

# □ MN103001G

|   |  |    |              |
|---|--|----|--------------|
| ■ <b>Type</b>                               | MN103001G  |    |              |
| ■ <b>Command ROM (×64-bit)</b>              | 128 K-byte   |    |              |
| ■ <b>Data RAM (×32-bit)</b>                 | 8 K-byte   |    |              |
| ■ <b>Package</b>                            | LQFP100-P-1414 *Lead-free  |    |              |
| ■ <b>Minimum Instruction Execution Time</b> | 17 ns (at 3.0 V to 3.6 V, 60 MHz)  |    |              |
| ■ <b>Interrupts</b>                         | • RESET • IRQ × 8 • NMI • Timer × 18 • SIF × 8 • WDT • A/D • System error  |    |              |
| ■ <b>Timer Counter</b>                      | <p>Timer counter 0 to 3: 32-bit × 1<br/>           (interval timer, event count, timer output, interrupt, clock source for serial I/F, A/D conversion trigger)<br/>           Clock source ..... IOCLK; IOCLK/8; IOCLK/32; external clock input; underflow of timer counter<br/>           Interrupt source ..... underflow of timer counter 0, 1, 2, 3</p> <p>Timer counter 4 to 7: 32-bit × 1 (interval timer, event count, timer output, PWM output, interrupt)<br/>           Clock source ..... IOCLK; IOCLK/8; IOCLK/32; external clock input; underflow of timer counter<br/>           Interrupt source ..... underflow of timer counter 4, 5, 6, 7</p> <p>Timer counter 8 to B: 32-bit × 1<br/>           (interval timer, event count, timer output, PWM output, interrupt, clock source for serial I/F)<br/>           Clock source ..... IOCLK; IOCLK/8; IOCLK/32; external clock input; underflow of timer counter<br/>           Interrupt source ..... underflow of timer counter 8, 9, A, B</p> <p>*: each of timer counters 0 to 3, 4 to 7, and 8 to B can be changed to an 8-, 16-, or 24-bit timer counter.</p> <p>Timer counter 10: 16-bit × 1<br/>           (interval timer, event count, PWM output, toggle output (2 lines), interrupt, input capture (2 lines), one-shot output)<br/>           Clock source ..... IOCLK; IOCLK/8; IOCLK/32; external clock input; underflow of timer counter<br/>           Interrupt source ..... overflow of timer counter 10; coincidence with compare capture (2 lines) or at capture</p> <p>Timer counter 11: 16-bit × 1 (interval timer, event count, toggle output, interrupt)<br/>           Clock source ..... IOCLK; IOCLK/8; IOCLK/32; external clock input; underflow of timer counter<br/>           Interrupt source ..... underflow of timer counter</p> <p>Timer counter 12: 16-bit × 1 (same functions as those of timer counter 11)</p> <p>Timer counter 13: 16-bit × 1 (same functions as those of timer counter 11)</p> <p>Watchdog timer: 16- to 25-bit × 1-ch.</p> |    |              |
| ■ <b>Serial Interface</b>                   | <p>Serial 0: 7-, 8-bit × 1 (clock synchronous, start-stop synchronous, I<sup>2</sup>C mode)</p> <p>Serial 1, 2: 7-, 8-bit × 2 (clock synchronous mode)</p> <p>Serial 3: 7-, 8-bit × 1 (start-stop synchronous mode)<br/>           Clock source ..... (clock synchronous mode, start-stop synchronous mode)<br/>           IOCLK; underflow of timer counter; external clock (I<sup>2</sup>C mode)<br/>           IOCLK; underflow of timer counter</p>  |    |              |
| ■ <b>I/O Pins</b>                           | <b>I/O</b>   | 53 | • Common use |
|   | <b>Output</b>  | 15 | • Common use |
|   | <b>Input</b>   | 4  | • Common use |

|                   |   |
|-------------------|---|
| <b>A/D Inputs</b> | 10-bit × 4-ch.  |
| <b>PWM</b>        | 16-bit × 1-ch., 8-bit × 8-ch. (common with timer)         |
| <b>ICR</b>        | 16-bit × 2-ch. (common with OCR)                          |
| <b>OCR</b>        | 16-bit × 2-ch., 8-bit × 8-ch. (common partially with ICR) |

**Electrical Characteristics****Supply current**

| Parameter                  | Symbol | Condition  | Limit |     |     | Unit |
|----------------------------|--------|--|-------|-----|-----|------|
|                            |        |  | min   | typ | max |      |
| Operating supply current   | IDD1   | VDD , PVDD , AVDD = 3.3 V<br>VI = VDD or VSS<br>fosc = 15.0 MHz<br>CKSEL pin = Hi level<br>At internal = 60 MHz<br>Output open |       |     | 180 | mA   |
| Supply current at stopping | IDD4   | VDD , PVDD , AVDD = 3.6 V<br>VI = VDD or VSS<br>fosc = Oscillation stopped<br>Output open                                      |       |     | 100 | μA   |

(Ta = -20°C to +70°C)

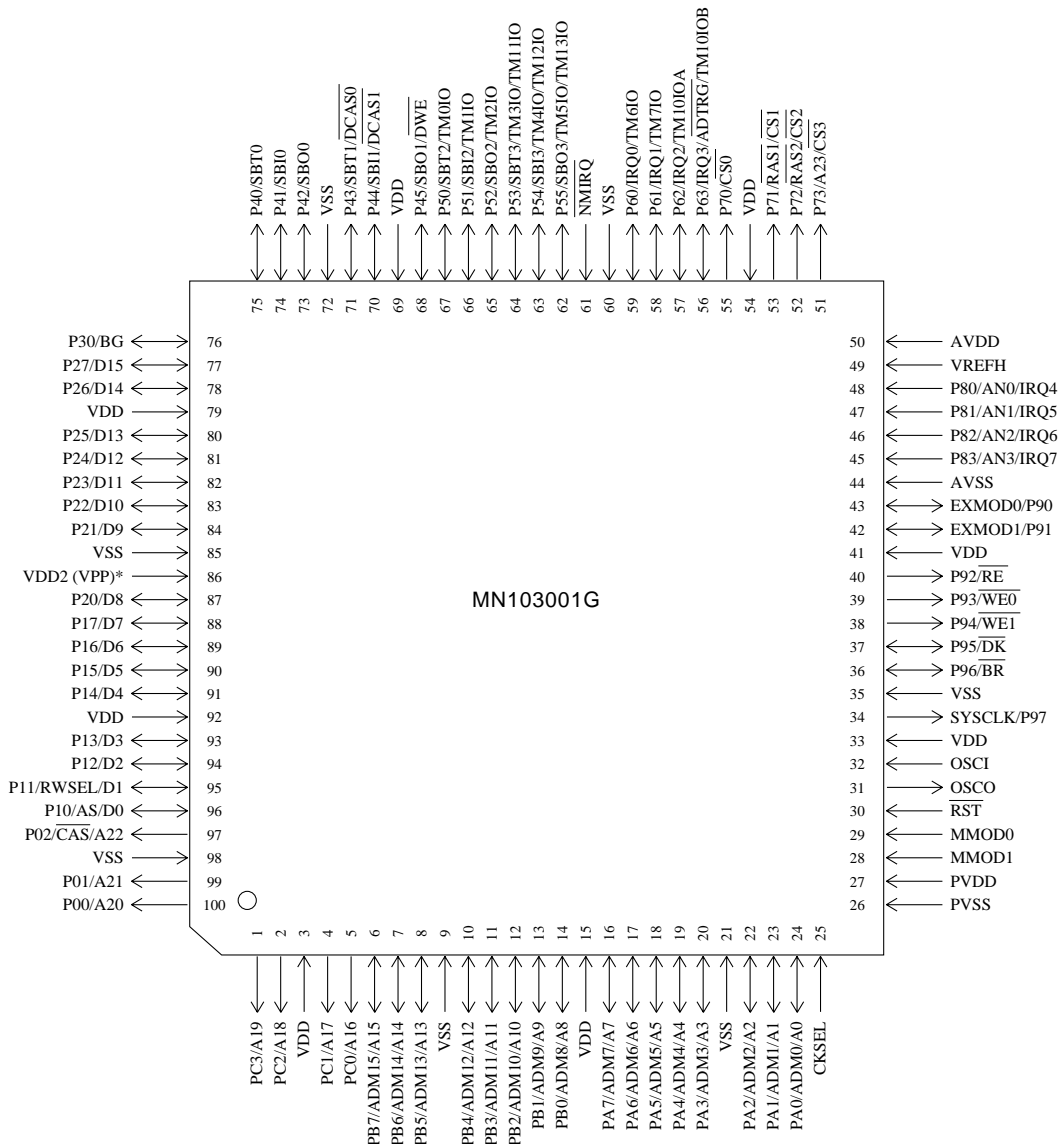
**A/D conversion performance**

| Parameter                     | Symbol | Condition                                     | Limit |     |     | Unit |
|-------------------------------|--------|---|-------|-----|-----|------|
|                               |        |   | min   | typ | max |      |
| Resolution                    |        |   |       |     | 10  | Bits |
| A/D conversion absolute error |        | VREF+ = 3.3 V<br>A/D conversion clock = 5 MHz |       |     | ± 7 | LSB  |
| A/D conversion relative error |        |   |       |     | ± 5 | LSB  |
| A/D conversion time           |        |   | 2.8   |     |     | μs   |

(Ta = -20°C to +70°C, AVDD = 3.3 V, AVSS = 0 V)

See the next page for pin assignment and support tool.

## Pin Assignment



LQFP100-P-1414 \*Lead-free

\* VDD2 for MN103001G and VPP for MN1030F01K

## Support Tool

|                            |   |
|----------------------------|---|
| In-circuit Emulator        | PX-ICE103001-LQFP100-P-1414   |
| On-board Development Tools | PX-ODB103S-O<br>CSIDE-MN10300 (Computex Co., Ltd, product)              |
| Flash Memory Built-in Type | Type<br>MN1030F01K  |
|                            | Command ROM (× 64-bit)<br>256 K-byte                                    |
|                            | Data RAM (× 32-bit)<br>8 K-byte   |
|                            | Minimum instruction execution time<br>25 ns (at 3.0 V to 3.6 V, 40 MHz) |
|                            | Package<br>LQFP100-P-1414 *Lead-free                                    |



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