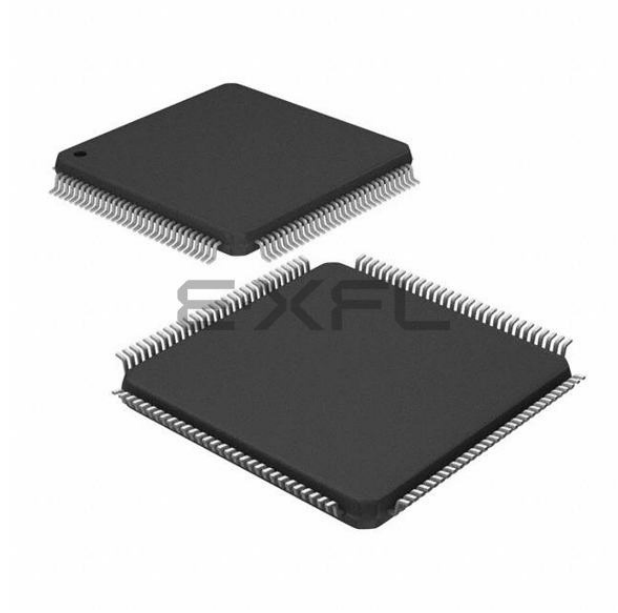
Infineon Technologies - MB96F6A6RBPMC-GSE2 Datasheet



Welcome to E-XFL.COM

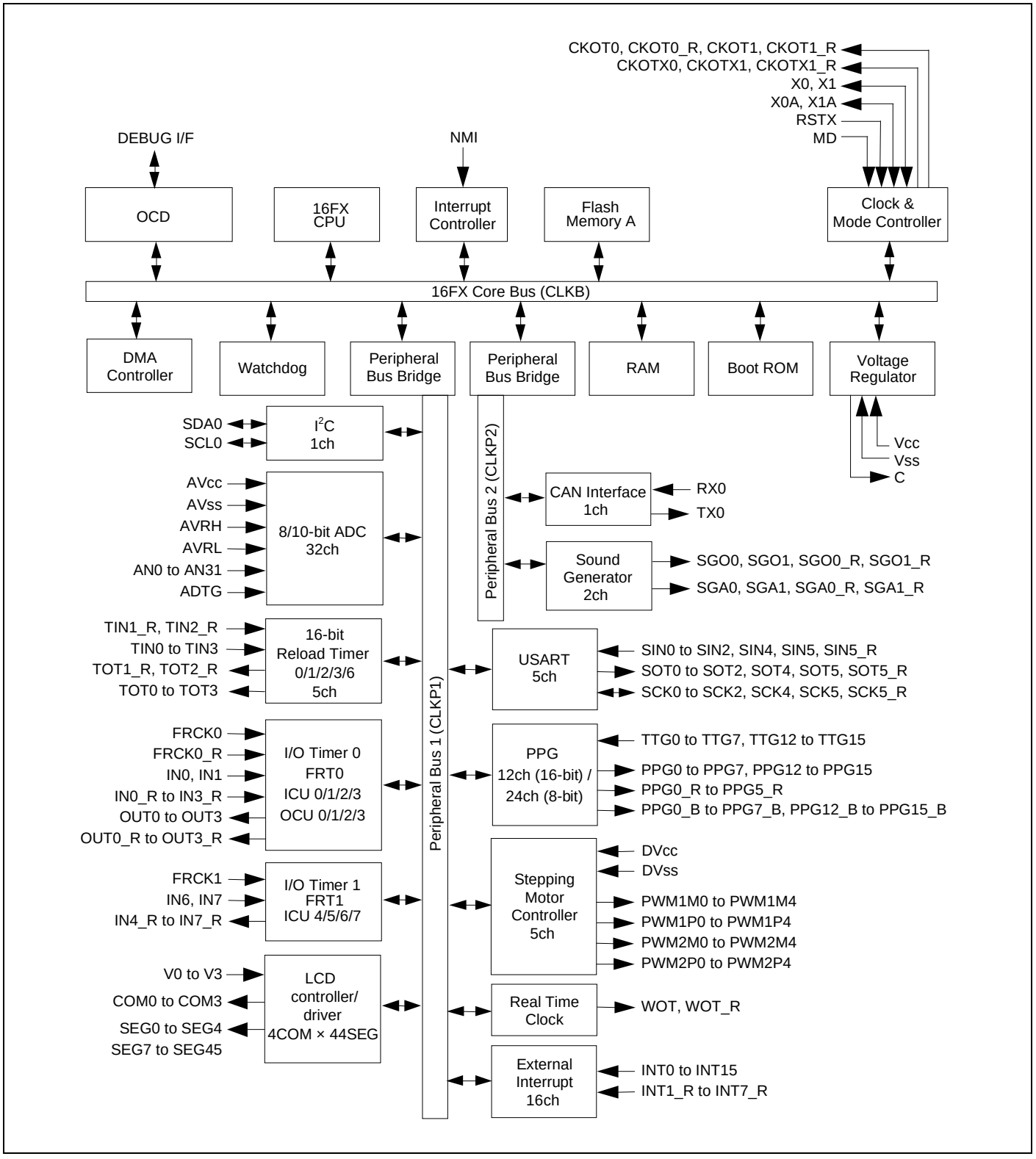
What is "Embedded - Microcontrollers"?

"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"

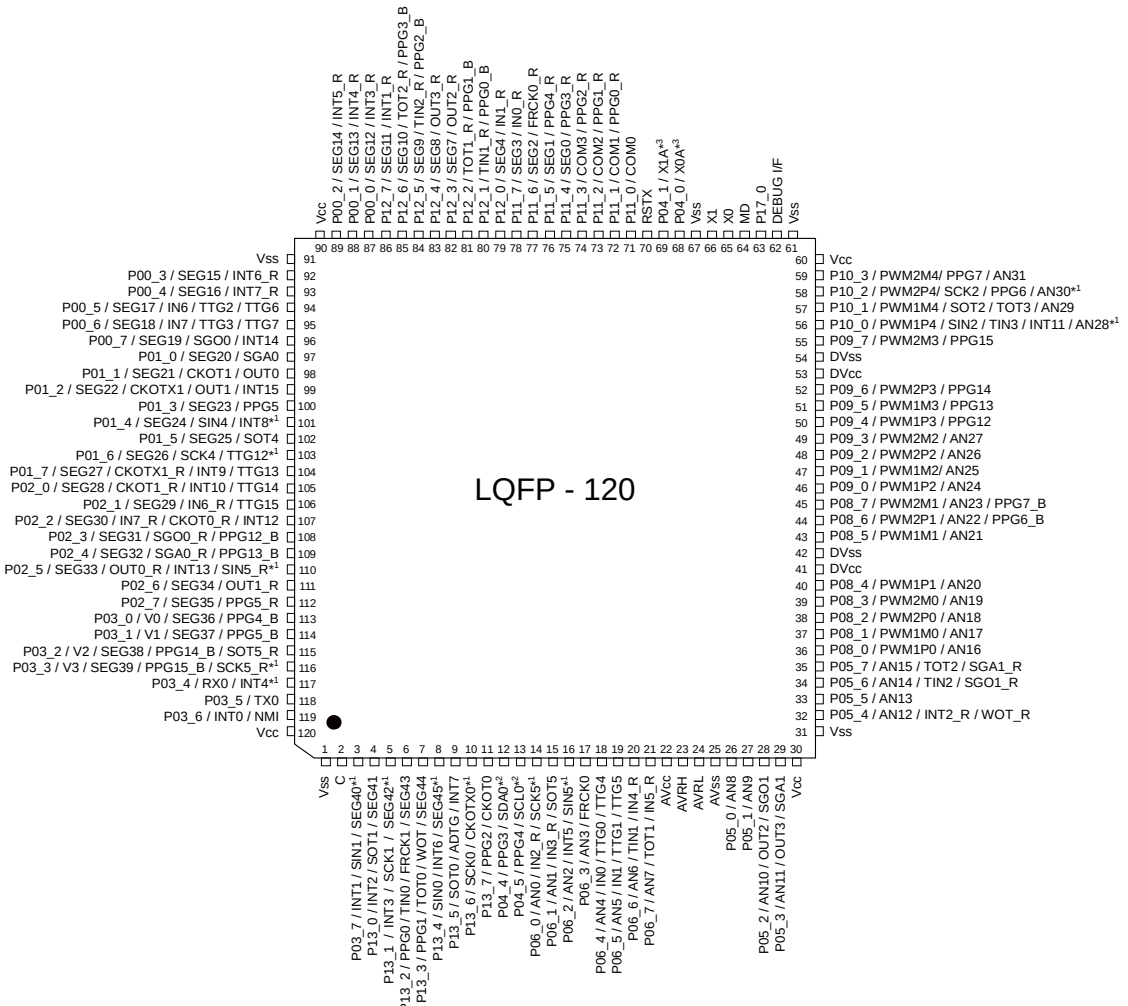
Details	
Product Status	Obsolete
Core Processor	F²MC-16FX
Core Size	16-Bit
Speed	32MHz
Connectivity	CANbus, I²C, LINbus, SCI, UART/USART
Peripherals	DMA, LCD, LVD, POR, PWM, WDT
Number of I/O	97
Program Memory Size	288KB (288K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	16K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 5.5V
Data Converters	A/D 32x8/10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	120-LQFP
Supplier Device Package	120-LQFP (16x16)
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb96f6a6rbpmc-gse2

2. Block Diagram



3. Pin Assignment

(Top view)



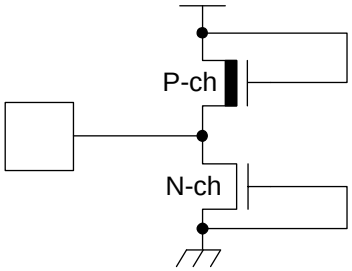
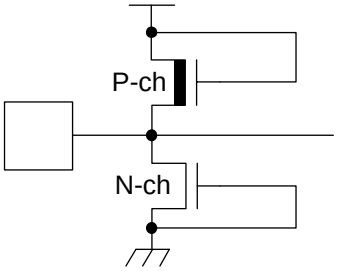
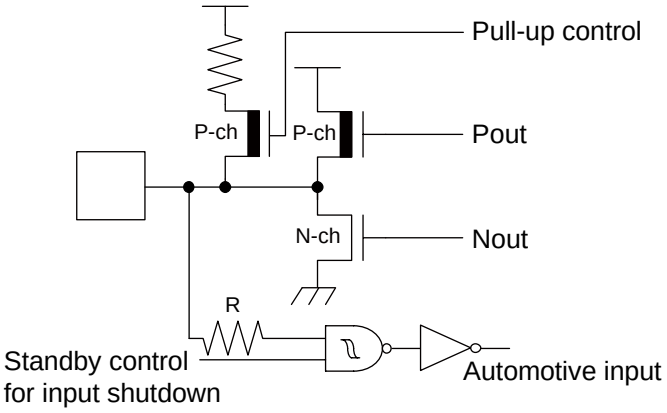
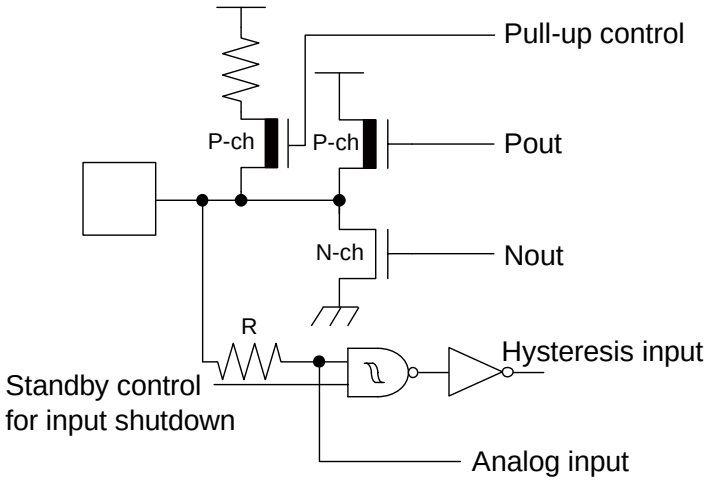
(LQM120)

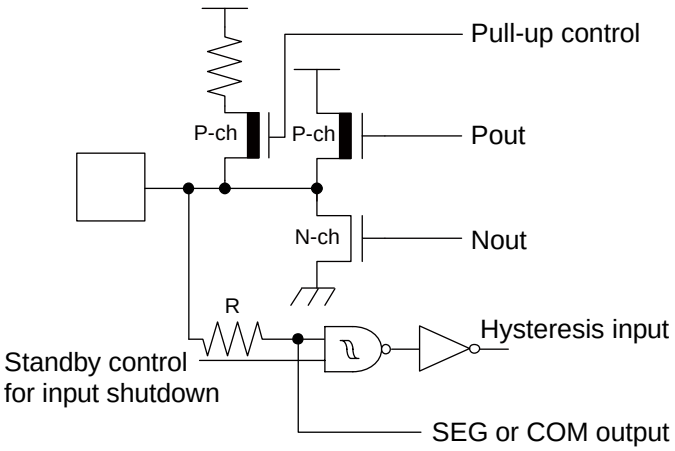
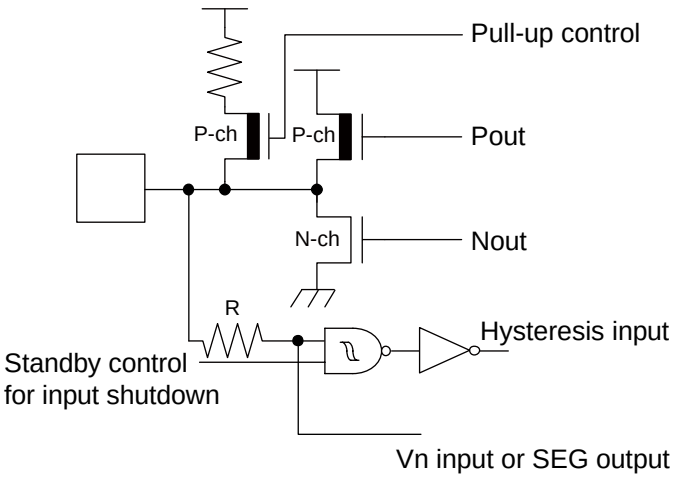
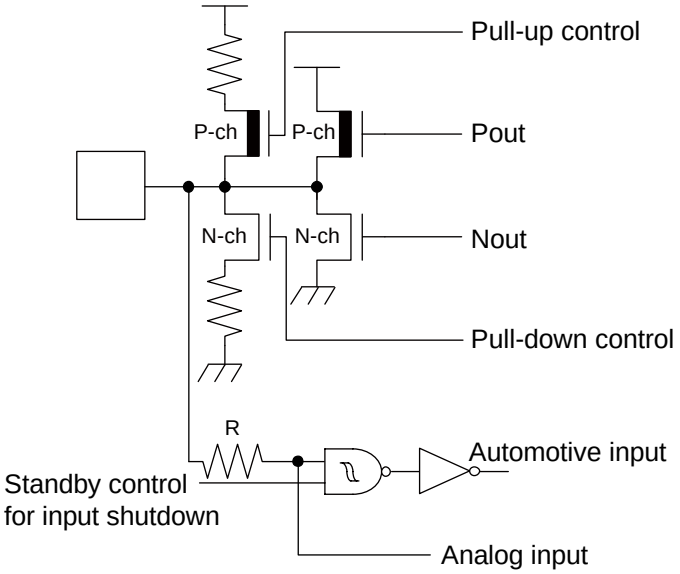
*1: CMOS input level only

*2: CMOS input level only for I^2C

*3: Please set ROM Configuration Block (RCB) to use the subclock.

Other than those above, general-purpose pins have only Automotive input level.

Type	Circuit	Remarks
F		Power supply input protection circuit
G		■A/D converter ref+ (AVRH)/ ref- (AVRL) power supply input pin with protection circuit ■Without protection circuit against V_{CC} for pins AVRH/AVRL
H		■CMOS level output (I_{OL} = 4mA, I_{OH} = -4mA) ■Automotive input with input shutdown function ■Programmable pull-up resistor
I		■CMOS level output (I_{OL} = 4mA, I_{OH} = -4mA) ■CMOS hysteresis input with input shutdown function ■Programmable pull-up resistor ■Analog input

Type	Circuit	Remarks
P		■CMOS level output (I_{OL} = 4mA, I_{OH} = -4mA) ■CMOS hysteresis inputs with input shutdown function ■Programmable pull-up resistor ■SEG or COM output
Q		■CMOS level output (I_{OL} = 4mA, I_{OH} = -4mA) ■CMOS hysteresis inputs with input shutdown function ■Programmable pull-up resistor ■Vn input or SEG output
R		■CMOS level output (programmable I_{OL} = 4mA, I_{OH} = -4mA and I_{OL} = 30mA, I_{OH} = -30mA) ■Automotive input with input shutdown function ■Programmable pull-up / pull-down resistor ■Analog input

11. Interrupt Vector Table

Vector Number	Offset in Vector Table	Vector Name	Cleared by DMA	Index in ICR to Program	Description
0	$3FC_H$	CALLV0	No	-	CALLV instruction
1	$3F8_H$	CALLV1	No	-	CALLV instruction
2	$3F4_H$	CALLV2	No	-	CALLV instruction
3	$3F0_H$	CALLV3	No	-	CALLV instruction
4	$3EC_H$	CALLV4	No	-	CALLV instruction
5	$3E8_H$	CALLV5	No	-	CALLV instruction
6	$3E4_H$	CALLV6	No	-	CALLV instruction
7	$3E0_H$	CALLV7	No	-	CALLV instruction
8	$3DC_H$	RESET	No	-	Reset vector
9	$3D8_H$	INT9	No	-	INT9 instruction
10	$3D4_H$	EXCEPTION	No	-	Undefined instruction execution
11	$3D0_H$	NMI	No	-	Non-Maskable Interrupt
12	$3CC_H$	DLY	No	12	Delayed Interrupt
13	$3C8_H$	RC_TIMER	No	13	RC Clock Timer
14	$3C4_H$	MC_TIMER	No	14	Main Clock Timer
15	$3C0_H$	SC_TIMER	No	15	Sub Clock Timer
16	$3BC_H$	LVDI	No	16	Low Voltage Detector
17	$3B8_H$	EXTINT0	Yes	17	External Interrupt 0
18	$3B4_H$	EXTINT1	Yes	18	External Interrupt 1
19	$3B0_H$	EXTINT2	Yes	19	External Interrupt 2
20	$3AC_H$	EXTINT3	Yes	20	External Interrupt 3
21	$3A8_H$	EXTINT4	Yes	21	External Interrupt 4
22	$3A4_H$	EXTINT5	Yes	22	External Interrupt 5
23	$3A0_H$	EXTINT6	Yes	23	External Interrupt 6
24	$39C_H$	EXTINT7	Yes	24	External Interrupt 7
25	398_H	EXTINT8	Yes	25	External Interrupt 8
26	394_H	EXTINT9	Yes	26	External Interrupt 9
27	390_H	EXTINT10	Yes	27	External Interrupt 10
28	$38C_H$	EXTINT11	Yes	28	External Interrupt 11
29	388_H	EXTINT12	Yes	29	External Interrupt 12
30	384_H	EXTINT13	Yes	30	External Interrupt 13
31	380_H	EXTINT14	Yes	31	External Interrupt 14
32	$37C_H$	EXTINT15	Yes	32	External Interrupt 15
33	378_H	CAN0	No	33	CAN Controller 0
34	374_H	-	-	34	Reserved
35	370_H	-	-	35	Reserved
36	$36C_H$	-	-	36	Reserved
37	368_H	-	-	37	Reserved
38	364_H	PPG0	Yes	38	Programmable Pulse Generator 0
39	360_H	PPG1	Yes	39	Programmable Pulse Generator 1

Vector Number	Offset in Vector Table	Vector Name	Cleared by DMA	Index in ICR to Program	Description
116	$22C_H$	-	-	116	Reserved
117	228_H	-	-	117	Reserved
118	224_H	-	-	118	Reserved
119	220_H	-	-	119	Reserved
120	$21C_H$	-	-	120	Reserved
121	218_H	SG1	No	121	Sound Generator 1
122	214_H	-	-	122	Reserved
123	210_H	-	-	123	Reserved
124	$20C_H$	-	-	124	Reserved
125	208_H	-	-	125	Reserved
126	204_H	-	-	126	Reserved
127	200_H	-	-	127	Reserved
128	$1FC_H$	-	-	128	Reserved
129	$1F8_H$	-	-	129	Reserved
130	$1F4_H$	-	-	130	Reserved
131	$1F0_H$	-	-	131	Reserved
132	$1EC_H$	-	-	132	Reserved
133	$1E8_H$	FLASHA	Yes	133	Flash memory A interrupt
134	$1E4_H$	-	-	134	Reserved
135	$1E0_H$	-	-	135	Reserved
136	$1DC_H$	-	-	136	Reserved
137	$1D8_H$	-	-	137	Reserved
138	$1D4_H$	-	-	138	Reserved
139	$1D0_H$	ADCRC0	No	139	A/D Converter 0 - Range Comparator
140	$1CC_H$	ADCPD0	No	140	A/D Converter 0 - Pulse detection
141	$1C8_H$	-	-	141	Reserved
142	$1C4_H$	-	-	142	Reserved
143	$1C0_H$	-	-	143	Reserved

■ Static Electricity
Because semiconductor devices are particularly susceptible to damage by static electricity, you must take the following precautions:

(1) Maintain relative humidity in the working environment between 40% and 70%. Use of an apparatus for ion generation may be needed to remove electricity.

(2) Electrically ground all conveyors, solder vessels, soldering irons and peripheral equipment.

(3) Eliminate static body electricity by the use of rings or bracelets connected to ground through high resistance (on the level of 1 MΩ).
Wearing of conductive clothing and shoes, use of conductive floor mats and other measures to minimize shock loads is recommended.

(4) Ground all fixtures and instruments, or protect with anti-static measures.

(5) Avoid the use of styrofoam or other highly static-prone materials for storage of completed board assemblies.

12.3 Precautions for Use Environment

Reliability of semiconductor devices depends on ambient temperature and other conditions as described above.

For reliable performance, do the following:

(1) Humidity
Prolonged use in high humidity can lead to leakage in devices as well as printed circuit boards. If high humidity levels are anticipated, consider anti-humidity processing.

(2) Discharge of Static Electricity
When high-voltage charges exist close to semiconductor devices, discharges can cause abnormal operation. In such cases, use anti-static measures or processing to prevent discharges.

(3) Corrosive Gases, Dust, or Oil
Exposure to corrosive gases or contact with dust or oil may lead to chemical reactions that will adversely affect the device. If you use devices in such conditions, consider ways to prevent such exposure or to protect the devices.

(4) Radiation, Including Cosmic Radiation
Most devices are not designed for environments involving exposure to radiation or cosmic radiation. Users should provide shielding as appropriate.

(5) Smoke, Flame
CAUTION: Plastic molded devices are flammable, and therefore should not be used near combustible substances. If devices begin to smoke or burn, there is danger of the release of toxic gases.

Customers considering the use of Cypress products in other special environmental conditions should consult with sales representatives.

Parameter	Symbol	Pin Name	Conditions	Value			Unit	Remarks
				Min	Typ	Max		
Power supply current in Stop mode*3	I_{CCH}	Vcc	-	-	20	60	µA	T_A = +25°C
				-	-	880	µA	T_A = +105°C
Flash Power Down current	$I_{CCFLASHPD}$		-	-	36	70	µA	
Power supply current for active Low Voltage detector*4	I_{CCLVD}		Low voltage detector enabled	-	5	-	µA	T_A = +25°C
				-	-	12.5	µA	T_A = +105°C
Flash Write/ Erase current*5	$I_{CCFLASH}$		-	-	12.5	-	mA	T_A = +25°C
				-	-	20	mA	T_A = +105°C

*1: The power supply current is measured with a 4MHz external clock connected to the Main oscillator and a 32kHz external clock connected to the Sub oscillator. See chapter “Standby mode and voltage regulator control circuit” of the Hardware Manual for further details about voltage regulator control. Current for "On Chip Debugger" part is not included. Power supply current in Run mode does not include Flash Write / Erase current.

*2: The power supply current in Timer mode is the value when Flash is in Power-down / reset mode. When Flash is not in Power-down / reset mode, $I_{CCFLASHPD}$ must be added to the Power supply current. The power supply current is measured with a 4MHz external clock connected to the Main oscillator and a 32kHz external clock connected to the Sub oscillator. The current for "On Chip Debugger" part is not included.

*3: The power supply current in Stop mode is the value when Flash is in Power-down / reset mode. When Flash is not in Power-down / reset mode, $I_{CCFLASHPD}$ must be added to the Power supply current.

*4: When low voltage detector is enabled, I_{CCLVD} must be added to Power supply current.

*5: When Flash Write / Erase program is executed, $I_{CCFLASH}$ must be added to Power supply current.

14.3.2 Pin Characteristics

(V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = - 40°C to + 105°C)

Parameter	Symbol	Pin Name	Conditions	Value			Unit	Remarks
				Min	Typ	Max		
"H" level input voltage	V_{IH}	Port inputs Pnn_m	-	V_{CC} × 0.7	-	V_{CC} + 0.3	V	CMOS Hysteresis input
			-	V_{CC} × 0.8	-	V_{CC} + 0.3	V	AUTOMOTIVE Hysteresis input
	V_{IHX0S}	X0	External clock in "Fast Clock Input mode"	VD × 0.8	-	VD	V	VD=1.8V±0.15V
	V_{IHX0AS}	X0A	External clock in "Oscillation mode"	V_{CC} × 0.8	-	V_{CC} + 0.3	V	
	V_{IHR}	RSTX	-	V_{CC} × 0.8	-	V_{CC} + 0.3	V	CMOS Hysteresis input
	V_{IHM}	MD	-	V_{CC} - 0.3	-	V_{CC} + 0.3	V	CMOS Hysteresis input
	V_{IHD}	DEBUG I/F	-	2.0	-	V_{CC} + 0.3	V	TTL Input
"L" level input voltage	V_{IL}	Port inputs Pnn_m	-	V_{SS} - 0.3	-	V_{CC} × 0.3	V	CMOS Hysteresis input
			-	V_{SS} - 0.3	-	V_{CC} × 0.5	V	AUTOMOTIVE Hysteresis input
	V_{ILX0S}	X0	External clock in "Fast Clock Input mode"	V_{SS}	-	VD × 0.2	V	VD=1.8V±0.15V
	V_{ILX0AS}	X0A	External clock in "Oscillation mode"	V_{SS} - 0.3	-	V_{CC} × 0.2	V	
	V_{ILR}	RSTX	-	V_{SS} - 0.3	-	V_{CC} × 0.2	V	CMOS Hysteresis input
	V_{ILM}	MD	-	V_{SS} - 0.3	-	V_{SS} + 0.3	V	CMOS Hysteresis input
	V_{ILD}	DEBUG I/F	-	V_{SS} - 0.3	-	0.8	V	TTL Input

Parameter	Symbol	Pin Name	Conditions	Value			Unit	Remarks
				Min	Typ	Max		
Input leak current	I_{IL}	Pnn_m	$V_{SS} < V_I < V_{CC}$ AV_{SS}, AVRL < V_I < AV_{CC}, AVRH	- 1	-	+ 1	µA	Single port pin except high current output I/O for SMC
		P08_m, P09_m, P10_m	$DV_{SS} < V_I < DV_{CC}$ AV_{SS}, AVRL < V_I < AV_{CC}, AVRH	- 3	-	+ 3	µA	
Total LCD leak current	$\Sigma\|I_{ILCD}\|$	All SEG/ COM pin	V_{CC} = 5.0V	-	0.5	10	µA	Maximum leakage current of all LCD pins
Internal LCD divide resistance	R_{LCD}	Between V3 and V2, V2 and V1, V1 and V0	V_{CC} = 5.0V	6.25	12.5	25	kΩ	
Pull-up resistance value	R_{PU}	Pnn_m	V_{CC} = 5.0V ±10%	25	50	100	kΩ	
Pull-down resistance value	R_{DOWN}	P08_m, P09_m, P10_m	V_{CC} = 5.0V ±10%	25	50	100	kΩ	
Input capacitance	C_{IN}	Other than C, Vcc, Vss, DVcc, DVss, AVcc, AVss, AVRH, AVRL, P08_m, P09_m, P10_m	-	-	5	15	pF	
		P08_m, P09_m, P10_m	-	-	15	30	pF	

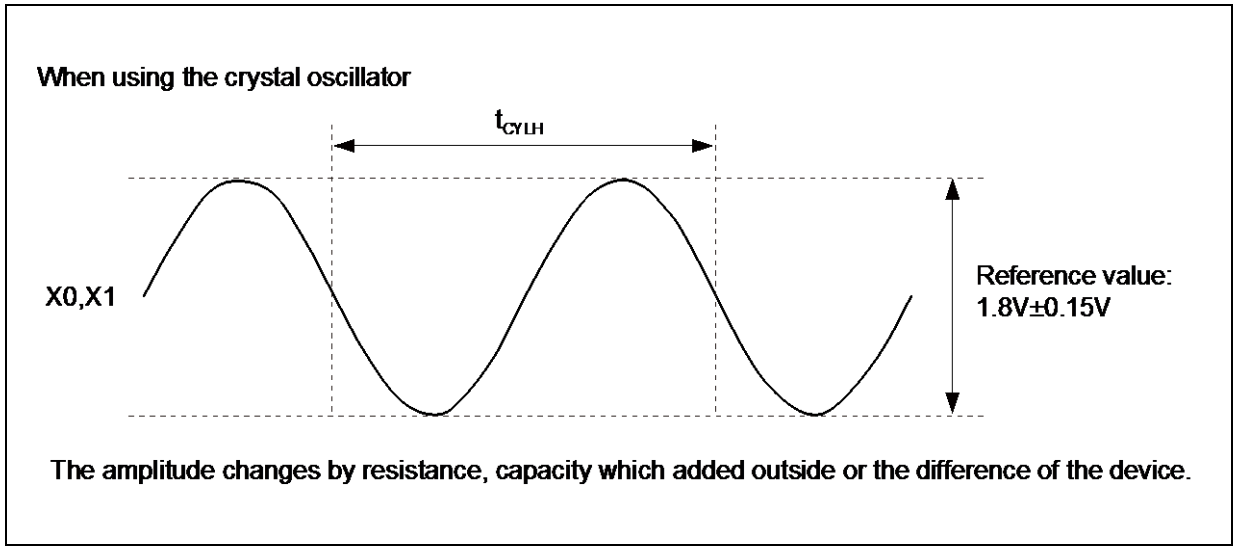
*: In the case of driving stepping motor directly or high current outputs, set "1" to the bit in the Port High Drive Register (PHDRnn:HDx="1").

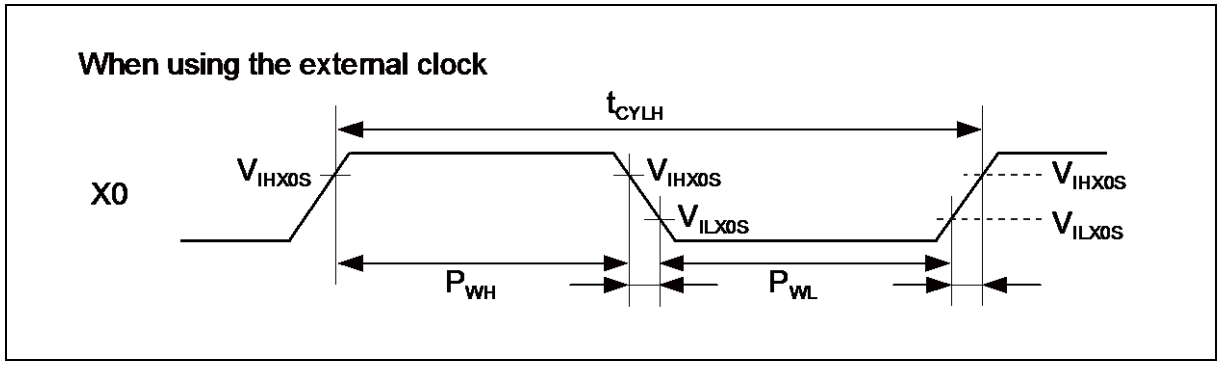
14.4 AC Characteristics

14.4.1 Main Clock Input Characteristics

(V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, VD=1.8V±0.15V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = - 40°C to + 105°C)

Parameter	Symbol	Pin Name	Value			Unit	Remarks
			Min	Typ	Max		
Input frequency	f_C	X0, X1	4	-	8	MHz	When using a crystal oscillator, PLL off
			-	-	8	MHz	When using an opposite phase external clock, PLL off
			4	-	8	MHz	When using a crystal oscillator or opposite phase external clock, PLL on
Input frequency	f_{FCI}	X0	-	-	8	MHz	When using a single phase external clock in “Fast Clock Input mode”, PLL off
			4	-	8	MHz	When using a single phase external clock in “Fast Clock Input mode”, PLL on
Input clock cycle	t_{CYLH}	-	125	-	-	ns	
Input clock pulse width	P_{WH}, P_{WL}	-	55	-	-	ns	

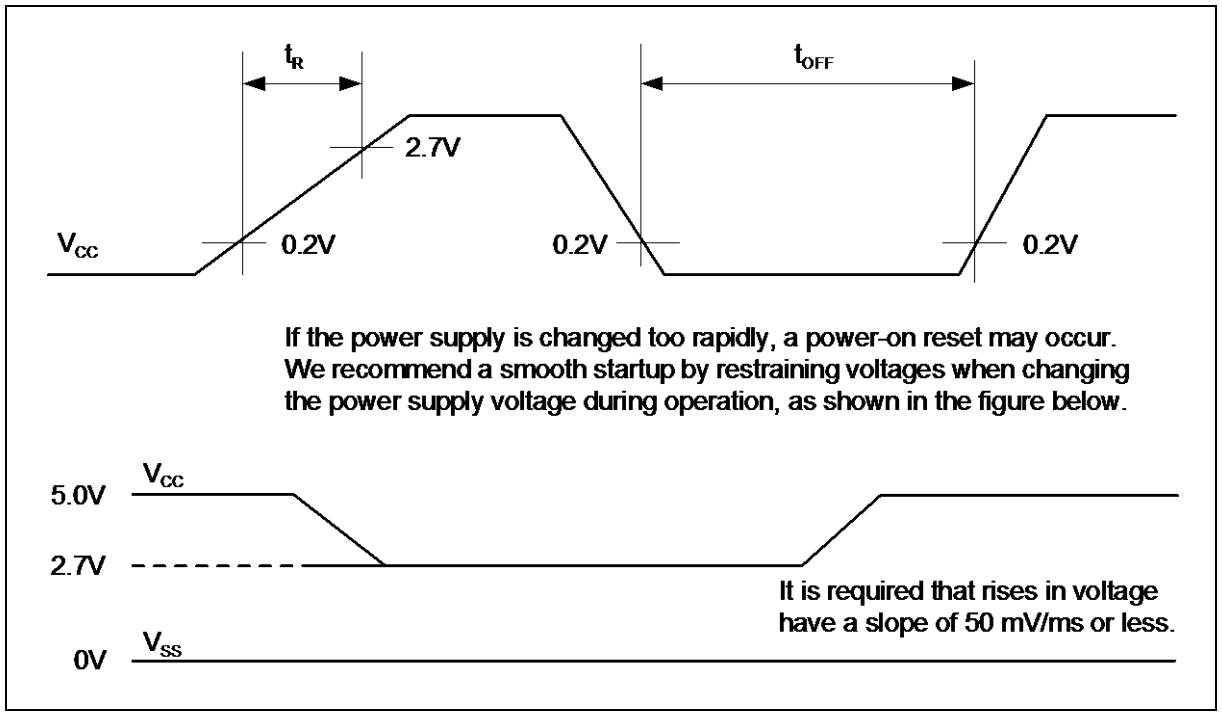




14.4.7 Power-on Reset Timing

(V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = - 40°C to + 105°C)

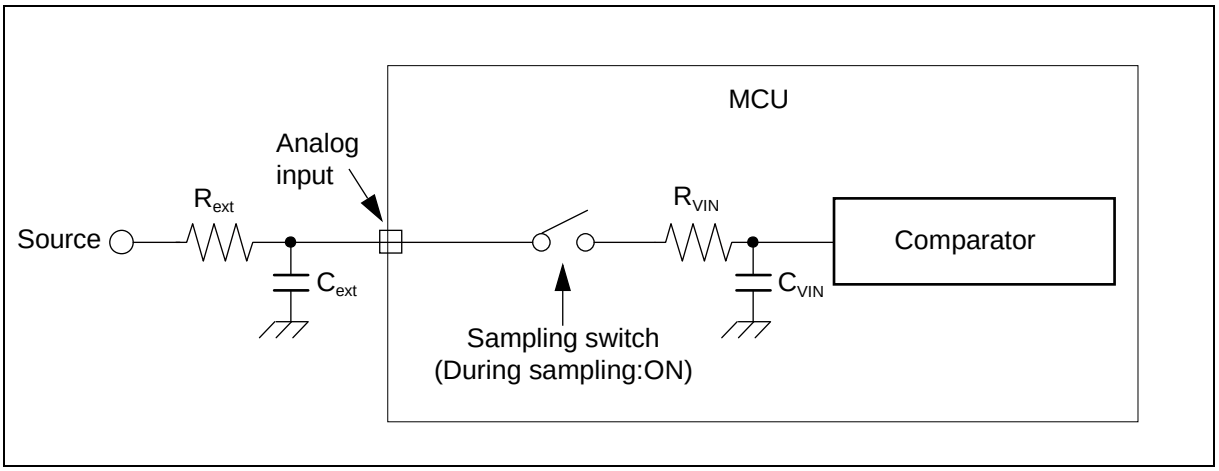
Parameter	Symbol	Pin Name	Value			Unit
			Min	Typ	Max	
Power on rise time	t_R	Vcc	0.05	-	30	ms
Power off time	t_{OFF}	Vcc	1	-	-	ms



14.5.2 Accuracy and Setting of the A/D Converter Sampling Time

If the external impedance is too high or the sampling time too short, the analog voltage charged to the internal sample and hold capacitor is insufficient, adversely affecting the A/D conversion precision.

To satisfy the A/D conversion precision, a sufficient sampling time must be selected. The required sampling time (Tsamp) depends on the external driving impedance R_{ext}, the board capacitance of the A/D converter input pin C_{ext} and the AV_{CC} voltage level. The following replacement model can be used for the calculation:



R_{ext}: External driving impedance

C_{ext}: Capacitance of PCB at A/D converter input

C_{VIN}: Analog input capacity (I/O, analog switch and ADC are contained)

R_{VIN}: Analog input impedance (I/O, analog switch and ADC are contained)

The following approximation formula for the replacement model above can be used:

$$Tsamp = 7.62 \times (Rext \times Cext + (Rext + R_{VIN}) \times C_{VIN})$$

- Do not select a sampling time below the absolute minimum permitted value. (0.5µs for 4.5V ≤ AV_{CC} ≤ 5.5V, 1.2µs for 2.7V ≤ AV_{CC} < 4.5V)
- If the sampling time cannot be sufficient, connect a capacitor of about 0.1µF to the analog input pin.
- A big external driving impedance also adversely affects the A/D conversion precision due to the pin input leakage current IIL (static current before the sampling switch) or the analog input leakage current IAIN (total leakage current of pin input and comparator during sampling). The effect of the pin input leakage current IIL cannot be compensated by an external capacitor.
- The accuracy gets worse as |AVRH - AVRL| becomes smaller.

14.8 Flash Memory Write/Erase Characteristics

(V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = - 40°C to + 105°C)

Parameter		Conditions	Value			Unit	Remarks
			Min	Typ	Max		
Sector erase time	Large Sector	-	-	1.6	7.5	s	Includes write time prior to internal erase.
	Small Sector	-	-	0.4	2.1	s	
	Security Sector	-	-	0.31	1.65	s	
Word (16-bit) write time		-	-	25	400	µs	Not including system-level overhead time.
Chip erase time		-	-	8.31	40.05	s	Includes write time prior to internal erase.

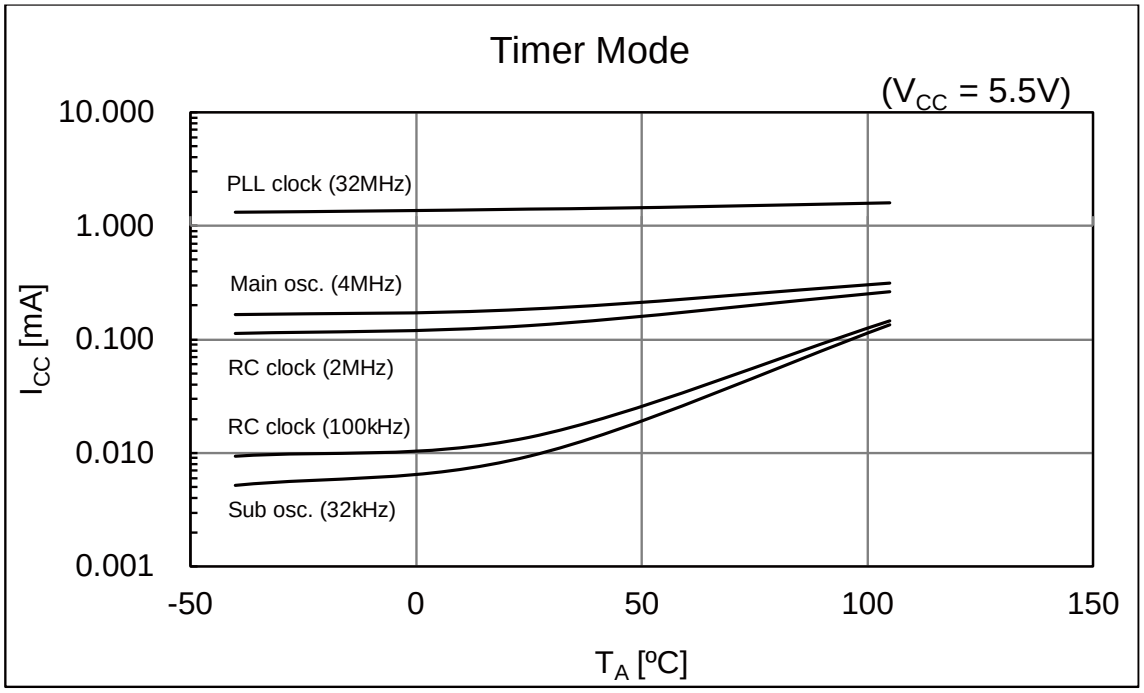
Note: While the Flash memory is written or erased, shutdown of the external power (V_{CC}) is prohibited. In the application system where the external power (V_{CC}) might be shut down while writing or erasing, be sure to turn the power off by using a low voltage detection function.
To put it concrete, change the external power in the range of change ration of power supply voltage (-0.004V/ µs to +0.004V/ µs) after the external power falls below the detection voltage (V_{DLX})*1.

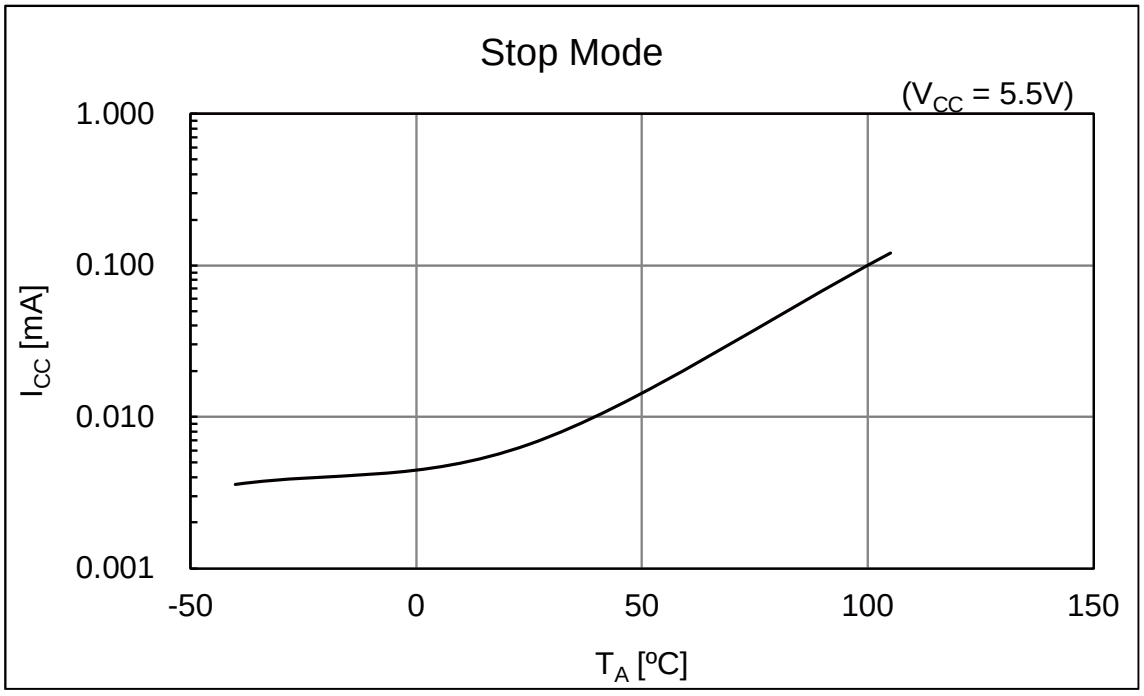
Write/Erase cycles and data hold time

Write/Erase Cycles (Cycle)	Data Hold Time (Year)
1,000	20 *2
10,000	10 *2
100,000	5 *2

*1: See "14.7. Low Voltage Detection Function Characteristics".
*2: This value comes from the technology qualification (using Arrhenius equation to translate high temperature measurements into normalized value at + 85°C).

■CY96F6A6


Timer Mode
(V_{CC} = 5.5V)
10.000
1.000
0.100
0.010
0.001
I_{CC} [mA]
PLL clock (32MHz)
Main osc. (4MHz)
RC clock (2MHz)
RC clock (100kHz)
Sub osc. (32kHz)
-50
0
50
100
150
T_A [ºC]


Stop Mode
(V_{CC} = 5.5V)
1.000
0.100
0.010
0.001
I_{CC} [mA]
-50
0
50
100
150
T_A [ºC]

Page	Section	Change Results
		Changed the annotation *4 Note that if the +B input is applied during power-on, the power supply is provided from the pins and the resulting supply voltage may not be sufficient to operate the Power reset (except devices with persistent low voltage reset in internal vector mode). → Note that if the +B input is applied during power-on, the power supply is provided from the pins and the resulting supply voltage may not be sufficient to operate the Power reset.
		Added the annotation *4 The DEBUG I/F pin has only a protective diode against V_{SS}. Hence it is only permitted to input a negative clamping current (4mA). For protection against positive input voltages, use an external clamping diode which limits the input voltage to maximum 6.0V.
39	Recommended Operating Conditions	Added the Value and Remarks to “Power supply voltage” Min: 2.0V Typ: - Max: 5.5V Remarks: Maintains RAM data in stop mode
		Changed the Value of “Smoothing capacitor at C pin” Typ: 1.0µF → 1.0µF to 3.9µF Max: 1.5µF → 4.7µF
		Changed the Remarks of “Smoothing capacitor at C pin” Deleted “(Target value)” Added “3.9µF (Allowance within ± 20%)”
40	DC Characteristics Current Rating	Deleted “(Target value)”
		Added the Symbol to “Power supply current in Run modes” I_{CCRCH}, I_{CCRCL}
		Changed the Conditions of I_{CCPLL}, I_{CCMAIN}, I_{CCSUB} in “Power supply current in Run modes” “Flash 0 wait” is added
		Changed the Value of “Power supply current in Run modes” I_{CCPLL} Typ: 28.5mA → 28mA (T_A = +25°C) I_{CCMAIN} Typ:5mA → 3.5mA (T_A = +25°C) Max: 10mA → 8mA (T_A = +105°C) I_{CCSUB} Typ:0.5mA → 0.1mA (T_A = +25°C) Max: 6mA → 3.3mA (T_A = +105°C)
41		Added the Symbol to “Power supply current in Sleep modes” I_{CCSRCH}, I_{CCSRCL}
		Changed the Conditions of $I_{CCSMAIN}$ in “Power supply current in Sleep modes” “SMCR:LPMSS=0” is added
		Changed the Value of “Power supply current in Sleep modes” I_{CCSPLL} Typ:10mA → 9.5m A (T_A = +25°C) $I_{CCSMAIN}$ Typ: 3mA → 1.1m A (T_A = +25°C) Max: 8mA → 4.7m A (T_A = +105°C) I_{CCSSUB} Typ: 0.3mA → 0.04m A (T_A = +25°C) Max: 4.5mA → 2.7m A (T_A = +105°C)
		Added the Symbol to “Power supply current in Timer modes” I_{CCTPLL}
		Changed the Conditions of $I_{CCTMAIN}$, I_{CCTRCH} in “Power supply current in Timer modes” “SMCR:LPMSS=0” is added

Page	Section	Change Results
41	DC Characteristics Current Rating	Changed the Value of “Power supply current in Timer modes” $I_{CCTMAIN}$ Max: 355µA → 330µA (T_A = +25°C) Max: 1320µA→ 1200µA (T_A = +105°C) I_{CCTRCH} Max: 245µA → 215µA (T_A = +25°C) Max: 1230µA→ 1110µA (T_A = +105°C) I_{CCTRCL} Max: 105µA → 75µA (T_A = +25°C) Max: 1030µA → 910µA (T_A = +105°C) I_{CCTSUB} Typ: 90µA→ 65µA (T_A = +25°C) Max: 1000µA → 885µA (T_A = +105°C)
42		Changed the Value of “Power supply current in Stop modes” I_{CCH} Max: 90µA → 60µA (T_A = +25°C) Max: 1000µA → 880µA (T_A = +105°C)
		Added the Symbol $I_{CCFLASHPD}$
		Changed the Value and condition of “Power supply current for active Low Voltage detector” I_{CCLVD} Typ: 5µA, Max: 15µA, Remarks: nothing → Typ: 5µA, Max: -, Remarks: T_A = +25°C Typ: -, Max: 12.5µA, Remarks: T_A = +105°C
		Changed the condition of “Flash Write/Erase current” $I_{CCFLASH}$ Typ: 12.5mA, Max: 20mA, Remarks: nothing → Typ: 12.5mA, Max: -, Remarks: T_A = +25°C Typ: -, Max: 20mA, Remarks: T_A = +105°C
		Changed the annotation *2 The power supply current is measured with a 4MHz external clock connected to the Main oscillator and a 32kHz external clock connected to the Sub oscillator. → The power supply current is measured with a 4MHz external clock connected to the Main oscillator and a 32kHz external clock connected to the Sub oscillator. The current for "On Chip Debugger" part is not included.
44	DC Characteristics Pin Characteristics	Added the Symbol for DEBUG I/F pin V_{OLD}

Page	Section	Change Results
45	DC Characteristics Pin Characteristics	Changed the Pin name of “Input capacitance” Other than Vcc, Vss, AVcc, AVss, AVRH, AVRL, P08_m, P09_m, P10_m → Other than C, Vcc, Vss, DVcc, DVss, AVcc, AVss, AVRH, AVRL, P08_m, P09_m, P10_m
		Deleted the annotation “I_{OH} and I_{OL} are target value.”
		Added the annotation “In the case of driving stepping motor directly or high current outputs, set "1" to the bit in the Port High Drive Register (PHDRnn:HDx="1").”
46	AC Characteristics Main Clock Input Characteristics	Changed MAX frequency for f_{FCI} in all conditions 16 → 8 Changed MIN frequency for t_{CYLH} 62.5 → 125 Changed MIN, MAX and Unit for P_{WH}, P_{WL} MIN: 30 → 55 MAX: 70 → - Unit: % → ns
		Added the figure (t_{CYLH}) when using the external clock
47	AC Characteristics Sub Clock Input Characteristics	Added the figure (t_{CYLL}) when using the crystal oscillator clock
48	AC Characteristics Built-in RC Oscillation Characteristics	Added “RC clock stabilization time”
49	AC Characteristics Operating Conditions of PLL	Changed the Value of “PLL input clock frequency” Max: 16MHz → 8MHz
		Changed the Symbol of “PLL oscillation clock frequency” f_{PLLO} → f_{CLKVCO}
		Added Remarks to “PLL oscillation clock frequency”
		Added “ PLL phase jitter” and the figure
	AC Characteristics Reset Input	Added the figure for reset input time (t_{RSTL})
51	AC Characteristics USART Timing	Changed the condition (V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = -40°C to + 105°C) → (V_{CC} = AV_{CC} = DV_{CC} = 2.7V to 5.5V, V_{SS} = AV_{SS} = DV_{SS} = 0V, T_A = -40°C to + 105°C, C_L = 50pF)
		Changed the HARDWARE MANUAL “MB966A0 series HARDWARE MANUAL” → “MB96600 series HARDWARE MANUAL”
52		Changed the figure for “Internal shift clock mode”
54	AC Characteristics I^2C timing	Added parameter, “Noise filter” and an annotation *5 for it
		Added t_{SP} to the figure

Page	Section	Change Results
55	A/D Converter Electrical Characteristics for the A/D Converter	Added “Analog impedance”
		Added “Variation between channels”
		Added the annotation
56	A/D Converter Accuracy and Setting of the A/D Converter Sampling Time	Deleted the unit “[Min]” from approximation formula of Sampling time
57	A/D Converter Definition of A/D Converter Terms	Changed the Description and the figure “Linearity” → “Nonlinearity” “Differential linearity error” → “Differential nonlinearity error”
		Changed the Description Linearity error: Deviation of the line between the zero-transition point (0b0000000000←→0b0000000001) and the full-scale transition point (0b1111111110←→0b1111111111) from the actual conversion characteristics. → Nonlinearity error: Deviation of the actual conversion characteristics from a straight line that connects the zero transition point (0b0000000000 ←→ 0b0000000001) to the full-scale transition point (0b1111111110 ←→ 0b1111111111).
		Added the Description “Zero transition voltage” “Full scale transition voltage”
59	High Current Output Slew Rate	Changed the Symbol and figure t_{R2}, t_{F2}, V_{OL2} → t_{R30}, t_{F30}, V_{OL30}
60	Low Voltage Detection Function Characteristics	Added the Value of “ Power supply voltage change rate” Max: +0.004 V/µs
		Added “Hysteresis width” (V_{HYS})
		Added “Stabilization time” ($T_{LVDSTAB}$)
		Added “Detection delay time” (t_d)
		Deleted the Remarks
		Added the annotation *1, *2
61		Added the figure for “Hysteresis width”
		Added the figure for “Stabilization time”
62	Flash Memory Write/Erase Characteristics	Changed the Value of “Sector erase time”
		Added “Security Sector” to “Sector erase time”
		Changed the Parameter “Half word (16 bit) write time” → “Word (16-bit) write time”
		Changed the Value of “Chip erase time”
		Changed the Remarks of “Sector erase time” Excludes write time prior to internal erase → Includes write time prior to internal erase
		Added the Note and annotation *1
		Deleted “(targeted value)” from title “ Write/Erase cycles and data hold time”
63 to 65	Example Characteristics	Added a section
66	Ordering information	Changed part number MCU with CAN controller MB96F6A6RAPMC-GSE1* → MB96F6A6RBPMC-GSE1 MB96F6A6RAPMC-GSE2* → MB96F6A6RBPMC-GSE2

Sales, Solutions, and Legal Information

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at Cypress Locations.

Products

Arm® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Internet of Things	cypress.com/iot
Memory	cypress.com/memory
Microcontrollers	cypress.com/mcu
PSoC	cypress.com/psoc
Power Management ICs	cypress.com/pmic
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless Connectivity	cypress.com/wireless

PSoC® Solutions

PSoC 1 | PSoC 3 | PSoC 4 | PSoC 5LP | PSoC 6 MCU

Cypress Developer Community

Community | Projects | Video | Blogs | Training | Components

Technical Support

cypress.com/support