

■ MN101D03A / D03D / DF03D

Type	MN101D03A (under planning) / D03D / DF03D (under development)
ROM (×8-Bit)	32 K / 64 K / 64 K (built-in flash EEPROM)
RAM (×8-Bit)	1 024 / 2 048 / 2 048
Minimum Instruction Execution Time	<p>0.10 μs (at 4.5 V to 5.5 V, 20 MHz) 0.238 μs (at 2.7 V to 5.5 V, 8.39 MHz)*1 125 μs (at 2.0 V to 5.5 V, 32 kHz)*2</p> <p>*1 The lower limit for operation guarantee for flash EEPROM built-in version is 4.5 V. *2 The lower limit for operation guarantee for EPROM built-in version is 2.3 V.</p>
Interrupts	<ul style="list-style-type: none"> • RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • External 5 • External 6 • External 7 • Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Timer 6 • Time Base • Timer 7 (2 systems) • Timer 8 (2 systems) • Serial 0 Reception • Serial 0 Transmission • Serial 1 • Serial 2 • Automatic Transfer finish • A/D Conversion finish • Key Interrupts (8 lines)
Timer Counter	<p>Timer Counter 0 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], PWM Output, Event Count, Remote Control Carrier Output, Simple Pulse Width Measurement Function)</p> <p>Clock Source . . . 1/2, 1/4 of System Clock, 1/1, 1/4, 1/16, 1/32, 1/64 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 1 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], Event Count, Timer Synchronous Output)</p> <p>Clock Source . . . 1/2, 1/8 of System Clock, 1/1, 1/4, 1/16, 1/64, 1/128 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 0, 1 can be cascade-connected.</p> <p>Timer Counter 2 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], PWM Output, Event Count, Timer Synchronous Output, Simple Pulse Width Measurement Function)</p> <p>Clock Source . . . 1/2, 1/4 of System Clock, 1/1, 1/4, 1/16, 1/32, 1/64 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 3 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], Event Count, Remote Control Carrier Output)</p> <p>Clock Source . . . 1/2, 1/8 of System Clock, 1/1, 1/4, 1/16, 1/64, 1/128 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 2, 3 can be cascade-connected.</p> <p>Timer Counter 4 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], PWM Output, Event Count, Simple Pulse Width Measurement Function)</p> <p>Clock Source 1/2, 1/4 of System Clock, 1/1, 1/4, 1/16, 1/32, 1/64 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 5 : 8-Bit × 1 (Square-Wave Output [Timer Pulse Output], Event Count)</p> <p>Clock Source 1/2, 1/8 of System Clock, 1/1, 1/4, 1/16, 1/64, 1/128 of OSC Oscillation Clock, 1/1 of XI Oscillation Clock, External Clock Input</p> <p>Timer Counter 4, 5 can be cascade-connected.</p> <p>Time Base Timer</p> <p>Clock Source 1/2⁷, 1/2⁸, 1/2⁹, 1/2¹⁰, 1/2¹³, 1/2¹⁵ of OSC Oscillation Clock, 1/2⁷, 1/2⁸, 1/2⁹, 1/2¹⁰, 1/2¹³, 1/2¹⁵ of XI Oscillation Clock</p> <p>Timer Counter 6 : 8-Bit × 1 Freerun Timer</p> <p>Clock Source 1/1 of System Clock, 1/1, 1/2⁷, 1/2¹³ of OSC Oscillation Clock, 1/1, 1/2⁷, 1/2¹³ of XI Oscillation Clock</p>

Timer Counter (Continue)**Timer Counter 7 : 16-Bit × 1**

Clock Source . . . Either of System Clock, OSC Oscillation Clock, External Clock 1 or External Clock 2 Frequency-Divided into 1/1, 1/2, 1/4 or 1/16)
(Hardware Configuration)
Double Buffer Type Compare Register × 2
Input Capture Register × 1
(Timer Functions)
Square-Wave Output (Timer Pulse Output), High-Precision PWM Output (Cycle/Duty Continuously Variable), Event Count, Simple Pulse Width Measurement Function and Input Capture Function

Timer Counter 8 : 16-Bit × 1

Clock Source . . . Either of System Clock, OSC Oscillation Clock, External Clock 1 or External Clock 2 Frequency-Divided into 1/1, 1/2, 1/4 or 1/16)
(Hardware Configuration)
Double Buffer Type Compare Register × 2
Input Capture Register × 1
(Timer Functions)
Square-Wave Output (Timer Pulse Output), PWM Output (Duty Continuously Variable), Event Count, Simple Pulse Width Measurement Function and Input Capture Function

Watchdog Timer

Interrupt Source . . . Runaway Detection Frequency Selection from 1/2¹⁶, 1/2¹⁸ and 1/2²⁰ of System Clock Frequency

Serial Interface**Serial 0 : 8-Bit × 1 (Full-Duplex UART/ Synchronous)**

Synchronization Method (MSB-or LSB-First Selectable, 1 to 8 bits Arbitrary Transmission, Continuous Transmission, Continuous Reception and Continuous Transmission-Reception Possible by Combination with ATC Function)
Transfer Clock Source 1/2, 1/4 of System Clock Frequency
1/2, 1/4, 1/16, 1/32 of OSC Oscillation Clock Frequency
1/1, 1/3 of Timer Counter 2 to 5
(Full-Duplex UART) (Built-In Baud Rate Timer, Parity Check, Overrun Error/Framing Error Detection and Transfer Bit Selectable from 7 and 8 bits)

Serial 1 : 8-Bit × 1 (Simple I²C/ Synchronous)

Synchronization Method (MSB-or LSB-First Selectable, 1 to 8 bits Arbitrary Transmission, Continuous Transmission, Continuous Reception and Continuous Transmission-Reception Possible by Combination with ATC Function)
Transfer Clock Source 1/2, 1/4 of System Clock Frequency
1/2, 1/4, 1/16, 1/32 of OSC Oscillation Clock Frequency
1/1, 1/3 of Timer Counter 2 to 5
(Simple I²C) (I²C Transmission Function with Single Master [9-Bit Transmission])

Serial 2 : 8-Bit × 1 (3-Wire Synchronous)

Synchronization Method (MSB-or LSB-First Selectable, 1 to 8 bits Arbitrary Transmission, Continuous Transmission, Continuous Reception and Continuous Transmission-Reception Possible by Combination with ATC Function)
Transfer Clock Source 1/2, 1/4 of System Clock Frequency
1/2, 1/4, 1/16, 1/32 of OSC Oscillation Clock Frequency
1/1, 1/3 of Timer Counter 2 to 5

See the next page for support tool and pin assignment.

I/O Pins	I/O	67	• Common use • Specified pull-up Resistor available • Input/Output selectable (bit unit)
	Input	1	• Common use

A/D Inputs	10-Bit × 8ch (with S/H) Conversion Cause 7	A/D Control Register Setting, Timer 4, 6 or 8 Interrupt, External Interrupt 3 or 7, or Serial 1 Interrupt
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Special Ports	Buzzer Output, Remote Control Carrier Signal Output, High-Current Drive Port × 1
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Package	LQFP080-P-1414A
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Electrical Characteristics

Supply Current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDD1	fosc = 20 MHz, VDD = 5 V			60	mA
	IDD2	fosc = 8.39 MHz, VDD = 5 V			25	mA
	IDD3	* fx = 32 kHz, VDD = 3 V			120	μA
Supply Current at HALT	IDD4	fx = 32 kHz, VDD = 3 V, Ta = 25 °C			8	μA
		fx = 32 kHz, VDD = 3 V, Ta = 85 °C			20	μA
Supply Current at STOP	IDD5	VDD = 5 V			10	μA

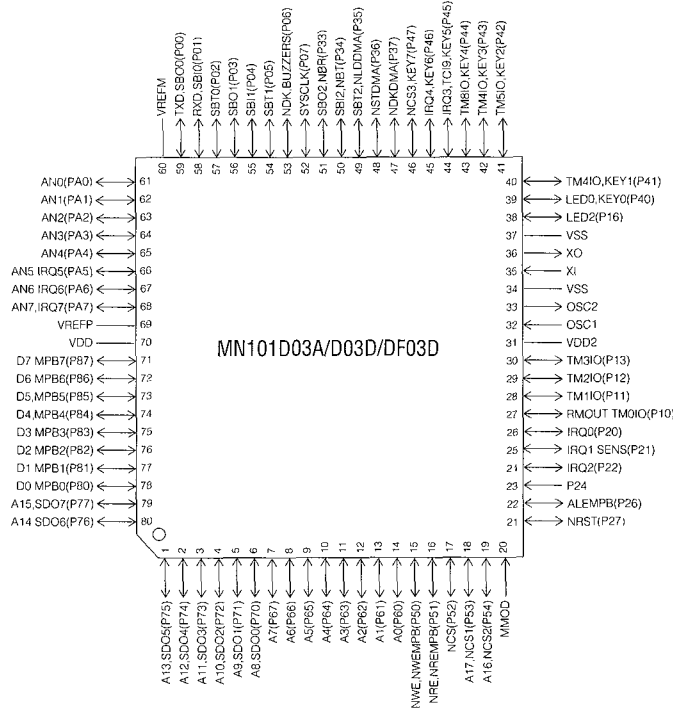
* 300 μA max. at VDD = 5 V in the case of the version with built-in flash EEPROM

Support Tool

In-Circuit Emulator	PX-ICE101C / D + PX-PRB101D03-C / D
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EPROM built-in Type	Type	MN101DP03FAL (under development)
	ROM (× 8-Bit)	96 K
	RAM (× 8-Bit)	4 096
	Minimum Instruction Execution Time	0.10 μs (at 4.5 V to 5.5 V, 20 MHz)
		0.238 μs (at 2.7 V to 5.5 V, 8.39 MHz) 125 μs (at 2.3 V to 5.5 V, 32 kHz)
	Package	LQFP080-P-1414A

Pin Assignment



LQFP080-P-1414A