

## **Notification about the transfer of the semiconductor business**

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

※ Except below description page

"Request for your special attention and precautions in using the technical information and semiconductors described in this book"

**Nuvoton Technology Corporation Japan**

# □ MN101C93 Series

Type	MN101C93K	MN101CF93K
Internal ROM type	Mask ROM	FLASH
ROM (byte)	224K	
RAM (byte)	6K	
Package (Lead-free)	LQFP100-P-1414	
Minimum Instruction Execution Time	0.125 $\mu$ s (at 3.0 V to 3.6 V, 8 MHz) 62.5 $\mu$ s (at 3.0 V to 3.6 V, 32 kHz)	0.167 $\mu$ s (at 3.0 V to 3.6 V, 6 MHz) 62.5 $\mu$ s (at 3.0 V to 3.6 V, 32 kHz)

## ■ Interrupts

RESET. Watchdog. External 0 to 5. External 6 (key interrupt dedicated). Timer 0 to 3. Timer 6. Timer 7 (2 systems). Timer 8 (2 systems). Time base. Serial 0 (2 systems). Serial 1 (2 systems). Serial 3 (1 systems). A/D conversion finish. Automatic transfer finish. USB interrupts

## ■ Timer Counter

8-bit timer  $\times$  5

Timer 0 .....Square-wave/8-bit PWM output. Event count. Remote control carrier output. Simple pulse width measurement. Added pulse (2-bit) type PWM output. Square-wave/PWM output to large current terminal PC3 possible

Timer 1 .....Square-wave output. Event count. Serial transfer clock output. Synchronous output event

Timer 2 .....Square-wave output. Added pulse (2-bit) type 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

Timer 3 .....Square-wave output. Event count. Serial transfer clock output

Timer 6 .....8-bit freerun timer

Timer 0, 1 can be cascade-connected

Timer 2, 3 can be cascade-connected

16-bit timer  $\times$  2

Timer 7 .....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. Square-wave/PWM output to large current terminal PC4 possible

Timer 8 .....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

Timer 7, 8 can be cascade-connected: Square-wave output, PWM is possible as a 32-bit timer

Time base timer: One-minute count setting

Watchdog timer  $\times$  1

## ■ Serial interface

Synchronous type/UART (full-duplex)  $\times$  2: Serial 0, 1

Synchronous type/Single-master I<sup>2</sup>C  $\times$  1: Serial 3

## ■ DMA controller

Maximum transfer cycles: 255

Starting factor: External request. Various types of interrupt. Software

Transfer mode: 1-byte transfer. Word transfer. Burst transfer

## ■ USB Functions

Conforms to USB 1.1: Full-speed (12 Mbps) supported

USB transceiver built-in. 5 end points (FIFO built-in independently)

FIFO size: EP0 = 16 bytes. EP1 = 128 bytes. EP2 = 128 bytes. EP3 = 64 bytes. EP4 = 64 bytes

EP0: Control transfer. IN/OUT (two ways)

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

## ■ I/O Pins

I/O 84 : Common use. Specified pull-up resistor available. Input/output selectable (bit unit)

## ■ A/D converter

10-bit  $\times$  12 channels (with S/H)

■ Display control function

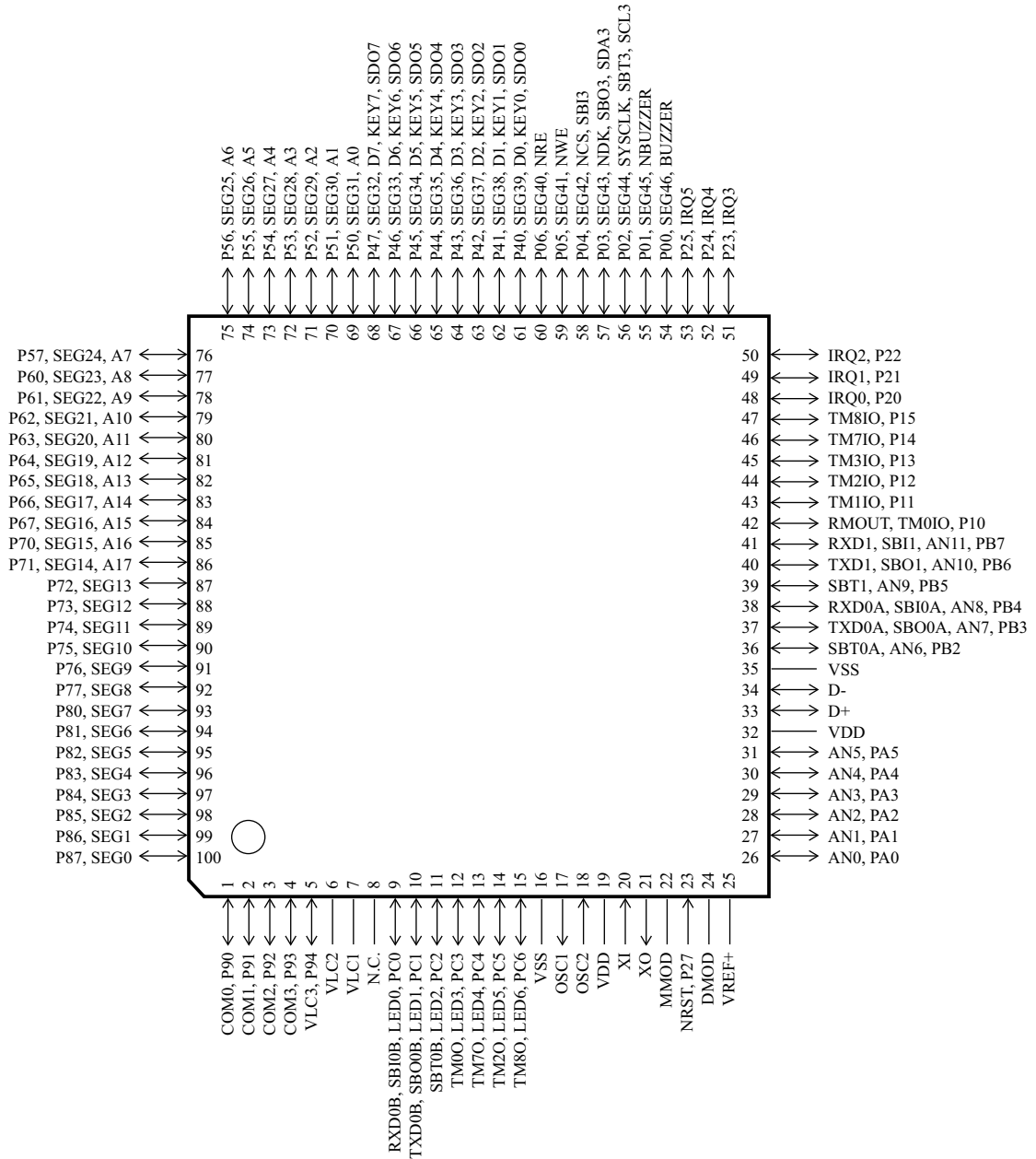
- LCD: 47 segments × 4 commons (Static, 1/2, 1/3, or 1/4 duty)
- LCD power supply separated from VDD (usable if VDD = VLCD ≤ 3.6 V)
- LCD power shunt resistance contained

■ Special Ports

USB ports (D+, D-). Buzzer output. Inverted buzzer output. Remote control carrier output. High-current drive port. Clock output

■ Pin Assignment

LQFP100-P-1414



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- (3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book.  
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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.
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