Difference among various products of 3851 Group

			M38513M4-XXXSP/FP(Note1) M38513E4-XXXSP/FP(Note2) M38513E4SP/FP(Note3) M38513E4SS(Note4)(Note5)	M38514M6-XXXSP/FP M38517M8-XXXSP/FP	M38514E6-XXXSP/FP M38514E6SP/FP M38514E6SS(Note5)	M38517F8SP/FP
ROM size (byte)			16K	24K:M6 32K:M8	24K	32K
Serial I/O			1 channel; UART/Clock synchronous 1	2 channels; UART/Clock synchronous 1 Clock synchronous 1	2 channels; UART/Clock synchronous 1 Clock synchronous 1	2 channels; UART/Clock synchronous 1 Clock synchronous 1
Additional Register			—	Serial I/O2 control register 1 (address 15_{16}) Serial I/O2 control register 2 (address 16_{16}) Serial I/O2 register (address 17_{16})	Serial I/O2 control register 1 (address 15_{16}) Serial I/O2 control register 2 (address 16_{16}) Serial I/O2 register (address 17_{16})	Serial I/O2 control register 1 (address 15_{16}) Serial I/O2 control register 2 (address 16_{16}) Serial I/O2 register (address 17_{16})
Large Current Port			5 ports; $P1_3$ to $P1_7$	8 ports; $P1_0$ to $P1_7$	8 ports; $P1_0$ to $P1_7$	8 ports; $P1_0$ to $P1_7$
A/D Converter			Not available in low-speed mode	Available in low-speed mode	Available in low-speed mode	Available in low-speed mode
Electrical characteristics	Absolute maximum ratings	Vcc	-0.3 to 7.0V	-0.3 to 6.5V	-0.3 to 6.5V	-0.3 to 6.5V
		VI CNVss	-0.3 to 13V	-0.3 to Vcc + 0.3V	-0.3 to 13V	-0.3 to 6.5V
	Recommended Operating Conditions	Σ I_{OL} (peak)	P13 to P17 80mA	P10 to P17 120mA	P10 to P17 120mA	P10 to P17 120mA
		Σ I_{OL} (avg)	P13 to P17 40mA	P10 to P17 60mA	P10 to P17 60mA	P10 to P17 60mA
		I_{OL} (peak)	P13 to P17 20mA	P10 to P17 20mA	P10 to P17 20mA	P10 to P17 20mA
		I_{OL} (avg)	P13 to P17 15mA	P10 to P17 15mA	P10 to P17 15mA	P10 to P17 15mA
	Electrical characteristics	VOL	P13 to P17 I_{OL}=20mA, Vcc=4.0 to 5.5 max2.0V I_{OL}=10mA, Vcc=2.7 to 5.5 max1.0V	P10 to P17 I_{OL}=20mA, Vcc=4.0 to 5.5 max2.0V I_{OL}=10mA, Vcc=2.7 to 5.5 max1.0V	P10 to P17 I_{OL}=20mA, Vcc=4.0 to 5.5 max2.0V I_{OL}=10mA, Vcc=2.7 to 5.5 max1.0V	P10 to P17 I_{OL}=20mA, Vcc=4.0 to 5.5 max2.0V I_{OL}=10mA, Vcc=2.7 to 5.5 max1.0V
		Icc (in low-speed mode) f(X_{IN}) = stopped f(X_{CIN}) =32.768kHz Vcc=2.7 to 5.5V	60μA (typ.)	60μA (typ.)	60μA (typ.)	250μA (typ.)
		In WAIT state Vcc=2.7 to 5.5V	20μA (typ.)	20μA (typ.)	20μA (typ.)	70μA (typ.)
		Vcc=3V	20μA (typ.)	20μA (typ.)	20μA (typ.)	150μA (typ.)
		In WAIT state Vcc=3V	5μA (typ.)	5μA (typ.)	5μA (typ.)	20μA (typ.)
EPROM version (Note 5)			M38513E4SS	M38514E6SS	M38514E6SS	—
Flash memory version			—	M38517F8SP/FP	M38517F8SP/FP	M38517F8SP/FP
Emulator MCU			(Note6)	M38517RSS	M38517RSS	M38517RSS
Notes for bit 3 of CPU mode register (Note 7)			Not applicable (Note 8)	Applicable	Applicable	Applicable
Oscillation circuit constants			The oscillation circuit constants of X_{IN}-X_{OUT}, X_{CIN}-X_{COUT} may be some differences each groups.			

Notes 1: Product not recommended for new designs. Replacement : M38514M6-XXXSP/FP
2: Product not recommended for new designs. Replacement : M38514E6-XXXSP/FP
3: Product not recommended for new designs. Replacement : M38514E6SP/FP
4: Product not recommended for new designs. Replacement : M38514E6SS
5: 42-pin SDIP windowed EPROM version (SS) is MCU for evaluation.
6: Use the M38517RSS. The function of the M38517RSS is the same as that of the M38517M8. When using the M38517RSS, be careful of the specification difference of above table.
Evaluation using the EPROM version and the one time PROM version must be required.
7: <Note> Fix bit 3 of the CPU mode register to "1" (Do not write "0"). It is set to "1" after releasing Reset.
<Reason> If using X_{CIN}-X_{COUT} oscillation with ports $P2_0$ and $P2_1$ in the condition of bit 3 of the CPU mode register = "0" , the oscillation might be incorrectly performed.
8: Fix bit 3 of the CPU mode register to "1", though X_{CIN}-X_{COUT} can oscillate in the condition of bit 3 of the CPU mode register = "0".

<Electric Characteristic Differences Between Mask ROM version and Flash memory, One Time PROM version MCUs>
There are differences in electric characteristics, operation margin, noise immunity, and noise radiation between Mask ROM and Flash Memory, One Time PROM version MCUs due to the difference in the manufacturing processes. When manufacturing an application system with the Flash memory, One time PROM version and then switching to use of the Mask ROM version, please perform sufficient evaluations for the commercial samples of the Mask ROM version.

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