

# □ MN103002A

<b>Type</b>	MN103002A
<b>Command Cache</b>	4 K-byte (2-Way)
<b>Data Cache</b>	4 K-byte (2-Way)
<b>Package (Conventional Package)</b>	QFP160-P-2828F *Lead-free (QFP160-P-2828B)
<b>Minimum Instruction Execution Time</b>	15 ns (at 3.3 V to lerrance = ± 5%, 66 MHz)
<b>Interrupts</b>	• RESET • IRQ0 to 7 • NMI • Timer 0 to 8 • SIO0 to 5 • DMAC0 to 3 • WDT • System error
<b>Timer Counter</b>	<p>Timer counter 0: 8-bit × 1 (timer output, 16-bit timer clock source, interval timer, event count, clock source for serial I/F0) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; underflow of timer 1, 2 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 1: 8-bit × 1 (timer output, 16-bit timer clock source, interval timer, event count, clock source for serial I/F1) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; output of timer counter 0; underflow of timer 0, 2 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 2: 8-bit × 1 (timer output; interval timer; event count; clock source for serial I/F 0, 2; DMA start) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; output of timer counter 1; underflow of timer 0, 1 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 3: 8-bit × 1 (timer output; interval timer; event count; clock source for serial I/F 1, 2; DMA start) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; output of timer counter 2; underflow of timer 0, 1, 2 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 4: 16-bit × 1 (timer output, down count, interval timer, event count) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; underflow of timer 0, 1, 2 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 5: 16-bit × 1 (timer output, down count, interval timer, event count) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; output of timer counter 4; underflow of timer 0, 1, 2 Interrupt source ..... underflow of timer counter</p> <p>Timer counter 6: 16-bit × 1 (event count, input capture, toggle output, PWM output, high-speed PWM output, up count, interval timer, one-shot output) Clock source ..... 1/(1, 8, 32) of I/O clock frequency; external clock input; underflow of timer 0, 1, 2 Interrupt source ..... overflow of timer counter; compare capture A, B</p> <p>Watchdog timer × 1 (watchdog overflow output) Clock source ..... system clock Interrupt source ..... overflow of watchdog timer</p>
<b>DMA Controller</b>	<p>Number of channels: 4 Unit of transfer: 8/16/32 bits Max. Transfer cycles: 65536 Starting factor: external request, various types of interrupt, software Transfer method: 2-bus cycle transfer, 1-bus cycle transfer Transfer modes: word transfer, burst transfer, intermittent transfer</p>

<b>Serial Interface</b>	Serial 0: 8-bit × 1 (start-stop synchronous mode, clock synchronous mode, I <sup>2</sup> C mode) Clock source ..... I/O clock; timer counter 0, 2; external clock
	Serial 1: 8-bit × 1 (start-stop synchronous mode, clock synchronous mode, I <sup>2</sup> C mode) Clock source ..... I/O clock; timer counter 1, 3; external clock
	Serial 2: 8-bit × 1 (start-stop synchronous mode with CTS control) Clock source ..... I/O clock; timer counter 2, 3; external clock

<b>I/O Pins</b>	<b>I/O</b>	26	• Common use
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## Electrical Characteristics

### Supply current

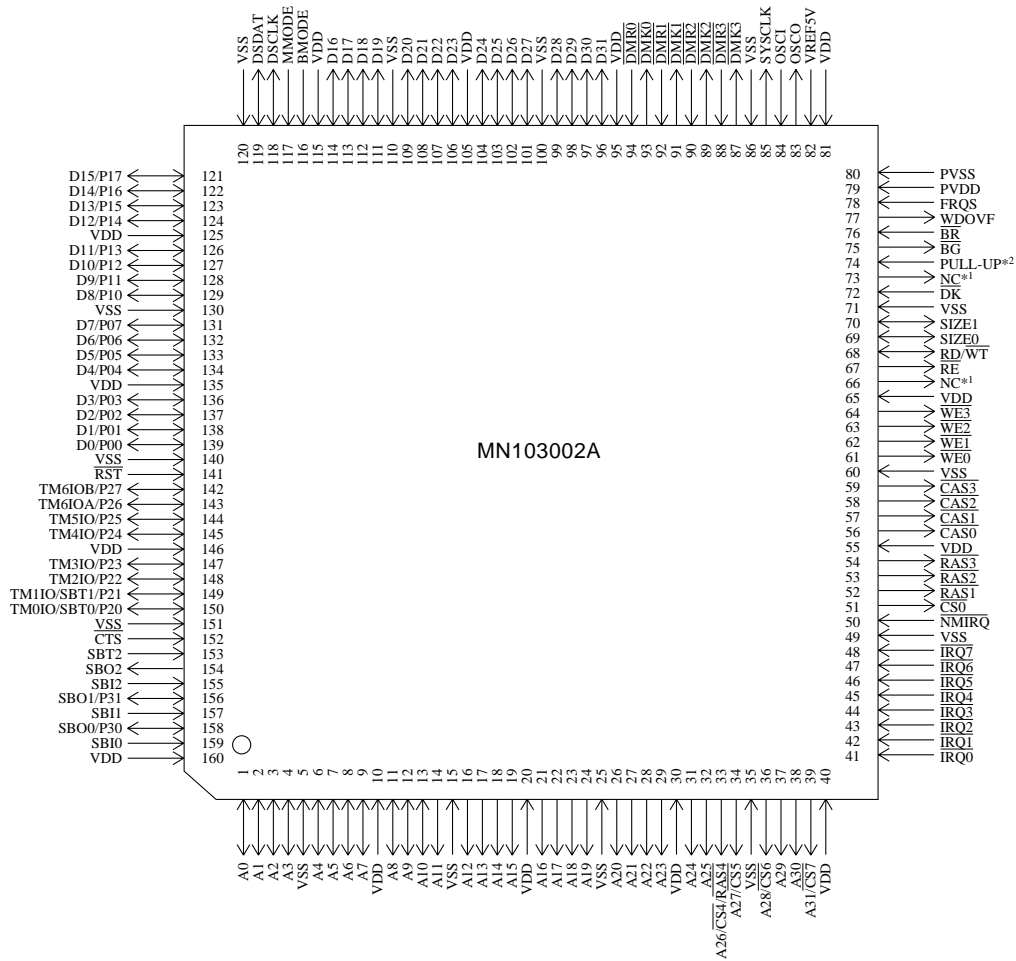
Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 16.6 MHz FRQS pin = Hi level Output open			250	mA
Supply current at SLEEP	IDD2	fosc = 16.6 MHz FRQS pin = Hi level Output open			50	mA
Supply current at HALT	IDD3	fosc = 16.6 MHz FRQS pin = Hi level Output open			6	mA
Supply current at stopping	IDD4	fosc = oscillation stopped Output open			1.25	mA

(Ta = -20°C to +70°C, VDD = 3.3 V, VSS = 0 V)

See the next page for pin assignment and support tool.

## Pin Assignment

( ): Conventional Package



QFP160-P-2828F \*Lead-free

(QFP160-P-2828B)

\*1: Set to open.

\*2: Pull up via the resistor.

## Support Tool

In-circuit Emulator	PX-ICE103002-QFP160-P-2828B
ROM Emulator	Partner ET-II (KMC product), ROMICE64 (Computex Co., Ltd, product)
On-board Development Tools	PX-ODB103S-O CSIDE-MN10300 (Computex Co., Ltd, product)



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