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RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RX*-A146A/E	Rev.	1.00
Title	Specification relaxation and error correction regarding the characteristics of the flash memory in RX64M group Specification relaxation regarding the characteristics of the flash memory in RX71M group		Information Category	Technical Notification		
Applicable Product	RX64M Group RX71M Group	Lot No. All	Reference Document	RX64M Group User's Manual: Hardware Rev. 1.00 (R01UH0377EJ0100) RX71M Group User's Manual: Hardware Rev. 1.00 (R01UH0493EJ0100)		

This document describes specification relaxation and error correction regarding the characteristics of the flash memory in the RX64M Group User's Manual: Hardware and the RX71M Group User's Manual: Hardware.

1. Correction of errors (RX64M Group only)

Table 64.54 Data Flash Memory Characteristics

Before correction

Item	Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Second suspend delay time during erasure (in suspend priority mode)	t_{DSESD2}	—	—	1.7	—	—	300	µs
Suspend delay time during erasing (in erasure priority mode)	t_{DSEED}	—	—	1.7	—	—	300	µs

After correction

Item	Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
		min	typ	Max	min	typ	max	
Second suspend delay time during erasure (in suspend priority mode)	t_{DSESD2}	—	—	300	—	—	300	µs
Suspend delay time during erasing (in erasure priority mode)	t_{DSEED}	—	—	300	—	—	300	µs

2. Specification relaxation and error correction of the characteristics of the flash memory

Table 64.53 Code Flash Memory Characteristics (RX64M Group)

Before correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time N_{PEC} ≤ 100 times	256 bytes	t_{P256}	-	TBD	TBD	-	2	6	ms
	8 Kbytes	t_{P8K}	-	TBD	TBD	-	50	90	ms
	32 Kbytes	t_{P32K}	-	TBD	TBD	-	200	360	ms
Programming time N_{PEC} >100 times	256 bytes	t_{P256}	-	TBD	TBD	-	2.4	7.2	ms
	8 Kbytes	t_{P8K}	-	TBD	TBD	-	60	108	ms
	32 Kbytes	t_{P32K}	-	TBD	TBD	-	240	432	ms
Erasure time N_{PEC} ≤ 100 times	8 Kbytes	t_{E8K}	-	TBD	TBD	-	50	120	ms
	32 Kbytes	t_{E32K}	-	TBD	TBD	-	200	480	ms
Erasure time N_{PEC} >100 times	8 Kbytes	t_{E8K}	-	TBD	TBD	-	60	144	ms
	32 Kbytes	t_{E32K}	-	TBD	TBD	-	240	576	ms
Reprogramming/erasure cycle*1		N_{PEC}	1000*2	-	-	1000*2	-	-	Times
Suspend delay time during programming		t_{SPD}	-	-	TBD	-	-	120	µs
First suspend delay time during erasing (in suspend priority mode)		t_{SESD1}	-	-	TBD	-	-	120	µs
Second suspend delay time during erasure (in suspend priority mode)		t_{SESD2}	-	-	TBD	-	-	1.7	ms
Suspend delay time during erasure (in erasure priority mode)		t_{SEED}	-	-	TBD	-	-	1.7	ms
Forced stop command		t_{FD}	-	-	TBD	-	-	20	µs
Data hold time*3		t_{DRP}	10	-	-	10	-	-	Year
FCU reset time		t_{FCUR}	35	-	-	35	-	-	µs

After correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time N_{PEC} ≤ 100 times	256 bytes	t_{P256}	—	0.9	13.2	—	0.4	6	ms
	8 Kbytes	t_{P8K}	—	29	176	—	13	80	ms
	32 Kbytes	t_{P32K}	—	116	704	—	52	320	ms
Programming time N_{PEC} >100 times	256 bytes	t_{P256}	—	1.1	15.8	—	0.5	7.2	ms
	8 Kbytes	t_{P8K}	—	35	212	—	16	96	ms
	32 Kbytes	t_{P32K}	—	140	848	—	64	384	ms
Erasure time N_{PEC} ≤ 100 times	8 Kbytes	t_{E8K}	—	71	216	—	39	120	ms
	32 Kbytes	t_{E32K}	—	254	864	—	141	480	ms
Erasure time N_{PEC} >100 times	8 Kbytes	t_{E8K}	—	85	260	—	47	144	ms
	32 Kbytes	t_{E32K}	—	304	1040	—	169	576	ms
Reprogramming/erasure cycle*1		N_{PEC}	1000*2	—	—	1000*2	—	—	Times
Suspend delay time during programming		t_{SPD}	—	—	264	—	—	120	µs
First suspend delay time during erasing (in suspend priority mode)		t_{SESD1}	—	—	216	—	—	120	µs
Second suspend delay time during erasure (in suspend priority mode)		t_{SESD2}	—	—	1.7	—	—	1.7	ms
Suspend delay time during erasure (in erasure priority mode)		t_{SEED}	—	—	1.7	—	—	1.7	ms
Forced stop command		t_{FD}	—	—	32	—	—	20	µs
Data hold time*3		t_{DRP}	10	—	—	10	—	—	Year
FCU reset time		t_{FCUR}	35	—	—	35	—	—	µs

Table 64.55 Code Flash Memory Characteristics (RX71M)

Before correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time N_{PEC} ≤ 100 times	256 bytes	t_{P256}	—	4.4	13.2	—	2	6	ms
	8 Kbytes	t_{P8K}	—	99	176	—	50	90	ms
	32 Kbytes	t_{P32K}	—	396	704	—	200	360	ms
Programming time N_{PEC} >100 times	256 bytes	t_{P256}	—	5.3	15.8	—	2.4	7.2	ms
	8 Kbytes	t_{P8K}	—	119	212	—	60	108	ms
	32 Kbytes	t_{P32K}	—	476	848	—	240	432	ms
Erasure time N_{PEC} ≤ 100 times	8 Kbytes	t_{E8K}	—	90	216	—	50	120	ms
	32 Kbytes	t_{E32K}	—	360	864	—	200	480	ms
Erasure time N_{PEC} >100 times	8 Kbytes	t_{E8K}	—	108	260	—	60	144	ms
	32 Kbytes	t_{E32K}	—	432	1040	—	240	576	ms

After correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time N_{PEC} ≤ 100 times	256 bytes	t_{P256}	—	0.9	13.2	—	0.4	6	ms
	8 Kbytes	t_{P8K}	—	29	176	—	13	80	ms
	32 Kbytes	t_{P32K}	—	116	704	—	52	320	ms
Programming time N_{PEC} >100 times	256 bytes	t_{P256}	—	1.1	15.8	—	0.5	7.2	ms
	8 Kbytes	t_{P8K}	—	35	212	—	16	96	ms
	32 Kbytes	t_{P32K}	—	140	848	—	64	384	ms
Erasure time N_{PEC} ≤ 100 times	8 Kbytes	t_{E8K}	—	71	216	—	39	120	ms
	32 Kbytes	t_{E32K}	—	254	864	—	141	480	ms
Erasure time N_{PEC} >100 times	8 Kbytes	t_{E8K}	—	85	260	—	47	144	ms
	32 Kbytes	t_{E32K}	—	304	1040	—	169	576	ms

Table 64.54 Data Flash Memory Characteristics (RX64M Group)

Before correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time	4 bytes	t_{DP4}	—	TBD	TBD	—	0.3	1.7	ms
Erasure time	64 bytes	t_{DE64}	—	TBD	TBD	—	3	10	ms
Blank check time	4 bytes	t_{DBC4}	—	—	TBD	—	—	30	µs
Reprogramming/erasure cycle*1		N_{DPEC}	100000 *2	—	—	100000 *2	—	—	—
Suspend delay time during programming		t_{DSPD}	—	—	TBD	—	—	120	µs
First suspend delay time during erasure (in suspend priority mode)		t_{DSESD1}	—	—	TBD	—	—	120	µs
Second suspend delay time during erasure (in suspend priority mode)		t_{DSESD2}	—	—	TBD	—	—	300	µs
Suspend delay time during erasing (in erasure priority mode)		t_{DSEED}	—	—	TBD	—	—	300	µs
Forced stop command		t_{FD}	—	TBD	—	—	—	20	µs
Data hold time*3		t_{DDRP}	10	—	—	10	—	—	—

After correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Programming time	4 bytes	t_{DP4}	—	0.36	3.8	—	0.16	1.7	ms
Erasure time	64 bytes	t_{DE64}	—	3.1	18	—	1.7	10	ms
Blank check time	4 bytes	t_{DBC4}	—	—	84	—	—	30	µs
Reprogramming/erasure cycle*1		N_{DPEC}	100000 *2	—	—	100000 *2	—	—	Times
Suspend delay time during programming		t_{DSPD}	—	—	264	—	—	120	µs
First suspend delay time during erasure (in suspend priority mode)		t_{DSESD1}	—	—	216	—	—	120	µs
Second suspend delay time during erasure (in suspend priority mode)		t_{DSESD2}	—	—	300	—	—	300	µs
Suspend delay time during erasing (in erasure priority mode)		t_{DSEED}	—	—	300	—	—	300	µs
Forced stop command		t_{FD}	—	–	32	—	—	20	µs
Data hold time*3		t_{DDRP}	10	—	—	10	—	—	Year

Table 64.56 Data Flash Memory Characteristics (RX71M Group)

Before correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			min	typ	max	min	typ	max	
Programming time	4 bytes	t_{DP4}	—	0.66	3.8	—	0.3	1.7	ms
Erasure time	64 bytes	t_{DE64}	—	5.4	18	—	3	10	ms

After correction

Item		Symbol	FCLK = 4 MHz			20 MHz ≤ FCLK ≤ 60 MHz			Unit
			min	typ	Max	min	typ	max	
Programming time	4 bytes	t_{DP4}	—	0.36	3.8	—	0.16	1.7	ms
Erasure time	64 bytes	t_{DE64}	—	3.1	18	—	1.7	10	ms