☐ **MN101E46 Series**

Type	MN101E46G	MN101E46N	MN101E46R	MN101EF46R
Internal ROM type	Mask ROM			FLASH
ROM (byte)	128K	508K	928K	
RAM (byte)	4K		6K	8K
Package (Lead-free)	TQFP128-P-1414C (Under development)	TQFP128-P-1414C (Under planning)		TQFP128-P-1414C (ES (Engineering Sample) available)
Minimum Instruction Execution Time	0.1 μs (at 2.4 V to 3.6 V, 10 MHz) 0.25 μs (at 1.8 V to 3.6 V, 8 MHz)* 61 μs (at 1.8 V to 3.6 V, 32.768 kHz)* *: The lower limit for operation guarantee for flash memory built-in type is 2.2 V.			

■ Interrupts

RESET. Watchdog. External 0 to 3. Timer 0 to 3. Timer 6. Timer 7 (2 systems). Timer 8 (2 systems). Time base. Serial 0. Serial 1 (2 systems). A/D conversion finish. Automatic transfer finish. LCD frame finish

■ Timer Counter

8-bit timer × 5

Timer 0 ....Square-wave/8-bit PWM output. Event count. Remote control carrier output. Simple pulse width measurement

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

Timer 2 ....Square-wave/8-bit PWM output. Serial transfer clock output. Event count. Simple pulse width measurement

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 × 2

Timer 7, 8 ....Square-wave output. 16-bit PWM output (cycle/duty continuous variable). Event count. Pulse width measurement. Input capture

Time base timer: One-minute count setting

Watchdog timer × 1

■ Serial interface

Synchronous type/Single-master I²C × 1: Serial 0

Synchronous type/UART (full-duplex) × 1: Serial 1

■ DMA controller

Maximum transfer cycles: 255

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

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

■ I/O Pins

I/O   67 : Common use

Output   40 : LCD drive output exclusive use

■ A/D converter

10-bit × 3 channels (External input 2 channels, Internal 1.8 V input 1 channel)

■ Display control function

Dot Matrix type LCD control function

Display size up to 2048 pixels (32 COM × 64 SEG)

LCD drivers: COM output maximum 32 pins / SEG output maximum 67 pins (3 pins has dual function for COM/SEG)

1/8, 1/16, 1/24, 1/32 duty

1/5, 1/6 bias

LCD panel drive voltage maximum 5.5 V

Built-in LCD voltage booster and LCD voltage dividing resister

16-level contrast control

Bright and dark 2-step level display function

Monochrome inversion function

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■ Special Ports
  Buzzer output. Remote control carrier output

■ ROM Correction
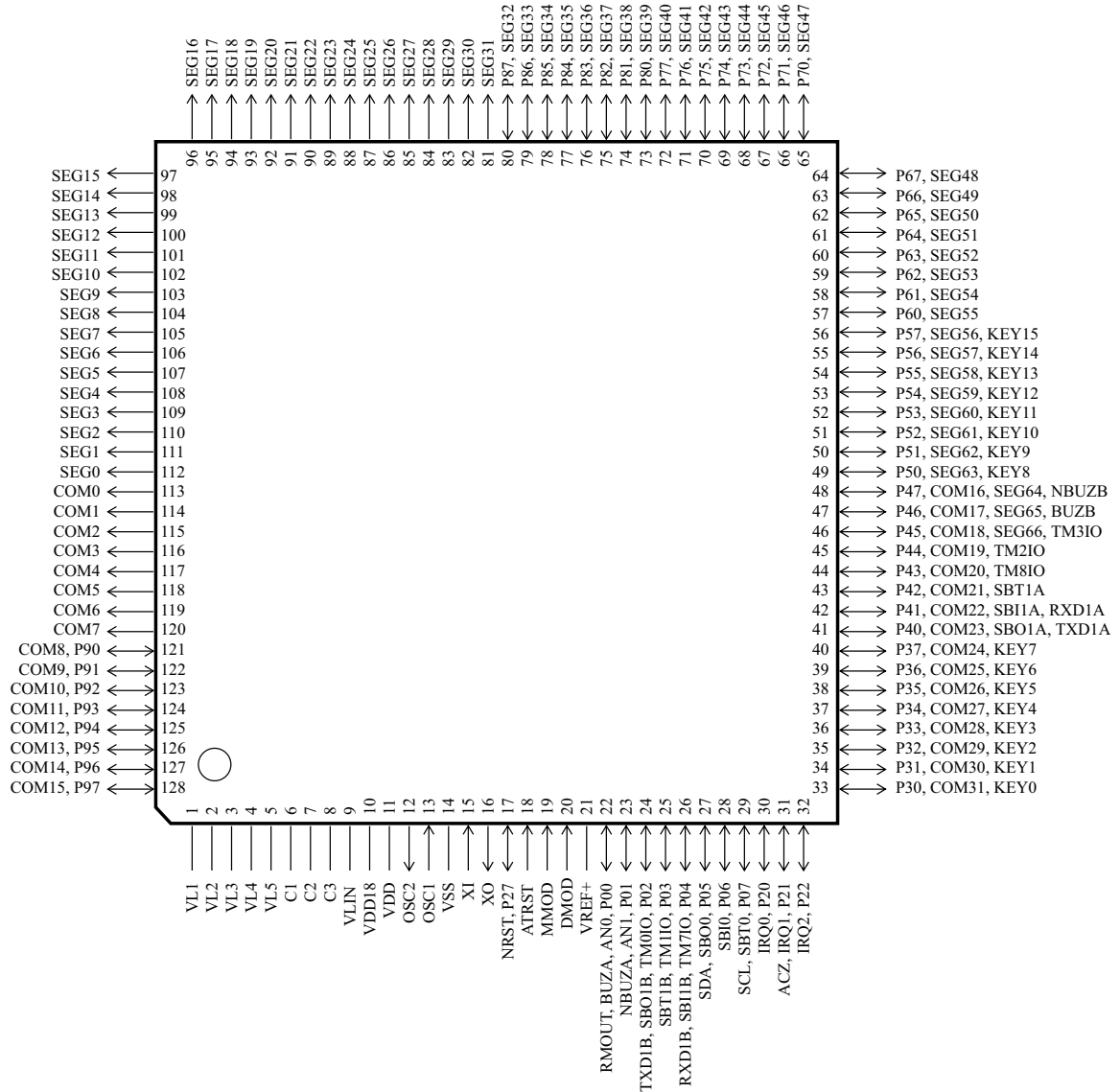 Correcting address designation: Up to 7 addresses possible

■ Development tools
  In-circuit Emulator
    PX-ICE101C/E + PX-PRB101E46-TQFP128-P-1414C

■ Pin Assignment
  TQFP128-P-1414C

Top pins (left to right, 96→65):
SEG16, SEG17, SEG18, SEG19, SEG20, SEG21, SEG22, SEG23, SEG24, SEG25, SEG26, SEG27, SEG28, SEG29, SEG30, SEG31, P87 SEG32, P86 SEG33, P85 SEG34, P84 SEG35, P83 SEG36, P82 SEG37, P81 SEG38, P80 SEG39, P77 SEG40, P76 SEG41, P75 SEG42, P74 SEG43, P73 SEG44, P72 SEG45, P71 SEG46, P70 SEG47

Left pins (97–128):
Pin	Signal
97	SEG15
98	SEG14
99	SEG13
100	SEG12
101	SEG11
102	SEG10
103	SEG9
104	SEG8
105	SEG7
106	SEG6
107	SEG5
108	SEG4
109	SEG3
110	SEG2
111	SEG1
112	SEG0
113	COM0
114	COM1
115	COM2
116	COM3
117	COM4
118	COM5
119	COM6
120	COM7
121	COM8, P90
122	COM9, P91
123	COM10, P92
124	COM11, P93
125	COM12, P94
126	COM13, P95
127	COM14, P96
128	COM15, P97

Right pins (64–33):
Pin	Signal
64	P67, SEG48
63	P66, SEG49
62	P65, SEG50
61	P64, SEG51
60	P63, SEG52
59	P62, SEG53
58	P61, SEG54
57	P60, SEG55
56	P57, SEG56, KEY15
55	P56, SEG57, KEY14
54	P55, SEG58, KEY13
53	P54, SEG59, KEY12
52	P53, SEG60, KEY11
51	P52, SEG61, KEY10
50	P51, SEG62, KEY9
49	P50, SEG63, KEY8
48	P47, COM16, SEG64, NBUZB
47	P46, COM17, SEG65, BUZB
46	P45, COM18, SEG66, TM3IO
45	P44, COM19, TM2IO
44	P43, COM20, TM8IO
43	P42, COM21, SBT1A
42	P41, COM22, SBI1A, RXD1A
41	P40, COM23, SBO1A, TXD1A
40	P37, COM24, KEY7
39	P36, COM25, KEY6
38	P35, COM26, KEY5
37	P34, COM27, KEY4
36	P33, COM28, KEY3
35	P32, COM29, KEY2
34	P31, COM30, KEY1
33	P30, COM31, KEY0

Bottom pins (1–32):
Pin	Signal
1	VL1
2	VL2
3	VL3
4	VL4
5	VL5
6	C1
7	C2
8	C3
9	VLIN
10	VDD18
11	VDD
12	OSC2
13	OSC1
14	VSS
15	XI
16	XO
17	NRST, P27
18	ATRST
19	MMOD
20	DMOD
21	VREF+
22	RMOUT, BUZA, AN0, P00
23	NBUZA, AN1, P01
24	TXD1B, SBO1B, TM0IO, P02
25	SBT1B, TM1IO, P03
26	RXD1B, SBI1B, TM7IO, P04
27	SDA, SBO0, P05
28	SBI0, P06
29	SCL, SBT0, P07
30	IRQ0, P20
31	ACZ, IRQ1, P21
32	IRQ2, P22

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