

# □ MN101C61D, MN101C61G

Type	MN101C61D (under development)	MN101C61G
ROM (×8-bit)	64 K	128 K
RAM (×8-bit)	3 K	12 K

**Package** TQFP080-P-1212D \*Lead-free

Minimum Instruction Execution Time	Standard:	0.1 μs (at 2.5 V to 3.6 V, 20 MHz) 0.2 μs (at 2.1 V to 3.6 V, 10 MHz) 0.5 μs (at 1.8 V to 3.6 V, 4 MHz)* 125 μs (at 1.8 V to 3.6 V, 32 kHz)*
	Double speed:	0.1 μs (at 2.5 V to 3.6 V, 10 MHz) 0.2 μs (at 2.1 V to 3.6 V, 5 MHz) 0.5 μs (at 1.8 V to 3.6 V, 2 MHz)* 62.5 μs (at 1.8 V to 3.6 V, 32 kHz)*

\* The operation guarantee range for flash memory built-in type is 2.2V to 3.0 V or 2.7V to 3.6 V.

Interrupts	<ul style="list-style-type: none"> <li>• RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • External 5</li> <li>• Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Timer 6 • Time base</li> <li>• Serial 0 reception • Serial 0 transmission • Serial 1 reception • Serial 1 transmission • Serial 2 • Serial 3</li> <li>• Automatic transfer finish • A/D conversion finish • Timer 7 (2 systems) • Key interrupts (8 lines)</li> </ul>
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Timer Counter	<p>Timer counter 0 : 8-bit × 1 (square-wave/8-bit PWM output, event count, generation of remote control carrier, pulse width measurement) 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 Interrupt source ..... coincidence with compare register 0</p> <p>Timer counter 1 : 8-bit × 1 (square-wave output, event count, synchronous output event) 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 Interrupt source ..... coincidence with compare register 1</p> <p>Timer counter 0, 1 can be cascade-connected.</p> <p>Timer counter 2 : 8-bit × 1 (square-wave/8-bit PWM output, event count, synchronous output event, pulse width measurement) 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 Interrupt source ..... coincidence with compare register 2</p> <p>Timer counter 3 : 8-bit × 1 (square-wave output, event count, generation of remote control carrier) 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 Interrupt source ..... coincidence with compare register 3</p> <p>Timer counter 2, 3 can be cascade-connected.</p> <p>Timer counter 4 : 8-bit × 1 (square-wave/8-bit PWM output, event count, pulse width measurement, serial 1 baud rate timer) 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; 1/1 of external clock input frequency Interrupt source ..... coincidence with compare register 4</p> <p>Timer counter 5 : 8-bit × 1 (square-wave/8-bit PWM output, event count, pulse width measurement, serial 0 baud rate timer) 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; 1/1 of external clock input frequency Interrupt source ..... coincidence with compare register 5</p>
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<b>Timer Counter (Continue)</b>	<p>Timer counter 6 : 8-bit freerun timer</p> <p>Clock source ..... 1/1 of system clock frequency; 1/1, 1/4096, 1/8192 of OSC oscillation clock frequency; 1/1, 1/4096, 1/8192 of XI oscillation clock frequency</p> <p>Interrupt source ..... coincidence with compare register 6</p> <p>Timer counter 7 : 16-bit × 1 (square-wave/16-bit PWM output, cycle / duty continuous variable, event count, synchronous output event, pulse width measurement, input capture)</p> <p>Clock source ..... 1/1, 1/2, 1/4, 1/16 of system clock frequency; 1/1, 1/2, 1/4, 1/16 of OSC oscillation clock frequency; 1/1, 1/2, 1/4, 1/16 of external clock input frequency</p> <p>Interrupt source ..... coincidence with compare register 7 (2 lines)</p> <p>Time base timer (one-minute count setting)</p> <p>Clock source ..... 1/1 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency</p> <p>Interrupt source ..... 1/128, 1/256, 1/512, 1/1024, 1/8192, 1/32768 of clock source frequency</p> <p>Watchdog timer</p> <p>Interrupt source ..... 1/65536, 1/262144, 1/1048576 of system clock frequency</p> <p>DMA controller (automatic data transfer)</p> <p>Max. Transfer cycles ..... 255</p> <p>Starting factor ..... external request, various types of interrupt, software</p> <p>Transfer mode ..... 1-byte transfer, word transfer, burst transfer</p>
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<b>Serial Interface</b>	<p>Serial 0 : synchronous type / UART (full-duplex) × 1</p> <p>Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 5; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency</p> <p>Serial 1 : synchronous type / UART (full-duplex) × 1</p> <p>Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 4; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency</p> <p>Serial 2 : synchronous type × 1</p> <p>Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 3; 1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency</p> <p>Serial 3 : synchronous type/single-master I<sup>2</sup>C × 1</p> <p>Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 3; 1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency</p>
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<b>I/O Pins</b>	<b>I/O</b>	62	• Common use • Specified pull-up resistor available • Input/output selectable (bit unit)
	<b>Input</b>	6	• Common use • Specified pull-up resistor available

<b>A/D Inputs</b>	10-Bit × 6-ch. (with S/H)
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<b>Special Ports</b>	Buzzer output, remote control carrier signal output, high-current drive port
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See the next page for electrical characteristics, pin assignment and support tool.

## Electrical Characteristics

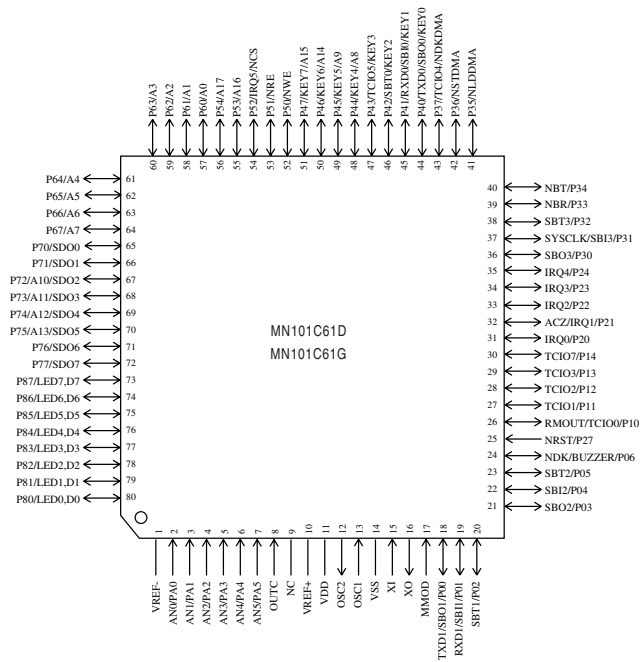
### Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 20 MHz, VDD = 3 V, (fs = fosc/2)		5	12	mA
	IDD2	fosc = 8.39 MHz, VDD = 3 V, (fs = fosc/2)		2	5	mA
	IDD3	fx = 32.768 kHz, VDD = 3 V, (fs = fx/2)			40	μA
Supply current at HALT	IDD4	fx = 32.768 kHz, VDD = 3 V, Ta = 25°C		4	8	μA
	IDD5	fx = 32.768 kHz, VDD = 3 V			30	μA
Supply current at STOP	IDD6	VDD = 3 V, Ta = 25°C			2	μA
	IDD7	VDD = 3 V			20	μA

Ta = -40°C to +85°C, VDD = 1.8 V to 3.6 V, VSS = 0 V

Note) Ta = -20°C to +70°C for a flash memory built-in version. Supply voltage range and supply current ratings are also different from the values mentioned above. Refer to Chapter 18 "Flash EEPROM" for details

## Pin Assignment



TQFP080-P-1212D \*Lead-free

NC serves as the VPP pin in the MN101CF61G, and cannot be used as a user pin.

## Support Tool

<b>In-circuit Emulator</b>	PX-ICE101C / D + PX-PRB101C61-TQFP080-P-1212-M		
<b>Flash Memory Built-in Type</b>	Type	MN101CF61G	
	ROM (× 8-bit)	128 K	
	RAM (× 8-bit)	12 K	
	Minimum instruction execution time	0.1 μs (at 2.7 V to 3.6 V, 20 MHz)	
		0.2 μs (at 2.7 V to 3.6 V, 10 MHz)	
		0.5 μs (at 2.7 V to 3.6 V, 4 MHz)	
		125 μs (at 2.7 V to 3.6 V, 32 kHz)	
	Package	TQFP080-P-1212D *Lead-free	
	<b>Flash Memory Built-in Type</b>	Type	MN101CF60G
		ROM (× 8-bit)	128 K
RAM (× 8-bit)		12 K	
Minimum instruction execution time		0.1 μs (at 2.5 V to 3.0 V, 20 MHz)	
		0.2 μs (at 2.2 V to 3.0 V, 10 MHz)	
		0.5 μs (at 2.2 V to 3.0 V, 4 MHz)	
		125 μs (at 2.2 V to 3.0 V, 32 kHz)	
Package		TQFP080-P-1212D *Lead-free	

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