

□ 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	<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)
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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) 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</p> <p>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</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) 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</p> <p>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</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) 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</p> <p>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</p> <p>Timer counter 4, 5 can be cascade-connected.</p> <p>Time base timer Clock source 1/2⁷, 1/2⁸, 1/2⁹, 1/2¹⁰, 1/2¹³, 1/2¹⁵ of OSC oscillation clock frequency; 1/2⁷, 1/2⁸, 1/2⁹, 1/2¹⁰, 1/2¹³, 1/2¹⁵ of XI oscillation clock frequency</p> <p>Timer counter 6 : 8-bit freerun timer Clock source 1/1 of system clock frequency; 1/1, 1/2⁷, 1/2¹³ of OSC oscillation clock frequency; 1/1, 1/2⁷, 1/2¹³ of XI oscillation clock frequency</p>
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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 I²C/ 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 I²C (I²C 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.

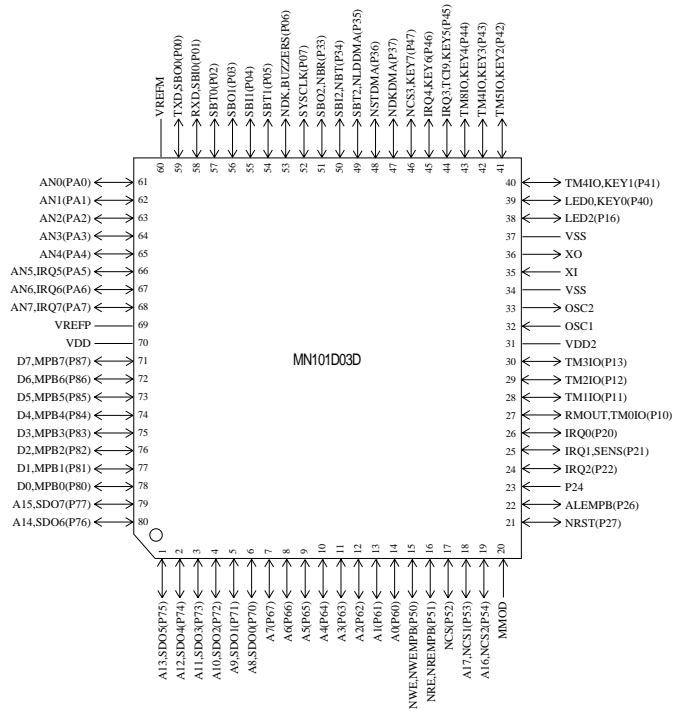
I/O Pins	I/O	67	• Common use • Specified pull-up resistor available • Input/output selectable (bit unit)
	Input	1	• Common use
A/D Inputs		10-bit × 8-ch. (with S/H)	Conversion Cause 7 A/D control register setting; timer 4, 6 or 8 interrupt; external interrupt 3 or 7; serial 1 interrupt
Special Ports		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
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