❑ MN103SD0 Series

Type	MN103SD0Q	MN103SFD0R
Internal ROM type	Mask ROM	FLASH
ROM (byte)	768K	1024K
RAM (byte)	32K	40K
Package (Lead-free)	UBGA257-P-1111A	
Minimum Instruction Execution Time	16.7 ns (at 2.7 V to 3.6 V, 60 MHz)	

■ Interrupts

RESET. IRQ × 11. NMI. Key input. Timer × 32. Input capture × 16. PWM × 6. SIF × 24. I^2C × 4. DMA × 18. WDT. A/D. System error

■ Timer Counter

8-bit timer × 8

Reload-down count. Cascade connection possible (usable as a 16-bit to 32-bit timer)

16-bit timer × 6

Up-down count. Input capture. PWM output. Compare/capture register 2 channnels

16-bit timer × 6

Reload-down count

Watchdog timer × 1

■ Serial interface

UART/Synchronous interface selective × 10: Serial 0, 1, 3 to A

Start-stop synchronization/Synchronization commonly used (16 bytes containing transmission/reception FIFO): Serial 2

I^2C serial interface, multi master transmission/reception function × 2

■ DMA controller

Number of channels: 6 channels

Unit of transfer: 8/16/32 bits

Maximum transfer cycles: 65535

Starting factor: External interrupt. Timer. Input capture. PWM. Serial transmission/reception. I^2C transmission/reception. A/D conversion finish. Software

Transfer method: 2-bus cycle transfer

Adressing modes: Fixed. Increment. Decrement

Transfer mode: Word transfer. Burst transfer. Intermittent transfer

■ I/O Pins

I/O	194 :	Common use
Input	1 :	Exclusive

■ A/D converter

10-bit × 32 channels

■ PWM

12/14-bit resolution × 6 channels

■ ICR

28-bit × 13 channels + 16-bit × 6 channels (common with timer)

■ OCR

16-bit × 12 channels (common with timer)

■ Timer Synchronous Output

4-bit (synchronous output) × 2 channels

■ ROM Correction

8 channels

■ Electrical Charactreistics (A/D converter characteristics)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Resolution					10	Bits
Non-linear error		VDD33 = 3.3 V. VSS = 0.0 V			±3	LSB
A/D conversion time		IOCLK = 20 MHz. T_{AD} = 200 ns	2.4			µs

Ta = 25 °C

Note) T_{AD} is A/D conversion clock cycle

■ Pin Assignment

UBGA257-P-1111A

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	
20	VDDL	VDDL	PN0, TM20IOA	PM3, SY0OT3	PL7, TM7IO	PL4, TM4IO	PL1, SCL0	PK6, KI6	PK2, KI2	PK0, KI0	PJ7, ADM15, A15	PJ5, ADM13, A13	PJ3, ADM11, A11	PJ1, ADM9, A9	PH3, SYSCLK	PH4, DK	PH0, NWE0	PG0, NCS0	VDDB	VDDB	20
19	VDDL	VDDL	PM7, SY1OT3	PM5, SY1OT1	PM1, SY0OT1	PL6, TM6IO	PL3, TM3IO	PL0, SDA0	PK4, KI4	PK1, KI1	PJ6, ADM14, A14	PJ4, ADM12, A12	PJ2, ADM10, A10	PJ0, ADM8, A8	PH5, AS	PH2, NRE	PG3, NCS3	PG1, NCS1	VDDB	VDDB	19
18	PN2, TM22IOA	PN1, TM21IOA	VDDL	PM6, SY1OT2	PM4, SY1OT0	PM0, SY0OT0	PL5, TM5IO	PL2	PK5, KI5	PK3, KI3	PI7, ADM7, A7	PI5, ADM5, A5	PI3, ADM3, A3	PI1, ADM1, A1	PH6, RWSEL	PH1, NWE1	PG2, NCS2	VDDB	PF7, TM2IO	PF6, TM1IO	18
17	PP0, SBI7	PN4, TM21IOB	PN3, TM20IOB	VDDL	PM2, SY0OT2	VSS	VDD18	PK7, KI7	VDD18	VSS	PI6, ADM6, A6	PI4, ADM4, A4	PI2, ADM2, A2	PI0, ADM0, A0	VSS	PG4, NCS4	VDDB	PF5, TM0IO	PF4, IRQ10	PF2, IRQ8	17
16	PP4, SBO8	PP2, SBT7	PP1, SBO7	PN5, TM22IOB													PF1, IRQ7	PF3, IRQ9	PF0, IRQ6	PE4	16
15	PP7, SBO9	PP5, SBT8	PP6, SBI9	PP3, SBI8													PE3, NBG	PE5	PE2, NBR	PE0, TM10IO	15
14	PR2, SBOA	PR0, SBT9	PR1, SBIA	VSS													PD6, D14	PE1, TM11IO	PD7, D15	PD5, D13, IRQ4	14
13	PS0	PR4, IRQ5	PR5	PR3, SBTA													VSS	PD3, D11, SBT6	PD4, D12, IRQ3	PD2, D10, SBO6	13
12	PS4, TM14IO	PS2, TM12IO	PS3, TM13IO	PS1													PC7, D7, SBO5	PD1, D9, SBI6	PD0, D8, SBT5	PC6, D6, SBI5	12
11	PS7	PS5, TM15IO	PS6	VDD33													VDD33	PC4, D4, SBO4	PC5, D5, SBT4	PC3, D3, SBI4	11
10	P00, AN0	P02, AN2	P04, AN4	P01, AN1													PB5, IRQ0	PC1, D1, SBO3	PC0, D0, SBI3	PC2, D2, SBT3	10
9	P03, AN3	P05, AN5	P06, AN6	VSS													VSS	PB2, SBI2	PB3, SBO2	PB4, SBT2	9
8	P07, AN7	P11, AN9	P12, AN10	P10, AN8													PA6, A22	PB0, A24	PA7, A23	PB1, A25	8
7	P13, AN11	P15, AN13	P17, AN15	P14, AN12													VSS	PA4, A20	PA3, A19	PA5, A21	7
6	P16, AN14	P20, AN16	P24, AN20	P21, AN17													P96, IRQ1	PA1, A17	PA0, A16	PA2, A18	6
5	P22, AN18	P23, AN19	P26, AN22	VSS	VSS												P85, PWM5	P94, SBO1	P95, SBT1	P97, IRQ2	5
4	P25, AN21	P27, AN23	P30, AN24	VDD33	VSS	VSS	P53, TM23IOB	VDD18	P76, NMI	VOUT	VOUT	VDD18	P71, ICR9	N.C.	VSS	N.C.	VDD33	P90, SBI0	P91, SBO0	P93, SBI1	4
3	P32, AN26	P31, AN25	VDD33	P34, AN28	P36, AN30	P51, TM24IOA	P56, SDA1	P61, ICR1	P63, ICR3	MMOD	P65, ICR5	P67, ICR7	P73, ICR11	OCD_SDA	N.C.	N.C.	P82, PWM2	VDD33	P92, SBT0	P84, PWM4	3
2	VDD33	VDD33	P33, AN27	P35, AN29	P41, WDOVF	P50, TM23IOA	P54, TM24IOB	P57, SCL1	P62, ICR2	VSS	NRST	P66, ICR6	P72, ICR10	N.C.	N.C.	N.C.	P80, PWM0	P83, PWM3	VDD33	VDD33	2
1	VDD33	VDD33	VREFH	P37, AN31	P40, ADTRG	P52, TM25IOA	P55, TM25IOB	P60, ICR0	LON	OSCI	OSCO	P64, ICR4	P70, ICR8	P74, ICR12	P75	N.C.	OCD_SCL	P81, PWM1	VDD33	VDD33	1
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	

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