

KS5211

CMOS DIGITAL INTEGRATED CIRCUIT

**BIPOLAR STEPPING MOTOR DRIVE
ANALOG CLOCK**

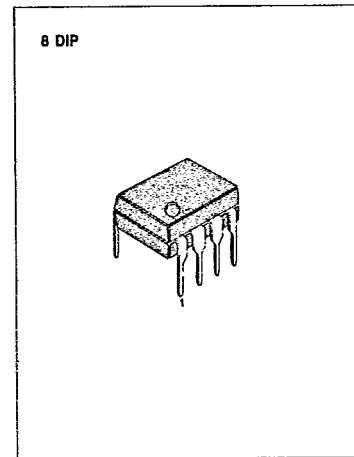
The KS5211 series with alarm function is CMOS integrated circuit for use in clock with bipolar stepping motor.

FUNCTIONS

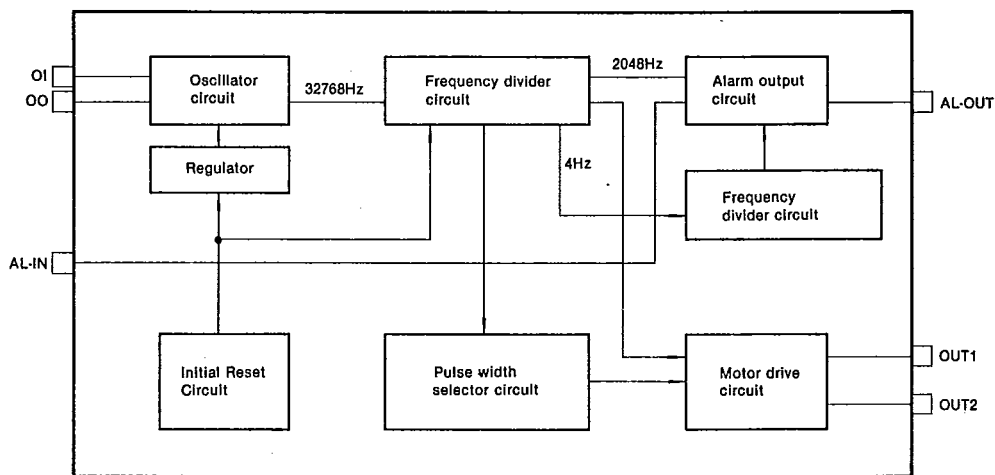
- Output pulse duration: KS5211A = 0.5Hz, 1 sec
KS5211E = 0.5Hz, 46.9msec
KS5211F = 0.5Hz, 31.2msec
- Active-low, AL-IN Input for enable alarm output

FEATURES

- 32.768KHz crystal oscillator
- Single 1.5V battery operation
- Low power dissipation
- 8 pin dual-in-line plastic package
- No trimmer capacitor



BLOCK DIAGRAM



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

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{SS}	-0.3 ~ +1.8	V
Power Dissipation	P_d	300	mW
Operating Temperature	T_{opr}	-10 ~ +60	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 ~ +125	$^\circ\text{C}$

* Value greater than above may result in damage to the circuit.

ELECTRICAL CHARACTERISTICS

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Operating Voltage	V_{DD}	$R_m = \infty, V_{DD} = 1.5\text{V}$	1.2	1.5	1.8	V
Supply Current	I_{dd}			0.7	2.0	μA
Output Drive Current	I_{L1}	$R_m = 200\Omega, V_{DD} = 1.2\text{V}$	4.0			mA
	I_{L2}		4.0			mA
Alarm Output Sink Current	I_s	$R_m = 1\text{K}, V_{DD} = 1.5\text{V}$	0.3			mA
Alarm Output Drive Current	I_d		0.3			mA
AL-IN Switch Current	I_{al}			2.0	3.0	μA
OSC Start Voltage	V_{OSC}	Specify		0.9	1.1	V
OSC Stop Voltage	V_{stop}			0.9	1.1	V
OSC Stability	O_{stb}	$\Delta V_{DD} = 100\text{mV}$		0.5	1	ppm
OSC Output Capacitance	C_{out}			20		pF
OSC Input Capacitance	C_{in}			20		pF
OSC Accuracy	O_{acr}			0.7	2	sec/day

GENERAL DESCRIPTION

The KS5211 series is a CMOS 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, regulator circuit, frequency divider, output pulse former, push-pull motor driver and alarm output. It provides alarm capability on time 1 sec and off time 3 sec. The alarm signal is made of 2048Hz, 8Hz, 0.5Hz, 0.25Hz.

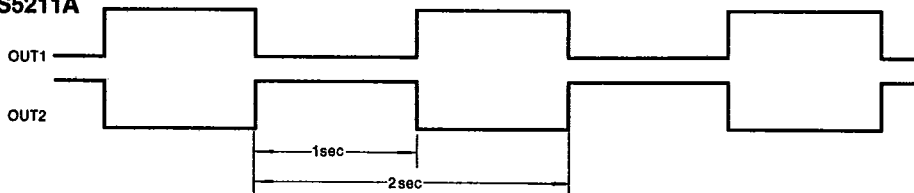
The alarm output consists of a push-pull stage and is able to drive an external-bipolar transistor. Also the KS5211 series has a AL-IN input. As long as AL-IN input is connected to V_{SS} , alarm output is generated. (Fig. 2). When you want to hear alarm sound, you have to connect buzzer (or speaker) to the alarm output. Then whenever AL-IN input is connected to V_{SS} , you can hear alarm sound. The two output of KS5211A has 0.5Hz, 1sec-width pulse waves with a phase shift of 180 degrees. (Fig. 1-1). The output of KS5211E has 0.5Hz, 46.9msec-width pulse waves and KS5211F has 0.5Hz, 31.2msec-width pulse waves. (Fig. 1-2).

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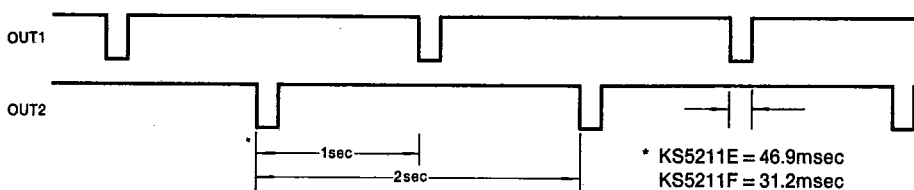
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OUT1 AND OUT2 WAVEFORMS

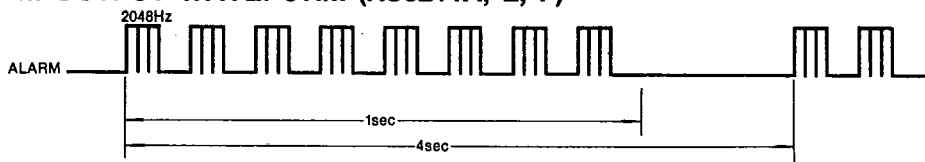
1) KS5211A



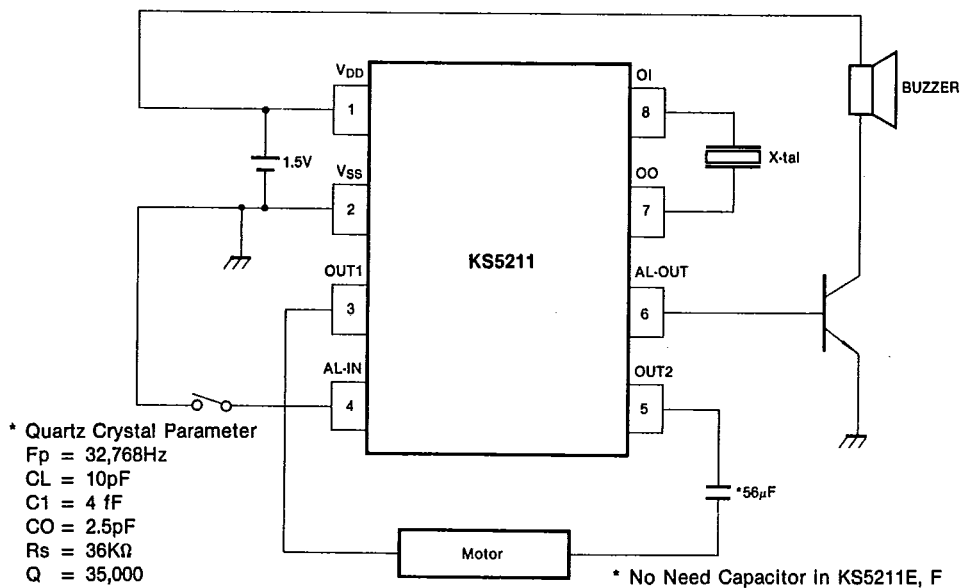
2) KS5211E/F



ALARM OUTPUT WAVEFORM (KS5211A, E, F)



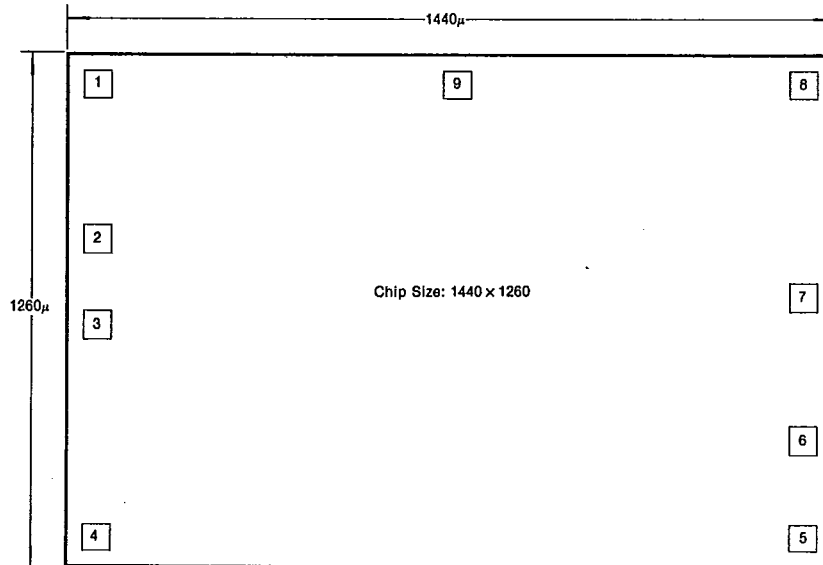
TYPICAL APPLICATION CIRCUIT



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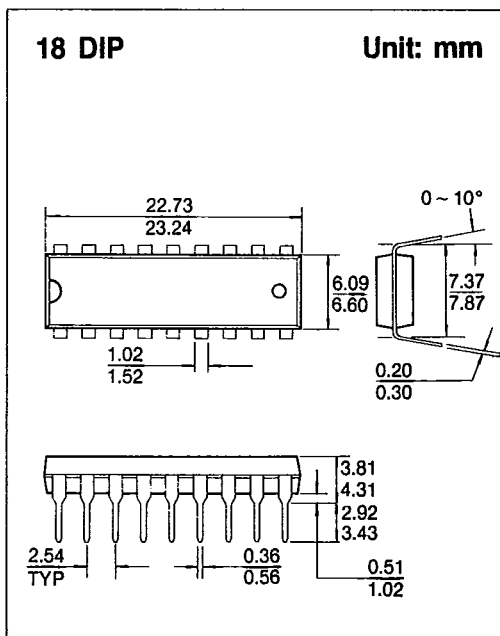
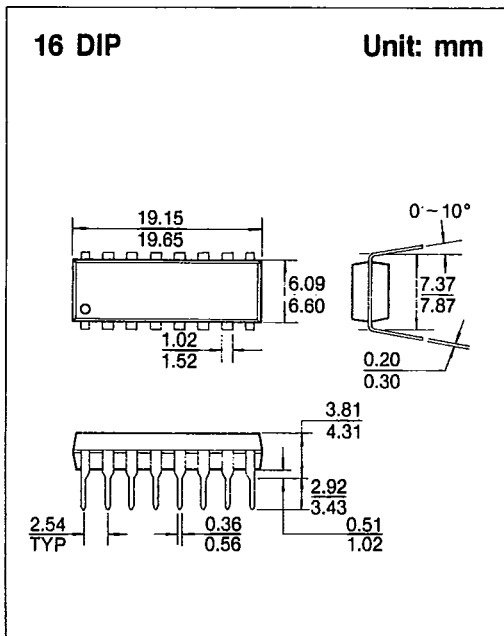
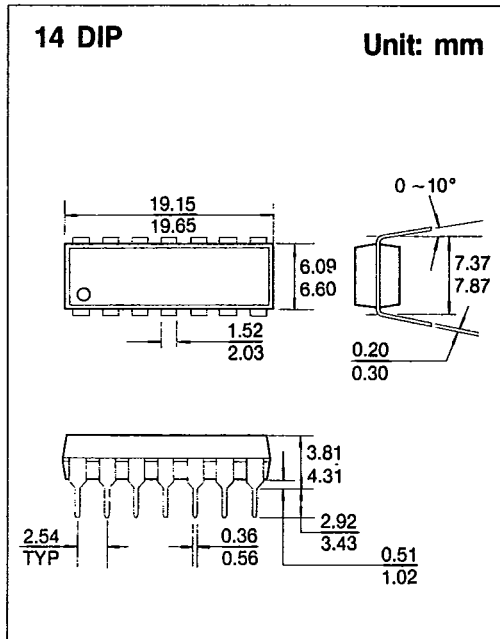
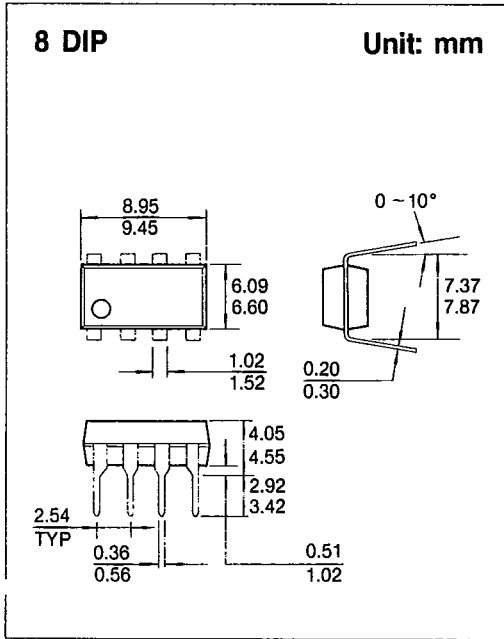
PAD LOCATION



Pad No.	Designation
1	V _{DD}
2	V _{SS}
3	M1
4	AL-IN
5	M2
6	AL-OUT
7	OO
8	OI
9	V _{EE}
10	

PACKAGE DIMENSIONS

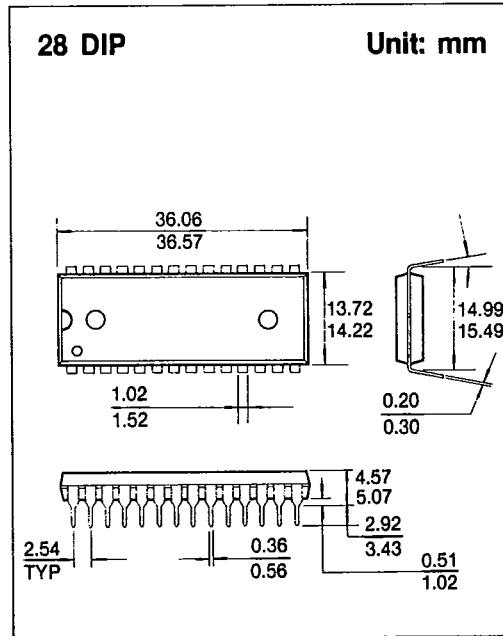
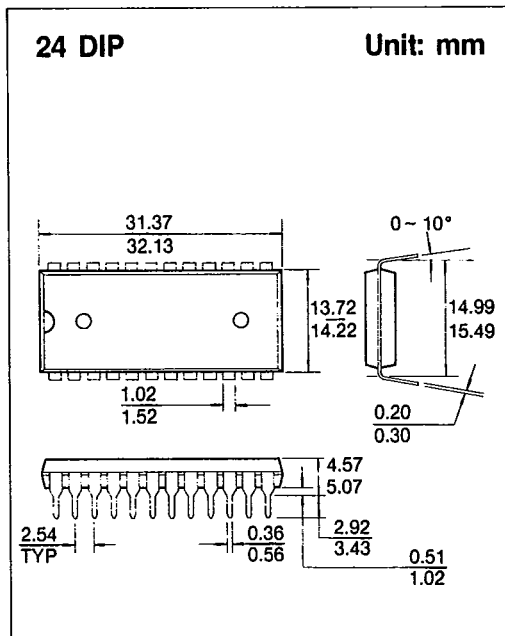
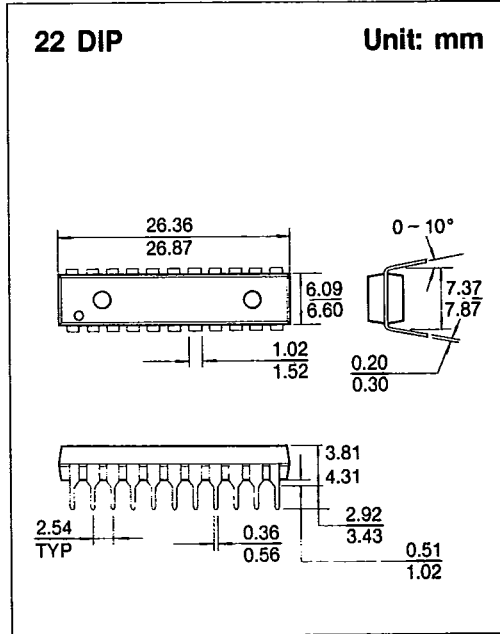
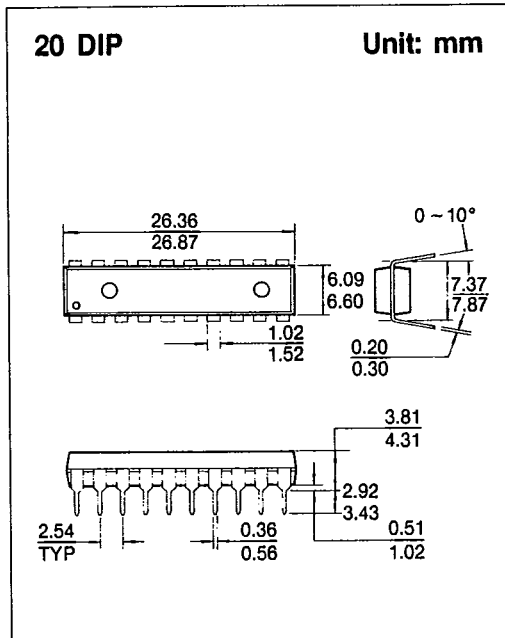
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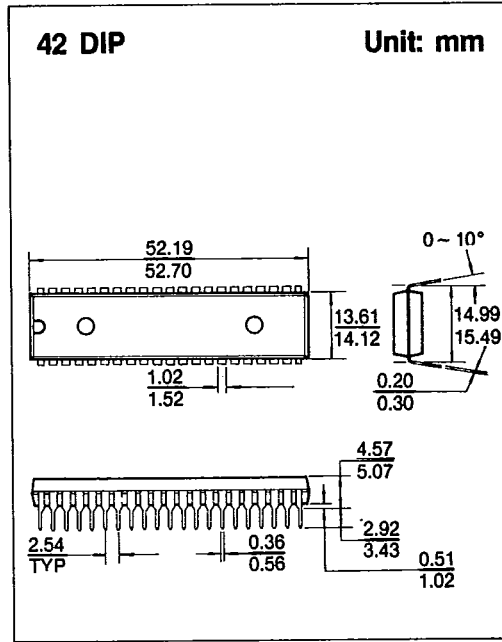
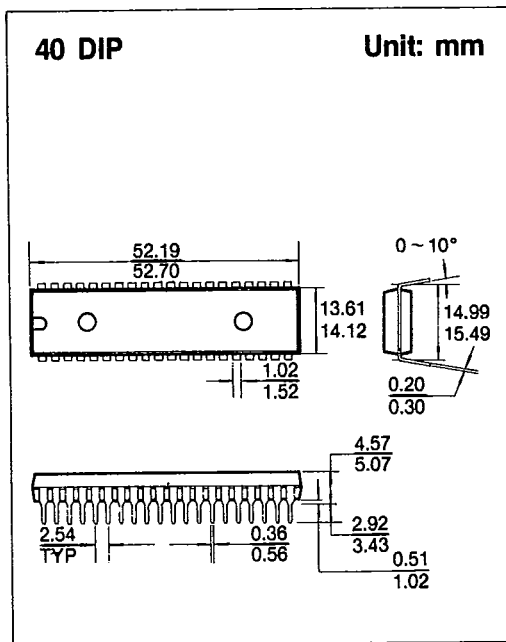
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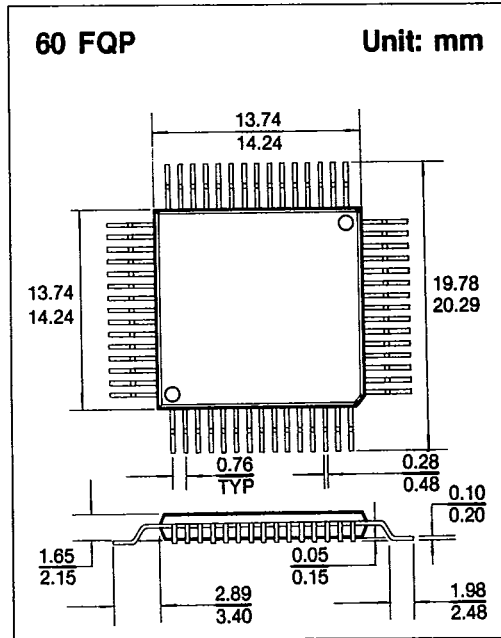
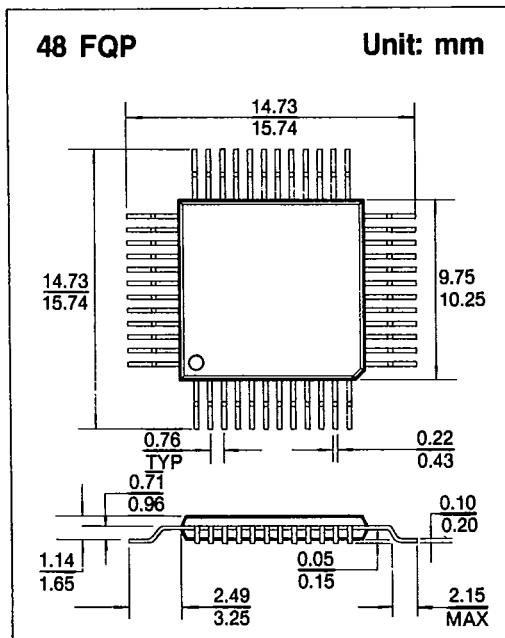


PACKAGE DIMENSIONS

T-90-20



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PACKAGE DIMENSIONS

T-90-20

