12[R/W] W 0----000 --00--00 00000000 0-000000				
000CC4 _H	DCSR12[R/W] H 0-----000		DTCR12[R/W] H 00000000 00000000		
000CC8 _H	DSAR12[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CCC _H	DDAR12[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CD0 _H	DCCR13[R/W] W 0----000 --00--00 00000000 0-000000				
000CD4 _H	DCSR13[R/W] H 0-----000		DTCR13[R/W] H 00000000 00000000		
000CD8 _H	DSAR13[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CDC _H	DDAR13[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CE0 _H	DCCR14[R/W] W 0----000 --00--00 00000000 0-000000				
000CE4 _H	DCSR14[R/W] H 0-----000		DTCR14[R/W] H 00000000 00000000		
000CE8 _H	DSAR14[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CEC _H	DDAR14[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CF0 _H	DCCR15[R/W] W 0----000 --00--00 00000000 0-000000				
000CF4 _H	DCSR15[R/W] H 0-----000		DTCR15[R/W] H 00000000 00000000		
000CF8 _H	DSAR15[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000CFC _H	DDAR15[R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000D00 _H to 000DF0 _H	—	—	—	—	Reserved [S]
000DF4 _H	—	—	DNMIR[R/W] B 0-----0	DILVR[R/W] B ---1111	DMA controller [S]
000DF8 _H	DMACR[R/W] W 0-----0-----				
000DFC _H	—	—	—	—	Reserved [S]

Address	Address Offset Value / Register Name				Block
	+0	+1	+2	+3	
00214C _H	IF2MCTR1 [R/W] B,H,W 00000000 0---0000		—		CAN1 (32msg)
002150 _H	IF2DTA11 [R/W] B,H,W 00000000 00000000		IF2DTA21 [R/W] B,H,W 00000000 00000000		
002154 _H	IF2DTB11 [R/W] B,H,W 00000000 00000000		IF2DTB21 [R/W] B,H,W 00000000 00000000		
002158 _H , 00215C _H	Reserved				
002160 _H , 002164 _H	Reserved (IF2 data mirror)				
002168 _H to 00217C _H	Reserved				
002180 _H	TREQR21 [R] B,H,W 00000000 00000000		TREQR11 [R] B,H,W 00000000 00000000		
002184 _H	—		—		
002188 _H	—		—		
00218C _H	—		—		
002190 _H	NEWDT21 [R] B,H,W 00000000 00000000		NEWDT11 [R] B,H,W 00000000 00000000		
002194 _H	—		—		
002198 _H	—		—		
00219C _H	—		—		
0021A0 _H	INTPND21 [R] B,H,W 00000000 00000000		INTPND11 [R] B,H,W 00000000 00000000		
0021A4 _H	—		—		
0021A8 _H	—		—		
0021AC _H	—		—		
0021B0 _H	MSGVAL21 [R] B,H,W 00000000 00000000		MSGVAL11 [R] B,H,W 00000000 00000000		
0021B4 _H	—		—		
0021B8 _H	—		—		
0021BC _H	—		—		
0021C0 _H to 0021FC _H	Reserved				

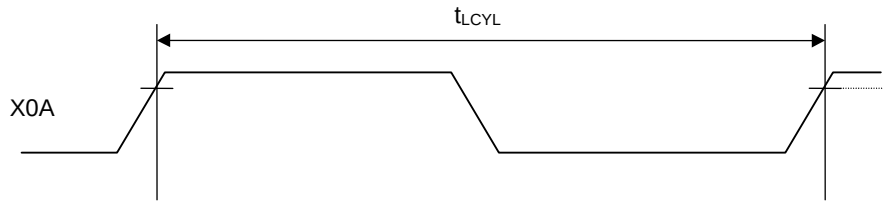
Address	Address Offset Value / Register Name				Block
	+0	+1	+2	+3	
002258 _H , 00225C _H	Reserved				CAN2 (32msg)
002260 _H , 002264 _H	Reserved (IF2 data mirror)				
002268 _H to 00227C _H	Reserved				
002280 _H	TREQR22[R] B,H,W 00000000 00000000		TREQR12[R] B,H,W 00000000 00000000		
002284 _H	—		—		
002288 _H	—		—		
00228C _H	—		—		
002290 _H	NEWDT22[R] B,H,W 00000000 00000000		NEWDT12[R] B,H,W 00000000 00000000		
002294 _H	—		—		
002298 _H	—		—		
00229C _H	—		—		
0022A0 _H	INTPND22[R] B,H,W 00000000 00000000		INTPND12[R] B,H,W 00000000 00000000		
0022A4 _H	—		—		
0022A8 _H	—		—		
0022AC _H	—		—		
0022B0 _H	MSGVAL22[R] B,H,W 00000000 00000000		MSGVAL12[R] B,H,W 00000000 00000000		
0022B4 _H	—		—		
0022B8 _H	—		—		
0022BC _H	—		—		
0022C0 _H to 0022FC _H	—	—	—	—	Reserved
002300 _H	DFCTLR[R/W]B,H,W -0-----		—	DFSTR [R/W] B,H,W -----001	WorkFlash
002304 _H	—	—	—	—	
002308 _H	FLIFCTLR [R/W] B,H,W ---0--00	—	FLIFFER1 [R/W] B,H,W -----	FLIFFER2 [R/W] B,H,W -----	
00230C _H to 0023FC _H	—	—	—	—	Reserved
002400 _H	SEEARX[R] B,H,W 00000000 00000000		DEEARX[R] B,H,W 00000000 00000000		XBS RAM ECC control register
002404 _H	EECSRX [R/W] B,H,W ----0000	—	EFEARX[R/W] B,H,W 00000000 00000000		
002408 _H	—	EFECRX[R/W] B,H,W -----0 00000000 00000000			
00240C _H to 0024FC _H	—	—	—	—	Reserved

11.4.1.1 Sub clock timing (products without s-suffix)

(T_A: Recommended operating conditions, V_{CC5}=5.0V ± 10%, V_{SS}=DV_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin Name	Conditions	Value			Unit	Remarks
				Min	Typ	Max		
Source oscillation clock frequency	F _{CL}	X0A, X1A	—	—	32.768	—	kHz	
Source oscillation clock cycle time	t _{LCYL}	X0A, X1A	—	—	30.52	—	μs	

• X0A,X1A Clock Timing

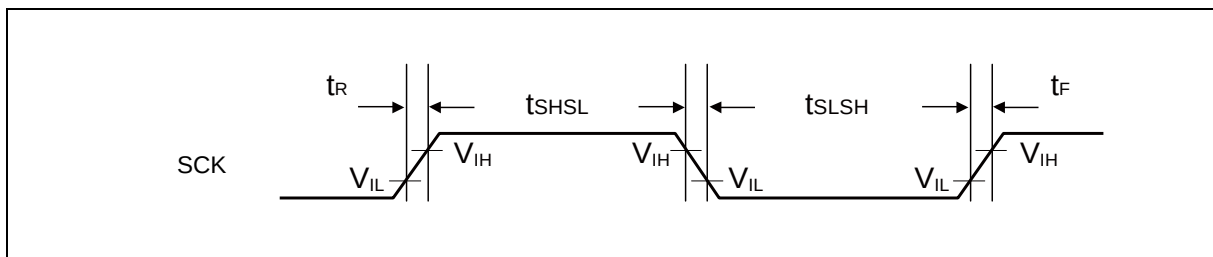


External Clock (EXT = 1): Asynchronous Only

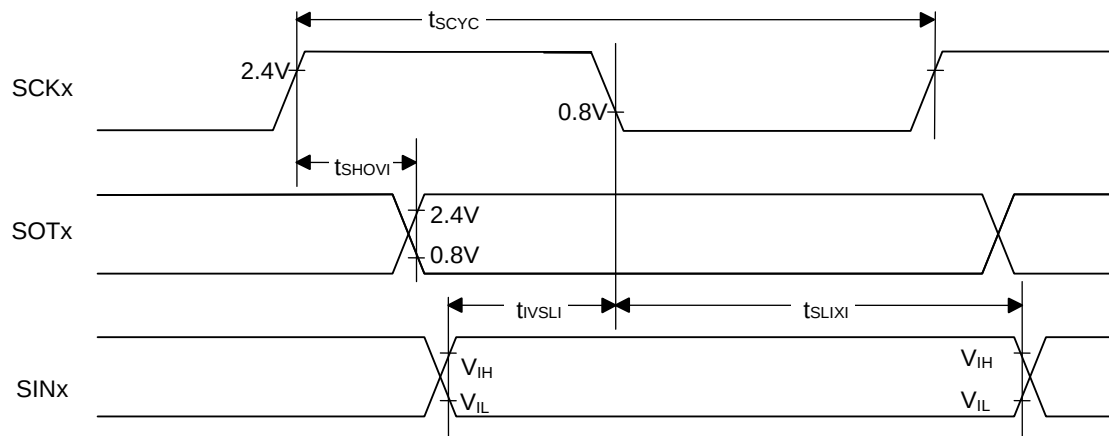
 (T_A: Recommended operating conditions, V_{CC}5=5.0V±10%, V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin Name	Conditions	Value		Unit
				Min	Max	
Serial clock "H" pulse width	t _{SHSL}	SCKx	C _L =50pF (When drive capability is 2mA or more.) C _L =20pF (When drive capability is 1mA)	t _{CPP} +10	-	ns
Serial clock "L" pulse width	t _{SLSH}			t _{CPP} +10	-	ns
SCK fall time	t _F			-	5	ns
SCK rise time	t _R			-	5	ns

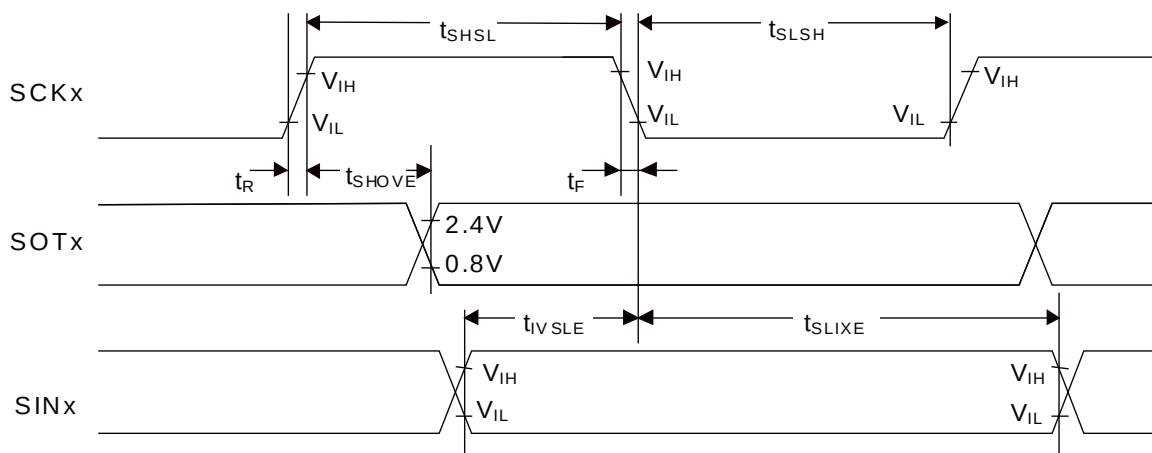
Note: "x" means channel number of 0, 1, 8, 9, 10, and 11 for SCKx, SINx and SOTx.



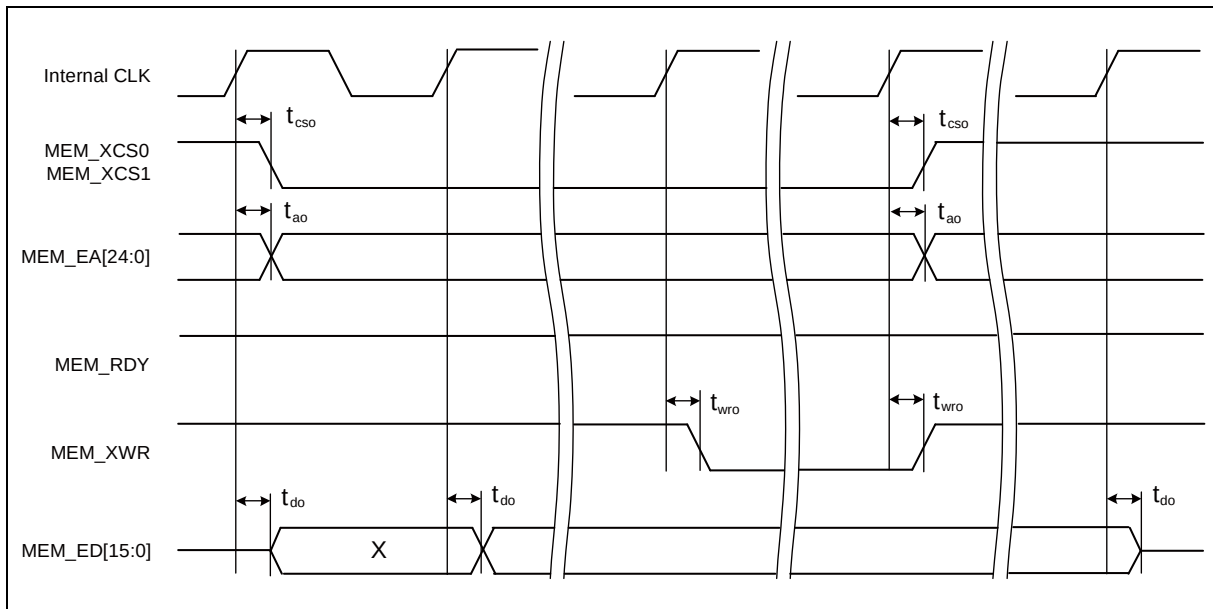
• **Internal Shift Clock Mode**



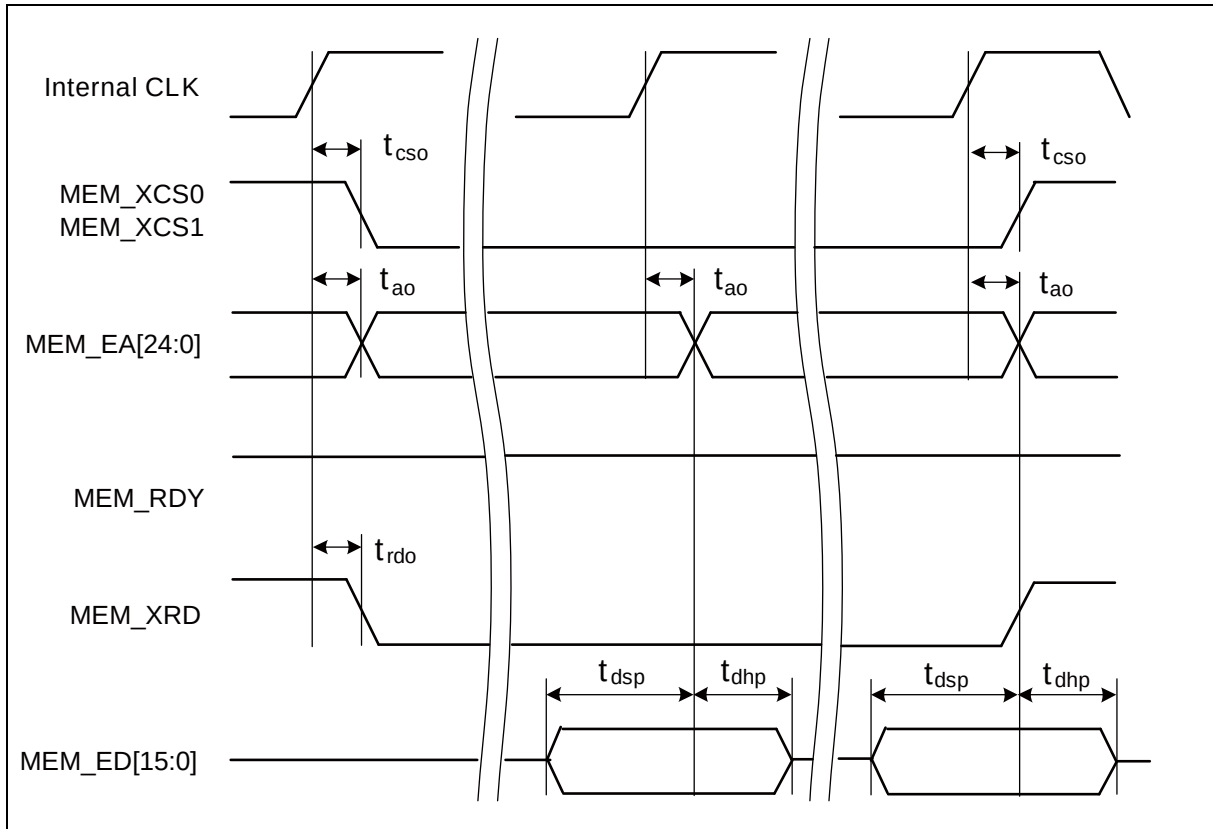
• **External Shift Clock Mode**



■ NOR Flash write timing



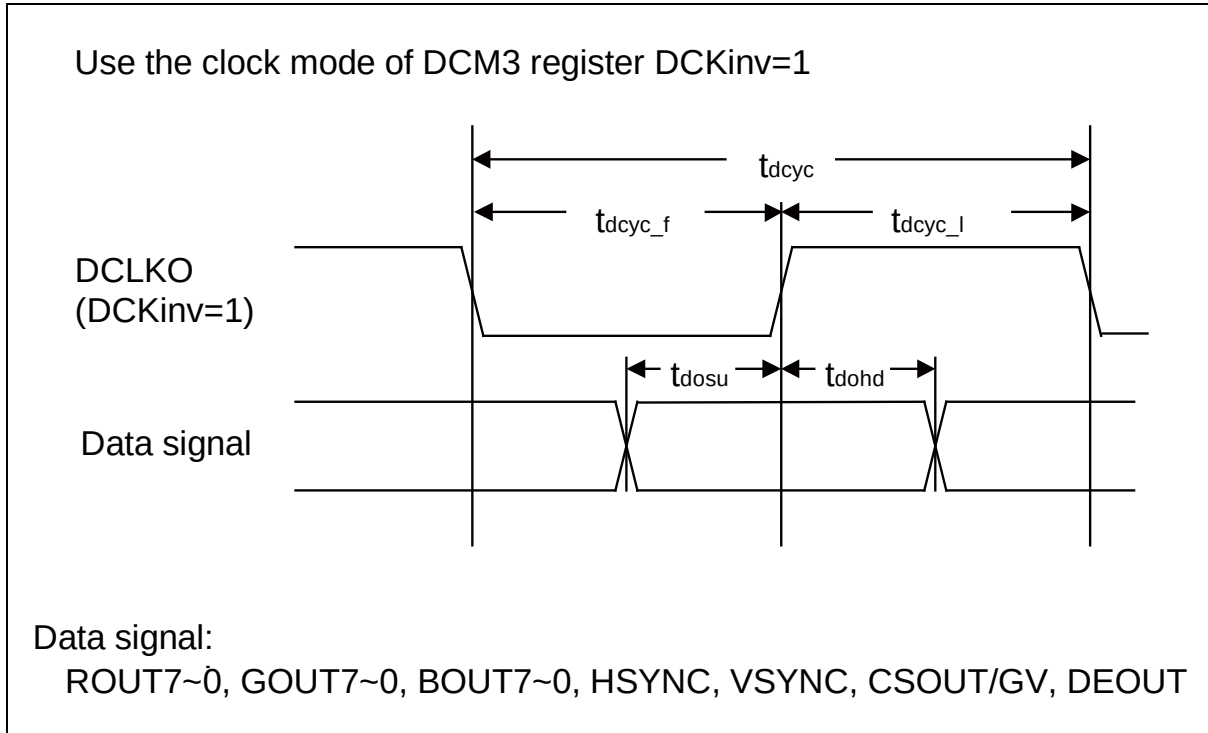
■ NOR Flash Page read timing



Built-in PLL reverse edge mode (DCM3.DCKinv=1)

Figure 3 shows the setup/hold definition when the external display device receives the signal at the rising edge of DCLKO.

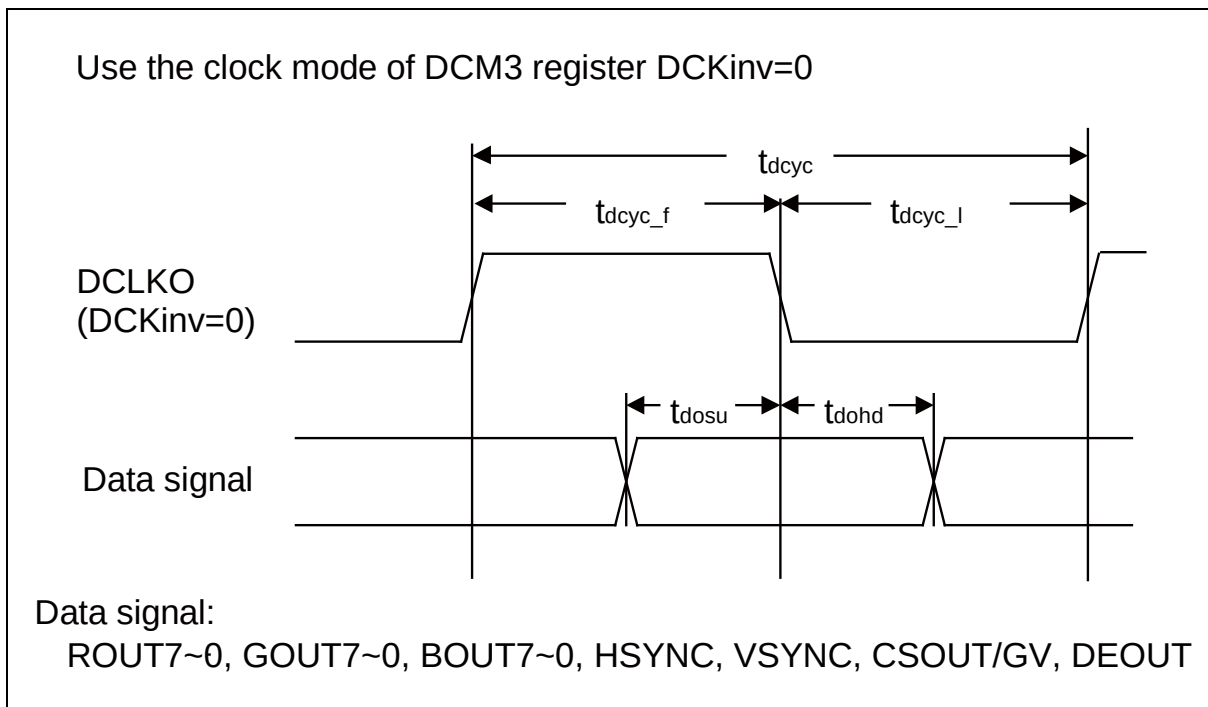
Figure 3. Built-in PLL Reverse Edge Mode Setup/Hold Definition



Built-in PLL standard mode (DCM3.DCKinv=0)

Figure 4 shows the setup/hold definition when the external display device receives the signal at the falling edge of DCLKO.

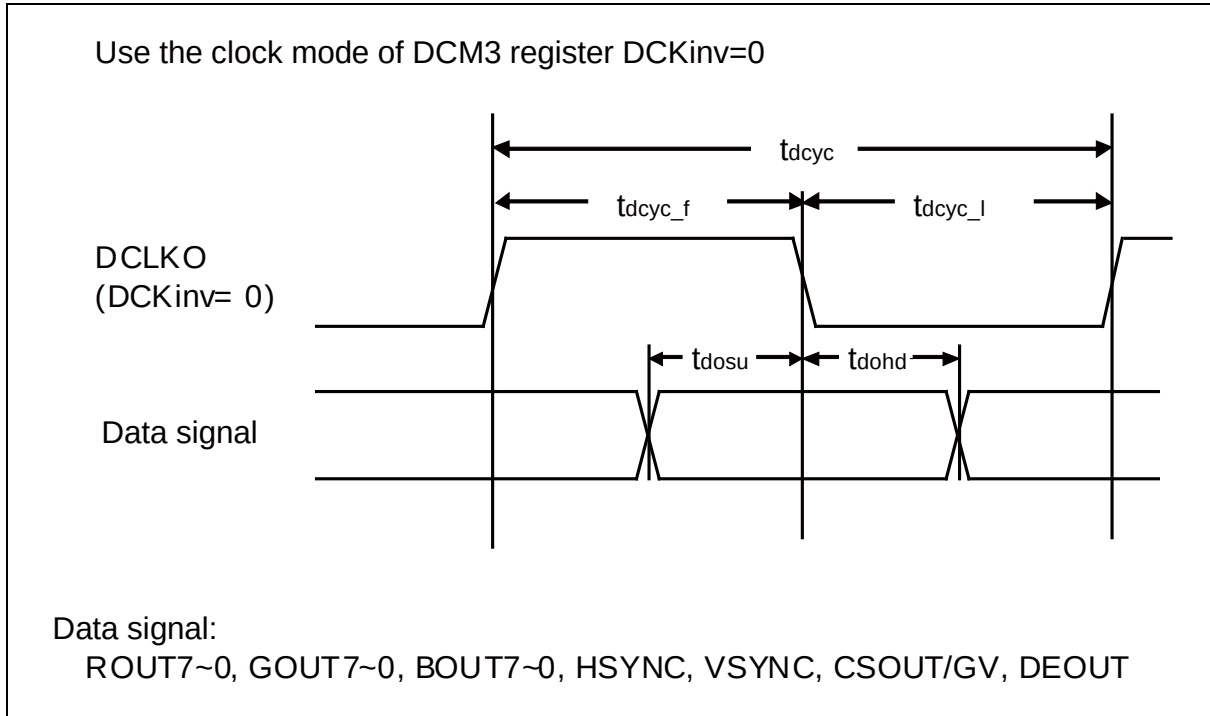
Figure 4. Built-in PLL Standard Mode Setup/Hold Definition



DCLKI Input Standard Mode (DCM3.DCKinv=0)

Figure 8 shows the setup/hold definition when the external display device (TFT) receives the signal at the falling edge of DCLKO.

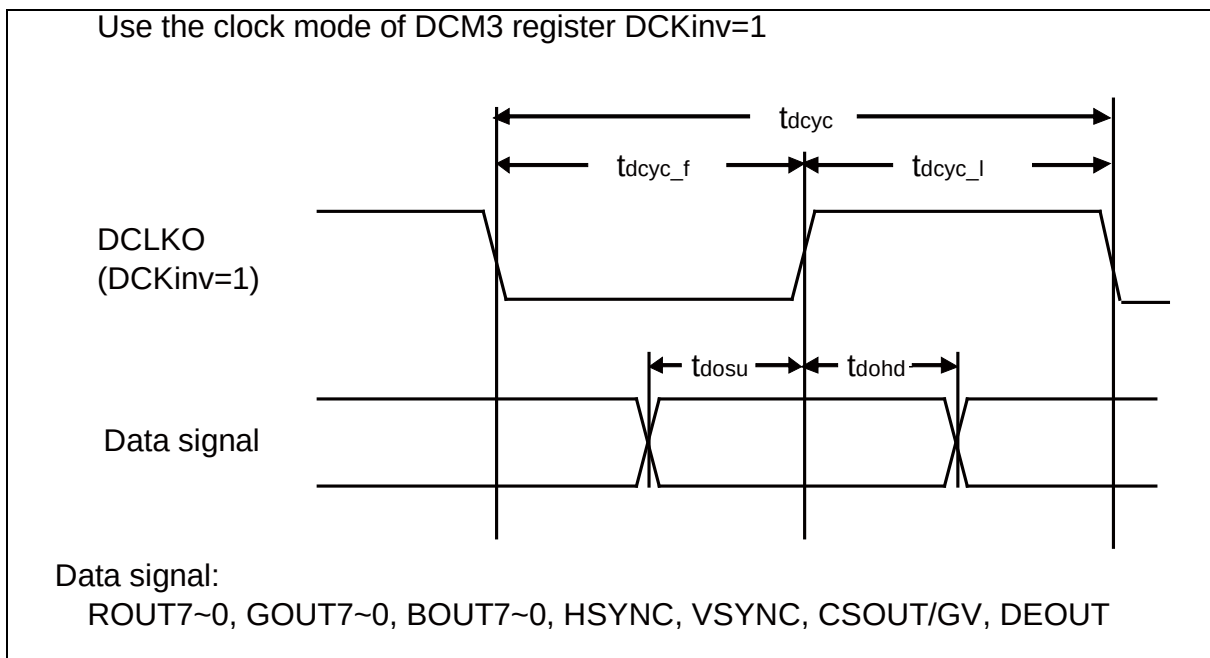
Figure 8. DCLKI Input Standard Mode Setup/Hold Definition



DCLKI Input Reverse Edge Mode (DCM3.DCKinv=1)

Figure 9 shows the setup/hold definition when the external display device (TFT) receives the signal at the rising edge of DCLKO.

Figure 9. DCLKI Input Reverse Edge Mode Setup/Hold Definition



11.5 A/D Converter

11.5.1 Electrical Characteristics

(T_A: Recommended operating conditions, V_{CC5}=AV_{CC5}=5.0V ± 10%, V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin Name	Value			Unit	Remarks
			Min	Typ	Max		
Resolution	—	—	—	—	10	bit	
Total error	—	—	—	—	±3	LSB	
Non linearity error	—	—	—	—	±2.5	LSB	
Differential linearity error	—	—	—	—	±1.9	LSB	
Zero transition voltage	V _{OT}	AN0 to AN31	AV _{SS} - 1.5LSB	—	AV _{SS} + 2.5LSB	V	1LSB = (AV _{CC} - AV _{SS}) / 1024
Full-scale transition voltage	V _{FST}	AN0 to AN31	AVRH5 - 3.5LSB	—	AVRH5 + 0.5LSB	V	
Sampling time	t _{SMP}	—	1.2	—	—	μs	*1
Compare time	t _{CMP}	—	1.8	—	—	μs	*1
A/D conversion time	t _{CNV}	—	3.0	—	—	μs	*1
Analog port input current	I _{AIN}	AN0 to AN31	-5	—	+5	μA	V _{AVSS} ≤ V _{AIN} ≤ V _{AVCC}
Analog input voltage	V _{AIN}	AN0 to AN31	AV _{SS}	—	AVRH5	V	
	—	—	—	—	—	—	
Reference voltage	A _{VRH}	AVRH5	4.5	—	5.5	V	AVRH5 ≤ AV _{CC5}
	A _{VRL}	AVSS	—	0.0	—	V	
Power supply current	I _A	AVCC	—	—	4.0	mA	
	I _{AH}	—	—	—	6.0	μA	*2
	I _R	—	—	600	900	μA	
	I _{RH}	AVRH5	—	—	5	μA	*2
Variation between channels	—	AN0 to AN31	—	—	4	LSB	

*1: Time for each channel.

*2: Power supply current (V_{CC} = AV_{CC} = 5.0 V) is specified if A/D converter is not operating and CPU is stopped.

Note:

Be sure to use the clock with a frequency between 8MHz and 17MHz for the ADC compare clock in order to ensure its accuracy.

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