

# □ MN101D08E

Type	MN101D08E	MN101DF08G
Internal ROM type	Mask ROM	FLASH
ROM (byte)	80K	128K
RAM (byte)	2K	4K
Package (Lead-free)	LQFP080-P-1414A	
Minimum Instruction Execution Time	[With main clock operated] 0.1397 $\mu$ s (at 4.0 V to 5.5 V, 14.32 MHz) 71.5 $\mu$ s (at 2.7 V to 5.5 V, 14.32 MHz internal frequency di Vision) [When sub-clock operated] 61 $\mu$ s (at 2.5 V to 5.5 V, 32.768 kHz)	0.1397 $\mu$ s (at 4.0 V to 5.5 V, 14.32 MHz) 71.5 $\mu$ s (at 2.7 V to 5.5 V, 14.32 MHz internal frequency di Vision) 61 $\mu$ s (at 2.5 V to 5.5 V, 32.768 kHz)

## ■ Interrupts

RESET, Runaway, External 0 to 4, Timer 0 to 3, Timer 6, Capstan FG, Control, HSW, Cylinder(Drum) FG, Servo V-sync, Synchronous output, OSD, XDS, Serial 1, Serial 2, PWM 4, OSD V-sync

## ■ Timer Counter

Timer counter 0 : 8-bit  $\times$  1 (timer function)

Clock source..... 1/4, 1/16 of system clock frequency

Interrupt source ..... overflow of timer counter 0

Timer counter 1 : 8-bit  $\times$  1 (timer function, linear timer counter function)

Clock source..... 1/4 of system clock frequency; CTL signal

Interrupt source ..... overflow of timer counter 1

Timer counter 2 : 16-bit  $\times$  1 (timer function, input capture (CTL specified edge), duty judgment of CTL signal)

Clock source..... 1/4, 1/16, 1/24 of system clock frequency

Interrupt source ..... overflow of timer counter 2; input of CTL specified edge; underflow of timer 2 shift register 4-bit counter; coincidence of timer 2 shift register with timer 2 shift register compare register

Timer counter 3 : 16-bit  $\times$  1 (timer function)

Clock source..... 1/4, 1/16 of system clock frequency

Interrupt source ..... overflow of timer counter 3

Timer counter 5 : 19-bit  $\times$  1 (watchdog, stable oscillation waiting function)

Clock source..... system clock

Watchdog interrupt source... 1/2<sup>16</sup>, 1/2<sup>19</sup> of timer counter 5 frequency

Clear by stable oscillation ... after 256 counts by timer counter 5 (2<sup>18</sup> counts of OSC oscillation clock)

Timer counter 6 : 16-bit  $\times$  1 (clock function [max. 2 s])

Clock source..... 1/512 of OSC oscillation clock frequency; XI oscillation clock; 1/8, 1/128 of system clock frequency

Interrupt source ..... 1/2<sup>13</sup>, 1/2<sup>14</sup>, 1/2<sup>15</sup> overflow of timer counter 6

## ■ Serial interface

Serial 1 : 8-bit  $\times$  1 (synchronous type)

(transfer direction of MSB/LSB selectable, start condition function)

Clock source..... 1/8, 1/16, 1/32, 1/64, 1/128, 1/256 of system clock frequency; NSBT1 pin input

Serial 2 : 8-bit  $\times$  1 (I<sup>2</sup>C) (master transmission/reception, slave transmission/reception)

Clock source..... 1/144 to 1/252 of system clock; SCK pin input

## ■ OSD

Display mode .....	Menu(Internal synchronized ) display, super impose(external synchronized) display
Applicable broadcasting system.....	NTSC, PAL, PAL-M, PAL-N
Screen configuration .....	24 characters × 2n rows (n = 1 to 6)
Character type .....	max. 128 character types (variable, include special characters)
Character size.....	12 × 18 dots (Vertical direction : 1 dot for 2H at not enlargement.)
Enlarged characters .....	each × 2 settings in horizontal and vertical
Character interpolation.....	none
Line background color .....	8-hue settable (settable in the row unit at menu display)
Line background intensity.....	8 gradations settable in the row unit
Screen background color.....	8-hue settable at menu display
Character color.....	white
Character intensity .....	8 gradations settable in the row unit
Frame function .....	1-dot frame in 4 directions
Frame intensity.....	4 gradations settable in the row unit
Blinking.....	none (covered by software)
Inverted character.....	settable in the character unit
Halftone.....	none
Input .....	composite video signal input (output level : 1 V[p-p] / 2 V[p-p])
Clamp method .....	sync tip clamp, clamp level in 4 levels
Output .....	composite video output
Measure against image fluctuation.....	built-in AFC circuit
Dot clock .....	1/2 of OSC oscillation clock (automatic phase adjustment)

## ■ I/O Pins

I/O	56	Common use : 45
Input	1	Common use : 1

## ■ A/D converter

8-bit × 11-ch. (without S/H)

## ■ PWM

13-bit × 2-ch. (at repetition cycle 572 ms at 14.32 MHz),

8-bit × 1-ch. (at repetition cycle 71.5 ms, 0.572 ms, 1.14 ms, 2.29 ms at 14.32 MHz)

## ■ ICR

16-bit × 2-ch.(Speed system),

18-bit × 4-ch.(Phase system)

## ■ OCR

16-bit × 3 (Synchronous output × 2, Rec CTL × 1 )

## ■ Special Ports

3-state output (PTO) VLP pin; CTL input; Capstan FG input; Cylinder(Drum) PG/FG inputs; HSW output; Head amp/ Rotary control outputs; output of 1/4 OSC oscillation clock (1 V[p-p])

## ■ ROM Correction

Correcting address designation : up to 3 addresses possible

Correction method : correction program being saved in internal RAM

■ Electrical Characteristics (Supply current)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	14.32 MHz operation without load, VDD = 5 V		50	100	mA
	IDD2	1/1024 of 14.32 MHz operation without load, VDD = 2.7 V		2	5	mA
	IDD3	Stop of 14.32 MHz oscillation, VDD = 2.7 V 32 kHz oscillation operation without load		50	100	μA
Supply current at STOP	IDSP	Stop of oscillation without load, VDD = 5 V			10	μA
Supply current at HALT	IDHT0	14.32 MHz oscillation without load, VDD = 5 V		5	15	mA
	IDHT1	Stop of 14.32 MHz oscillation, VDD = 2.7 V 32 kHz oscillation operation without load		5	20	μA

(Ta = 25°C±2°C , VSS = 0 V)

■ Electrical Characteristics (A/D converter characteristics)

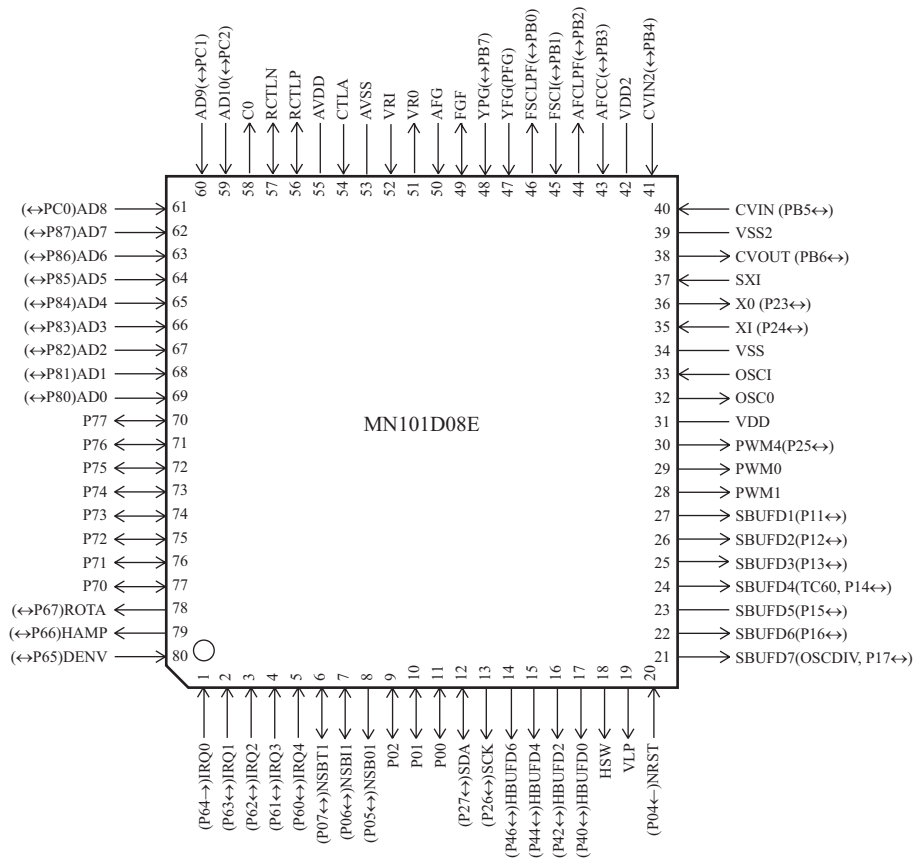
Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Conversion relative error	ΔNLAD				±3	LSB
A/D Conversion Time	tAD	fosc = 14.32 MHz		8		μs
Analog Input Voltage					5	V

(Ta = 25°C±2°C , VDD = 5.0 V , VSS = 0 V)

■ Development tools  
In-circuit Emulator

PX-ICE101C/D + PX-PRB101D08-LQFP080-P-1414A

■ Pin Assignment



LQFP080-P-1414A

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