SONY

CXP750000

CMOS 8-bit Single Chip Microcomputer
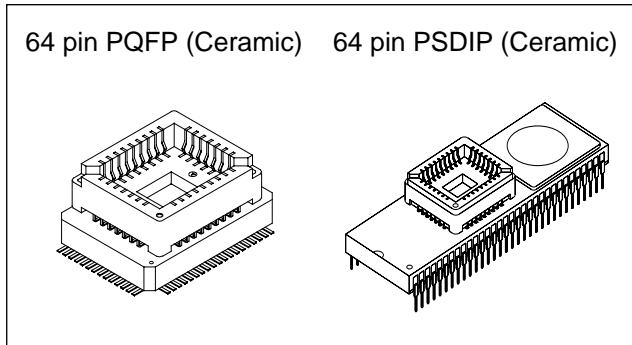
Piggy/evaluation chip

Description

The CXP750000 is a CMOS 8-bit single chip micro-computer of piggyback/evaluator combined type, which is developed for evaluating the function of the CXP/750064/750072/750080/750096/750010.

Note that the CXP750000 corresponds to the custom font.

64 pin PQFP (Ceramic)　　64 pin PSDIP (Ceramic)

Structure
Silicon gate CMOS IC

Features

- A wide instruction set (211 instructions) which covers various types of data
  - 16-bit operation/multiplication and division/ Boolean bit operation instructions
- Minimum instruction cycle　　167ns at 24MHz operation
  　　　　　　　　　　　　　　250ns at 16MHz operation
  　　　　　　　　　　　　　　122µs at 32kHz operation
- Applicable EPROM　　CXP27C702K (Maximum 120K bytes are available.)
- Incorporated RAM　　2496 bytes (Excludes VRAM for on-screen display)
- EPROM for custom font　　57K bytes
- Peripheral functions
  - A/D converter　　8 bits, 6 channels, successive approximation method
    　　　　　　　　(Conversion time of 3.25µs at 16MHz)
  - Serial interface　　8-bit clock sync type, 1 channel
  - Timer　　8-bit timer
    　　　　8-bit timer/counter
    　　　　19-bit time-base timer
    　　　　32kHz timer/counter
  - On-screen display (OSD)　　24×32 dots, 512 character types, 15 character colors, 32 characters $\times$ 2 lines
    　　　　frame background 8 colors/half blanking
    　　　　background on full screen 15 colors/half blanking
    　　　　edging/shadowing/rounding for every line
    　　　　background with shadow for every character, double scanning
    　　　　sprite OSD; 24×32 dots, 1 screen, 8 colors for every dot
  - I²C bus interface
  - PWM output　　8 bits, 8 channels
    　　　　　　　14 bits, 1 channel
  - Remote control unit receive circuit
    　　　　8-bit pulse measurement counter, 6-stage FIFO
  - HSYNC counter　　2 channels
  - Watchdog timer
- Interruption　　13 factors, 13 vectors, multi-interruption possible
- Standby mode　　Sleep
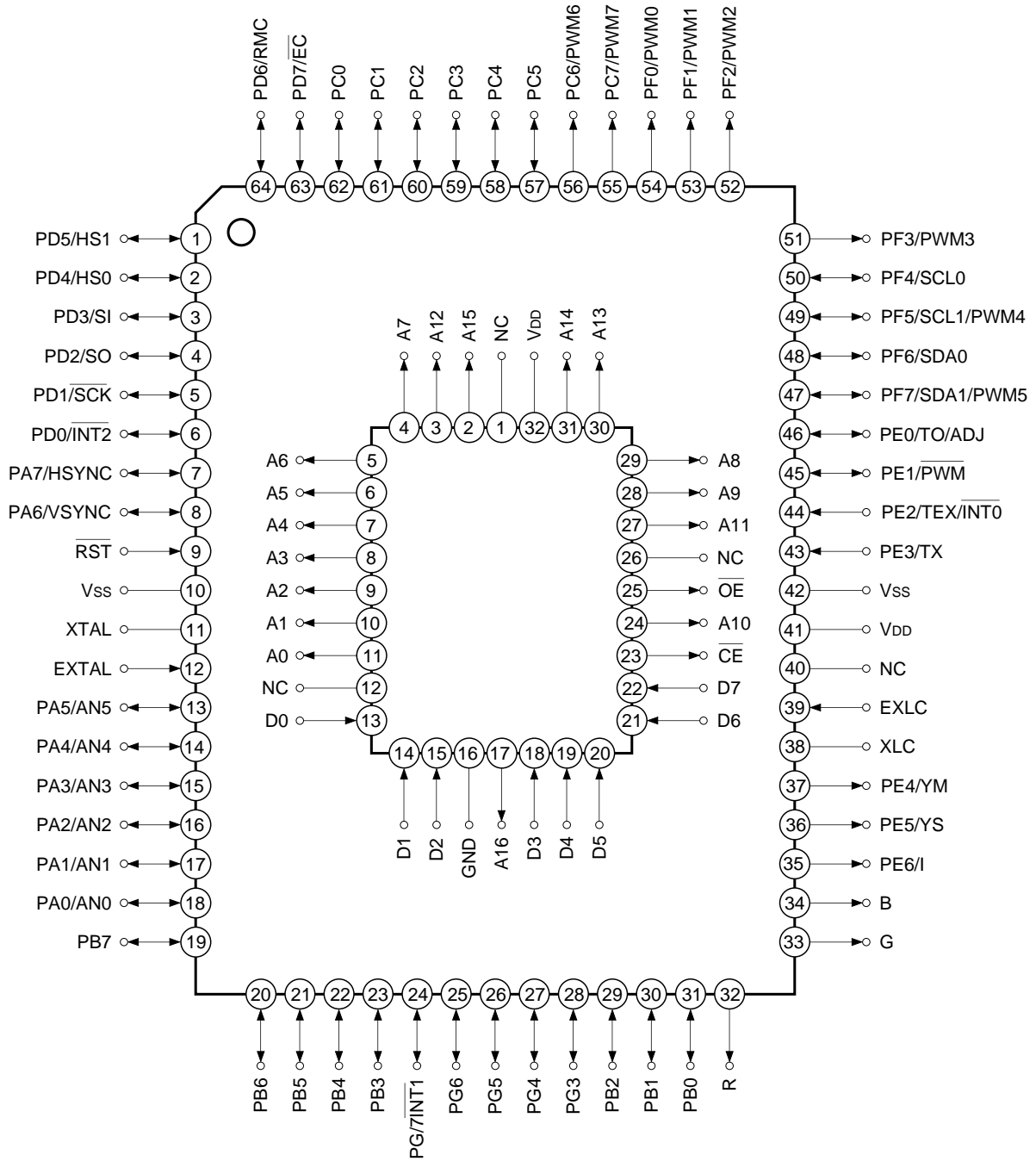- Package　　CXP750000 64-pin ceramic PQFP/PSDIP (Supports custom font)

Note) Mask option depends on the type of the CXP750000. Refer to the Product List for details.

E98613A28-PS

CXP750000

Pin Assignment in Piggyback Mode (Top View)

Top pins (64–52):
PD6/RMC (64), PD7/$\overline{EC}$ (63), PC0 (62), PC1 (61), PC2 (60), PC3 (59), PC4 (58), PC5 (57), PC6/PWM6 (56), PC7/PWM7 (55), PF0/PWM0 (54), PF1/PWM1 (53), PF2/PWM2 (52)

Left pins (1–19):
1 PD5/HS1
2 PD4/HS0
3 PD3/SI
4 PD2/SO
5 PD1/$\overline{SCK}$
6 PD0/$\overline{INT2}$
7 PA7/HSYNC
8 PA6/VSYNC
9 $\overline{RST}$
10 Vss
11 XTAL
12 EXTAL
13 PA5/AN5
14 PA4/AN4
15 PA3/AN3
16 PA2/AN2
17 PA1/AN1
18 PA0/AN0
19 PB7

Bottom pins (20–32):
PB6 (20), PB5 (21), PB4 (22), PB3 (23), PG7/$\overline{INT1}$ (24), PG6 (25), PG5 (26), PG4 (27), PG3 (28), PB2 (29), PB1 (30), PB0 (31), R (32)

Right pins (51–33):
51 PF3/PWM3
50 PF4/SCL0
49 PF5/SCL1/PWM4
48 PF6/SDA0
47 PF7/SDA1/PWM5
46 PE0/TO/ADJ
45 PE1/$\overline{PWM}$
44 PE2/TEX/$\overline{INT0}$
43 PE3/TX
42 Vss
41 VDD
40 NC
39 EXLC
38 XLC
37 PE4/YM
36 PE5/YS
35 PE6/I
34 B
33 G

Inner (piggyback) socket pins:
Top: A7 (4), A12 (3), A15 (2), NC (1), VDD (32), A14 (31), A13 (30)
Left: A6 (5), A5 (6), A4 (7), A3 (8), A2 (9), A1 (10), A0 (11), NC (12), D0 (13)
Bottom: D1 (14), D2 (15), GND (16), A16 (17), D3 (18), D4 (19), D5 (20)
Right: A8 (29), A9 (28), A11 (27), NC (26), $\overline{OE}$ (25), A10 (24), $\overline{CE}$ (23), D7 (22), D6 (21)

Note) 1. NC (Pin 40) is left open.

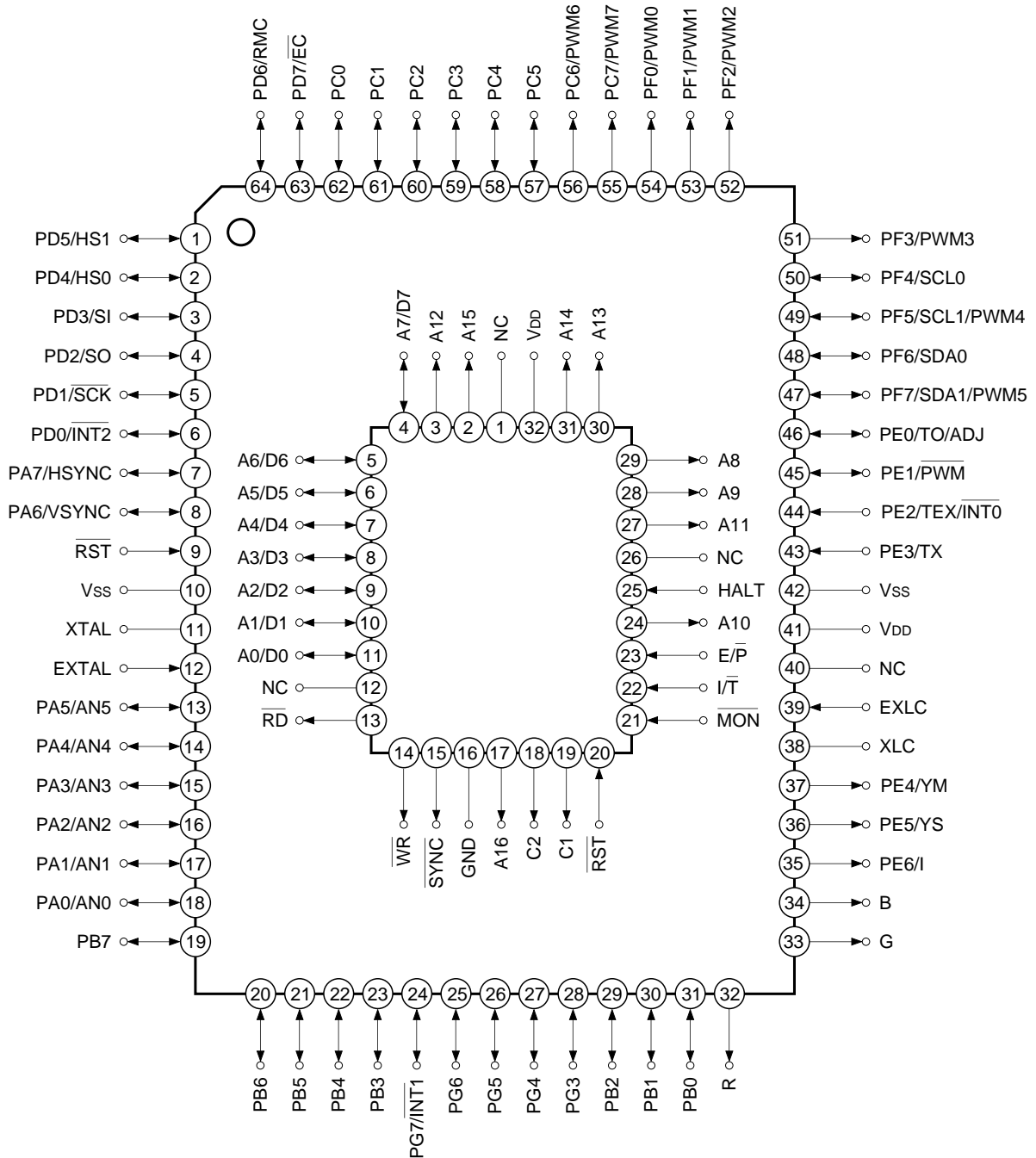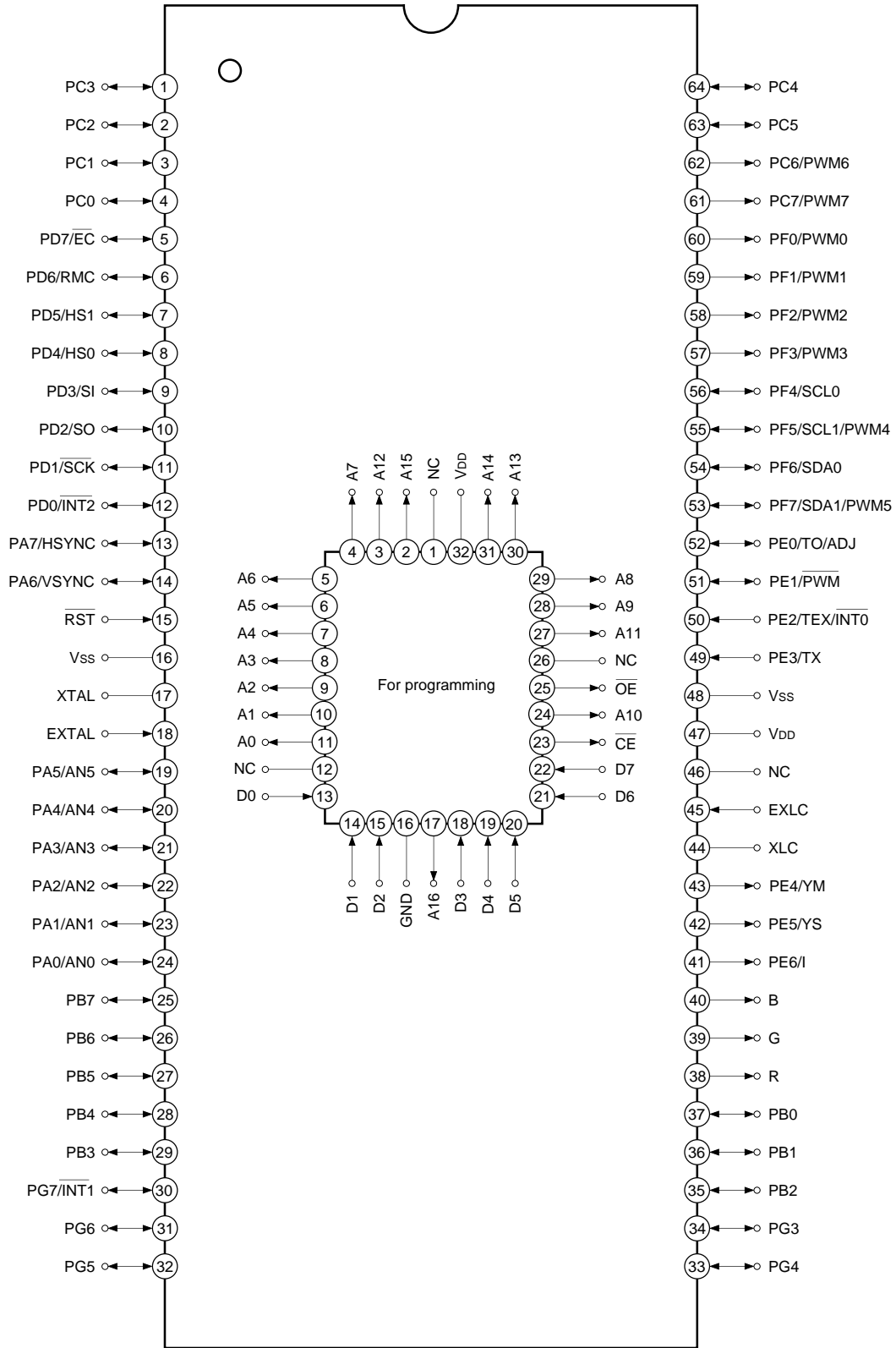2. Vss (Pins 10 and 42) are both connected to GND.

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Pin Assignment in Evaluator Mode (Top View)

Note) 1. NC (Pin 40) is left open.

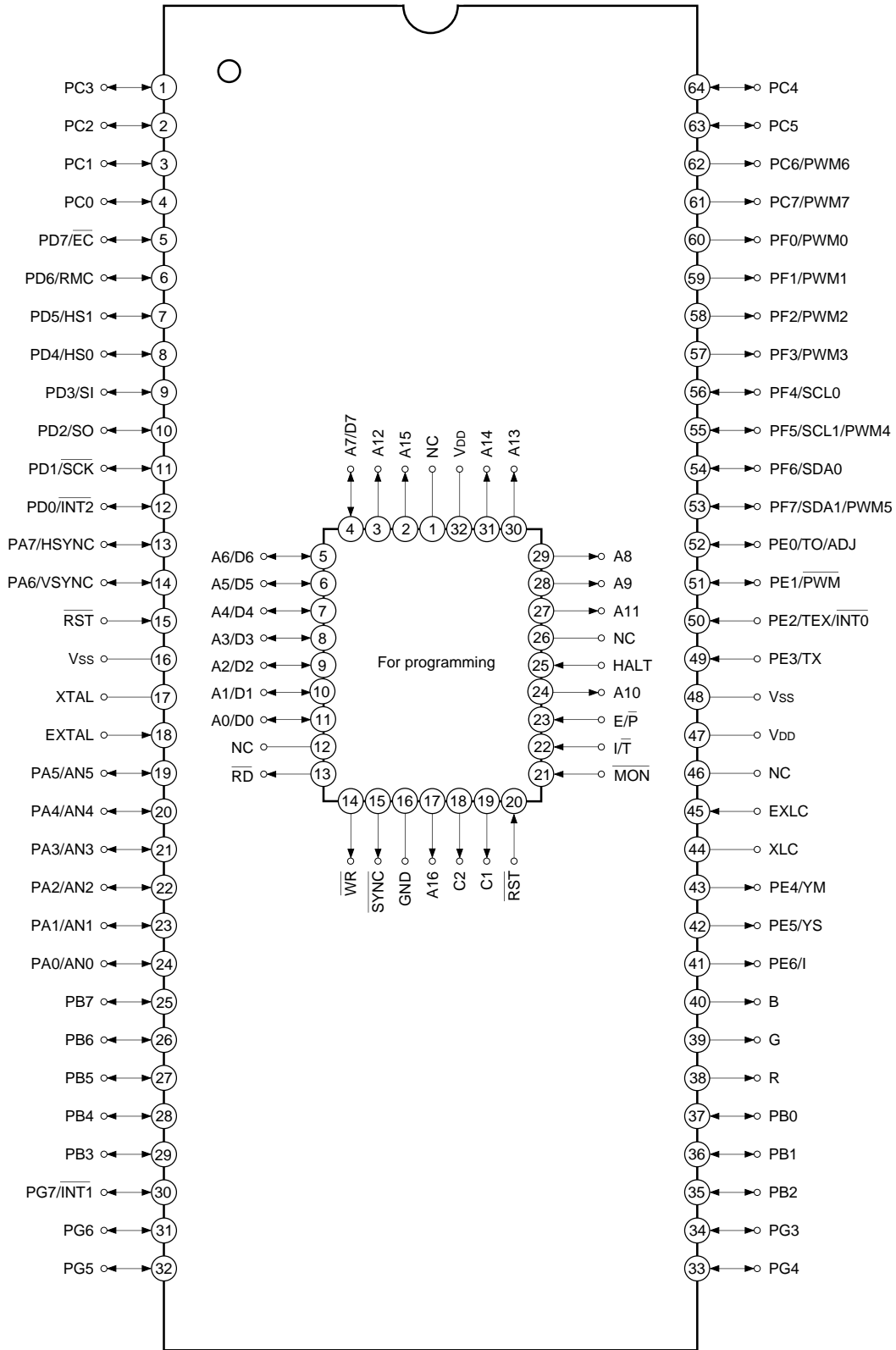2. Vss (Pins 10 and 42) are both connected to GND.

CXP750000

Pin Assignment in Piggyback Mode (Top View)

Left pins		Right pins
PC3 — 1		64 — PC4
PC2 — 2		63 — PC5
PC1 — 3		62 — PC6/PWM6
PC0 — 4		61 — PC7/PWM7
PD7/$\overline{EC}$ — 5		60 — PF0/PWM0
PD6/RMC — 6		59 — PF1/PWM1
PD5/HS1 — 7		58 — PF2/PWM2
PD4/HS0 — 8		57 — PF3/PWM3
PD3/SI — 9		56 — PF4/SCL0
PD2/SO — 10		55 — PF5/SCL1/PWM4
PD1/$\overline{SCK}$ — 11		54 — PF6/SDA0
PD0/$\overline{INT2}$ — 12		53 — PF7/SDA1/PWM5
PA7/HSYNC — 13		52 — PE0/TO/ADJ
PA6/VSYNC — 14		51 — PE1/$\overline{PWM}$
$\overline{RST}$ — 15		50 — PE2/TEX/$\overline{INT0}$
Vss — 16		49 — PE3/TX
XTAL — 17		48 — Vss
EXTAL — 18		47 — VDD
PA5/AN5 — 19		46 — NC
PA4/AN4 — 20		45 — EXLC
PA3/AN3 — 21		44 — XLC
PA2/AN2 — 22		43 — PE4/YM
PA1/AN1 — 23		42 — PE5/YS
PA0/AN0 — 24		41 — PE6/I
PB7 — 25		40 — B
PB6 — 26		39 — G
PB5 — 27		38 — R
PB4 — 28		37 — PB0
PB3 — 29		36 — PB1
PG7/$\overline{INT1}$ — 30		35 — PB2
PG6 — 31		34 — PG3
PG5 — 32		33 — PG4

For programming (inner DIP):

Top pins: 4 — A7, 3 — A12, 2 — A15, 1 — NC, 32 — VDD, 31 — A14, 30 — A13

Left pins:
- A6 — 5
- A5 — 6
- A4 — 7
- A3 — 8
- A2 — 9
- A1 — 10
- A0 — 11
- NC — 12
- D0 — 13

Right pins:
- 29 — A8
- 28 — A9
- 27 — A11
- 26 — NC
- 25 — $\overline{OE}$
- 24 — A10
- 23 — $\overline{CE}$
- 22 — D7
- 21 — D6

Bottom pins: 14 — D1, 15 — D2, 16 — GND, 17 — A16, 18 — D3, 19 — D4, 20 — D5

Note) 1. NC (Pin 46) is left open.

2. Vss (Pins 16 and 48) are both connected to GND.

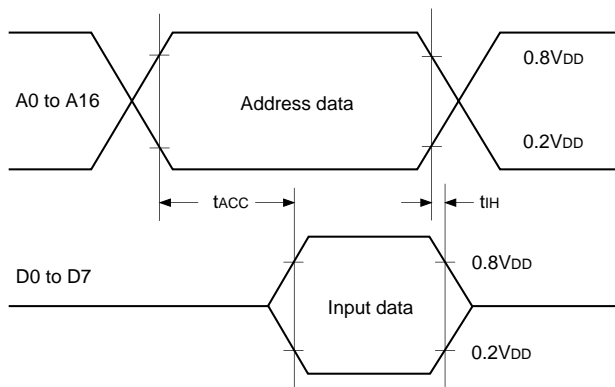## CXP750000

Pin Assignment in Evaluator Mode (Top View)

PC3 — 1	64 — PC4
PC2 — 2	63 — PC5
PC1 — 3	62 — PC6/PWM6
PC0 — 4	61 — PC7/PWM7
PD7/$\overline{EC}$ — 5	60 — PF0/PWM0
PD6/RMC — 6	59 — PF1/PWM1
PD5/HS1 — 7	58 — PF2/PWM2
PD4/HS0 — 8	57 — PF3/PWM3
PD3/SI — 9	56 — PF4/SCL0
PD2/SO — 10	55 — PF5/SCL1/PWM4
PD1/$\overline{SCK}$ — 11	54 — PF6/SDA0
PD0/$\overline{INT2}$ — 12	53 — PF7/SDA1/PWM5
PA7/HSYNC — 13	52 — PE0/TO/ADJ
PA6/VSYNC — 14	51 — PE1/$\overline{PWM}$
$\overline{RST}$ — 15	50 — PE2/TEX/$\overline{INT0}$
Vss — 16	49 — PE3/TX
XTAL — 17	48 — Vss
EXTAL — 18	47 — VDD
PA5/AN5 — 19	46 — NC
PA4/AN4 — 20	45 — EXLC
PA3/AN3 — 21	44 — XLC
PA2/AN2 — 22	43 — PE4/YM
PA1/AN1 — 23	42 — PE5/YS
PA0/AN0 — 24	41 — PE6/I
PB7 — 25	40 — B
PB6 — 26	39 — G
PB5 — 27	38 — R
PB4 — 28	37 — PB0
PB3 — 29	36 — PB1
PG7/$\overline{INT1}$ — 30	35 — PB2
PG6 — 31	34 — PG3
PG5 — 32	33 — PG4

For programming

Top pins: 4 A7/D7, 3 A12, 2 A15, 1 NC, 32 VDD, 31 A14, 30 A13

Left pins:
- A6/D6 — 5
- A5/D5 — 6
- A4/D4 — 7
- A3/D3 — 8
- A2/D2 — 9
- A1/D1 — 10
- A0/D0 — 11
- NC — 12
- $\overline{RD}$ — 13

Right pins:
- 29 — A8
- 28 — A9
- 27 — A11
- 26 — NC
- 25 — HALT
- 24 — A10
- 23 — E/$\overline{P}$
- 22 — I/$\overline{T}$
- 21 — $\overline{MON}$

Bottom pins: 14 $\overline{WR}$, 15 $\overline{SYNC}$, 16 GND, 17 A16, 18 C2, 19 C1, 20 $\overline{RST}$

Note) 1. NC (Pin 46) is left open.

2. Vss (Pins 16 and 48) are both connected to GND.

EPROM Read Timing

(Ta = −20 to +75°C, V_{DD} = 4.5 to 5.5V, Vss = 0V)

Item	Symbol	Pins	Min.	Max.	Unit
Address → data input delay time	t_{ACC}	A0 to A16 D0 to D7		75	ns
Address → data hold time	t_{IH}	A0 to A16 D0 to D7	0		ns

Product List

Optional item	Products						
	Mask ROM					Piggy/evaluation chip	
	CXP750064	CXP750072	CXP750080	CXP750096	CXP750010	CXP750000-U01Q	CXP750000-U01S
Package	64-pin plastic SDIP/QFP					64-pin ceramic PQFP	64-pin ceramic PSDIP
ROM capacity	64K bytes	72K bytes	80K bytes	96K bytes	120K bytes	EPROM 120K bytes	
Reset pin pull-up resistor	Existent/Non-existent					Existent	
Font data	User data					EPROM 57K bytes	

CXP750000

Piggyback mode and evaluator mode can be switched as shown below.

Piggyback mode

Evaluator mode

LCC type EPROM

CXP750000

CPU probe

Pin 1 marking

EPROM Pin 1 marking

Pin 1 index

Note)

Pin 1 index

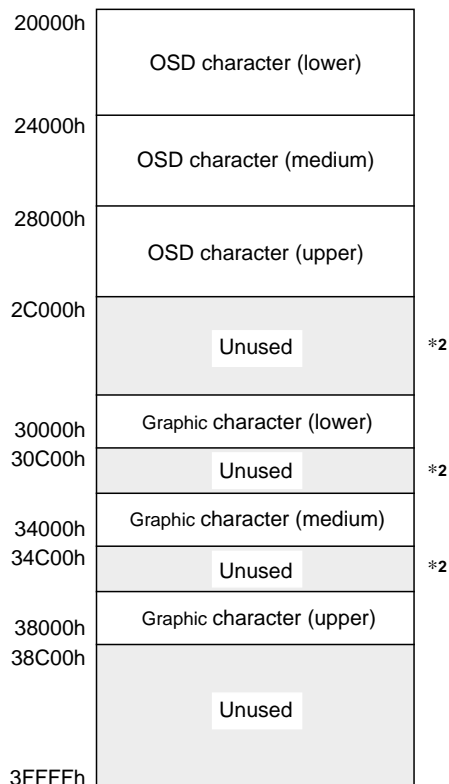**Note)** Evaluation cap should be connected to the CPU probe.
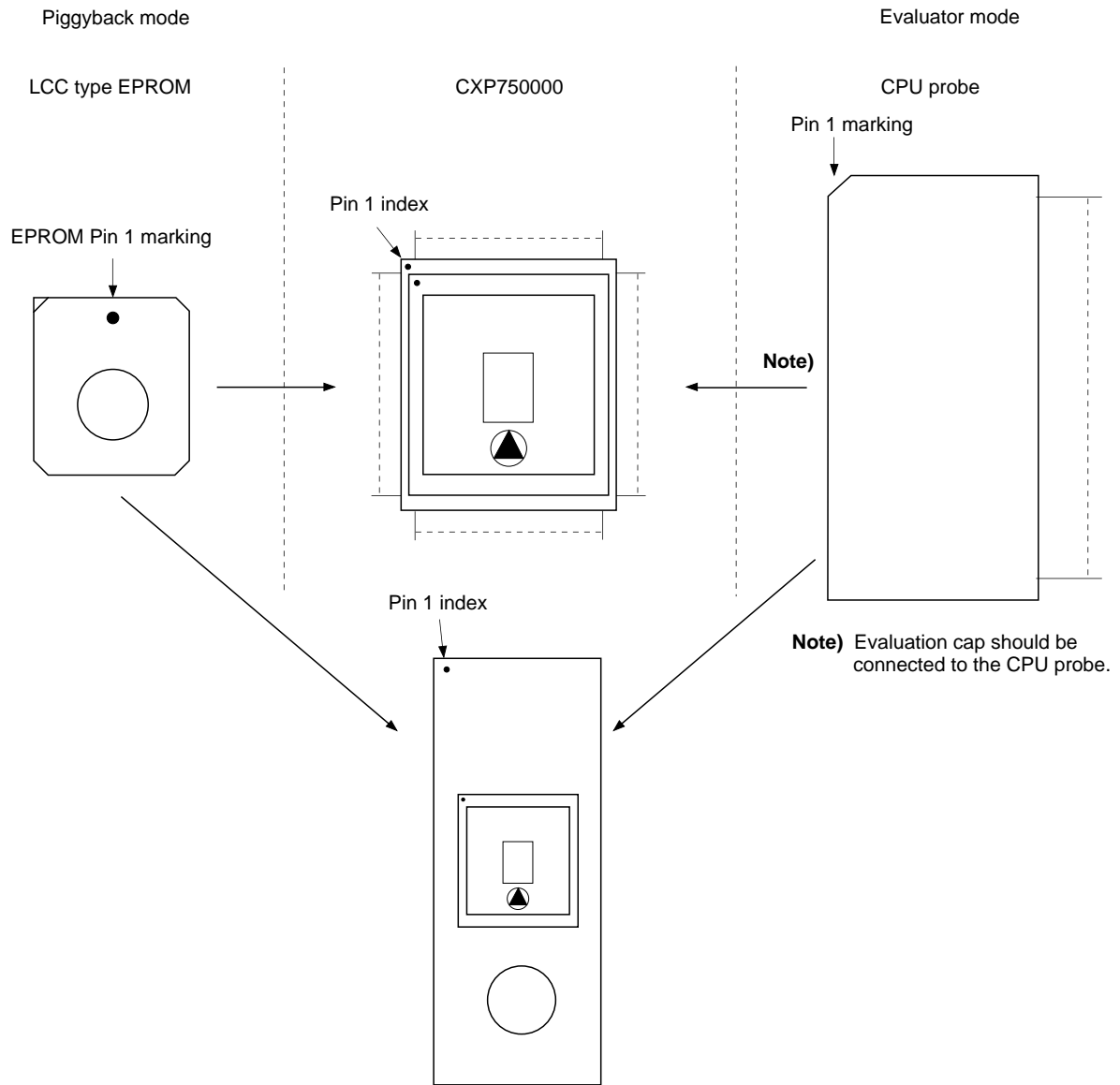
Piggy/Evaluation Chip Corresponds to Custom Font

The CXP750000 is a piggy/evaluation chip which corresponds to custom font. This incorporates EPROM of OSD font data block. This IC is shipped in blank status, and write to EPROM using exclusive write adaptor. Use exclusive font editor (SFE700II) as for generating font data.

| Write mode	Intel method
Write voltage	12.75V
Write pulse width	100µs
Write ROM type	27C020
Starting address for write	20000h
Ending address for write	38BFFh
Write adaptor[1]	SDIP: SEK7500P10-64S (Upper board) QFP: SEK750000-64Q (Upper board) Lower board: SEK-32DP-DWN2

[1] SUNHAYATO Corp. made

OSD Font Data Block Memory Map

```
20000h ┌─────────────────────┐
       │  OSD character (lower)  │
24000h ├─────────────────────┤
       │  OSD character (medium) │
28000h ├─────────────────────┤
       │  OSD character (upper)  │
2C000h ├─────────────────────┤
       │       Unused         │  *2
30000h ├─────────────────────┤
       │ Graphic character (lower)│
30C00h ├─────────────────────┤
       │       Unused         │  *2
34000h ├─────────────────────┤
       │Graphic character (medium)│
34C00h ├─────────────────────┤
       │       Unused         │  *2
38000h ├─────────────────────┤
       │ Graphic character (upper)│
38C00h ├─────────────────────┤
       │       Unused         │
3FFFFh └─────────────────────┘
```

[2] Fill up ROM writer memory with FFh.

Package Outline   Unit: mm

64PIN PQFP (CERAMIC)
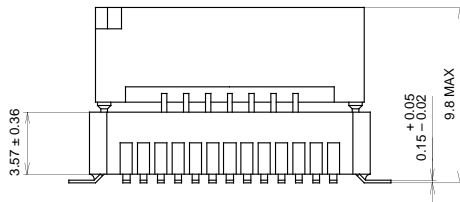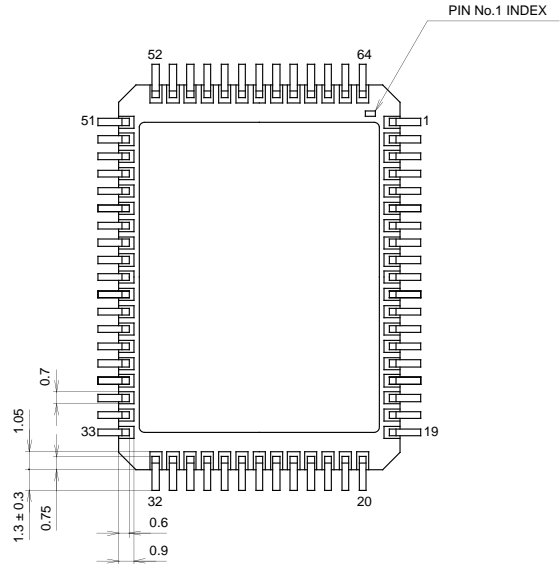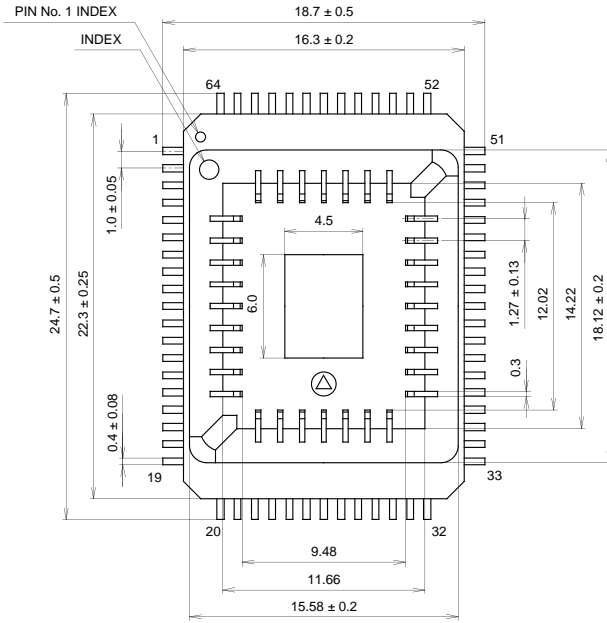
PACKAGE STRUCTURE

SONY CODE	PQFP-64C-L02
EIAJ CODE	AQFP064-C-0000-B
JEDEC CODE	————

PACKAGE MATERIAL	CERAMIC
LEAD TREATMENT	GOLD PLATING
LEAD MATERIAL	42 ALLOY
PACKAGE WEIGHT	5.2g

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Package Outline   Unit: mm

64PIN PSDIP(CERAMIC)

58.90 ± 0.55
18.12 ± 0.2   20.0 ± 0.2
64   33
15.85 ± 0.2
17.5 ± 0.17
18.75 ± 0.25
1
PIN 1 INDEX   1.27 ± 0.13   32

$0.25 ^{+\,0.05}_{-\,0.02}$
19.05 ± 0.25

11.24 MAX
0.46 ± 0.08   1.778 ± 0.1
0.9
1.27 ± 0.25
3.43 ± 0.38

SONY CODE	PSDIP-64C-03
EIAJ CODE	ADIP064-C-0750
JEDEC CODE	————

PACKAGE STRUCTURE

PACKAGE MATERIAL	CERAMIC
LEAD TREATMENT	GOLD PLATING
LEAD MATERIAL	42 ALLOY
PACKAGE MASS	19.2g