

The S-7292AF is a CMOS 4-bit microcomputer for telephone sets, which integrates ROM, RAM, timers, a serial I/O, I/O ports and a dialer circuit on one chip. It features low voltage operation and low current consumption. At power failure, it is powered solely by telephone line input. It is usable for wireless telephone set and multi-function telephone set.

## ■ Features

### *Characteristics*

- Power supply voltage: 1.7 to 5.5 V (PULSE mode, a crystal used)  
2.0 to 5.5 V (DTMF mode)
- Current consumption: Running: 0.20 mA typ. in PULSE mode, 2.4V operation  
0.35 mA typ. in DTMF mode, 2.4V operation  
Standby: 2.5  $\mu$ A max., 2.4V operation
- Instruction execution time : 17.9  $\mu$ s (operating frequency : 224kHz)

### *Hardware functions*

- ROM : 3K  $\times$  16 bits
- RAM : 768  $\times$  4 bits
- I/O line : 33 [10 inputs, 12 outputs, 11 I/O (including key interface)]
- Serial I/O : 1 ch (8-bit clock synchronization)
- Timer : Timer 1 (8-bit general-purpose timer with reload function)  
Timer 2 (8-bit dial pulse timer)  
Interval timer (selectable from 150 / 300Hz)
- Watchdog timer
- 4 pins for telephone use : HS ( $\overline{\text{HS}}$ ),  $\overline{\text{BEEP}}$ ,  $\overline{\text{KT}}$ , TONE-OUT
- Interrupt function: Internal (three), external (four)
- Oscillation circuit : Crystal or ceramic oscillator (3.579545MHz)

### *Software*

- Instruction: 35 basic instruction sets (166 when addressing modes are included)
- 16-level subroutine nesting

### *Package*

- 44-pin QFP

### *OTP version*

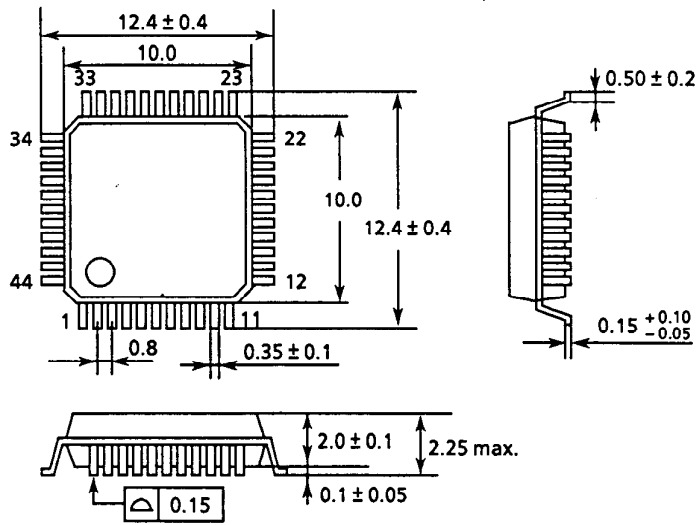
- S-72P92AF (its electrical characteristics differ from those of S-7292AF)

## ■ Applications

- Standard telephone set, wireless telephone set, answering machine
- Personal facsimile

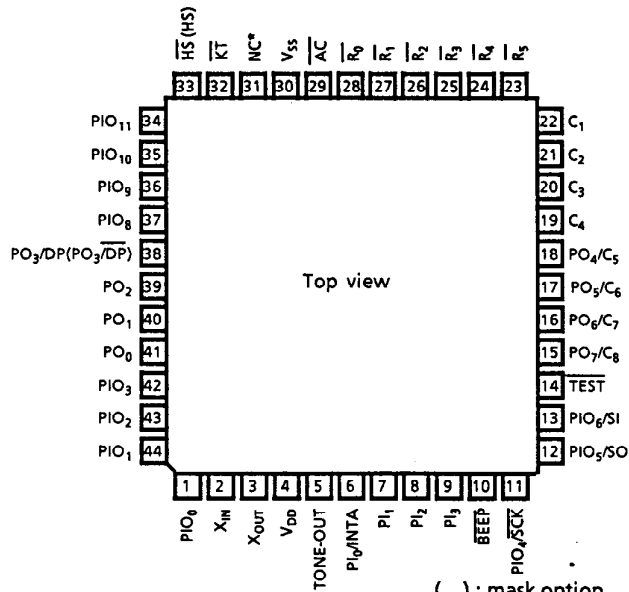
# 1-chip MICROCOMPUTER FOR TELEPHONE SET S-7292AF

## ■ Dimensions (44-pin QFP)



Unit : mm

## ■ Pin Assignments



( ) : mask option

\*NC is V<sub>PP</sub> for S-72P92AF

■ Terminal Functions

Pin name	I/O	Functions
V <sub>SS</sub>	—	COMMON potential terminal
V <sub>DD</sub>	—	Positive power supply
$\overline{\text{TEST}}$	Input	Test, usually connected to V <sub>DD</sub> (built-in pull-up resistor)
$\overline{\text{AC}}$	Input	Reset (built-in pull-up resistor, schmitt trigger input)
X <sub>IN</sub> X <sub>OUT</sub>	Input Output	Crystal/ceramic oscillator connection terminal for system clock oscillation or DTMF signal generation
$\overline{\text{HS}}$	Input	Hook switch input
$\overline{\text{BEEP}}$	Output	Buzzer output
TONE-OUT	Output	DTMF signal output (Pch open-drain output)
$\overline{\text{KT}}$	Output	Key-in-tone output
$\overline{\text{R}}_0$ to $\overline{\text{R}}_5$	Input	Row signal input (built-in pull-up resistor)
C <sub>1</sub> to C <sub>4</sub>	Output	Column signal output (see the description of PO <sub>4</sub> to PO <sub>7</sub> for C <sub>5</sub> to C <sub>8</sub> )
PI <sub>0</sub> to PI <sub>3</sub>	Input	4-bit input port (Port 0). PI <sub>0</sub> is shared with the following function: PI <sub>0</sub> /INTA : external interrupt (schmitt trigger input)
PO <sub>0</sub> to PO <sub>3</sub>	Output	4-bit output port (Port 1). PO <sub>3</sub> is shared with the following function: PO <sub>3</sub> /DP(PO <sub>3</sub> / $\overline{\text{DP}}$ ) : dial pulse output
PO <sub>4</sub> to PO <sub>7</sub>	Output	4-bit output port (Port 5). PO <sub>4</sub> to PO <sub>7</sub> are shared with Column signal outputs as follows: PO <sub>4</sub> /C <sub>5</sub> , PO <sub>5</sub> /C <sub>6</sub> , PO <sub>6</sub> /C <sub>7</sub> , PO <sub>7</sub> /C <sub>8</sub>
PIO <sub>0</sub> to PIO <sub>3</sub>	I/O	4-bit input/output port (Port 3), selectable in bit unit.
PIO <sub>4</sub> to PIO <sub>6</sub>	I/O	3-bit input/output port (Port 4), selectable in bit unit. PIO <sub>4</sub> to PIO <sub>6</sub> are shared with Column signal outputs as follows (PIO <sub>4</sub> and PIO <sub>6</sub> are schmitt trigger input): PIO <sub>4</sub> / $\overline{\text{SCK}}$ : serial clock input/output PIO <sub>5</sub> /SO : serial data output PIO <sub>6</sub> /SI : serial data input
PIO <sub>8</sub> to PIO <sub>11</sub>	I/O	4-bit input/output port (Port 2), selectable in bit unit.
NC	—	V <sub>pp</sub> terminal for S-72P92AF

■ Block Diagram

The S-7292AF blocks connect with a 4-bit data bus(DB), 4-bit address bus(AB), 4-bit RAM address bus(RA) and 12-bit operation bus(OB).

