❑ MN101D03A / 03D / F03D

Type	**MN101D03A (under development) / 03D (under development) / F03D**
ROM (x8-bit)	32K/64K/64K (built-in flash EEPROM)
RAM (x8-bit)	1024/2048/2048
Minimum Instruction Execution Time	**0.10 µs (at 4.5 to 5.5V, 20MHz)** **0.25 µs (at 2.7 to 5.5V, 8MHz)*** **125 µs (at 2.0 to 5.5V, 32kHz)*** *** The lower limit for operation guarantee for flash EEPROM built-in version is 4.5V.**
Interrupts	• 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
Timer Counter	**Timer Counter 0 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], PWM Output, Event Count, Remote Control Carrier Output, Simple Pulse Width Meausurement Function) 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 **Timer Counter 1 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], Event Count, Timer Synchronous Output) 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 **Timer Counter 0, 1 can be cascade-connected.** **Timer Counter 2 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], PWM Output, Event Count, Timer Synchronous Output, Simple Pulse Width Meausurement Function) 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 **Timer Counter 3 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], Event Count, Remote Control Carrier Output) 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 **Timer Counter 2, 3 can be cascade-connected.** **Timer Counter 4 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], PWM Output, Event Count, Simple Pulse Width Meausurement Function) 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 **Timer Counter 5 : 8-bit x 1** (Square-wave Output [Timer Pulse Output], Event Count) 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 **Timer Counter 4, 5 can be cascade-connected.** **Time Base Timer** (Independently Operable 8-bit Freerun Timer) Clock Source . . .. . .1/1 of System Clock, 1/1, $1/2^{13}$, $1/2^{7}$ of OSC Oscillation Clock, 1/1, $1/2^{13}$, $1/2^{7}$ of XI Oscillation Clock

Timer Counter (Continue)

Timer Counter 7 : 16-bit x 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 x 2
- Input Capture Register x 2

(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 x 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 x 1
- Input Capture Register x 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 $1/2^{16}$, $1/2^{18}$ and $1/2^{20}$ of System Clock Frequency

Serial Interface

Serial 0 : 8-bit x 1 (Full-duplex UART/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
Timer Counter 2, 3, 4 and 5 Outputs

(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 x 1 (Simple I²C/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
Timer Counter 2, 3, 4 and 5 Outputs

(Simple I²C) (I²C Transmission Function with Single Master [9-bit Transmission])

Serial 2 : 8-bit x 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
Timer Counters 2, 3, 4 and 5 Outputs

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

See the next page for support tool and pin assignment.

A/D Inputs	10-bit x 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
Special Ports	Buzzer Output, Remote Control Carrier Signal Output, High-current Drive Port x 1
Package	LQFP080-P-1414A

Electrical Characteristics

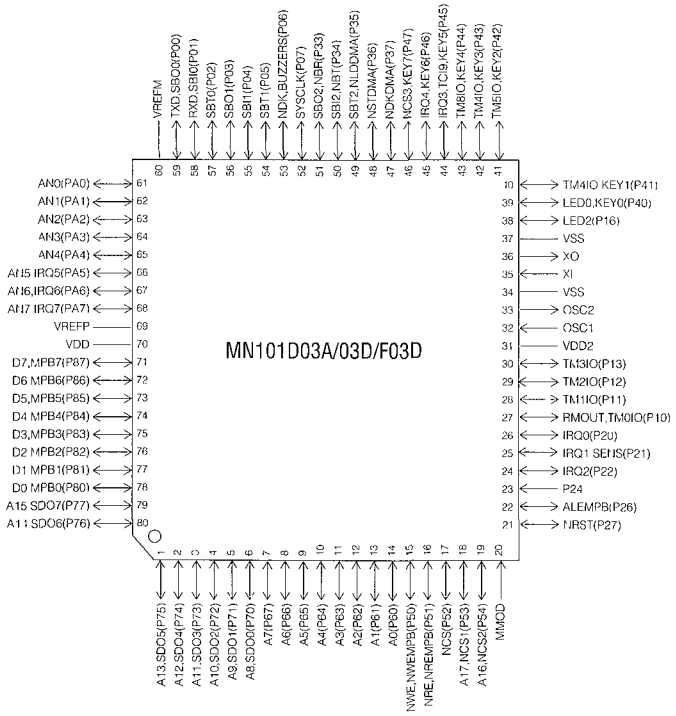
Supply Current

Parameter	Symbol	Condition	Limit min	Limit typ	Limit max	Unit
Operating Supply Current	IDD1	fosc = 20MHz, VDD = 5V			60	mA
	IDD2	fx = 32kHz, VDD = 3V			100	µA
Supply Current at HALT	IDD3	fx = 32kHz, VDD = 3V, Ta = 25°C			8	µA
		fx = 32kHz, VDD = 3V, Ta = 85°C			20	µA
Supply Current at STOP	IDD4	VDD = 5V, Ta = 25°C			1	µA
		VDD = 5V, Ta = 85°C			30	µA

Support Tool

In-Circuit Emulator	PX-ICE101C / D + PX-PRB101D03-C / D

Pin Assignment



LQFP080-P-1414A