

**BIPOLAR STEPPING MOTOR DRIVE  
ANALOG CLOCK**

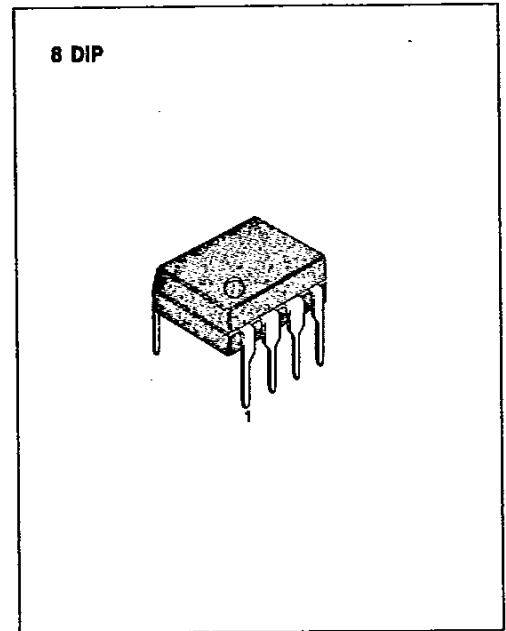
The KS5206 series with alarm function is a C-MOS integrated circuit for use in clock with bipolar stepping motor.

**FUNCTIONS**

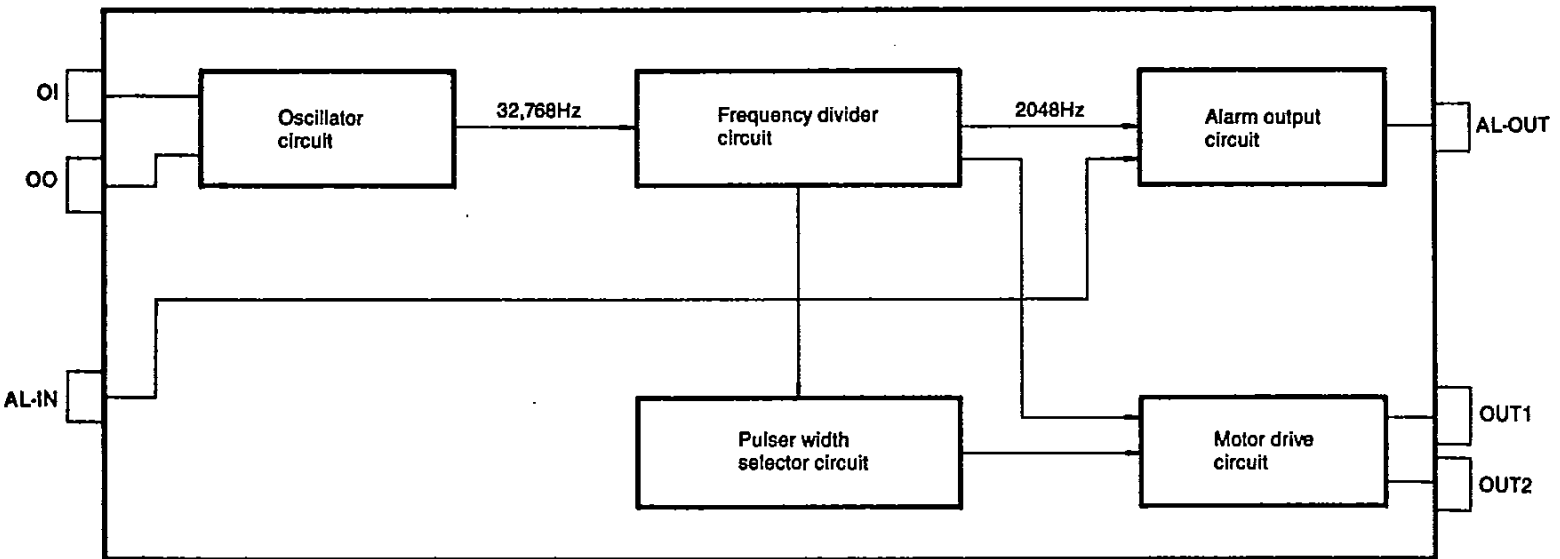
- Output pulse duration KS5206A=0.5Hz, 1 sec.  
KS5206E=0.5Hz, 46.9msec  
KS5206F=0.5Hz, 31.2msec
- Gated 2048Hz alarm output.
- Active-high, AL-IN input for enable alarm output.

**FEATURES**

- 32.768KHz crystal oscillator
- Single 1.5V battery operation
- Low power dissipation
- 8 pin dual-in-line plastic package



**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS** ( $T_a=25^\circ\text{C}$ )

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{SS}$	-2.0 ~ 0.3	V
Power Dissipation	$P_D$	300	mW
Operating Temperature	$T_{opr}$	-10 ~ +60	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ +125	$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS**

( $V_{DD}=0\text{V}$ ,  $V_{SS}=-1.5\text{V}$ ,  $T_a=25^\circ\text{C}$ ,  $F_{osc}=32.768\text{KHz}$ ; Unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Voltage	$ V_{SS} $	$R_m=\infty$ , $V_{SS}=-1.5\text{V}$	1.2	1.5	1.7	V
Supply Current	$I_{DD}$			2.0	2.5	$\mu\text{A}$
Output Drive Current	$I_{L1}$	$R_m=200\Omega$ , $V_{SS}=-1.2\text{V}$	4.0	4.5		mA
	$I_{L2}$		4.0	4.5		mA
Alarm Output Sink Current	$I_S$	$R=1\text{K}\Omega$ , $V_{SS}=-1.4\text{V}$	-0.3	-0.6		mA
AL-IN Switch Current	$I_{AL}$			55.0	70.0	$\mu\text{A}$
OSC Start Voltage	$ V_{OSCl} $	Within 5 seconds			1.45	V
OSC Stop Voltage	$ V_{OSPl} $				1.0	V

**GENERAL DESCRIPTION**

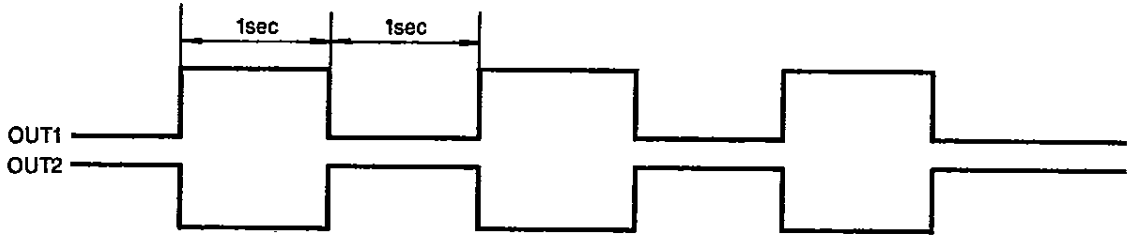
The KS5206 series is a C-MOS analog clock IC, driving a stepping motor precisely once in one second, when external 32.768KHz quartz crystal and single 1.5V battery are connected. Basically it consists of oscillator circuit, frequency divider, output pulse former, push-pull motor driver and alarm output. It provides alarm capability on and off for equal time interval of 500msec. The alarm single is made of 2048Hz, 8Hz and 1Hz.

The alarm output consists of a push-pull stage and is able to drive an external bipolar transistor. Also the KS5206 series has a AL-IN input. As long as AL-IN input is connected to  $V_{DD}$ , alarm output is generated. (Fig. 2) When you want to hear alarm sound, you have to connect Buzzer (or speaker) to the alarm output. (pin 6) The whenever AL-IN input is connected to  $V_{DD}$ , you can hear alarm sound. The two output of KS5206A has 0.5Hz, 1 sec-width pulse waves with a phase shift of 180 degrees. (Fig. 1-1) The output of KS5206E has 0.5Hz, 46.9msec-width pulse waves and KS5206F has 0.5Hz, 31.2msec-width pulse waves. (Fig. 1-2)

- Value greater than this may result in damage to the circuit

OUT 1 AND OUT 2 WAVEFORMS

1) KS5206A



2) KS5206E/F

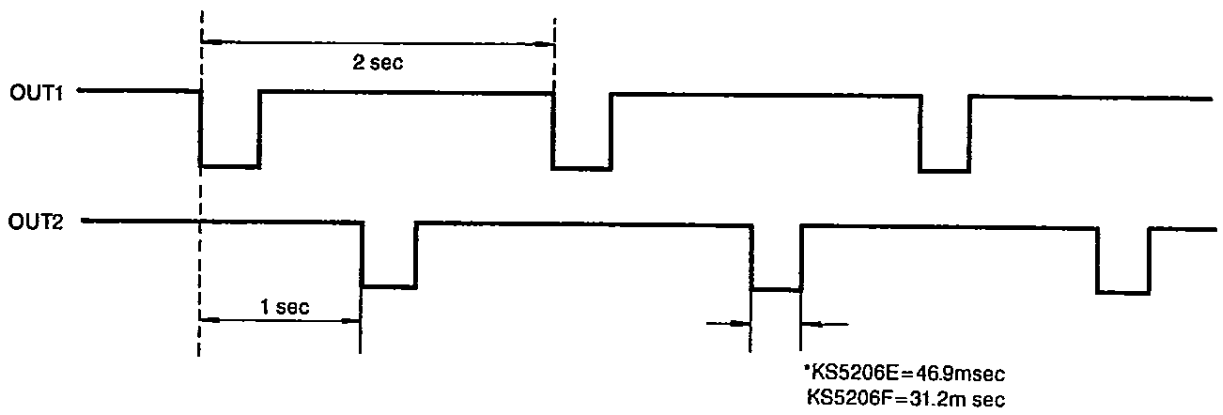


Fig. 1

ALARM OUTPUT WAVEFORM (KS5206A, E, F)

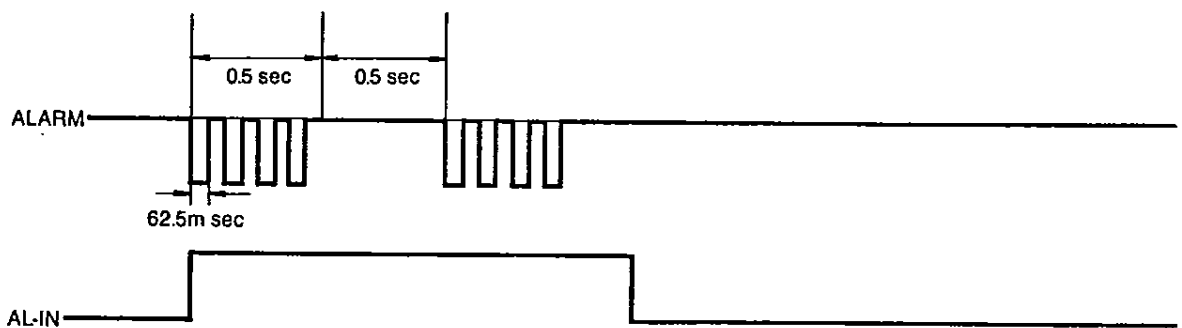
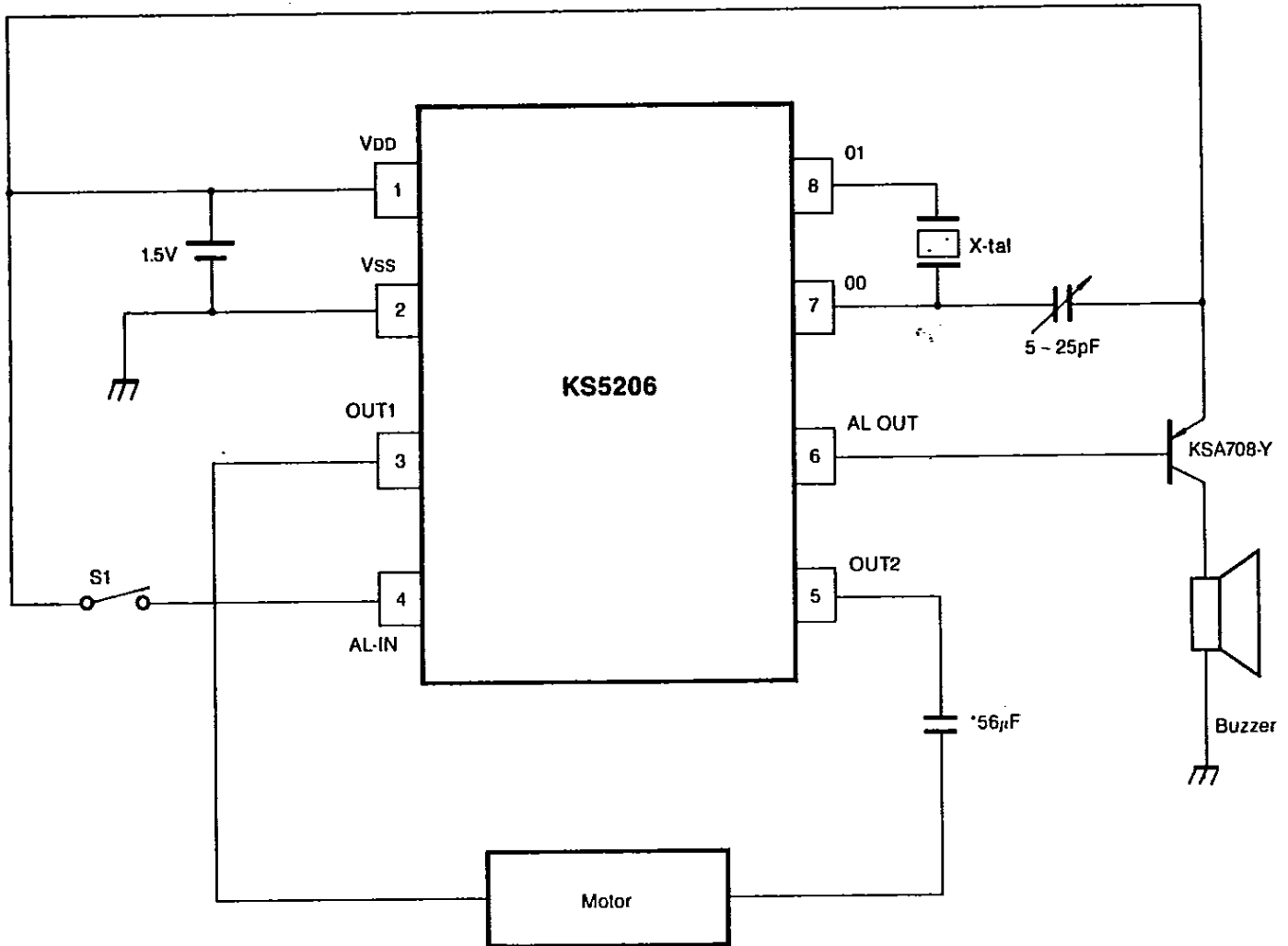


Fig. 2

APPLICATION CIRCUIT



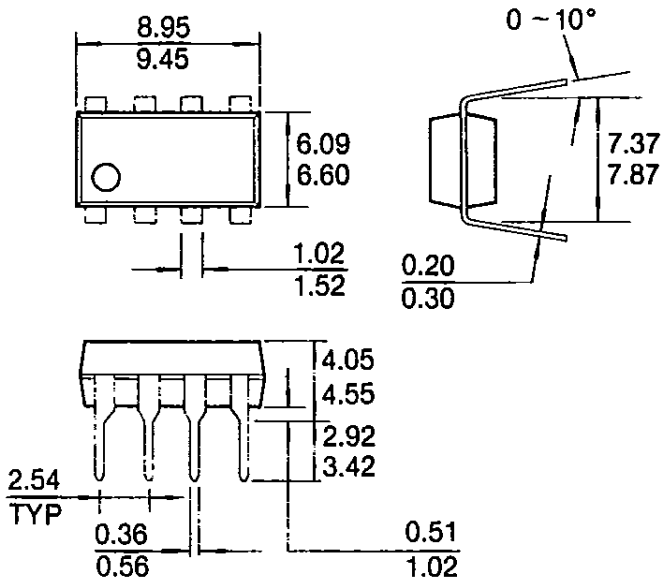
\* Quartz crystal parameters  
 $f_p = 32,768\text{Hz}$   
 $C_L = 10\text{pF}$   
 $C_1 = 4\text{pF}$   
 $C_0 = 2.5\text{pF}$   
 $R_s = 36\text{K}$   
 $Q = 35,000$

\* No NEED CAPACITOR in KS5206E, F

Fig. 3.

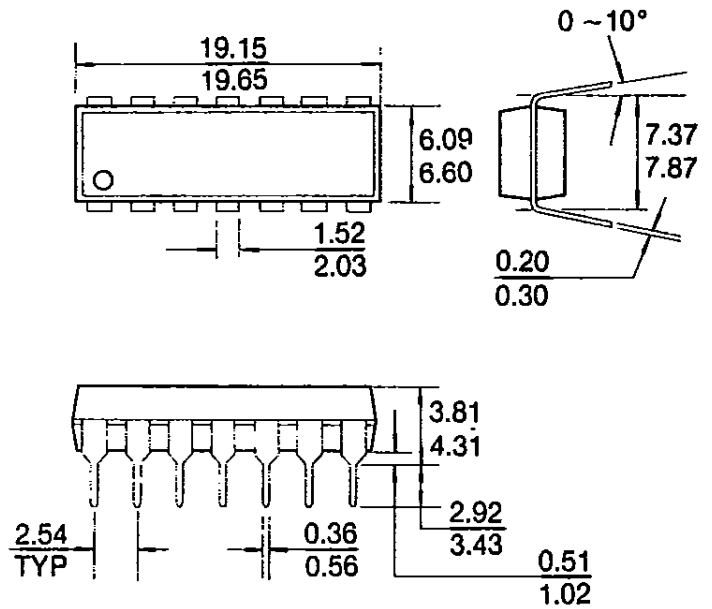
### 8 DIP

Unit: mm



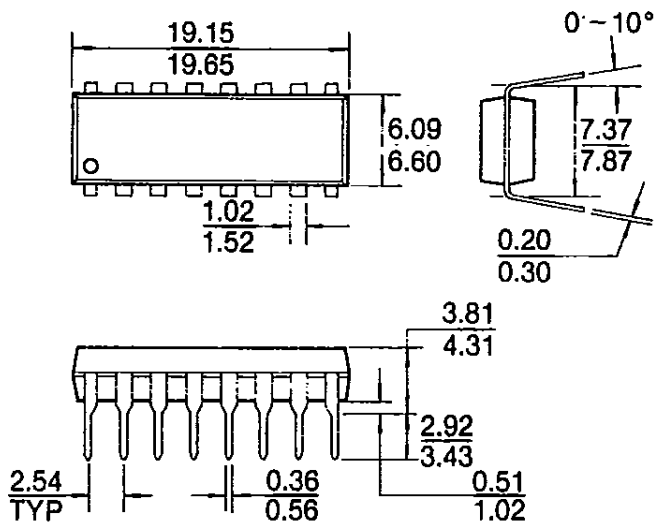
### 14 DIP

Unit: mm



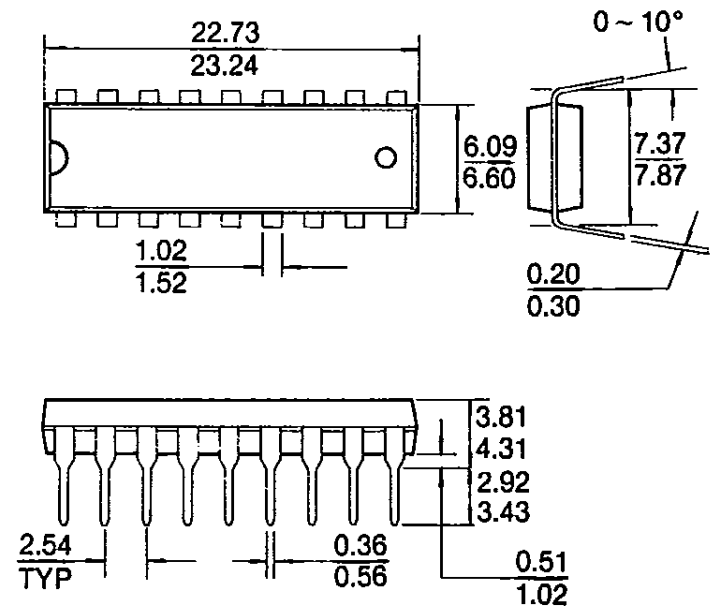
### 16 DIP

Unit: mm



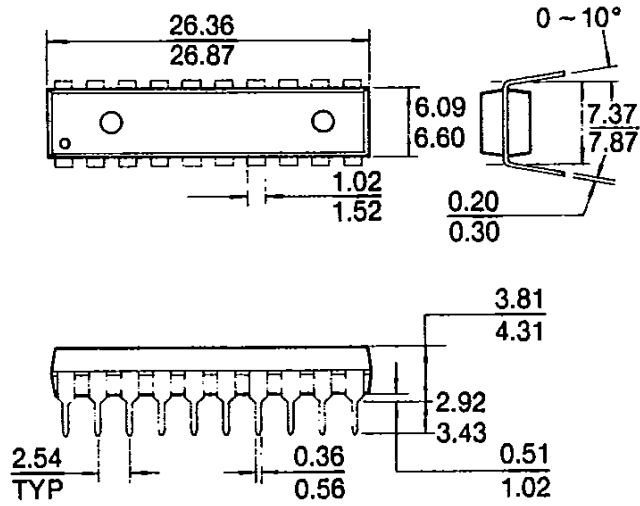
### 18 DIP

Unit: mm



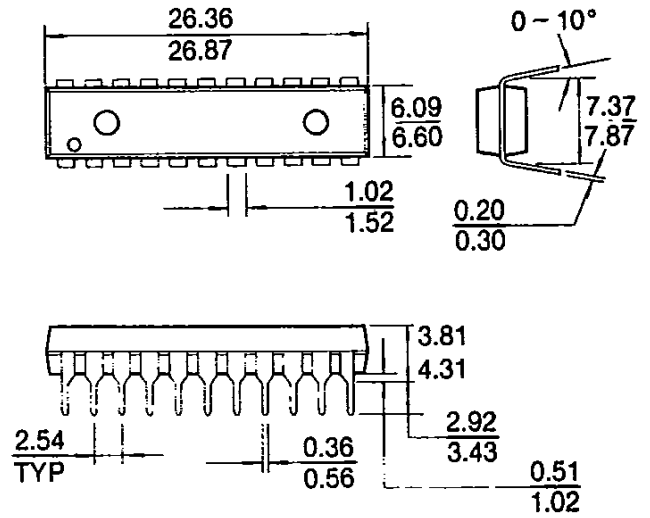
### 20 DIP

Unit: mm



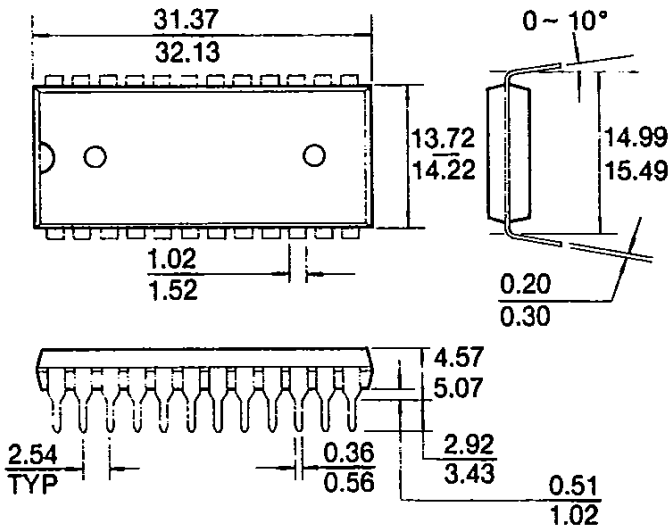
### 22 DIP

Unit: mm



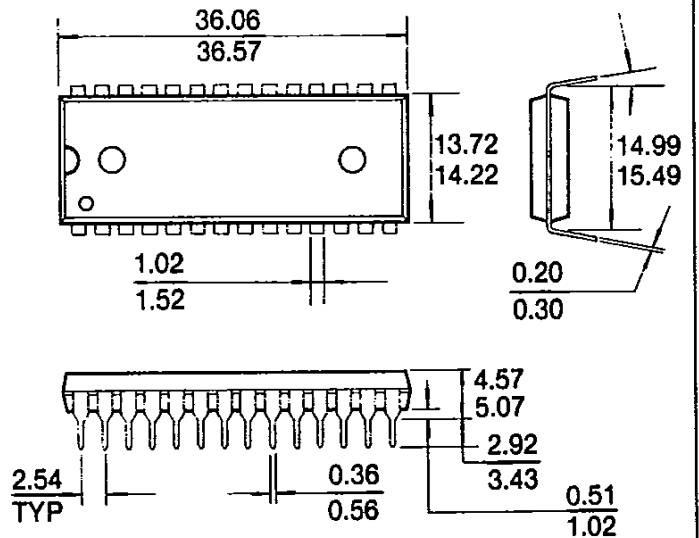
### 24 DIP

Unit: mm



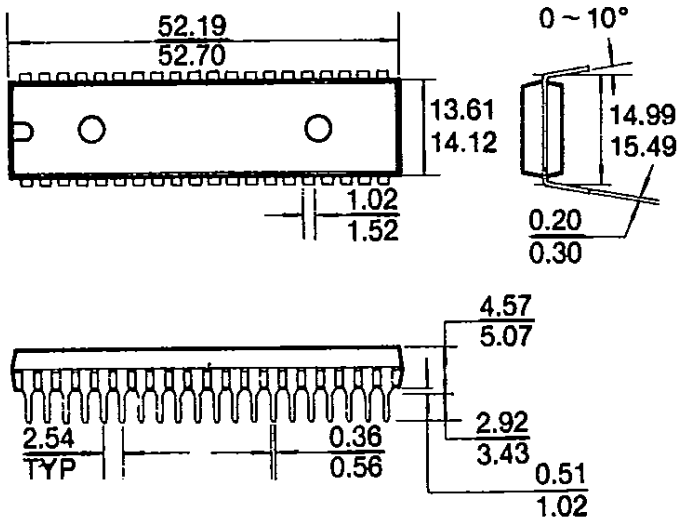
### 28 DIP

Unit: mm



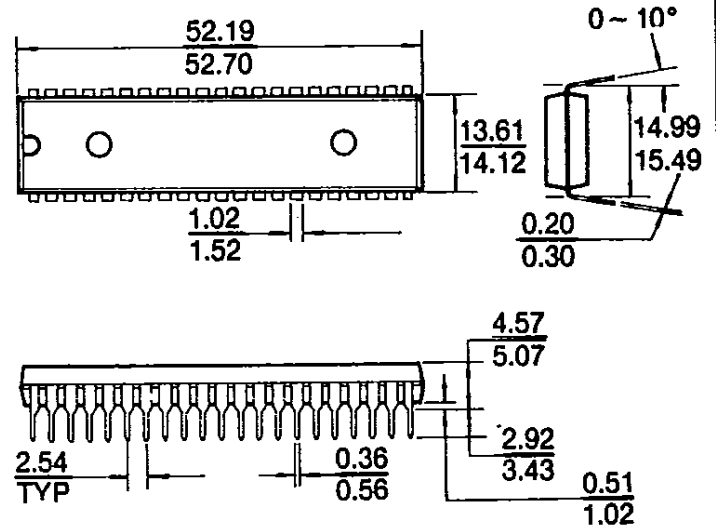
### 40 DIP

Unit: mm



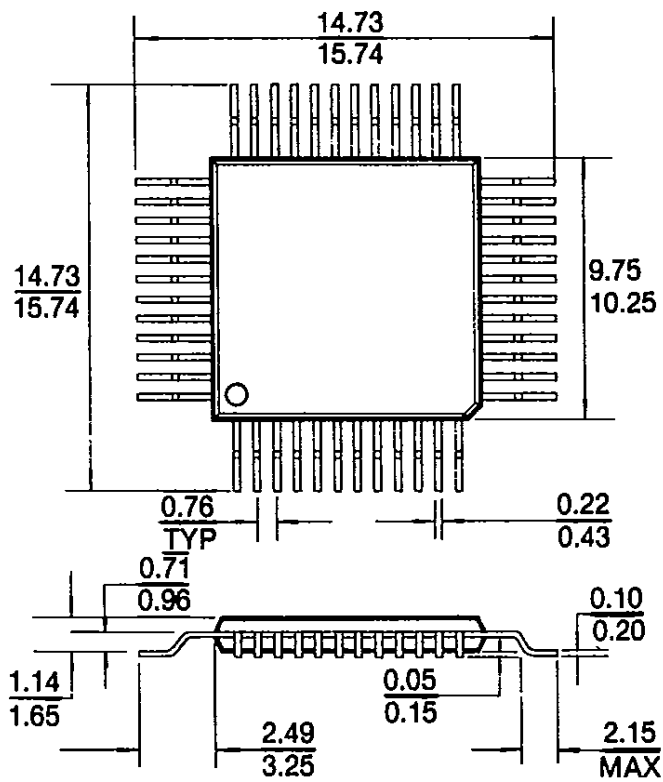
### 42 DIP

Unit: mm



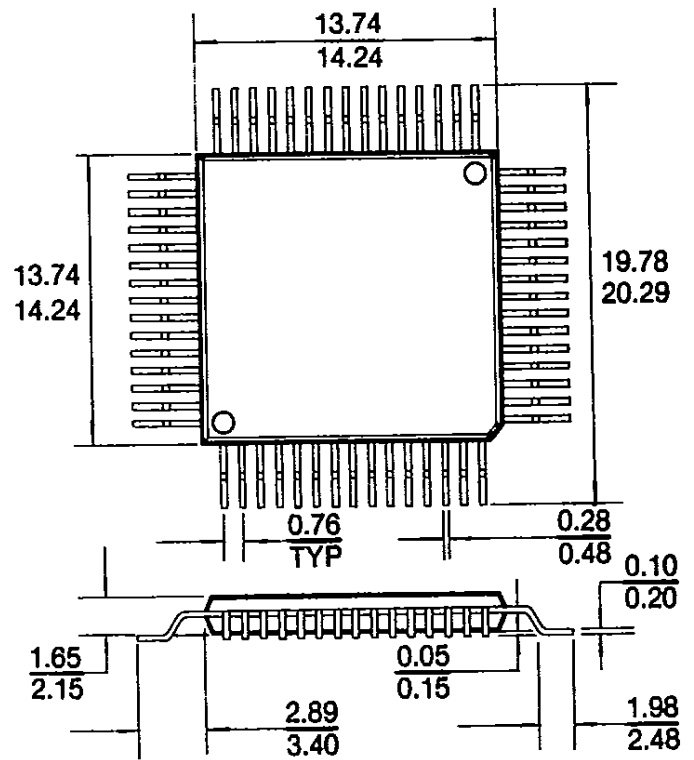
### 48 FQP

Unit: mm



### 60 FQP

Unit: mm



60 FQP

Unit: mm

