

# ■ MN101C28A / 28C / 28D / 28F / 28L

<b>Type</b>	<b>MN101C28A / 28C / 28D / 28F / 28L</b>
<b>ROM (×8-Bit)</b>	32 K / 48 K / 64 K / 96 K / 96 K (External memory can be expanded)
<b>RAM (×8-Bit)</b>	1 536 / 2 048 / 2 048 / 4 096 / 10 240 (External memory can be expanded)
<b>Minimum Instruction Execution Time</b>	<b>0.10 μs (at 4.5 V to 5.5 V, 20 MHz)</b> <b>0.25 μs (at 2.6 V to 5.5 V, 8 MHz)</b> <b>0.333 μs (at 2.3 V to 5.5 V, 6 MHz)</b> <b>1.00 μs (at 2.0 V to 5.5 V, 2 MHz)*</b> <b>125 μs (at 2.0 V to 5.5 V, 32 kHz)*</b> <b>* The lower limit for operation guarantee for EPROM built-in version is 2.3 V.</b>
<b>Interrupts</b>	<ul style="list-style-type: none"> <li>• RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • Timer 0</li> <li>• Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Time Base • Serial 0 • Serial 1 • Serial 2</li> <li>• Automatic Transfer finish • A/D Conversion finish</li> </ul>
<b>Timer Counter</b>	<p><b>Timer Counter 0 : 8-Bit × 1</b> (Square-Wave/8-Bit PWM Output, Event Count, Generation of Remote Control Carrier)  Clock Source . . . 1/1, 1/4 of System Clock, 1/1 of OSC Oscillation Clock, External Clock Input  Interrupt Source . . . Coincidence with Compare Register 0</p> <p><b>Timer Counter 1 : 8-Bit × 1</b> (Square-Wave Output, Event Count, Synchronous Output Event)  Clock Source . . . 1/16, 1/64 of System Clock, 1/1 of XI Oscillation Clock, External Clock Input  Interrupt Source . . . Coincidence with Compare Register 1</p> <p><b>Timer Counter 0, 1 can be cascade-connected.</b></p> <p><b>Timer Counter 2 : 8-Bit × 1</b> (Square-Wave/8-Bit PWM Output, Event Count, Synchronous Output Event)  Clock Source . . . 1/1, 1/4 of System Clock, 1/1 of XI Oscillation Clock, External Clock Input  Interrupt Source . . . Coincidence with Compare Register 2</p> <p><b>Timer Counter 3 : 8-Bit × 1</b> (Square-Wave Output, Event Count, Generation of Remote Control Carrier, Serial 0 Baud Rate Timer)  Clock Source . . . 1/4, 1/16 of System Clock, 1/1 of OSC Oscillation Clock, External Clock Input  Interrupt Source . . . Coincidence with Compare Register 3</p> <p><b>Timer Counter 2, 3 can be cascade-connected.</b></p> <p><b>Timer Counter 4 : 16-Bit × 1</b> (Square-Wave/16-Bit PWM Output, Event Count, Synchronous Output Event, Input Capture)  Clock Source . . . 1/4, 1/16 of System Clock, 1/1 of OSC Oscillation Clock, External Clock Input  Interrupt Source . . . Coincidence with Compare Register 4</p> <p><b>Time Base Timer</b> (One-Minute Count Setting, Independently operable 8-Bit Timer Counter 5)  Clock Source . . . 1/4 of System Clock, 1/1, 1/8192 of OSC Oscillation Clock,  1/1, 1/8192 of XI Oscillation Clock  Interrupt Source . . . Coincidence with Compare Register 5, 1/8192 Prescaler Overflow</p> <p><b>Watchdog Timer</b>  Interrupt Source . . . 1/65536, 1/262144, 1/1048576 of System Clock (ROM Option)</p>
<b>Serial Interface</b>	<p><b>Serial 0 : 8-Bit × 1</b> (Synchronous Type/Simple UART[Half-Duplex])  Clock Source . . . 1/2, 1/4, 1/16 of System Clock  1/2 of Timer Counter 3</p> <p><b>Serial 1 : 8-Bit × 1</b> (Synchronous Type)  Clock Source . . . 1/2, 1/8, 1/64 of System Clock  1/2 of Timer Counter 3</p> <p><b>Serial 2 : 8-Bit × 1</b> (Synchronous Type/Simple I<sup>2</sup>C)  Clock Source . . . 1/1, 1/2, 1/4 of System Clock  1/2 of Timer Counter 0</p>

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I/O Pins	I/O	57	• Common use • Specified pull-up Resistor available • Input/Output selectable (bit unit)
	Input	13	• Common use • Specified pull-up Resistor available

A/D Inputs	10-Bit × 8ch (with S/H)
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Special Ports	Buzzer Output, Remote Control Carrier Signal Output, High-Current Drive Port
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Package	MN101C28A / 28C / 28D LQFP080-P-1414A, TQFP080-P-1212, QFP084-P-1818E MN101C28L / 28F LQFP080-P-1414A
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Electrical Characteristics

Supply Current

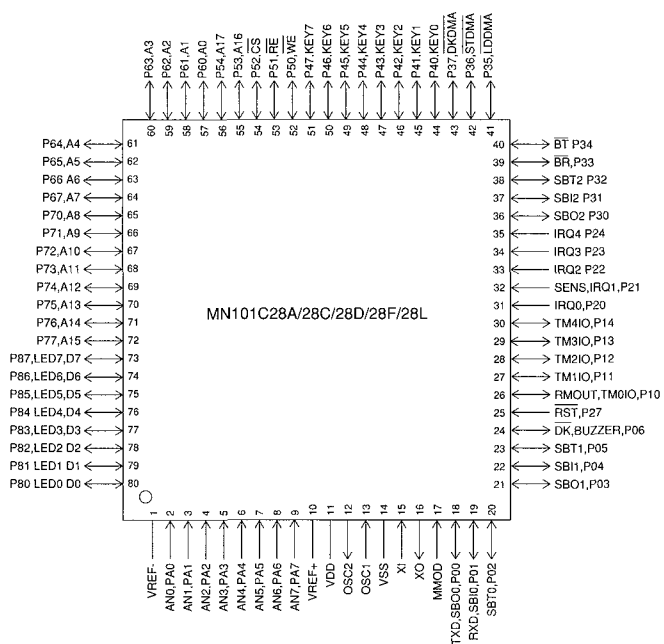
Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating Supply Current	IDD1	fosc = 20 MHz, VDD = 5 V			60	mA
	IDD2	fx = 32 kHz, VDD = 3 V			100	μA
Supply Current at HALT	IDD3	fx = 32 kHz, VDD = 3 V, Ta = 25 °C			8	μA
		fx = 32 kHz, VDD = 3 V, Ta = 85 °C			20	μA
Supply Current at STOP	IDD4	VDD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

Support Tool

In-Circuit Emulator	PX-ICE101C / D + PX-PRB101C28-C / D
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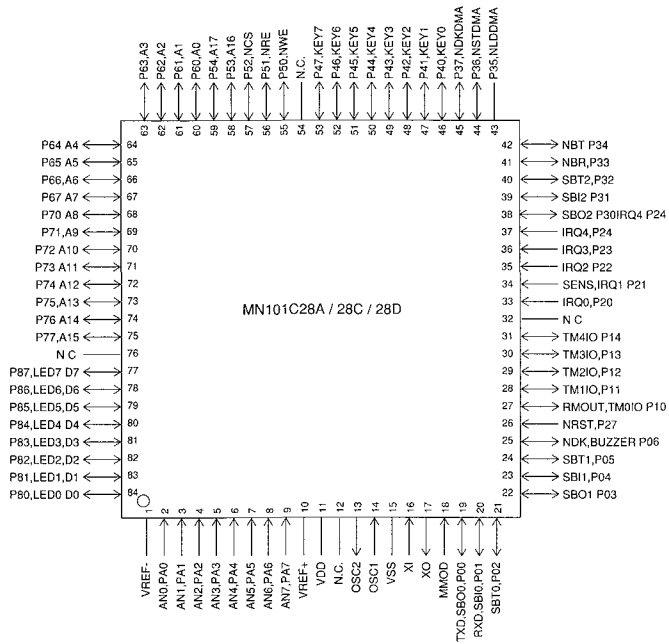
EPROM built-in Type	Type	MN101CP28DBF / CP28DAL / CP28DHT / CP28LAL	
	ROM (× 8-Bit)	64 K / 64 K / 64 K / 96 K	
	RAM (× 8-Bit)	2 048 / 2 048 / 2 048 / 10 240	
	Minimum Instruction Execution Time		0.10 μs (at 4.5 V to 5.5 V, 20 MHz)
			0.333 μs (at 2.3 V to 5.5 V, 6 MHz)
			0.25 μs (at 2.6 V to 5.5 V, 8 MHz)
Package	LQFP080-P-1414A, TQFP080-P-1212, QFP084-P-1818E		

## Pin Assignment



LQFP080-P-1414A (MN101C28A / 28C / 28D / 28F / 28L)

TQFP080-P-1212 (MN101C28A / 28C / 28D)



QFP084-P-1818E (MN101C28A / 28C / 28D)