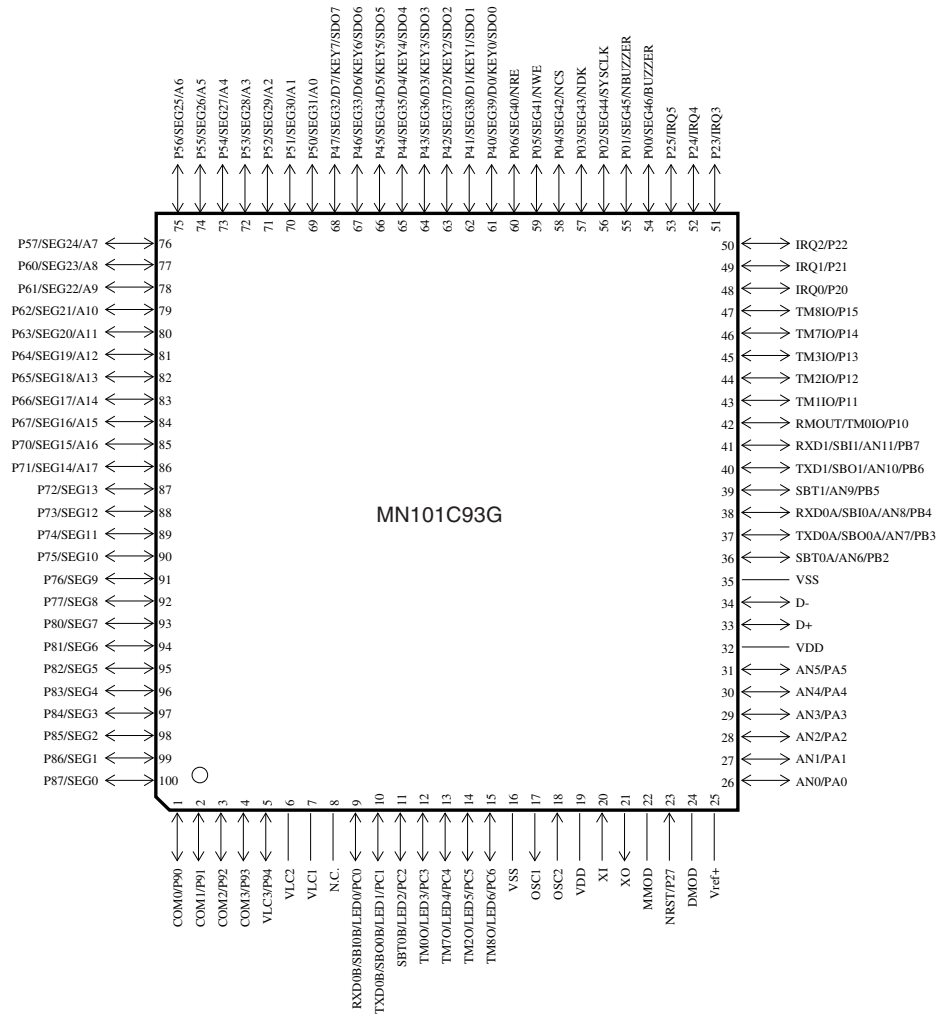


# □ MN101C93G

<b>Type</b>	MN101C93G (under planning)
<b>ROM (x8-bit)</b>	128K
<b>RAM (x8-bit)</b>	6K
<b>Package</b>	LQFP100-P-1414 *Lead-free (under planning), MLGA100-L-1010 *Lead-free (under planning)
<b>Minimum Instruction Execution Time</b>	0.125 μs (at 3.0 V to 3.6 V, 8 MHz, non-use of USB) 0.167 μs (at 3.0 V to 3.6 V, 6 MHz, use of USB) 62.5 μs (at 3.0 V to 3.6 V, 32 kHz, non-use of USB)
<b>Interrupts</b>	<ul style="list-style-type: none"> <li>• RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • External 5</li> <li>• External 6 (key interrupt dedicated) • Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 6 • Time base</li> <li>• Timer 7 (2 systems) • Timer 8 (2 systems) • Serial 0 (2 systems) • Serial 1 (2 systems)</li> <li>• A/D conversion finish • Automatic transfer finish • USB interrupts</li> </ul>
<b>USB Functions</b>	<p>Conforms to USB1.1.            USB transceiver built-in            Full-speed (12 Mbps) supported.            5 end points (FIFO built-in independently)            FIFO size            (EP0, 1, 2, 3, 4): 16, 128, 128, 64, 64 bytes</p> <ul style="list-style-type: none"> <li>• EP0                Control transfer                IN/OUT (two ways)</li> <li>• EP1 to EP4                Interrupt/Bulk/Isochronous transfer supported.                Settable to IN or OUT.                Double Buffering function supported.                When the MAXP size is set to a half or less of the MAXFIFO size for each EP, the Double Buffering function is made valid automatically.</li> </ul>
<b>Timer Counter</b>	<p>Timer counter 0: 8-bit × 1            (square-wave/8-bit PWM output, event count, generation of remote control carrier, simple pulse width measurement, added pluse (2-bit) system PWM output) (square-wave/PWM output to large current terminal PC3 possible)            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; timer counter 8 output            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 output, added pluse (2-bit) system PWM output, PWM output, serial transfer clock output, event count, synchronous output event, simple pulse width measurement) (square-wave/PWM output to large current terminal PC5 possible)            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>

<b>Timer Counter (Continue)</b>	<p>Timer counter 3: 8-bit × 1 (square-wave output, event count, generation of remote control carrier, serial transfer clock) 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 6: 8-bit freerun timer Clock source ..... 1/1 of system clock frequency; 1/1, 1/128, 1/8192 of OSC oscillation clock frequency; 1/1, 1/128, 1/8192 of XI oscillation clock frequency Interrupt source ..... coincidence with compare register 6</p> <p>Timer counter 7: 16-bit × 1 (square-wave output, 16-bit PWM output (cycle / duty continuous variable), event count, synchronous output event, pulse width measurement, input capture, real time output control, high performance IGBT output (Cycle/Duty can be changed constantly)) (square-wave/PWM output to large current terminal PC4 possible) 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 Interrupt source ..... coincidence with compare register 7 (2 lines), input capture register</p> <p>Timer counter 8: 16 bit × 1 (square-wave/16-bit PWM output [duty continuous variable], event count, pulse width measurement, input capture) (square-wave/PWM output to large current terminal PC6 possible) 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 Interrupt source ..... coincidence with compare register 8 (2 lines), input capture register</p> <p>Timer counters 7, 8 can be cascade-connected. (square-wave output, PWM is possible as a 32-bit timer.)</p> <p>Time base timer (one-minute count setting) Clock source ..... 1/1 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency Interrupt source ..... 1/128, 1/256, 1/512, 1/1024, 1/4096, 1/8192, 1/16384, 1/32768 of clock source frequency</p> <p>Watchdog timer Interrupt source ..... 1/65536, 1/262144, 1/1048576 of system clock frequency</p>
<b>DMA Controller (Automatic Data Transfer)</b>	<p>Max. Transfer cycles    255 Starting factor    external request, various types of interrupt, software Transfer mode    1-byte transfer, word transfer, burst transfer</p>
<b>Serial Interface</b>	<p>Serial 0: synchronous type/UART (full-duplex) × 1 Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 1 or 2; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency, external clock</p> <p>Serial 1: synchronous type/single-master I<sup>2</sup>C × 1 Clock source ..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 2 or 3; 1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency, external clock</p>

<b>I/O Pins</b>	<b>I/O</b>	83	• Common use • Specified pull-up resistor available • Input/output selectable (bit unit)
<b>A/D Inputs</b>		10-bit × 12-ch. (with S/H)	
<b>LCD</b>		47 segments × 4 commons (static, 1/2, 1/3, or 1/4 duty) LCD power supply separated from VDD (usable if VDD = VLCD ≤ 3.6 V) LCD power shunt resistance contained	
<b>Special Ports</b>		USB ports (D+, D-), buzzer output, remote control carrier signal output, high-current drive port, clock output	
<b>ROM Correction</b>		Correcting address designation: up to 7 addresses possible	
<b>Pin Assignment</b>			



LQFP100-P-1414 \*Lead-free

MLGA100-L-1010 \*Lead-free

## Support Tool

<b>In-circuit Emulator</b>	PX-ICE101C / D + PX-PRB101C93-LQFP100-P-1414-M (under planning)	
<b>Flash Memory Built-in Type</b>	Type	MN101CF93G (under planning)
	ROM (× 8-bit)	128K
	RAM (× 8-bit)	6K
	Minimum instruction execution time	0.125 μs (at 3.0 V to 3.6 V, 8 MHz, non-use of USB)
		0.167 μs (at 3.0 V to 3.6 V, 6 MHz, use of USB)
		62.5 μs (at 3.0 V to 3.6 V, 32 kHz, non-use of USB)
Package	LQFP100-P-1414 *Lead-free (under planning)	
	MLGA100-L-1010 *Lead-free (under planning)	

## Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technical information described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuits examples of the products. It neither warrants non-infringement of intellectual property right or any other rights owned by our company or a third party, nor grants any license.
- (3) We are not liable for the infringement of rights owned by a third party arising out of the use of the technical information as described in this material.
- (4) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).  
Consult our sales staff in advance for information on the following applications:
  - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
  - Any applications other than the standard applications intended.
- (5) The products and product specifications described in this material are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (6) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage, and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.  
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (7) When using products for which damp-proof packing is required, observe the conditions (including shelf life and amount of time let standing of unsealed items) agreed upon when specification sheets are individually exchanged.
- (8) This material may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.