# MN103SA2 Series

Туре	MN103SFA2R
Internal ROM type	FLASH
ROM (byte)	1024К
RAM (byte)	64K
Package (Lead-free)	LQFP100-P-1414 (Under development)
Minimum Instruction Execution Time	16.7 ns (at 2.7 V to 3.6 V, 60 MHz)

#### Interrupts

RESET. IRQ × 8. NMI. Timer × 32. I<sup>2</sup>C × 3. SIF × 16. DMA × 12. WDT. A/D. Time base timer × 2. System error. Key input. Remote control × 4. CAN × 2

#### Timer Counter

8-bit timer  $A \times 10$ 

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

8-bit timer  $\mathrm{B}\times3$ 

Interval timer. Event count. Square-wave output. Simple pulse width measurement. PWM output

16-bit timer  $\times 6$ 

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

Time base timer  $\times 1$ 

Watchdog timer  $\times 2$ 

### Serial interface

UART/Synchronous/Multi-master I<sup>2</sup>C interface selective × 3 UART/Synchronous interface selective × 5

#### Remote Contorol Interface

Remote control reception: Correspondence with AEHA (Association for Electric Home Appliances) format. Queued reception by low speed clock

#### CAN controller

Number of channels: 2 channels CAN Protocol Specification Version: CAN2.0B Transmission speed: Max. 1 Mbps Data length code: 0 to 8 bytes Message frame types: Standard and extended frame format supported Standard (SFF) ID: 11-bit. Extended (EFF) ID: 29-bit Buffer size (each channel): 32 (transmission/reception)

#### DMA controller

Number of channels: 4 channels Unit of transfer: 8/16/32 bits Maximum transfer cycles: 65535 Starting factor: External interrupt. Timer. Serial transmission/reception. A/D conversion finish. I<sup>2</sup>C transmission/reception. Software. Remote control data reception. CAN Transfer method: 2-bus cycle transfer Adressing modes: Fixed. Increment. Decrement Transfer mode: Word transfer. Burst transfer. Intermittent transfer

#### ■ I/O Pins

I/O

22 : Common use 59 : Common use

Input 1 : Common use

## A/D converter

10-bit  $\times$  8 channels

ROM Correction

8 channels

Electrical Charactreistics (A/D converter characteristics)

Parameter	Symbol	Condition	min	Limit	may	Un
Resolution			111111	typ	max 10	Bit
Non-linear error					±4	LS
Differential non-linearity error		VDD5 = VREFH = 5.5 V. VDD33 = 3.3 V. VSS = 0 V			±4 ±4	LS
					⊥4	LS
Development tools In-circuit Emulator PX-ICE-103SA2 On-board Development Tools PX-ODB103S-D0						
Pin Assignment LQFP100-P-1414						
		PA1, SB04, SB14, TM1310B, D15         F > Pa0, SB14, TM1310B, D13         F > P85, TM1210A, D14         F > P85, TM1210B, D13         F > P85, TM1210A, D12         F > P84, TM110B, D13         F > P84, TM110A, D12         F > P84, TM110A, D10         F > P74, D5         F > P75, D7         F > P74, D6         F > P75, D3         F > P75, D4         F > P76, KEYG, D0         F > P66, KEYG, D0         F > P66, KEYG, D0         F > P66, KEYG, D0				
P90, SBO0B, CTX0 ≤		00 51 2 2 2 2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 0	> P63, K	EY3 A2		
P91, SBI0B, CRX0 ≤	→ 77	49 <	➢ P62, K	EY2, A3		
P92, SBT0B € P93, SBO3B, SDA3B €			> P61, K> P60, K			
P94, SBI3B, IETXA ≤	$\rightarrow$ 80	46 <	> P57, K	EY15, A6		
P95, SBT3B, SCL3B, IERXA ≤ PD0, SBO2B, SDA2B ≤				EY14, A7 EY13, A8		
PD1, SBI2B ≤	$\rightarrow$ 83	43 <	> P54, K	EY12, A9	``````````````````````````````````````	
PD2, SBT2B, SCL2B ← PD3, IRQ0B ←	$\rightarrow$ 85	41 <		EY11, A10 EY10, A11		
PD4, IRQ1B ≤ PD5, IRQ2B, CTX1, IETXB ≤		40 <	➢ P51, K – VSS	EY9, A12		
96, IRQ3B, TM15IOA, CRX1, IERXB ≤	$\rightarrow$ 88	38 <	> P50, K	EY8, A13		
− VDD5 PD7, IRQ4B, TM15IOB <	$\rightarrow 90$	37 36 <	<ul> <li>VDD1:</li> <li>&gt; P35, SI</li> </ul>	8 BT3A, SCI	L3A, A14	
VSS -	91	35 <	> P34, SI	BI3A, A15		
PA0, AN0, SBO7A ← PA1, AN1, SBI7A ←		33 <	> P32, SI	303A, SD 3T1A, A1′	7	,
PA2, AN2, SBT7A ← PA3, AN3, TM22IOA ←				BI1A, A18 BO1A, A1		
PA4, AN4 <	→ 96	30 <	> P25, IF	Q5A, A20	)	
PA5, AN5 ≤ PA6, AN6, TM21IOA ≤	$\rightarrow$ 98	28 ←		Q4A, NSO Q3A, NSO		
PA7, AN7, TM20IOA ≺ VREFH −	$\rightarrow$ 99 (			Q2A, NSO Q1A, RM		)
V KL/11		20 20 20 20 20 20 20 20 20 20	· 21, 11	~~, 10.101	,	
	↓ ↓ 0 -	(↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓				
	P00, SBO0A, NWE0 D01 SB10A NWE1	P02, SBT04, NRE P02, SBT05A, NRE A, SDA2A, SB15A, SB15A A, SCI2A, SB05A, SB15A A, SCI2A, SB05A A, SCI2A, SB05A M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) M510, (OCD_SDJ) A, SBT6A, WDOVF CDD18 VD08 VDD18				
	0A, 1	ZA, SZA, SZA, SZA, SZA, SZA, SZA, SZA, S				
	SBO	2, 52, 52, 51, 52, 51, 52, 51, 52, 51, 52, 51, 52, 52, 52, 52, 52, 52, 52, 52, 52, 52				
	P00, P01	P02, SBT0A, NET P02, SBT0A, NET P04, SB12A, SB15A P06, R05B, TM2010B P06, R05B, TM2010B P06, R05B, TM2010B P06, R05B, TM2010B O, TW810, (OCD_SD1) II, TM610, (OCD_SD1) II, TM610, (OCD_SD1) O, SYSCLK, TM2210B OSCO OSCO OSCO OSCO OSCO OSCO OSCO OSC				
	_	P02, SB10A, NRE P02, SB10A, NRE P04, SB12A, SB15A P06, SB12A, SB15A P10, TM410, (OCD_SD1) P11, TM410, (OCD_SD1) P11, TM410, (OCD_SC1) P11, TM410, (OCD_SC1) P11, TM410, SYSCLK, TM2210B OSC0 OSC0 OSC0 OSC0 OSC0 OSC0 D17 P11, TM12D18 P11, TM12D18 P11, TM1410A, SB16A, WD0VF I5, SB01B, TM1410B, SB16A P16, SB11B, TM110, SB16A P16, SB11B, TM110, SB16A P20, IRQ0A, DK, (VPD)				
		P02, SB704, NB7 P02, SB754, SB754, SB754, SB754 P05, SB724, SB754, SB754 P05, SB724, SB724, SB754 P06, IRQ58, TM2010B P10, IRQ58, TM2010B P11, TM610, SYSCLK, TM2210B P11, TM610, SYSCLK, TM2210B MM0D OSC0 OSC0 OSC1 VSS XI, P07 XI, P07 XI, P07 XI, P07 VDD18 VI, P018, VI, P018 VI, P018, VI, P16, SB164, WD0VF P14, SB71B, TM1410B, SB164, WD0VF P15, SB01B, TM1410B, SB164, WD0VF P15, SB01B, TM1410B, SB164, WD0VF P15, SB01B, TM1410B, SB164, WD0VF P16, SB11B, TM710, SB764, WD0VF P16, SB11B, TM710, SB764, WD0VF P16, SB11B, TM710, SB764, WD0VF P20, IRQ04, DK, (VPP)				
		TIB, TII				
		SB				

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