Infineon Technologies - MB91F525BSCPMC1-GTE1 Datasheet

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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, I²C, LINbus, SPI, UART/USART
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	44
Program Memory Size	832KB (832K x 8)
Program Memory Type	FLASH
EEPROM Size	64K x 8
RAM Size	104K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 26x12b; D/A 1x8b
Oscillator Type	External
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	64-LQFP
Supplier Device Package	64-LQFP (10x10)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb91f525bscpmc1-gte1

Product lineup comparison 144 pins

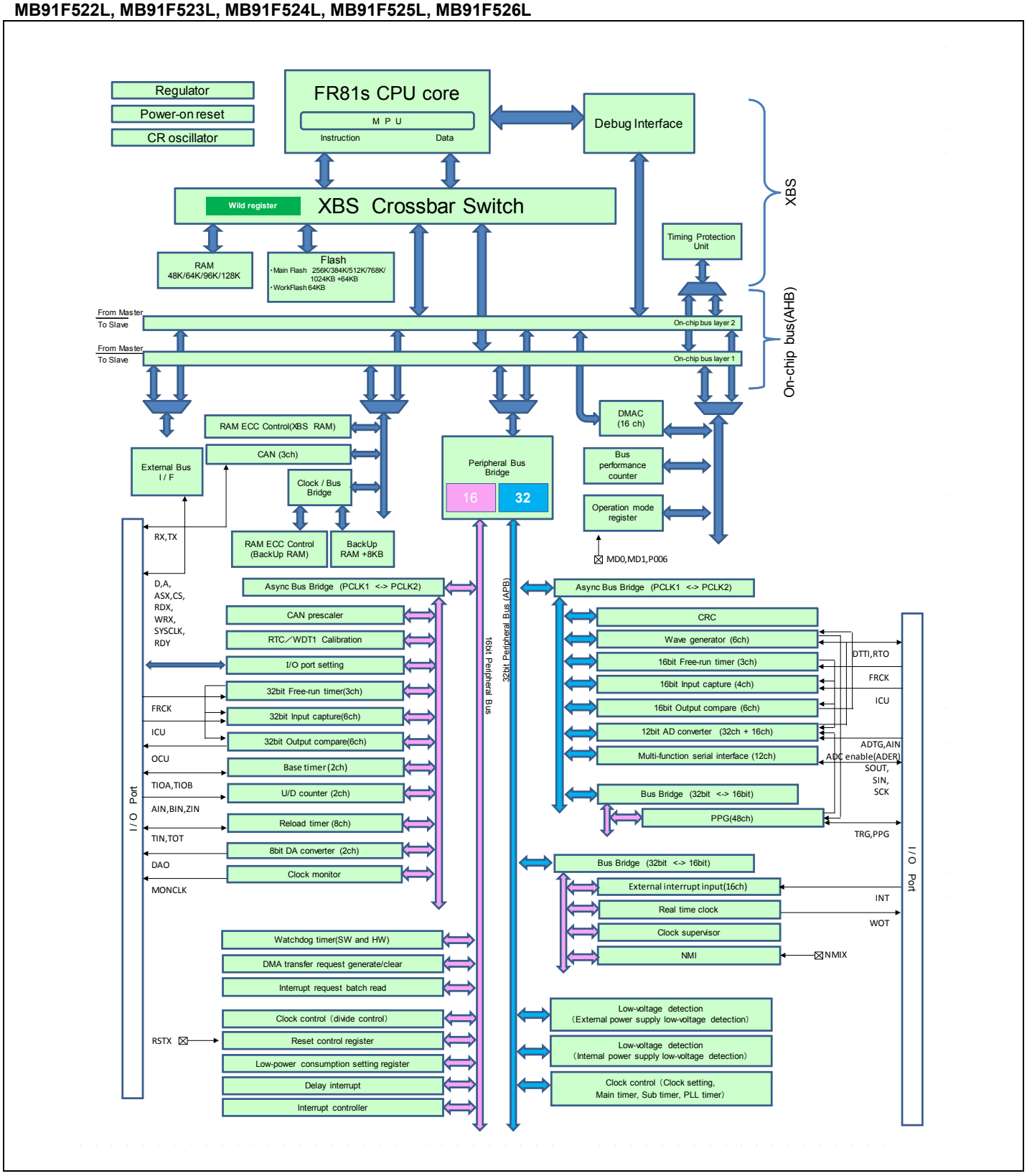
	MB91F522K	MB91F523K	MB91F524K	MB91F525K	MB91F526K
System Clock	On chip PLL Clock multiple method				
Minimum instruction execution time	12.5ns (80MHz)				
Flash Capacity (Program)	(256+64)KB	(384+64)KB	(512+64)KB	(768+64)KB	(1024+64)KB
Flash Capacity (Data)	64KB				
RAM Capacity	(48+8)KB		(64+8)KB	(96+8)KB	(128+8)KB
External BUS I/F (22address/16data/4cs)	Yes				
DMA Transfer	16ch				
16-bit Base Timer	2ch				
Free-run Timer	16bit×3ch, 32bit×3ch				
Input capture	16bit×4ch, 32bit×6ch				
Output Compare	16bit×6ch, 32bit×6ch				
16-bit Reload Timer	8ch				
PPG	16bit×44ch				
Up/down Counter	2ch				
Clock Supervisor	Yes				
External Interrupt	8ch×2units				
A/D converter	12bit×32ch (1unit), 12bit×16ch (1unit)				
D/A converter (8bit)	2ch				
Multi-Function Serial Interface	12ch*1				
CAN	64msg×2ch/128msg×1ch				
Hardware Watchdog Timer	Yes				
CRC Formation	Yes				
Low-voltage detection reset	Yes				
Flash Security	Yes				
ECC Flash/WorkFlash	Yes				
ECC RAM	Yes				
Memory Protection Function (MPU)	Yes				
Floating point arithmetic (FPU)	Yes				
Real Time Clock (RTC)	Yes				
General-purpose port (#GPIOs)	120 ports				
SSCG	Yes				
Sub clock	Yes				
CR oscillator	Yes				
NMI request function	Yes				
OCD (On Chip Debug)	Yes				
TPU (Timing Protection Unit)	Yes				
Key code register	Yes				
Waveform generator	6ch				
Operation guaranteed temperature (T_A)	-40°C to +125°C				
Power supply	2.7V to 5.5V *2				
Package	LQS144, LQN144				

*1: Only channel 3 and channel 4 support the I^2C (fast mode/standard mode).
Only channel 5, channel 6, channel 7, channel 8, channel 10 and channel 11 support the I^2C (standard mode).

*2: The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the minimum guaranteed MCU operation voltage, MCU operations are not guaranteed with the exception of LVD.

Pin no.						Pin Name	Polarity	I/O circuit types*8	Function*9
64	80	100	120	144	176				
-	-	-	-	64	80	P080	-	A	General-purpose I/O port
						SCS52_0	-		Serial chip select 52 output (0)
						PPG0_0	-		PPG ch.0 output (0)
29	37	46	56	65	81	P081	-	G	General-purpose I/O port
						SOT5_0/ SDA5	-		Multi-function serial ch.5 serial data output (0)/I^{2}C bus serial data I/O
						AN0	-		ADC analog 0 input
						PPG1_0	-		PPG ch.1 output (0)
30	38	47	57	66	82	P082	-	G	General-purpose I/O port
						SIN5_0	-		Multi-function serial ch.5 serial data input (0)
						AN1	-		ADC analog 1 input
						PPG2_0	-		PPG ch.2 output (0)
-	-	-	-	67	83	P083	-	B	General-purpose I/O port
						SCS50_0	-		Serial chip select 50 I/O (0)
						AN2	-		ADC analog 2 input
						PPG3_0	-		PPG ch.3 output (0)
-	-	-	-	68	84	P084	-	B	General-purpose I/O port
						SCS51_0	-		Serial chip select 51 output (0)
						AN3	-		ADC analog 3 input
						PPG4_0	-		PPG ch.4 output (0)
-	-	-	-	69	85	P085	-	A	General-purpose I/O port
						PPG5_0	-		PPG ch.5 output (0)
-	-	48	58	70	86	P086	-	C	General-purpose I/O port
						DAO1	-		DAC analog 1 output
						PPG6_0	-		PPG ch.6 output (0)
31	39	49	59	71	87	P087	-	C	General-purpose I/O port
						DAO0	-		DAC analog 0 output
						PPG7_0	-		PPG ch.7 output (0)
						INT8_0	-		INT8 External interrupt input (0)
-	-	-	-	-	90	P190	-	A	General-purpose I/O port
						TIN0_1	-		Reload timer ch.0 event input (1)
-	-	-	-	-	91	P191	-	A	General-purpose I/O port
						TIN1_1	-		Reload timer ch.1 event input (1)
-	-	-	-	74	92	P090	-	B	General-purpose I/O port
						AN4	-		ADC analog 4 input
						ICU0_0	-		Input capture ch.0 input (0)
						TIN2_1	-		Reload timer ch.2 event input (1)
-	-	-	-	75	93	P091	-	B	General-purpose I/O port
						AN5	-		ADC analog 5 input
						PPG41_1	-		PPG ch.41 output (1)
						ICU1_0	-		Input capture ch.1 input (0)
						TIN3_1	-		Reload timer ch.3 event input (1)

MB91F522L, MB91F523L, MB91F524L, MB91F525L, MB91F526L



Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
$0001F8_H$	TMRLRA6 [R/W] H XXXXXXXX XXXXXXXX		TMR6 [R] H XXXXXXXX XXXXXXXX		Reload Timer 6
$0001FC_H$	TMRLRB6 [R/W] H XXXXXXXX XXXXXXXX		TMCSR6 [R/W] B, H,W 00000000 0-000000		
000200_H to 000238_H	—	—	—	—	Reserved
$00023C_H$	DACR0 [R/W] B,H,W -------0	DADR0 [R/W] B,H,W XXXXXXXX	DACR1 [R/W] B,H,W -------0	DADR1 [R/W] B,H,W XXXXXXXX	DA Converter
000240_H	CPCLR3 [R/W] W 11111111 11111111 11111111 11111111				Free-run Timer 3 32-bit FRT
000244_H	TCDT3 [R/W] W 00000000 00000000 00000000 00000000				
000248_H	TCCSH3 [R/W] B,H,W 0-----00	TCCSL3 [R/W] B,H,W -1-00000	—	—	
$00024C_H$	CPCLR4 [R/W] W 11111111 11111111 11111111 11111111				Free-run Timer 4 32-bit FRT
000250_H	TCDT4 [R/W] W 00000000 00000000 00000000 00000000				
000254_H	TCCSH4 [R/W] B,H,W 0-----00	TCCSL4 [R/W] B,H,W -1-00000	—	—	
000258_H to $0002C0_H$	—	—	—	—	Reserved
$0002C4_H$ to $0002FC_H$	—	—	—	—	Reserved
000300_H to $00030C_H$	—	—	—	—	Reserved
000310_H	—	—	MPUCR [R/W] H 000000-0 ----0100		MPU [S] (Only CPU core can access this area)
000314_H	—	—	—	—	
000318_H	—				
$00031C_H$	—	—	—		
000320_H	DPVAR [R] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
000324_H	—	—	DPVSR [R/W] H -------- 00000--0		

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
00049C$_H$	IORR12 [R/W] B,H,W -0000000	IORR13 [R/W] B,H,W -0000000	IORR14 [R/W] B,H,W -0000000	IORR15 [R/W] B,H,W -0000000	DMA request by peripheral [S]
0004A0$_H$	—	—	—	—	Reserved
0004A4$_H$	CANPRE [R/W] B,H,W ---00000	—	—	—	CAN prescaler
0004A8$_H$	—	—	CSCFG[R/W]B,H,W ---0----	CMCFG[R/W]B,H,W 00000000	Clock monitor control register
0004AC$_H$	ADERH0[R/W] B,H 11111111 11111111		ADERL0[R/W] B,H 11111111 11111111		Analog input control register 0
0004B0$_H$	—		ADERL1[R/W] B,H 11111111 11111111		Analog input control register 1
0004B4$_H$	—	—	—	—	Reserved
0004B8$_H$	CUCR0 [R/W] B,H,W -------- ---0--00		CUTD0 [R/W] B,H,W 10000000 00000000		RTC/WDT1 calibration
0004BC$_H$	CUTR0 [R] B,H,W -------- 00000000 00000000 00000000				
0004C0$_H$	—	—	—	—	
0004C4$_H$	CUCR1 [R/W] B,H,W -------- ---0--00		CUTD1 [R/W] B,H,W 11000011 01010000		
0004C8$_H$	CUTR1 [R] B,H,W -------- 00000000 00000000 00000000				
0004CC$_H$ to 00050C$_H$	—	—	—	—	Reserved
000510$_H$	CSELR [R/W] B,H,W 001---00	CMONR [R] B,H,W 001---00	MTMCR [R/W] B,H,W 00001111	STMCR [R/W] B,H,W 0000-111	Clock Control [S]
000514$_H$	PLLCR [R/W] B,H,W -------- 11110000		CSTBR [R/W] B,H,W -0000000	PTMCR [R/W] B,H,W 00------	
000518$_H$	—	—	CPUAR [R/W] B,H,W 0----XXX	—	Reset Control [S]
00051C$_H$	—	—	—	—	Reserved [S]
000520$_H$	CCPSSELR [R/W] B,H,W -------0	—	—	CCPSDIVR [R/W] B,H,W -000-000	Clock Control 2 [S]
000524$_H$	—	CCPLLFBR [R/W] B,H,W -0000000	CCSSFBR0 [R/W] B,H,W --000000	CCSSFBR1 [R/W] B,H,W ---00000	
000528$_H$	—	CCSSCCR0 [R/W] B,H,W ----0000	CCSSCCR1 [R/W] H,W 000----- --------		

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
$000BF8_H$	—	—	MBR [R/W] B,H,W 00------ XXXXXXXX		OCDU
$000BFC_H$	—	—	UER [W] B,H,W -------- -------X		
$000C00_H$	DCCR0 [R/W] W 0----000 --00--00 00000000 0-000000				DMA Controller [S]
$000C04_H$	DCSR0 [R/W] H 0------- -----000		DTCR0 [R/W] H 00000000 00000000		
$000C08_H$	DSAR0 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C0C_H$	DDAR0 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C10_H$	DCCR1 [R/W] W 0----000 --00--00 00000000 0-000000				
$000C14_H$	DCSR1 [R/W] H 0------- -----000		DTCR1 [R/W] H 00000000 00000000		
$000C18_H$	DSAR1 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C1C_H$	DDAR1 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C20_H$	DCCR2 [R/W] W 0----000 --00--00 00000000 0-000000				
$000C24_H$	DCSR2 [R/W] H 0------- -----000		DTCR2 [R/W] H 00000000 00000000		
$000C28_H$	DSAR2 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C2C_H$	DDAR2 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C30_H$	DCCR3 [R/W] W 0----000 --00--00 00000000 0-000000				
$000C34_H$	DCSR3 [R/W] H 0------- -----000		DTCR3 [R/W] H 00000000 00000000		
$000C38_H$	DSAR3 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C3C_H$	DDAR3 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				
$000C40_H$	DCCR4 [R/W] W 0----000 --00--00 00000000 0-000000				
$000C44_H$	DCSR4 [R/W] H 0------- -----000		DTCR4 [R/W] H 00000000 00000000		
$000C48_H$	DSAR4 [R/W] W XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX				

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
00125C$_H$	OCCPB4/OCCP4 [R/W] H,W 00000000 00000000		OCCPB5/OCCP5 [R/W] H,W 00000000 00000000		16-bit Output compare 4/5
001260$_H$	OCS45 [R/W] B,H,W -110--00 00001100		—	OCMOD45 [R/W] B,H,W ------00	
001264$_H$ to 001278$_H$	—	—	—	—	Reserved
00127C$_H$	IPCP0 [R] H,W 00000000 00000000		IPCP1 [R] H,W 00000000 00000000		16-bit Input capture 0/1
001280$_H$	ICS01 [R/W] B,H,W ------00 00000000		—	LSYNS [R/W] B,H,W ----0000	
001284$_H$	IPCP2 [R] H,W 00000000 00000000		IPCP3 [R] H,W 00000000 00000000		16-bit Input capture 2/3
001288$_H$	ICS23 [R/W] B,H,W ------00 00000000		—	—	
00128C$_H$ to 001298$_H$	—	—	—	—	Reserved
00129C$_H$	—	—	—	—	Reserved
0012A0$_H$	TMRR0 [R/W] H,W 00000000 00000001		TMRR1 [R/W] H,W 00000000 00000001		Waveform generator 0/1/2
0012A4$_H$	TMRR2 [R/W] H,W 00000000 00000001		—	—	
0012A8$_H$	DTSCR0 [R/W] B,H,W 00000000	DTSCR1 [R/W] B,H,W 00000000	DTSCR2 [R/W] B,H,W 00000000	—	
0012AC$_H$	—	DTIR0 [R/W] B,H,W 000000--	—	DTMNS0 [R/W] B,H,W 00---000	
0012B0$_H$	—	SIGCR10 [R/W] B,H,W 00000000	—	SIGCR20 [R/W] B,H,W 000000-1	
0012B4$_H$	PICS0 [R/W] B,H,W 000000-- -------- -------- --------				
0012B8$_H$ to 0012CC$_H$	—	—	—	—	Reserved
0012D0$_H$	FRS5 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				16-bit Free-run timer selection A/D activation compare

Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
0012D4$_H$	FRS6 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				16-bit Free-run timer selection A/D activation compare
0012D8$_H$	FRS7 [R/W] B,H,W --00--00 --00--00 --00--00 --00--00				
0012DC$_H$ to 0012FC$_H$	—	—	—	—	Reserved
001300$_H$	—				Reserved
001304$_H$	ADTSS0[R/W] B,H,W -------0	—	—	—	12-bit A/D converter 1/2 unit
001308$_H$	ADTSE0[R/W] B,H,W 00000000 00000000 00000000 00000000				
00130C$_H$	ADCOMP0/ADCOMPB0[R/W] H,W 00000000 00000000		ADCOMP1/ADCOMPB1[R/W] H,W 00000000 00000000		12-bit A/D converter 1/2 unit
001310$_H$	ADCOMP2/ADCOMPB2[R/W] H,W 00000000 00000000		ADCOMP3/ADCOMPB3[R/W] H,W 00000000 00000000		
001314$_H$	ADCOMP4/ADCOMPB4[R/W] H,W 00000000 00000000		ADCOMP5/ADCOMPB5[R/W] H,W 00000000 00000000		
001318$_H$	ADCOMP6/ADCOMPB6[R/W] H,W 00000000 00000000		ADCOMP7/ADCOMPB7[R/W] H,W 00000000 00000000		
00131C$_H$	ADCOMP8/ADCOMPB8[R/W] H,W 00000000 00000000		ADCOMP9/ADCOMPB9[R/W] H,W 00000000 00000000		
001320$_H$	ADCOMP10/ADCOMPB10[R/W] H,W 00000000 00000000		ADCOMP11/ADCOMPB11[R/W] H,W 00000000 00000000		
001324$_H$	ADCOMP12/ADCOMPB12[R/W] H,W 00000000 00000000		ADCOMP13/ADCOMPB13[R/W] H,W 00000000 00000000		
001328$_H$	ADCOMP14/ADCOMPB14[R/W] H,W 00000000 00000000		ADCOMP15/ADCOMPB15[R/W] H,W 00000000 00000000		
00132C$_H$	ADCOMP16/ADCOMPB16[R/W] H,W 00000000 00000000		ADCOMP17/ADCOMPB17[R/W] H,W 00000000 00000000		
001330$_H$	ADCOMP18/ADCOMPB18[R/W] H,W 00000000 00000000		ADCOMP19/ADCOMPB19[R/W] H,W 00000000 00000000		
001334$_H$	ADCOMP20/ADCOMPB20[R/W] H,W 00000000 00000000		ADCOMP21/ADCOMPB21[R/W] H,W 00000000 00000000		
001338$_H$	ADCOMP22/ADCOMPB22[R/W] H,W 00000000 00000000		ADCOMP23/ADCOMPB23[R/W] H,W 00000000 00000000		
00133C$_H$	ADCOMP24/ADCOMPB24[R/W] H,W 00000000 00000000		ADCOMP25/ADCOMPB25[R/W] H,W 00000000 00000000		
001340$_H$	ADCOMP26/ADCOMPB26[R/W] H,W 00000000 00000000		ADCOMP27/ADCOMPB27[R/W] H,W 00000000 00000000		

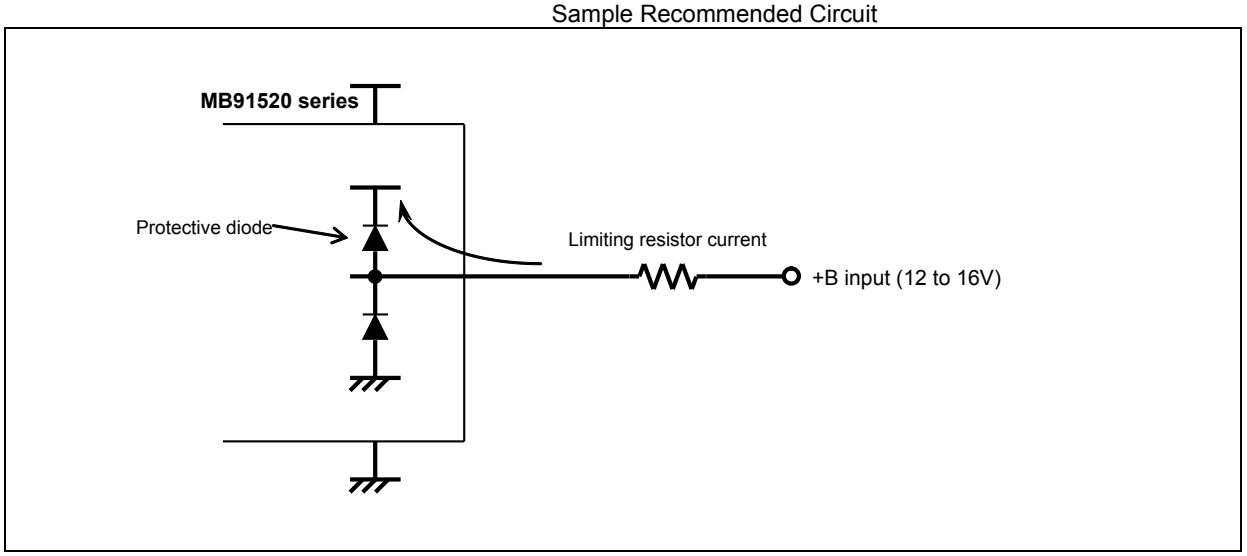
Address	Address offset value / Register name				Block
	+0	+1	+2	+3	
001790$_H$	—/(TBYTE31)/ (LAMESR1) [R/W] B,H,W -------- *3	—/(TBYTE21)/ (LAMERT1) [R/W] B,H,W -------- *3	—/(TBYTE11)/ (LAMIER1) [R/W] B,H,W -------- *3	TBYTE01/(LAMRID1) / (LAMTID1) [R/W] B,H,W 00000000	Multi-UART1 *3: Reserved because CSIO mode is not set immediately after reset. *4: Reserved because LIN2.1 mode is not set immediately after reset.
001794$_H$	BGR1[R/W] H,W 00000000 00000000		— /(ISMK1)[R/W] B,H,W -------- *2	— /(ISBA1)[R/W] B,H,W -------- *2	
001798$_H$	FCR11[R/W] B,H,W ---00100	FCR01[R/W] B,H,W -0000000	FBYTE1[R/W] B,H,W 00000000 00000000		
00179C$_H$	FTICR1[R/W] B,H,W 00000000 00000000		—	—	
0017A0$_H$	SCR2/(IBCR2)[R/W] B,H,W 0--00000	SMR2[R/W] B,H,W 000-00-0	SSR2[R/W] B,H,W 0-000011	ESCR2/(IBSR2)[R/W] B,H,W 00000000	Multi-UART2 *1: Byte access is possible only for access to lower 8 bits. *2: Reserved because I^2C mode is not set immediately after reset. *3: Reserved because CSIO mode is not set immediately after reset. *4: Reserved because LIN2.1 mode is not set immediately after reset.
0017A4$_H$	— /(RDR12/(TDR12))[R/W] B,H,W -------- -------- *3		RDR02/(TDR02)[R/W] B,H,W -------0 00000000 *1		
0017A8$_H$	SACSR2[R/W] B,H,W 0----000 00000000		STMR2[R] B,H,W 00000000 00000000		
0017AC$_H$	STMCR2[R/W] B,H,W 00000000 00000000		— /(SCSCR2/SFUR2)[R/W] B,H,W -------- -------- *3 *4		
0017B0$_H$	— /(SCSTR32)/ (LAMSR2) [R/W] B,H,W -------- *3	— /(SCSTR22)/ (LAMCR2) [R/W] B,H,W -------- *3	— /(SCSTR12)/ (SFLR12) [R/W] B,H,W -------- *3	— /(SCSTR02)/ (SFLR02) [R/W] B,H,W -------- *3	
0017B4$_H$	—	— /(SCSFR22) [R/W] B,H,W -------- *3	— /(SCSFR12) [R/W] B,H,W -------- *3	— /(SCSFR02) [R/W] B,H,W -------- *3	
0017B8$_H$	—/(TBYTE32)/ (LAMESR2) [R/W] B,H,W -------- *3	—/(TBYTE22)/ (LAMERT2) [R/W] B,H,W -------- *3	—/(TBYTE12)/ (LAMIER2) [R/W] B,H,W -------- *3	TBYTE02/(LAMRID2) / (LAMTID2) [R/W] B,H,W 00000000	
0017BC$_H$	BGR2[R/W] H, W 00000000 00000000		— /(ISMK2)[R/W] B,H,W -------- *2	— /(ISBA2)[R/W] B,H,W -------- *2	
0017C0$_H$	FCR12[R/W] B,H,W ---00100	FCR02[R/W] B,H,W -0000000	FBYTE2[R/W] B,H,W 00000000 00000000		Multi-UART2
0017C4$_H$	FTICR2[R/W] B,H,W 00000000 00000000		—	—	

Interrupt factor	Interrupt number		Interrupt level	Offset	Default address for TBR	RN
	Decimal	Hexadecimal				
Multi-function serial interface ch.3 (transmission completed)	27	1B	ICR11	390_H	$000FFF90_H$	11
Multi-function serial interface ch.4 (reception completed)	28	1C	ICR12	$38C_H$	$000FFF8C_H$	12*1
Multi-function serial interface ch.4 (status)						
Multi-function serial interface ch.4 (transmission completed)	29	1D	ICR13	388_H	$000FFF88_H$	13
Multi-function serial interface ch.5 (reception completed)	30	1E	ICR14	384_H	$000FFF84_H$	14*1
Multi-function serial interface ch.5 (status)						
Multi-function serial interface ch.5 (transmission completed)	31	1F	ICR15	380_H	$000FFF80_H$	15
Multi-function serial interface ch.6 (reception completed)	32	20	ICR16	$37C_H$	$000FFF7C_H$	16*1
Multi-function serial interface ch.6 (status)						
Multi-function serial interface ch.6 (transmission completed)	33	21	ICR17	378_H	$000FFF78_H$	17
CAN0	34	22	ICR18	374_H	$000FFF74_H$	-
CAN1	35	23	ICR19	370_H	$000FFF70_H$	-
RAM diagnosis end						
RAM initialization completion						
Error generation during RAM diagnosis						
Backup RAM diagnosis end						
Backup RAM initialization completion						
Error generation during Backup RAM diagnosis						
CAN2	36	24	ICR20	$36C_H$	$000FFF6C_H$	-
Up/down counter 0						
Up/down counter 1						
Real time clock	37	25	ICR21	368_H	$000FFF68_H$	-
Multi-function serial interface ch.7 (reception completed)	38	26	ICR22	364_H	$000FFF64_H$	22*1
Multi-function serial interface ch.7 (status)						
16-bit Free-run timer 0 (0 detection) / (compare clear)	39	27	ICR23	360_H	$000FFF60_H$	23
Multi-function serial interface ch.7 (transmission completed)						
PPG 0/1/10/11/20/21/30/31	40	28	ICR24	$35C_H$	$000FFF5C_H$	24*3
16-bit Free-run timer 1 (0 detection) / (compare clear)						
PPG 2/3/12/13/22/23/32/33/43	41	29	ICR25	358_H	$000FFF58_H$	25*3
16-bit Free-run timer 2 (0 detection) / (compare clear)						
PPG 4/5/14/15/24/25/35/44	42	2A	ICR26	354_H	$000FFF54_H$	26*3
PPG 6/7/16/17/26/27/37	43	2B	ICR27	350_H	$000FFF50_H$	27*3
PPG 8/9/18/19/28/29	44	2C	ICR28	$34C_H$	$000FFF4C_H$	28*3

*8: It is a standard when four-layer substrate is used.

*9: Corresponding pins: General-purpose ports other than those of P103, P104, P105 and P106.
*10: Corresponding pins: General-purpose ports of P103, P104, P105 and P106.

Sample Recommended Circuit



<WARNING>

Semiconductor devices may be permanently damaged by application of stress (including, without limitation, voltage, current or temperature) in excess of absolute maximum ratings. Do not exceed any of these ratings.

Recommended operating conditions

(V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Value		Unit	Remarks
		Min	Max		
Power supply voltage	V_{CC}, AV_{CC}	4.5	5.5	V	Recommended operation guarantee range (When 5.0V is used)
		3.0	3.6	V	Recommended operation guarantee range (When 3.3V is used)
		2.7	5.5	V	Operation guarantee range *1
Smoothing capacitor *2	C_S	4.7 (tolerance within ±50%)		µF	Use a ceramic capacitor or a capacitor that has the similar frequency characteristics. Use a capacitor with a capacitance greater than C_S as the smoothing capacitor on the VCC pin.
Operating temperature	T_A	-40	+105	°C	
		-40	+125	°C	*3

*1: When it is used outside recommended operation guarantee range (range of the operation guarantee),contact your sales representative.
The initial detection voltage of the external low voltage detection is 2.8V±8% (2.576V to 3.024V). This LVD setting and internal LVD cannot be used to reliably generate a reset before voltage dips below minimum guaranteed operation voltage, as these detection levels are below the minimum guaranteed MCU operation voltage. Below the

AC Characteristics

(1) Main Clock Timing

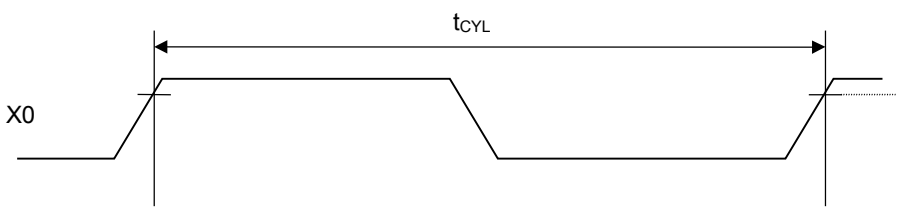
(T_A: -40°C to +125°C, V_{CC}= AV_{CC}=5.0V ± 10%/V_{CC}=AV_{CC}=3.3V±0.3V, V_{SS} =AV_{SS}=0.0V)

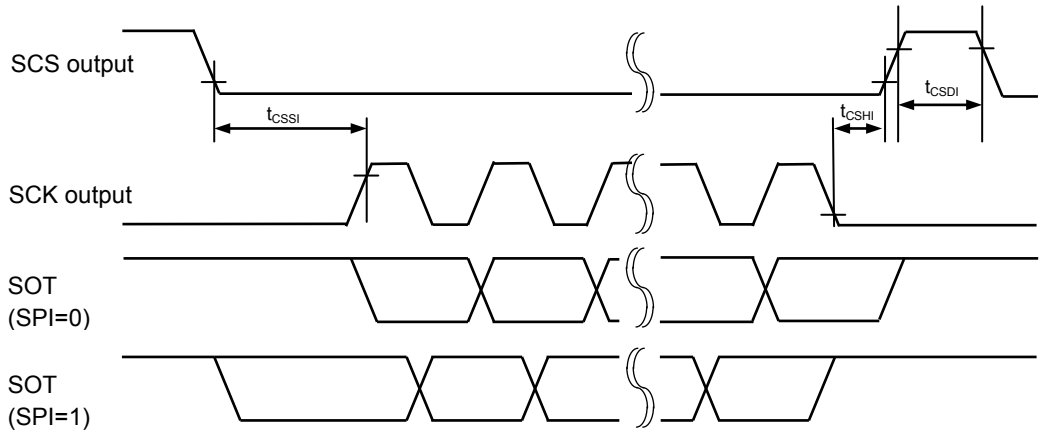
Parameter	Symbol	Pin name	Conditions	Value			Unit	Remarks
				Min	Typ	Max		
Source oscillation clock frequency	F_C	X0, X1		-	4	16	MHz	
Source oscillation clock cycle time	t_{CYL}	X0, X1		62.5	250	-	ns	
Internal operating clock frequency*1	F_{CP}	-		2	-	80	MHz	CPU clock
	F_{CPP}			1		40		Peripheral bus clock
	F_{CPT}			1		40		External bus clock (When V_{CC}=5.0V is used) *2
				1		32		External bus clock (When V_{CC}=3.3V is used)
Internal operating clock cycle time*1	t_{CP}	-	-	12.5	-	500	ns	CPU clock
	t_{CPP}			25		1000		Peripheral bus clock
	t_{CPT}			25		1000		External bus clock (When V_{CC}=5.0V is used)
				31.25		1000		External bus clock (When V_{CC}=3.3V is used)
CAN PLL jitter (during lock)	t_{PJ}	-		-10	-	10	ns	F_{CP}=80MHz (4MHz□Multiplied by 20)
Built-in CR oscillation frequency	F_{CCR}	-		50	100	150	kHz	

*1: The maximum / minimum value is defined when using the main clock and PLL clock.

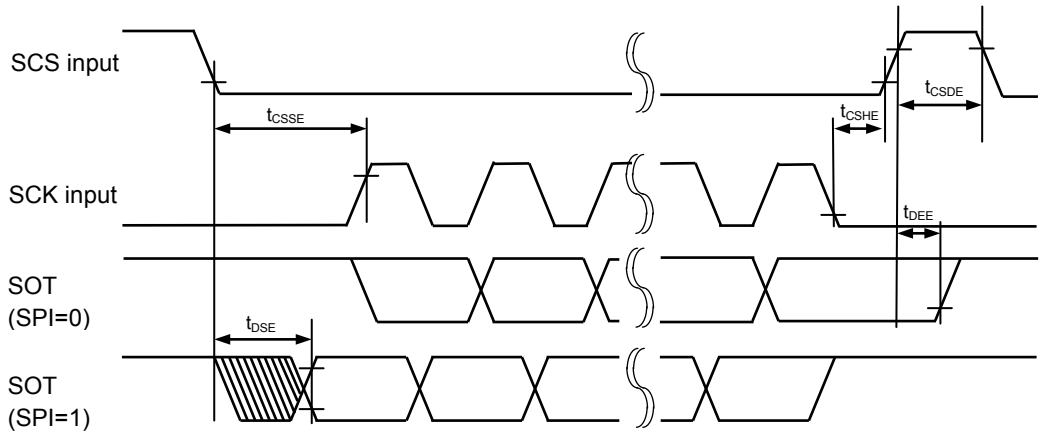
*2: Please use it with external load capacity 12pF or less for VCC=3.3V±0.3V (40MHz operation).

• X0,X1 clock timing

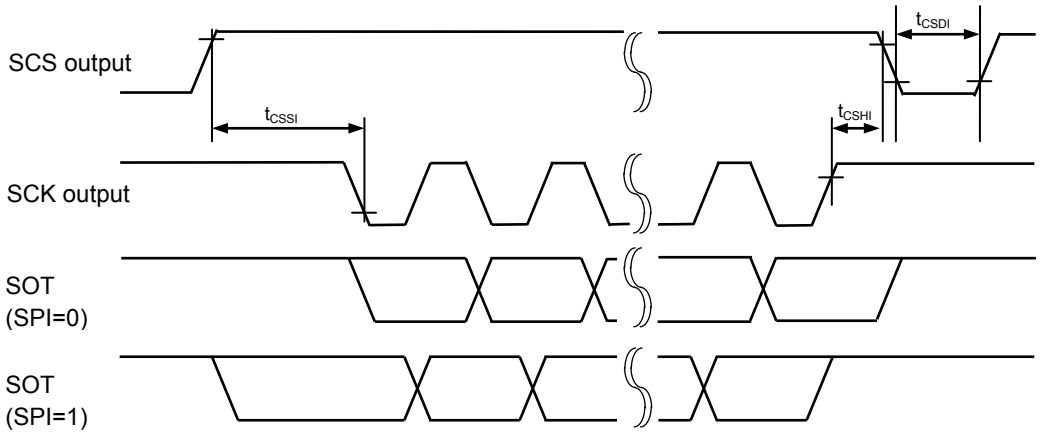




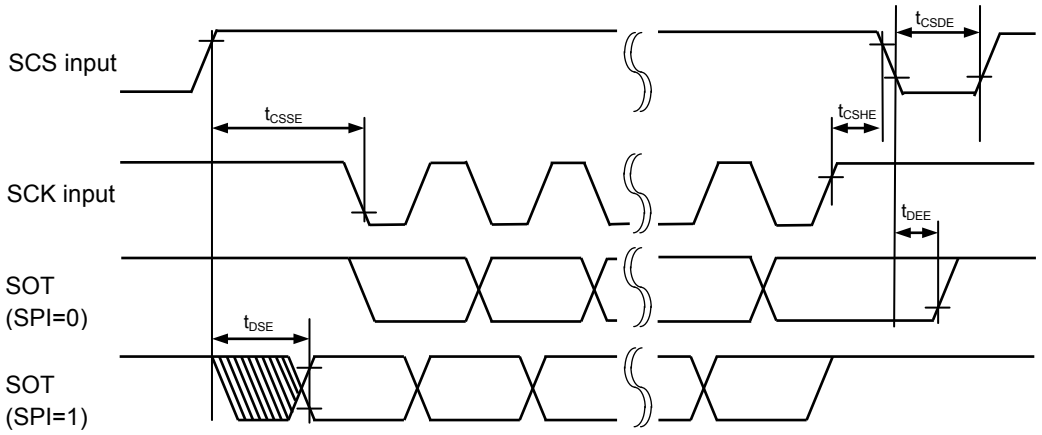
When Serial chip select is used , Serial clock output mark level "L",
Serial chip select Inactive level "H"
Internal shift clock mode



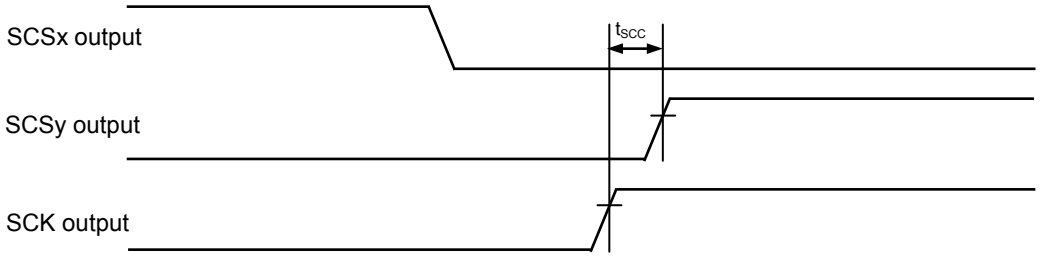
When Serial chip select is used , Serial clock output mark level "L",
Serial chip select Inactive level "H"
External shift clock mode



When Serial chip select is used , Serial clock output mark level "H",
Serial chip select Inactive level "L"
Internal shift clock mode



When Serial chip select is used , Serial clock output mark level "H",
Serial chip select Inactive level "L"
External shift clock mode



When Serial chip select is used , Serial clock output mark level "L",
Serial chip select Inactive level "L"
Master mode, Example of switching clock by round operation (x,y=0,1,2,3)

A/D Converter

(1) 12-bit A/D Converter Electrical Characteristics

(T_A: -40°C to +125°C, V_{CC}=AV_{CC}=5.0V ± 10%/V_{CC}= AV_{CC}=3.3V±0.3V, V_{SS}=AV_{SS}=0.0V)

Parameter	Symbol	Pin name	Value			Unit	Remarks
			Min	Typ	Max		
Resolution	-	-	-	-	12	bit	
Total error	-	-	-	-	±12	LSB	
Linearity error	-	-	-	-	± 4.0	LSB	
Differential linearity error	-	-	-	-	± 1.9	LSB	
Zero transition voltage	V_{OT}	AN0 to AN47	AVRL-11.5LSB	-	AVRL+12.5LSB	V	1LSB= (V_{FST}-V_{OT})/4094
Full-scale transition voltage	V_{FST}	AN0 to AN47	AVRH-13.5LSB	-	AVRH+10.5LSB	V	
Sampling time	t_{SMP}	-	0.7	-	-	µs	*1
Compare time	t_{CMP}	-	0.7	-	-	µs	*1
A/D conversion time	t_{CNV}	-	1.4	-	-	µs	*1
Analog port input current	I_{AIN}	AN0 to AN47	-1.0	-	+1.0	µA	$V_{AVSS} \le V_{AIN} \le V_{AVCC}$
Analog input voltage	V_{AIN}	AN0 to AN47	AVRL	-	AVRH	V	
Reference voltage	AVRH	AVRH	3.0	-	5.5	V	
	AVRL	AVSS/AVRL	-	0.0	-	V	
Power supply current	I_A	AVCC*3	-	0.47	0.63	mA	Per unit T_A: +105°C
			-	0.47	0.7	mA	Per unit T_A: +125°C
	I_{AH}		-	-	2.5	µA	*2
	I_R	AVRH	-	1	1.96	mA	Per unit
	I_{RH}		-	-	1.6	µA	*2
Variation between channels	-	AN0 to AN47	-	-	4	LSB	

*1: Time for each channel.

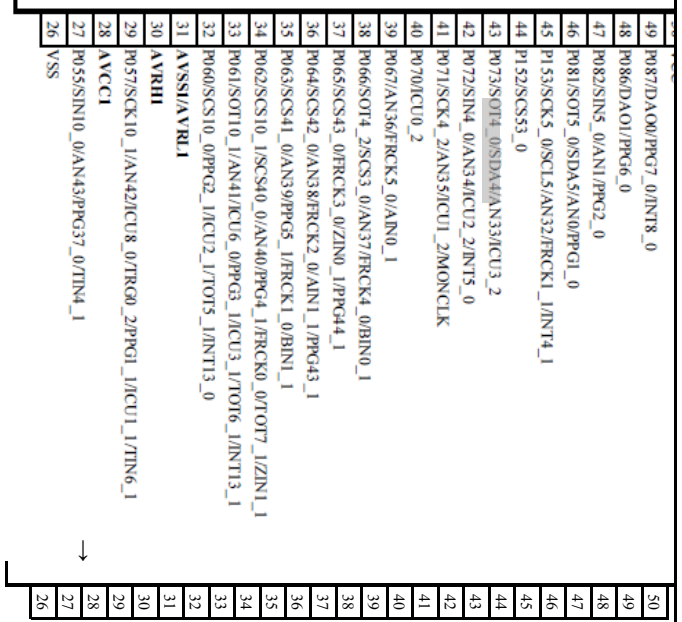
*2: Power supply current (V_{CC} = AV_{CC} = 5.0 V) is specified if A/D converter is not operating and CPU is stopped.

*3: The power supply current described only current value on A/D converter.
The total AVcc current value must be calculated the power supply current for A/D converter and D/A converter.

(Note) Please use the clock of 0.5MHz-20MHz for the output clock of A/D converter to guarantee accuracy.

Part number	Sub clock	CSV Initial value	LVD Initial value	Package*
MB91F526BWDPMC1	Yes	ON	ON	LQD・64 pin, Plastic
MB91F526BJDPMC1		OFF	ON	
MB91F525BWDPMC1		ON	ON	
MB91F525BJDPMC1		OFF	ON	
MB91F524BWDPMC1		ON	ON	
MB91F524BJDPMC1		OFF	ON	
MB91F523BWDPMC1		ON	ON	
MB91F523BJDPMC1		OFF	ON	
MB91F522BWDPMC1		ON	ON	
MB91F522BJDPMC1		OFF	ON	
MB91F526BSDPMC1	None	ON	ON	
MB91F526BHDPMC1		OFF	ON	
MB91F525BSDPMC1		ON	ON	
MB91F525BHDPMC1		OFF	ON	
MB91F524BSDPMC1		ON	ON	
MB91F524BHDPMC1		OFF	ON	
MB91F523BSDPMC1		ON	ON	
MB91F523BHDPMC1		OFF	ON	
MB91F522BSDPMC1		ON	ON	
MB91F522BHDPMC1		OFF	ON	

*: For details of the package, see "■ PACKAGE DIMENSIONS ".

Page	Section	Change Results
15	■Pin Assignment MB91F52xF	Signals indicated by the shading below deleted in Figure. (Error) - Bottom 

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<tr><td>RDY</td></tr>
<tr><td>SCK10_1</td></tr>
<tr><td>AN42</td></tr>
<tr><td>ICU8_0</td></tr>
<tr><td>TRG0_2</td></tr>
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