❑ MN101D03D

Type	MN101D03D
ROM (x8-bit)	64 K
RAM (x8-bit)	2 K
Package	LQFP080-P-1414A *Lead-free
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)*1 125 µs (at 2.0 V to 5.5 V, 32 kHz)*2 *1 The lower limit for operation guarantee for flash memory built-in type is 4.5 V. *2 The lower limit for operation guarantee for EPROM built-in type is 2.3 V.
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 • Key interrupts (8 lines)
Timer Counter	Timer counter 0 : 8-bit × 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 frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 1 : 8-bit × 1 (square-wave output [timer pulse output], event count, timer synchronous output) Clock source ····· 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 0, 1 can be cascade-connected. Timer counter 2 : 8-bit × 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 frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 3 : 8-bit × 1 (square-wave output [timer pulse output], event count, remote control carrier output) Clock source ····· 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 2, 3 can be cascade-connected. Timer counter 4 : 8-bit × 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 frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 5 : 8-bit × 1 (square-wave output [timer pulse output], event count) Clock source ····· 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input Timer counter 4, 5 can be cascade-connected. Time base timer Clock source ····· $1/2^7$, $1/2^8$, $1/2^9$, $1/2^{10}$, $1/2^{13}$, $1/2^{15}$ of OSC oscillation clock frequency; $1/2^7$, $1/2^8$, $1/2^9$, $1/2^{10}$, $1/2^{13}$, $1/2^{15}$ of XI oscillation clock frequency Timer counter 6 : 8-bit freerun timer Clock source ····· 1/1 of system clock frequency; 1/1, $1/2^7$, $1/2^{13}$ of OSC oscillation clock frequency; 1/1, $1/2^7$, $1/2^{13}$ of XI oscillation clock frequency

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 $1/2^{16}$, $1/2^{18}$ and $1/2^{20}$ of system clock frequency

Serial Interface

Serial 0 : 8-bit × 1 (full-duplex UART/ synchronous type)

Synchronous type (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 to 5 output;
1/3 of frequency of the above clocks

Full-duplex UART (built-in baud rate timer, parity check, overrun error/framing error detection, transfer bit selectable from 7 and 8 bits)

Serial 1 : 8-bit × 1 (simple I^2C/ synchronous type)

Synchronous type (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 to 5 output;
1/3 of frequency of the above clocks

Simple I^2C (I^2C transmission function with single master [9-bit transmission])

Serial 2 : 8-bit × 1 (3-wire synchronous type)

Synchronous type (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 to 5 output;
1/3 of frequency of the above clocks

See the next page for electrical characteristics, pin assignment and support tool.

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 × 8-ch. (with S/H)
Conversion Cause 7 ····· A/D control register setting; timer 4, 6 or 8 interrupt; external interrupt 3 or 7; serial 1 interrupt

Special Ports Buzzer output, remote control carrier signal output, high-current drive port × 1

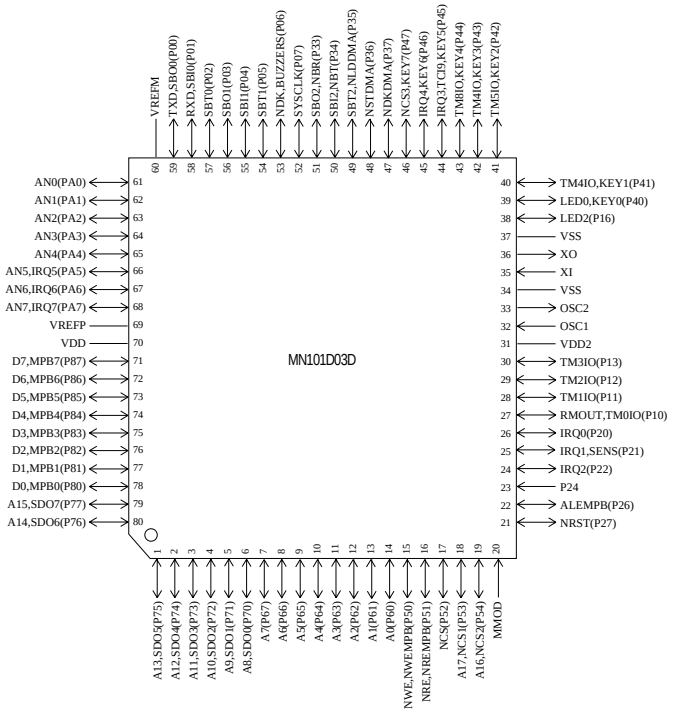
Electrical Characteristics

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

* Flash memory built-in type : 300 µA max. at VDD = 5 V

Pin Assignment



LQFP080-P-1414A *Lead-free

Support Tool

In-circuit Emulator	PX-ICE101C / D + PX-PRB101D03-LQFP080-P-1414A	
EPROM Built-in Type	Type	MN101DP03FAL
	ROM (× 8-bit)	96 K
	RAM (× 8-bit)	4 K
	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 *Lead-free
Flash Memory Built-in Type	Type	MN101DF03D
	ROM (× 8-bit)	64 K
	RAM (× 8-bit)	2 K
	Minimum instruction execution time	0.10 µs (at 4.5 V to 5.5 V, 20 MHz) 0.238 µs (at 4.5 V to 5.5 V, 8.39 MHz)
	Package	LQFP080-P-1414A *Lead-free

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