Difference among various products of 3822 Group

Renesas Technology Corporation
Renesas LSI Design Corporation
Renesas Solutions Corporation

Products effected

- Emulator MCU
  M38227RFS
- One-time PROM version
  M38223E4FP/GP/HP, M38227ECFP/HP
- Mask ROM version Standard version
  M38222M2-XXXFP/GP/HP, M38223M4-XXXFP/GP/HP
- Mask ROM version M version
  M38223M4MXXXFP/GP/HP, M38224M6MXXXFP/HP
- Mask ROM version H version
  M38223M4HXXXFP/HP, M38224M6HXXXFP/HP, M38227M8HXXXFP/HP, M38227MCHXXXFP/HP, M38227MCDXXXFP
- Mask ROM version A version
  M38223M4A-XXXFP/HP, M38224M6A-XXXFP/HP, M38227M8A-XXXFP/HP, M38227MCA-XXXFP/HP

Precaution

- When Mask ROM version, One-time PROM version and memory size differ in one group, actual values such as an electrical characteristics, operation margin, A-D conversion accuracy, noise immunity, and noise radiation may differ from the ideal values due to the difference in the manufacturing processes.
  When these products are used switching, perform system evaluation for each product of every after confirming product specification.
- This document shows difference, some specifications and standards, not for all.
  Be sure to refer to the most current data sheet as for the latest detailed specification and an electrical characteristics.

1. Difference among various products of 3822 Group

		Mask ROM version (Standard version) One-time PROM version	Mask ROM version (M version)	Mask ROM version (H version)	Mask ROM version (A version)
ROM/RAM size[byte]		8K/384,16K/512,48K/1K	16K/512,24K/640	16K/512, 24K/640, 32K/1K, 48K/1K	16K/512, 24K/640, 32K/1K, 48K/1K
Package		M38223E4 : 80P6N, 80P6Q, 80P6S M38227EC:80P6N,80P6Q	M38223M4M : 80P6N, 80P6Q, 80P6S M38224M6M:80P6N,80P6Q	80P6N,80P6Q	←
Oscillation circuit constants		The oscillation circuit constants of XIN-XOUT, XCIN-XCOUT will depend on each product.			
Hysteresis characteristics (See 3.section)		Almost fixed	←	It depends on the power supply and becomes narrow.	←
Circuit structure of the peripheral function input pins		See 4.section			
Vpp power supply pin connection (P40)		Serial resistor (5kΩ) is necessary.Make the length of wiring which is connected to the Vpp pin as short as possible. It protects input noise.	Serial resistor is unnecessary.	←	←
Absolute Maximum ratings	Power source voltage(Vcc)	-0.3V to 7.0V	←	-0.3V to 6.5V	←
	Output voltage at segment output	-0.3V to VL3+0.3V	←	-0.3V to VL3	←
Power source current		See 6.section			
Power supply(Vcc) / Main-clock input oscillation frequency		See 7.1. and 7.2. section			
RAM retention voltage (Min.)		2.0V	←	←	1.8V
Timer X,Y input frequency (Max.) f(CNTR0),f(CNTR1)		2.5<=Vcc<=4.0V : (2 x Vcc - 4) MHz 4.0<=Vcc<=5.5V : 4 MHz	2.2<=Vcc<=4.0V : (10 x Vcc - 4)/9 MHz 4.0<=Vcc<=5.5V : 4 MHz	2.0<=Vcc<=4.0V : (Vcc) MHz 4.0<=Vcc<=5.5V : 4 MHz	1.8<=Vcc<=2.0V : (5 x Vcc - 8) MHz 2.0<=Vcc<=4.0V : (Vcc) MHz 4.0<=Vcc<=4.5V : (2 x Vcc - 4) MHz 4.5<=Vcc<=5.5V : 5 MHz
absolute accuracy of A-D converter		See 7.2. section			
LCD display circuit		See 5.1. section			

2. Oscillation circuit constants

The oscillation circuit constants of XIN-XOUT, XCIN-XCOUT will depend on each product of Mask ROM version (Standard version, M version, H version, A version) and One-time PROM version.

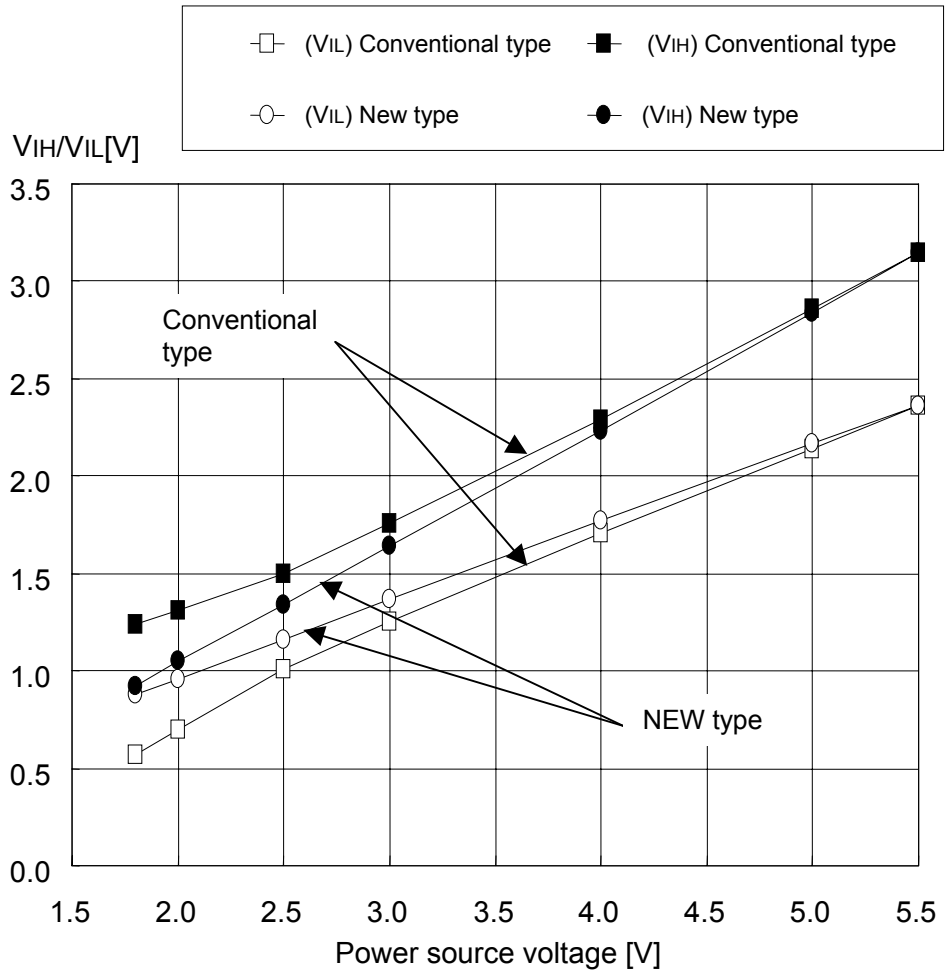
So that the product used for mass production obtains the stabilized operation clock on the user system and its condition, contact the resonator manufacturer and select the resonator and oscillation circuit constants. Be careful especially when range of voltage and temperature is wide.

We recommend to design the circuit in consideration of the wiring pattern of the feed-back resistor, the dumping resistor and the load capacity in advance.

We publish the reference-use oscillation circuit parameters in Renesas Technology home page.

http://www.renesas.com/en/38000

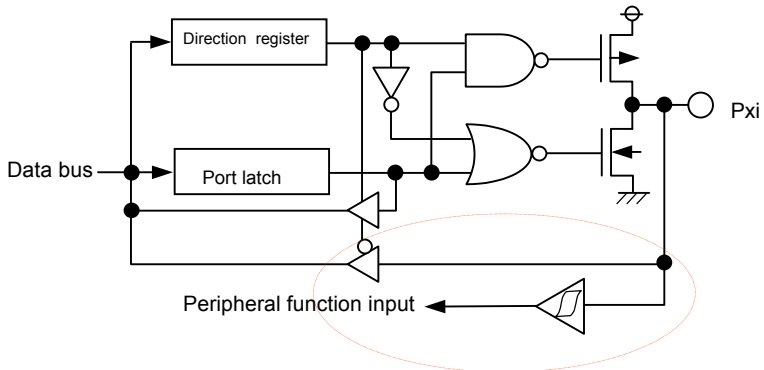
3. Hysteresis characteristic



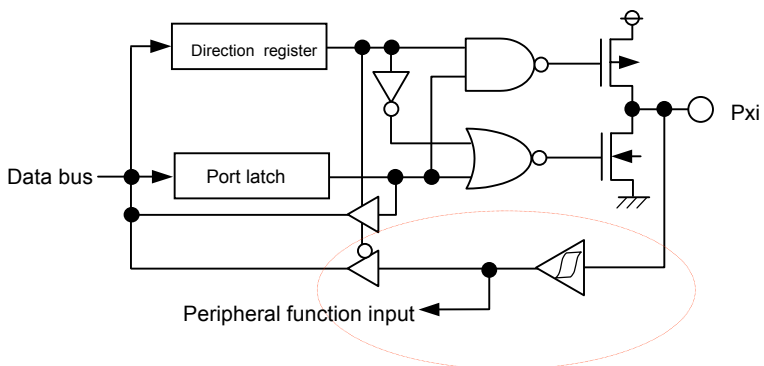
		Conventional type	New type
Emulator MCU		O	
One-time PROM version		O	
Mask ROM version	Standard version	O	
	M version	O	
	H version		O
	A version		O

Note: Data described here are characteristic examples.
The data values are not guaranteed.

4. Circuit structure of the peripheral function input pins



Type A



Type B

Type A : Input level of port does not always correspond with it of the peripheral function input pin.

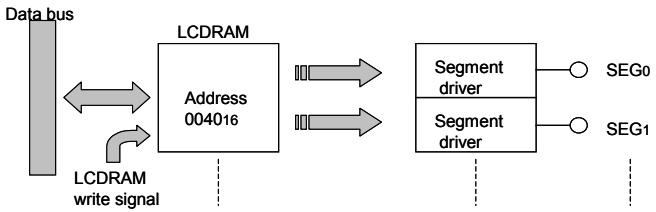
Type B : Input level of port corresponds with it of the peripheral function input pin. (The port input also has hysteresis.)

		Type A	Type B
Emulator MCU		O	
One-time PROM version		O	
Mask ROM version	Standard version	O	
	M version	O	
	H version		O
	A version		O

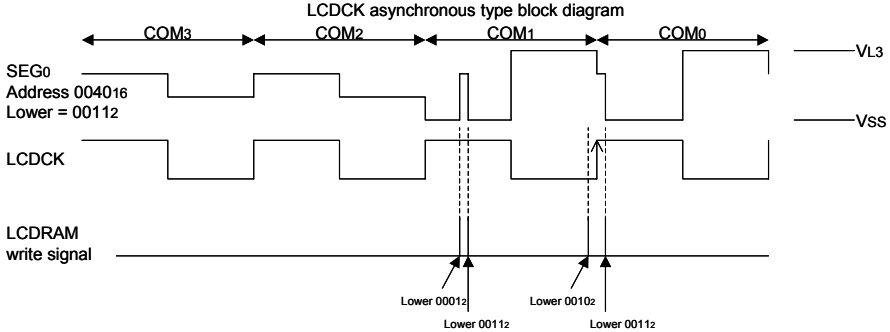
Pins ;
P20 to P27, P42/INT0, P43/INT1, P44/RXD, P46/SCLK, P50/INT2, P51/INT3, P54/CNTR0, P55/CNTR1, P57/ADT

5.1. LCD display circuit type

LCDCK asynchronous type



LCDCK asynchronous type block diagram



LCDCK asynchronous type Example of SEG output waveform by LCDRAM writing timing (1/3 bias, 4 duty)

LCDCK synchronous type

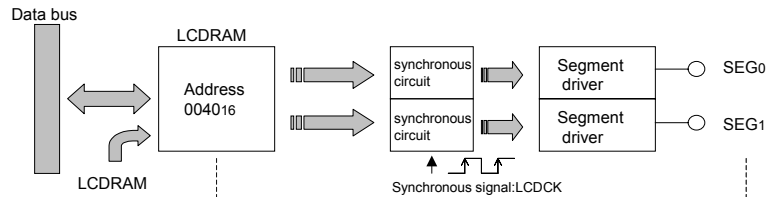


Figure 1:Synchronous type block diagram

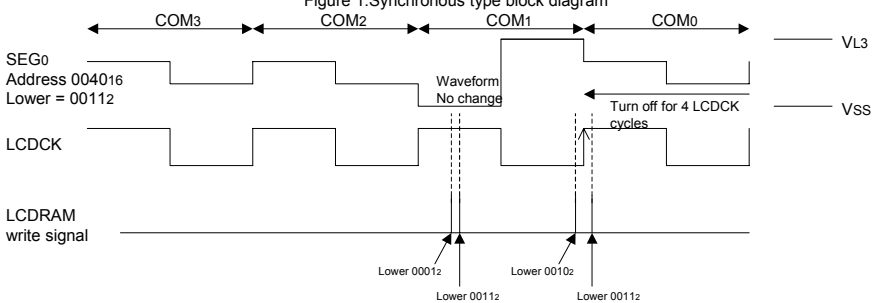


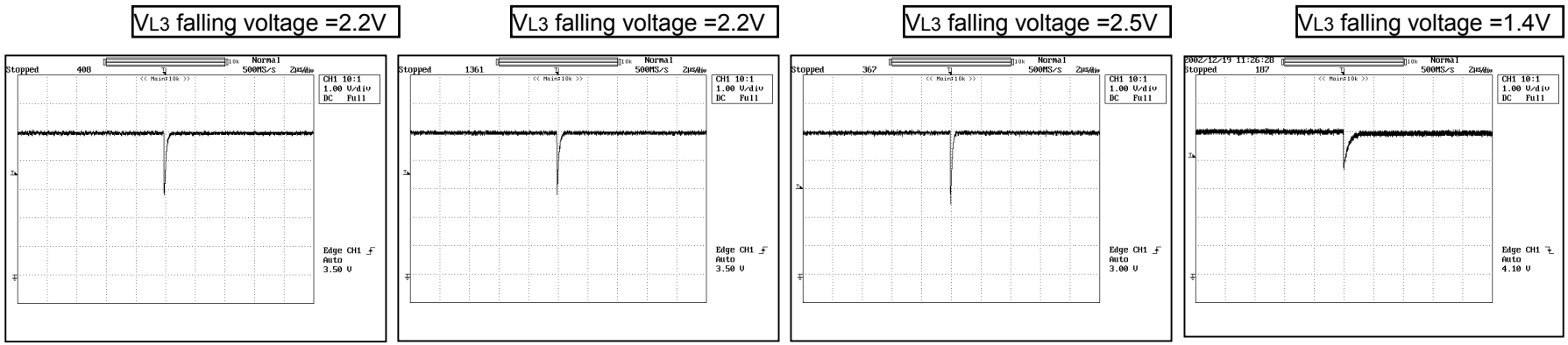
Figure 2:Synchronous type Example of SEG output waveform by LCDRAM writing timing (1/3 bias , 4 duty)

		LCDCK asynchronous type	LCDCK synchronous type
Emulator MCU		O	
One-time PROM version		O	
Mask ROM version	Standard version	O	
	M version	O	
	H version		O
	A version	O	

5.2. LCD power supply pins

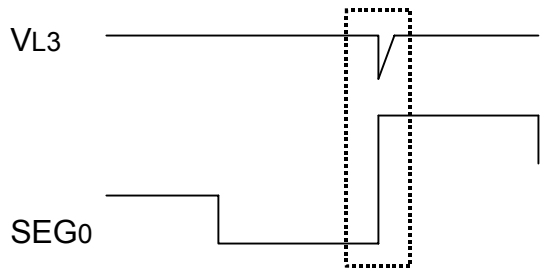
M38223E4 M38227EC M38224M6H M38224M6A

VL3



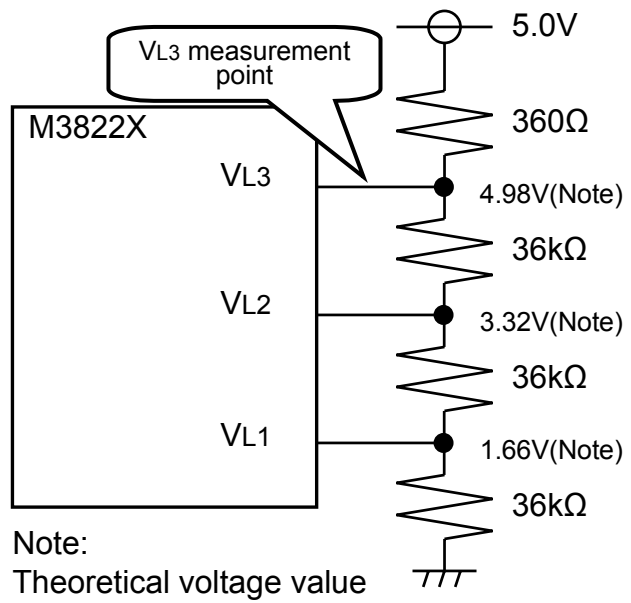
Note: Data described here are characteristic examples. The data values are not guaranteed.

<Measure condition>
-Only SEG exclusive pins output the LCD drive waveform.
-PORT pins shared with LCD outputs are selected as PORT function.
-COM and SEG pins are open.(No load)
-All data of LCDRAM is 55h.



Voltage falling occurs in every LCDCK cycle

(1)Shorten the wiring pattern in right diagram.
(2)Connect condensers to the LCD power supply pin and Vss with the shortest possible wiring to steady voltage level. (reference value:0.1μF to 0.33μF).



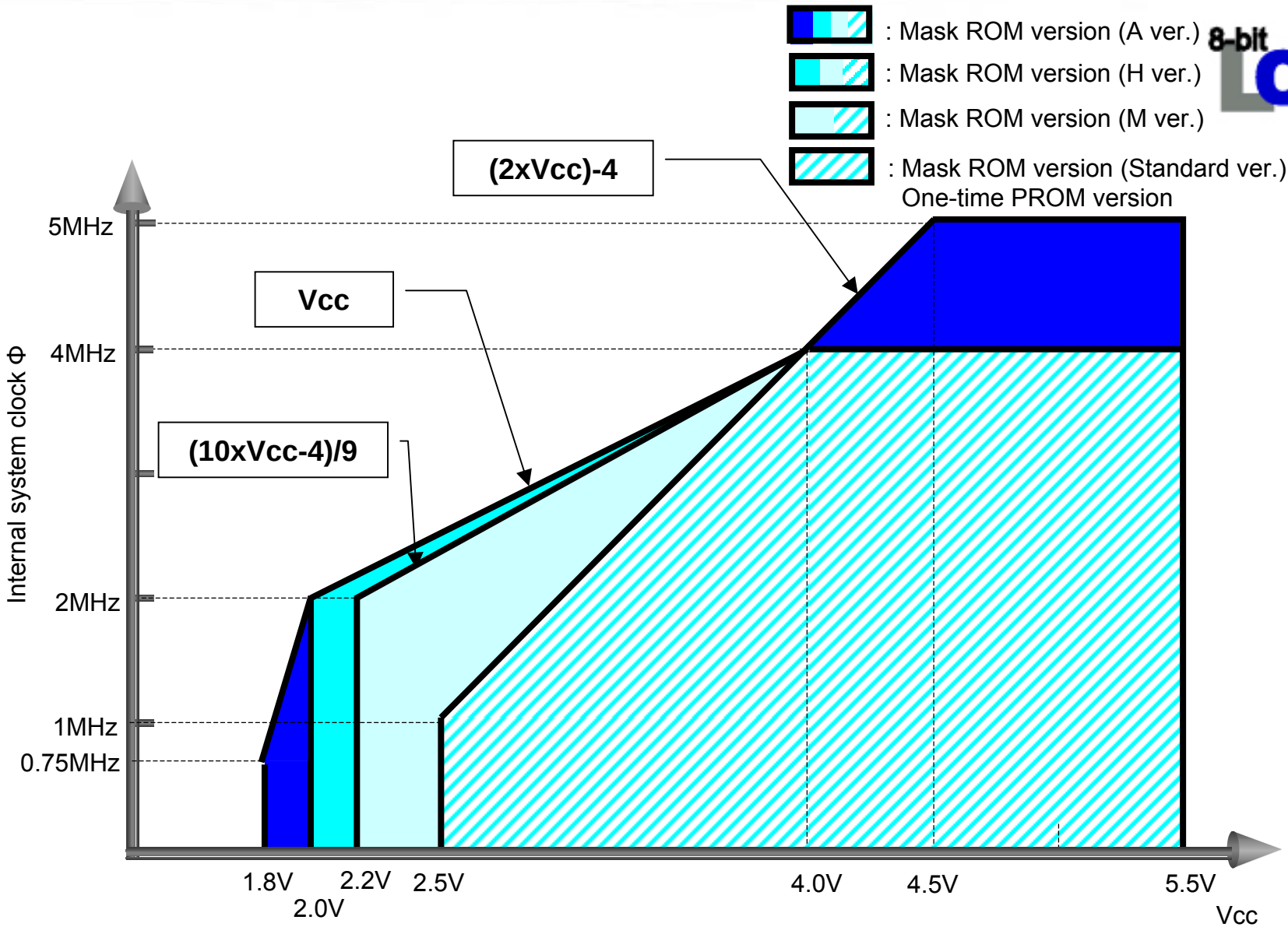
Note:
Theoretical voltage value

6. Electrical characteristics (Power source current)

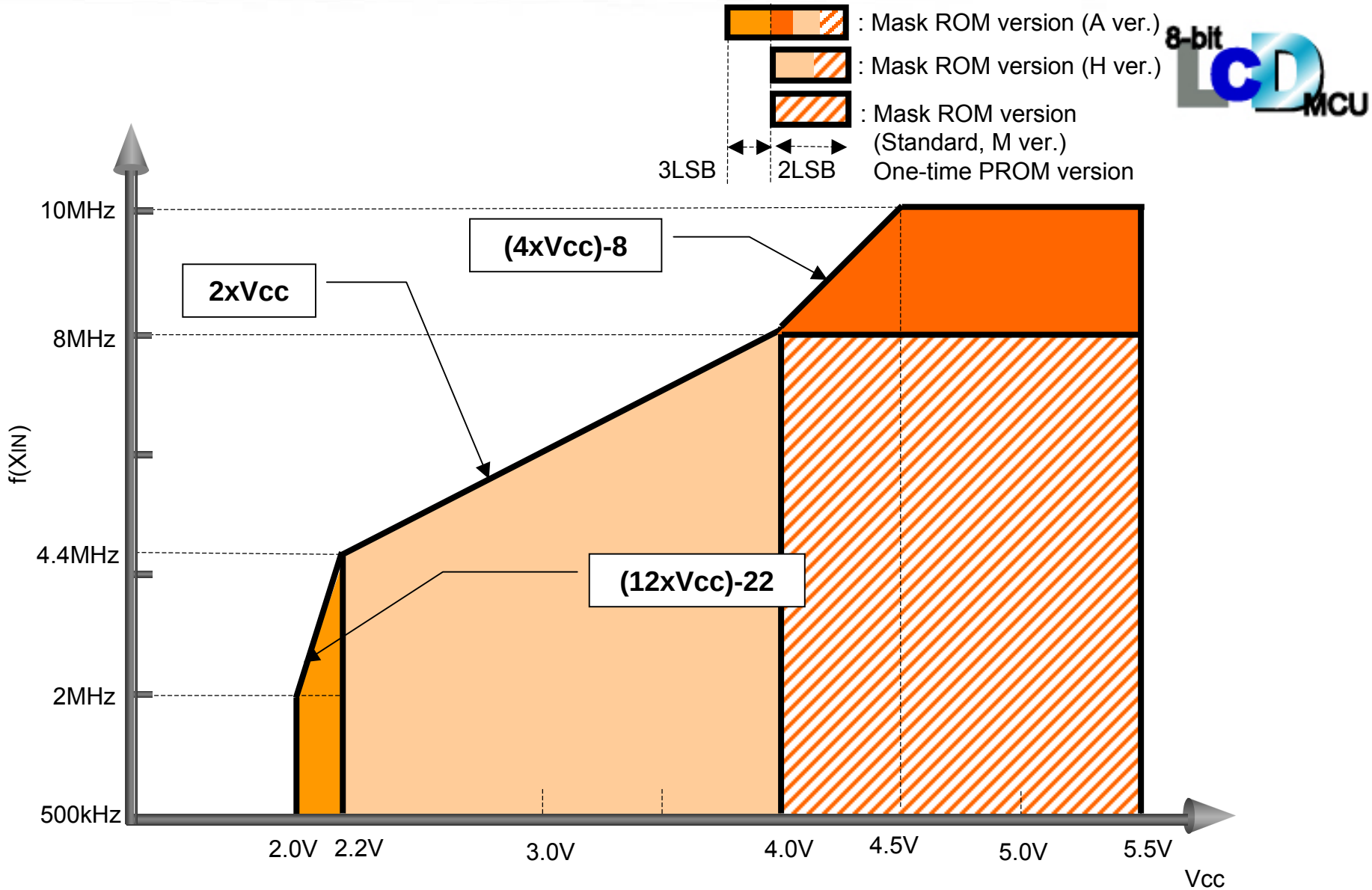
Symbol	Parameter	Test conditions	Mask ROM ver. (Standard, M, H ver.) One-time PROM ver.		Mask ROM ver. (A ver.)		Unit
			Typ.	Max.	Typ.	Max.	
Icc	Power source current	High-speed mode, Vcc = 5V, f(XIN) = 10MHz, f(XCIN) = 32.768kHz Output transistors “off”, A-D converter in operating	-	-	5.0	10	mA
		High-speed mode, Vcc = 5V, f(XIN) = 8MHz, f(XCIN) = 32.768 kHz Output transistors “off”, A-D converter in operating	6.4	13	3.0	6.0	mA
		High-speed mode, Vcc = 5V, f(XIN) = 8MHz (in WIT state), f(XCIN) = 32.768kHz, Output transistors “off”, A-D converter stop	1.6	3.2	0.8	1.6	mA
		Low-speed mode, Vcc = 5V, Ta =< 55°C, f(XIN) = stopped f(XCIN) = 32.768kHz, Output transistors “off”	25	36	13	26	µA
		Low-speed mode, Vcc = 5V, Ta =25°C, f(XIN) = stopped f(XCIN) = 32.768kHz(in WIT state), Output transistors “off”	7.0	14	5.5	11	µA
		Low-speed mode, Vcc = 3V, Ta =< 55°C, f(XIN) = stopped f(XCIN) = 32.768kHz, Output transistors “off”	15	22	8	16	µA
		Low-speed mode, Vcc = 3V, Ta =25°C, f(XIN) = stopped f(XCIN) = 32.768kHz(in WIT state), Output transistors “off”	4.5	9.0	4.0	8.0	µA
		All oscillation stopped (in STP state), Ta =25°C, Output transistors “off”	0.1	1.0	0.1	1.0	µA
		All oscillation stopped (in STP state), Ta =85°C, Output transistors “off”	-	10	-	10	µA

Memo

7.1. Internal-clock vs. Vcc (Except A-D converter)



7.2. External-clock vs. Vcc (A-D converter in operating)



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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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