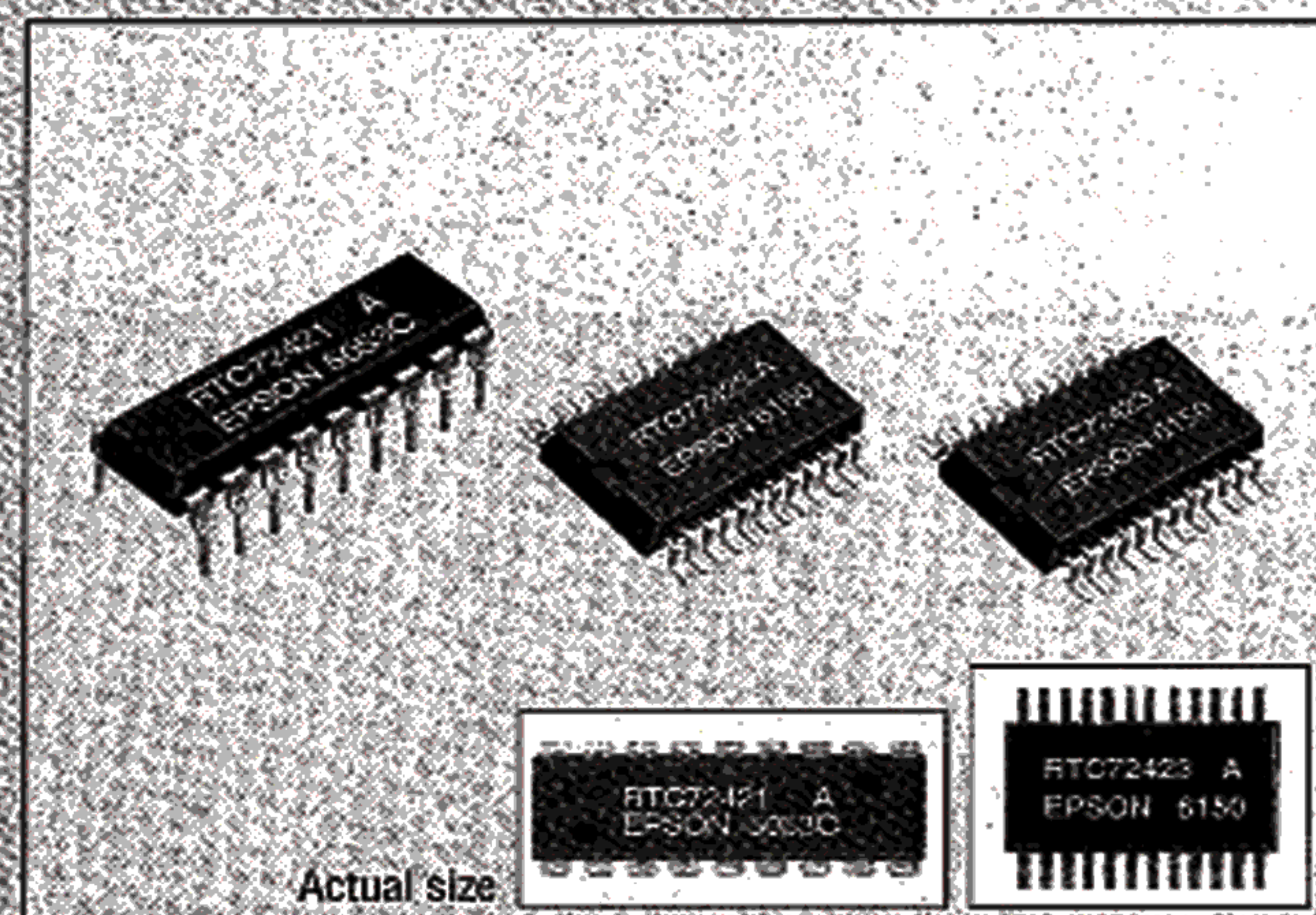


## 4-bit REAL TIME CLOCK MODULE

## RTC-72421/72423

- Built-in crystal unit allows adjustment-free efficient operation.
- ALE input terminal available for 8048, 8051, and 8085 series.
- 12/24H clock switchover function and automatic leap year setting.
- Interrupt masking.
- 30 second adjustment function.
- Low current consumption and features a backup function.



## ■ Specifications (characteristics)

## ■ Absolute Max. rating

| Item                     | Symbol    | Condition              | Specifications                                                                                          | Unit             |
|--------------------------|-----------|------------------------|---------------------------------------------------------------------------------------------------------|------------------|
| Power source voltage     | $V_{DD}$  | $T_a=25^\circ\text{C}$ | -0.3 to 7.0                                                                                             | V                |
| Input and output voltage | $V_{IO}$  | $T_a=25^\circ\text{C}$ | GND -0.3 to $V_{CC}+0.3$                                                                                | V                |
| Storage temperature      | $T_{STB}$ | RTC-72421              | -55 to +85                                                                                              | $^\circ\text{C}$ |
|                          |           | RTC-72423              | -55 to +125                                                                                             |                  |
| Soldering condition      | $T_{SOL}$ | RTC-72421              | Under $260^\circ\text{C}$ within 10 sec. (lead part) (package should be less than $150^\circ\text{C}$ ) |                  |
|                          |           | RTC-72423              | Twice at under $260^\circ\text{C}$ within 10 sec. or under $230^\circ\text{C}$ within 3 min.            |                  |

## ■ Operating range

| Item                     | Symbol    | Condition                        | Specifications | Unit             |
|--------------------------|-----------|----------------------------------|----------------|------------------|
| Operating voltage        | $V_{DD}$  |                                  | 4.5 to 5.5     | V                |
| Operating temperature    | $T_{OPR}$ | RTC-72421                        | -10 to 70      | $^\circ\text{C}$ |
|                          |           | RTC-72423                        | -40 to 85      |                  |
| Data holding voltage     | $V_{DH}$  |                                  | 2.0 to 5.5     | V                |
| CSI data holding time    | $t_{OHR}$ | Refer to the data holding timing | 2.0 min.       | $\mu\text{s}$    |
| Operation restoring time | $t_R$     |                                  |                |                  |

## ■ Frequency characteristics and current consumption characteristics

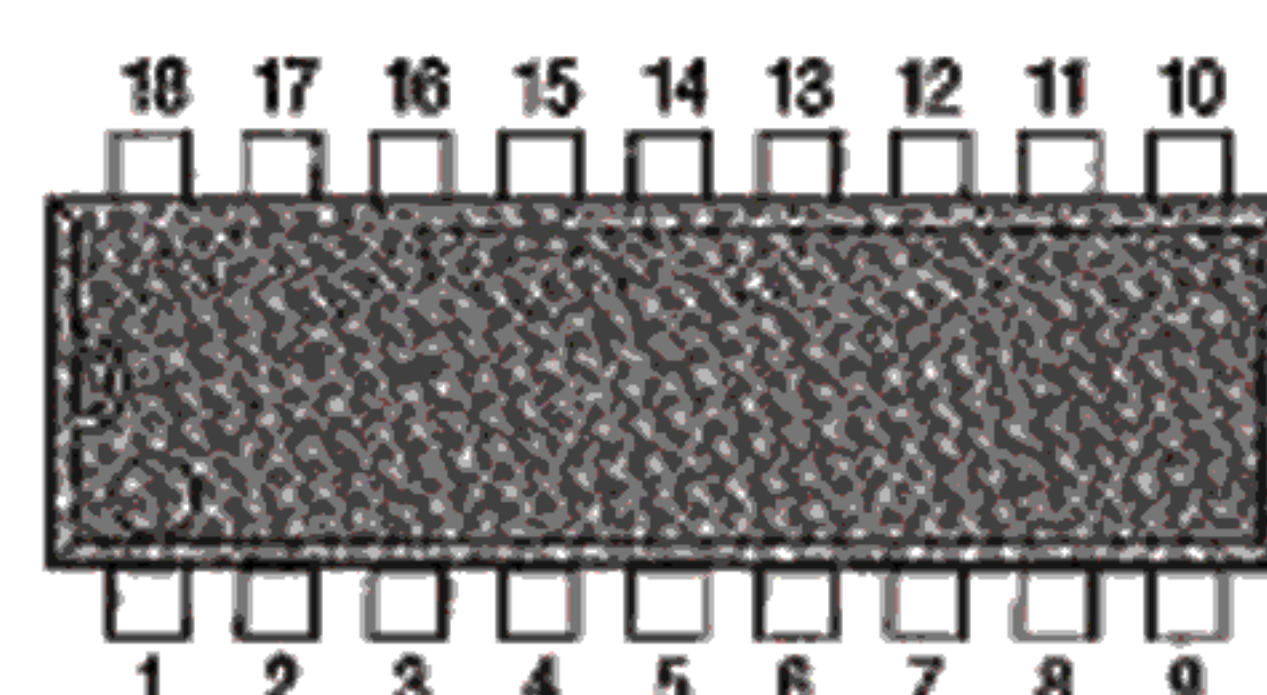
| Item                                  | Symbol         | Condition                                                                                                            | Specifications     | Unit          |               |
|---------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------|--------------------|---------------|---------------|
| Frequency tolerance                   | $\Delta f/f_0$ | $T_a=25^{\circ}\text{C}$<br>$V_{CC}=5\text{V}$                                                                       | 72421 A            | $\pm 10$      | ppm           |
|                                       |                |                                                                                                                      | 72421 B            | $\pm 50$      |               |
|                                       |                |                                                                                                                      | 72423 A            | $\pm 20$      |               |
|                                       |                |                                                                                                                      | 72423              | $\pm 50$      |               |
| Frequency temperature characteristics |                | $-10$ to $+70^{\circ}\text{C}$<br>( $25^{\circ}\text{C}$ reference temperature)                                      |                    | $+10/-120$    |               |
| Aging                                 | $f_a$          | $V_{CC}=5\text{V}$ , $T_a=25^{\circ}\text{C}$ ,<br>first year                                                        |                    | $\pm 5$ max.  | ppm/Y         |
| Shock resistance                      | S.R.           | Three drops on a<br>hard board from 75 cm<br>or 300CG $\times$ 0.3ms $\times$<br>1/2 sine wave $\times$ 3 directions |                    | $\pm 10$ max. | ppm           |
| Current consumption                   | $I_{DD1}$      | $CS_1=0\text{V}$<br>Exclude input/<br>output current                                                                 | $V_{CC}=5\text{V}$ | 10 max.       | $\mu\text{A}$ |
|                                       | $I_{DD2}$      |                                                                                                                      | $V_{CC}=2\text{V}$ | 5 max.        |               |

## ■ Electrical characteristics

| Item                   | Symbol     | Condition                   | Min.         | Typ. | Max.         | Unit          | Remarks                         |
|------------------------|------------|-----------------------------|--------------|------|--------------|---------------|---------------------------------|
| "H" input voltage (1)  | $V_{IH1}$  |                             | 2.2          |      |              | V             | All inputs other than $CS_1$    |
| "L" input voltage (1)  | $V_{IL1}$  |                             |              |      | 0.8          | V             |                                 |
| Input leak current (1) | $I_{IK1}$  | $V_I=V_{DD}/OV$             |              |      | $\pm 1$      | $\mu\text{A}$ | Input other than $D_0$ to $D_3$ |
| Input leak current (2) | $I_{IK2}$  |                             |              |      | $\pm 10$     | $\mu\text{A}$ | $D_0$ to $D_3$                  |
| "L" output voltage (1) | $V_{OL1}$  | $I_{OL}=2.5\text{mA}$       |              |      | 0.4          | V             |                                 |
| "H" output voltage (1) | $V_{OH1}$  | $I_{OH}=-400\mu\text{A}$    | 2.4          |      |              | V             |                                 |
| "L" output voltage (2) | $V_{OL2}$  | $I_{OL}=2.5\text{mA}$       |              |      | 0.4          | V             |                                 |
| Off leak current       | $I_{OFFK}$ | $V_I=V_{DD}/OV$             |              |      | 10           | $\mu\text{A}$ | STD.P                           |
| Input capacity         | $C_1$      | Input frequency 1MHz        | 10           |      |              | pF            | Input other than $D_0$ to $D_3$ |
|                        |            |                             | 20           |      |              | pF            | $D_0$ to $D_3$                  |
| "H" input voltage (2)  | $V_{IH2}$  | $V_{DD}=2$ to $5.5\text{V}$ | $4/5 V_{DD}$ |      |              | V             | $CS_1$                          |
| "L" input voltage (2)  | $V_{IL2}$  |                             |              |      | $1/5 V_{DD}$ | V             |                                 |

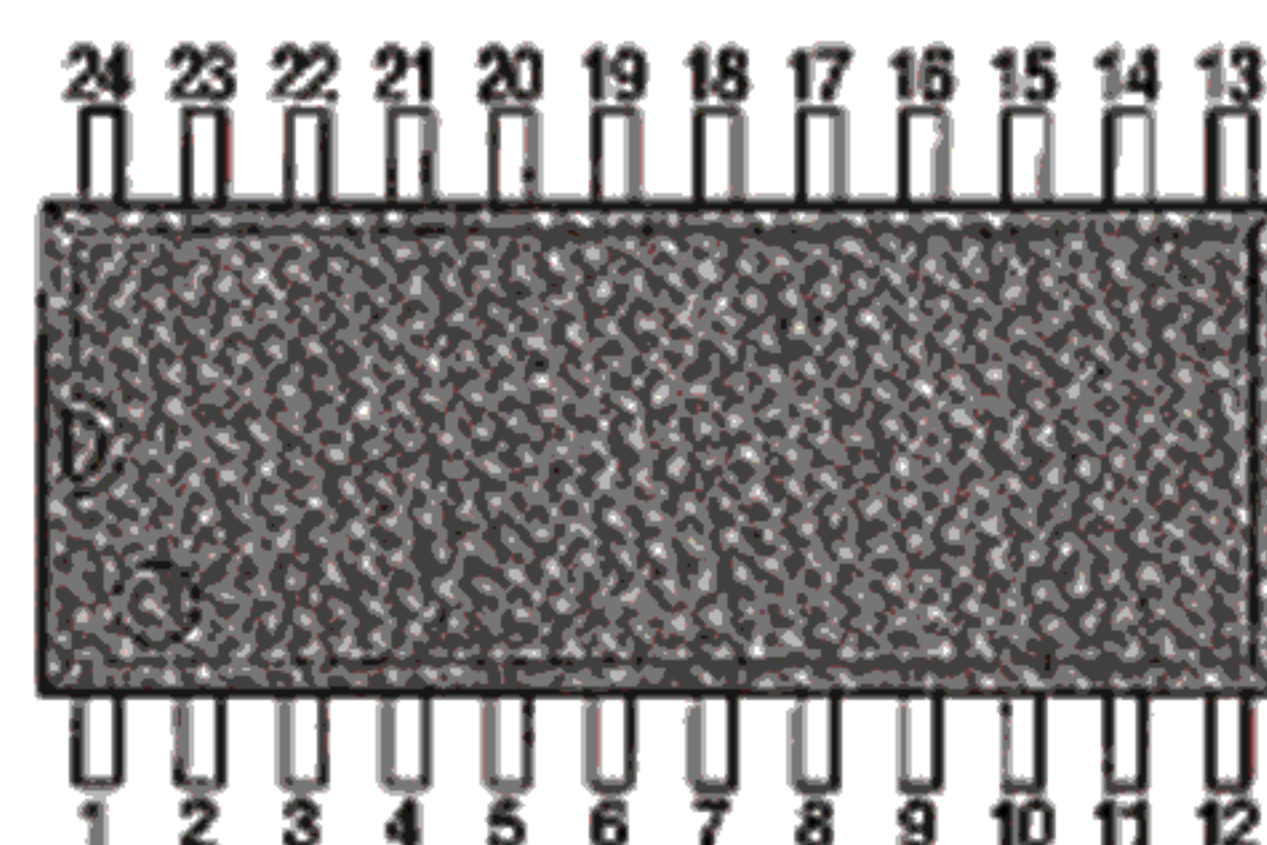
## ■ Terminal connection

## ● RTC-72421



| No. | 72421              | No. | 72423              |
|-----|--------------------|-----|--------------------|
| 1   | STD.P              | 1   | STD.P              |
| 2   | $CS_0$             | 2   | $CS_0$             |
| 3   | ALE                | 3   | NC                 |
| 4   | $A_0$              | 4   | ALE                |
| 5   | $A_1$              | 5   | $A_2$              |
| 6   | $A_2$              | 6   | NC                 |
| 7   | $A_3$              | 7   | $A_1$              |
| 8   | RD                 | 8   | NC                 |
| 9   | GND                | 9   | $A_2$              |
| 10  | WR                 | 10  | $A_3$              |
| 11  | $D_0$              | 11  | RD                 |
| 12  | $D_1$              | 12  | GND                |
| 13  | $D_2$              | 13  | WR                 |
| 14  | $D_3$              | 14  | $D_0$              |
| 15  | $CS_1$             | 15  | $D_1$              |
| 16  | (V <sub>DD</sub> ) | 16  | $D_2$              |
| 17  | (V <sub>DD</sub> ) | 17  | NC                 |
| 18  | V <sub>DD</sub>    | 18  | NC                 |
|     |                    | 19  | $D_3$              |
|     |                    | 20  | $CS_0$             |
|     |                    | 21  | NC                 |
|     |                    | 22  | (V <sub>DD</sub> ) |
|     |                    | 23  | (V <sub>DD</sub> ) |
|     |                    | 24  | V <sub>DD</sub>    |

## ● RTC-72423

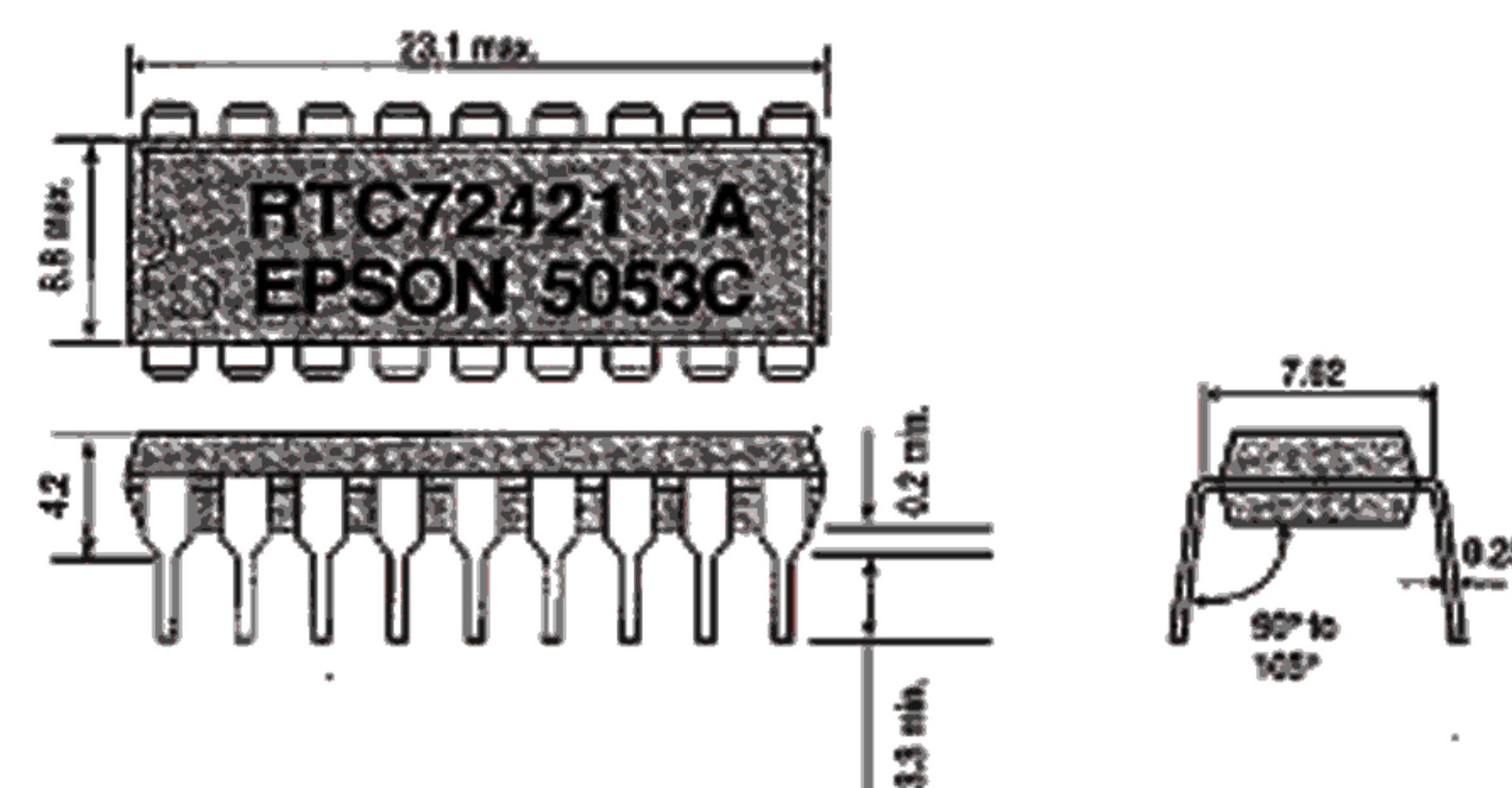


- (V<sub>DD</sub>) and V<sub>DD</sub> are to have the same level of voltage. Do not connect it to any external terminals.
- NC is not connected internally.

## ■ External dimensions

(Unit: mm)

## ● RTC-72421



## ● RTC-72423

