❑ MN101C28A , MN101C28C , MN101C28D , MN101C28F , MN101C28L

Type	MN101C28A	MN101C28C	MN101C28D	MN101C28F	MN101C28L
ROM (×8-bit) External memory can be expanded	32 K	48 K	64 K	96 K	96 K
RAM (×8-bit) External memory can be expanded	1.5 K	2 K	2 K	4 K	10 K
Package **(Old Package)**	[All Pb free] LQFP080-P-1414A, TQFP080-P-1212D, QFP084-P-1818E (TQFP080-P-1212C)			LQFP080-P-1414A *Pb free	

Minimum Instruction Execution Time

0.10 µs (at 4.5 V to 5.5 V, 20 MHz)
0.238 µs (at 2.6 V to 5.5 V, 8.39 MHz)
0.333 µs (at 2.3 V to 5.5 V, 6 MHz)
1.00 µs (at 2.0 V to 5.5 V, 2 MHz)*
125 µs (at 2.0 V to 5.5 V, 32.768 kHz)*

* 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 • Timer 0
• Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Time base • Serial 0 • Serial 1 • Serial 2
• Automatic transfer finish • A/D conversion finish

Timer Counter

Timer counter 0 : 8-bit × 1 (square-wave/8-bit PWM output, event count, generation of remote control carrier)
Clock source ····· 1/1, 1/4 of system clock frequency; 1/1 of OSC oscillation clock frequency; external clock input
Interrupt source ····· coincidence with compare register 0

Timer counter 1 : 8-bit × 1 (square-wave output, event count, synchronous output event)
Clock source ····· 1/1, 1/16, 1/64 of system clock frequency; 1/1 of XI oscillation clock frequency; external clock input
Interrupt source ····· coincidence with compare register 1

Timer counter 0, 1 can be cascade-connected.

Timer counter 2 : 8-bit × 1 (square-wave/8-bit PWM output, event count, synchronous output event)
Clock source ····· 1/1, 1/4 of system clock frequency; 1/1 of XI oscillation clock frequency; external clock input
Interrupt source ····· coincidence with compare register 2

Timer counter 3 : 8-bit × 1
(square-wave output, event count, generation of remote control carrier, serial 0 baud rate timer)
Clock source ····· 1/4, 1/16 of system clock frequency; 1/1 of OSC oscillation clock frequency; external clock input
Interrupt source ····· coincidence with compare register 3

Timer counter 2, 3 can be cascade-connected.

Timer counter 4 : 16-bit × 1
(square-wave/16-bit PWM output, event count, synchronous output event, input capture)
Clock source ····· 1/4, 1/16 of system clock frequency; 1/1 of OSC oscillation clock frequency; external clock input
Interrupt source ····· coincidence with compare register 4

Time base timer (one-minute count setting, independently operable 8-bit timer counter 5)
Clock source ····· 1/4 of system clock frequency; 1/1, 1/8192 of OSC oscillation clock frequency; 1/1, 1/8192 of XI oscillation clock frequency
Interrupt source ····· coincidence with compare register 5; 1/8192 prescaler overflow

Watchdog timer
Interrupt source ····· 1/65536, 1/262144, 1/1048576 of system clock frequency (ROM option)

Serial Interface

Serial 0 : synchronous type/simple UART (half-duplex) × 1
Clock source ·····1/2, 1/4, 1/16 of system clock frequency; output of timer counter 3

Serial 1 : synchronous type × 1
Clock source ·····1/2, 1/8, 1/64 of system clock frequency; output of timer counter 3

Serial 2 : synchronous type/simple I^2C × 1
Clock source ·····1/4, 1/8, 1/16, 1/32 of system clock frequency; 1/4 of timer counter 0 frequency

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 × 8-ch. (with S/H)

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

Electrical Characteristics

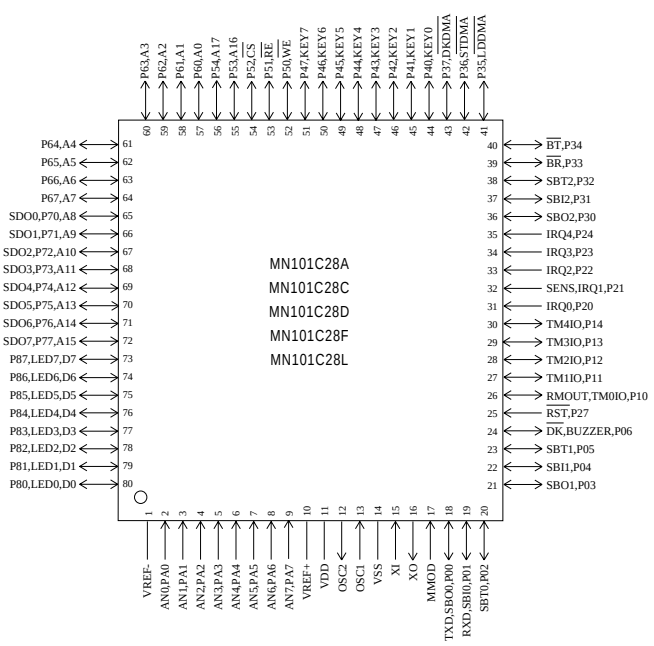
Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 20 MHz, VDD = 5 V		25	50	mA
	IDD2	fx = 32.768 kHz, VDD = 3 V		40	120	µA
Supply current at HALT	IDD3	fx = 32.768 kHz, VDD = 3 V, Ta = 25°C		4	8	µA
		fx = 32.768 kHz, VDD = 3 V, Ta = 85°C			20	µA
Supply current at STOP	IDD4	VDD = 5 V, Ta = 25°C		0	1	µA
		VDD = 5 V, Ta = −40°C to +85°C		0	30	µA

See the next page for pin assignment and support tool.

Pin Assignment

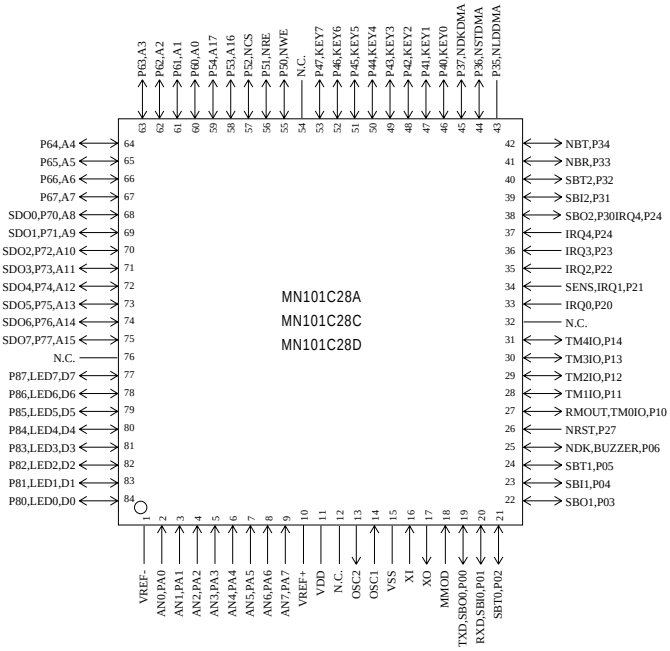
( ) : Old Package



LQFP080-P-1414A *Pb free

TQFP080-P-1212D *Pb free [MN101C28A/28C/28D]

(TQFP080-P-1212C)



QFP084-P-1818E *Pb free

Support Tool

In-circuit Emulator	PX-ICE101C/D+PX-PRB101C28-TQFP080-P-1212 PX-ICE101C/D+PX-PRB101C28-QFP084-P-1818E PX-ICE101C/D+PX-PRB101C28-LQFP080-P-1414A	
EPROM Built-in Type	Type	MN101CP28DBF , MN101CP28DAL , MN101CP28DHT , MN101CP28LAL
	ROM (× 8-bit)	64 K / 64 K / 64 K / 96 K
	RAM (× 8-bit)	2 K / 2 K / 2 K / 10 K
	Minimum instruction execution time	0.10 µs (at 4.5 V to 5.5 V, 20 MHz) 0.238 µs (at 2.6 V to 5.5 V, 8.39 MHz) 0.333 µs (at 2.3 V to 5.5 V, 6 MHz)
	Package (Old Package)	[All Pb free] LQFP080-P-1414A, TQFP080-P-1212D, QFP084-P-1818E (TQFP080-P-1212C)

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