KS5184 CMOS DIGITAL INTEGRATED CIRCUIT

6 FUNCTION 6 DIGIT ALARM WATCH WITH CHIME FOR DUPLEXED LCD

The KS5184 is a CMOS 6 function watch circuit with alarm function and chime, designed to use with 6 Digit duplexed liquid crystal display with 7 day mark, date mark, alarm mark, AM/PM mark and colon.

FUNCTIONS

- 6 Function: Month, Date, Day-of-week, Hour, Minute, Second
- Alarm, Snooze
- Alarm output for melody IC (KS5310 Series)
- User selectable 12 hour/24 hour format
- 4 year calendar
- One touch correction of time error within ±30 seconds.
- Chime on every hour
- 3 Switch sequential operation
- LCD test

FEATURES

- **Single chip CMOS construction**
- **Drives 6 digit duplexed LCD with 7 day mark, AM/PM mark, date mark and alarm mark**
- **Colon display**
- **Direct drive of piezoelectric transducer at 3 volt peak to peak**
- **Fast advance for time and alarm set**
- **32,768Hz crystal frequency**
- **On-chip oscillator and resistors**
- **On-chip voltage doubler**
- **Single 1.5V battery operation**
- **Low power dissipation**
- **Debounce circuitry on switch inputs**
- **Protection against static discharge**

ABSOLUTE MAXIMUM RATINGS ($T_a = 25°C$)

Characteristic	Symbol	Value	Unit
Supply Voltage ($V_{DD} - V_{SS}$)	V_{DS}	−0.3 ~ +2.0	V
Supply Voltage ($V_{DD} - V_{EE}$)	V_{DE}	−0.3 ~ +4.0	V
Operating Temperature	T_{opr}	−20 ~ +75	°C
Storage Temperature	T_{stg}	−55 ~ +125	°C

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

KS5184 C-MOS DIGITAL INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS ($T_a = 25°C$, $V_{DD} = 0V$, $V_{SS} = -1.5V$; unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Operating Voltage	$\|V_{SS1}\|$		1.2	1.5	1.8	V
	$\|V_{EE1}\|$		2.4	3.0	3.6	V
Supply Current	I_{DD}	Without Load		1.0	2.0	μA
Input High Voltage	V_{IH}		$V_{DD} - 0.3$		V_{DD}	V
Input Low Voltage	V_{IL}		V_{SS}		$V_{SS} + 0.3$	V
Switch Activation Current	I_{SW}	$V_{in} = V_{DD}$	0.1	0.5	3	μA
Oscillator Start Voltage	$\|V_{OSC}\|$	Within 5 Sec			1.45	V
Oscillator Stop Voltage	$\|V_{OSP}\|$				1.15	V
Alarm Drive Current	I_{ala}	$V_{sat} = 0.5V$ (Both Direction)	0.5	2.0		mA
	I_{alb}	$V_{sat} = 0.5V$	10	20		μA
Oscillator Frequency	F_{OSC}			32,768		Hz
DC-DC Conversion Frequency	F_{CON}	$C1 = C2 = 0.1\mu F$		2,048		Hz
LCD Frequency	F_d			32		Hz
Oscillator Input Capacitor	C_{in}			25		pF
Time Stability	T_{stb}	$\triangle V_{DD} = 0.5V$ ($C_{out} = 25pF$)			1	ppm
Switch Debouncing Time	T_{deb}				62.5	mSEC

LCD FORMAT

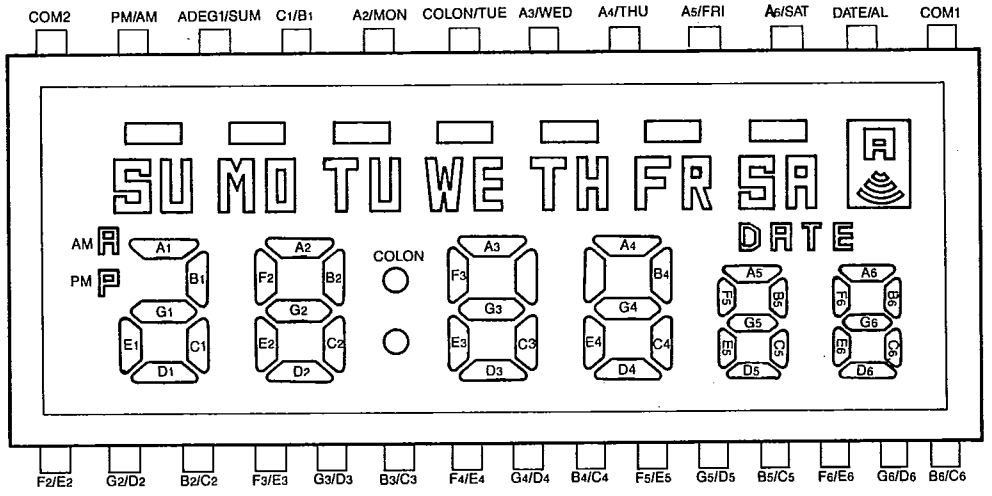


Fig. 1

KS5184 CMOS DIGITAL INTEGRATED CIRCUIT

SETTING SEQUENCY AND SWITCH OPERATION

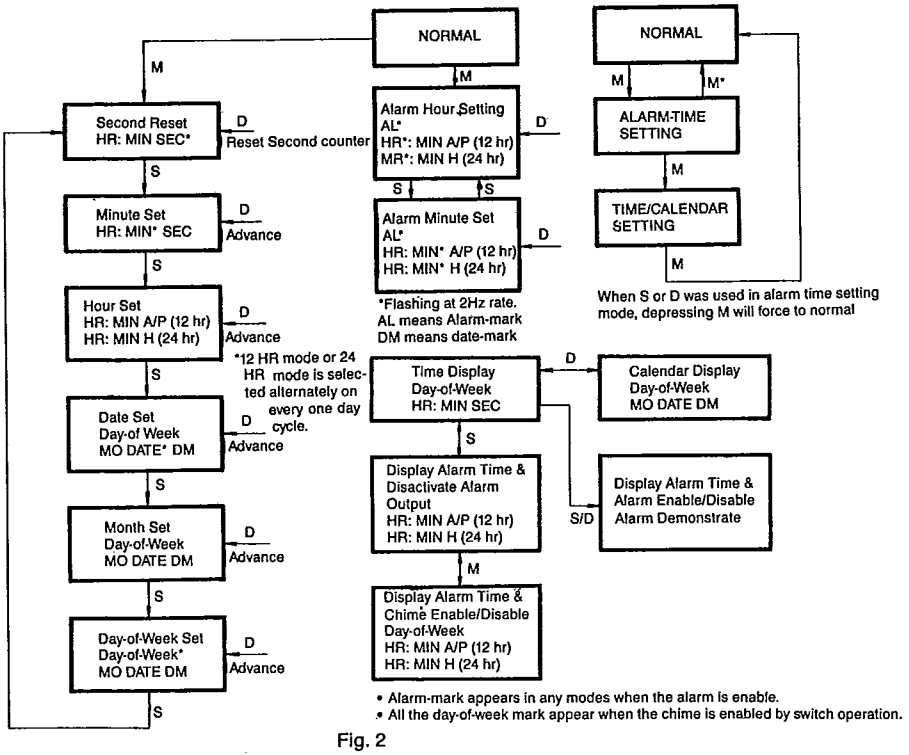


Fig. 2

ALARM OUTPUT WAVEFORMS

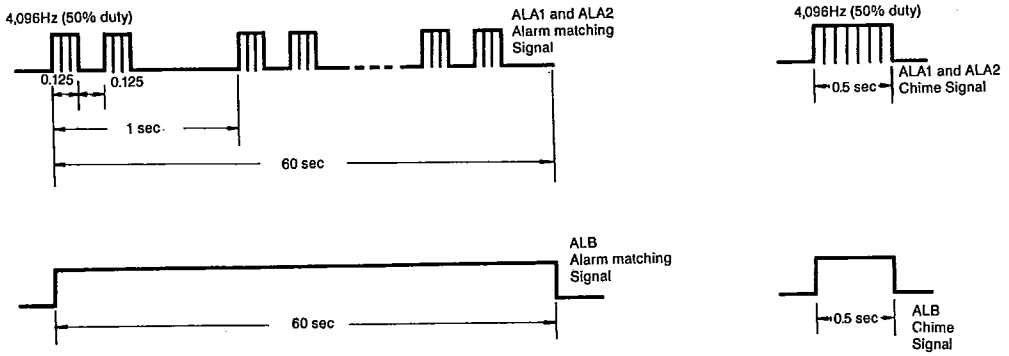
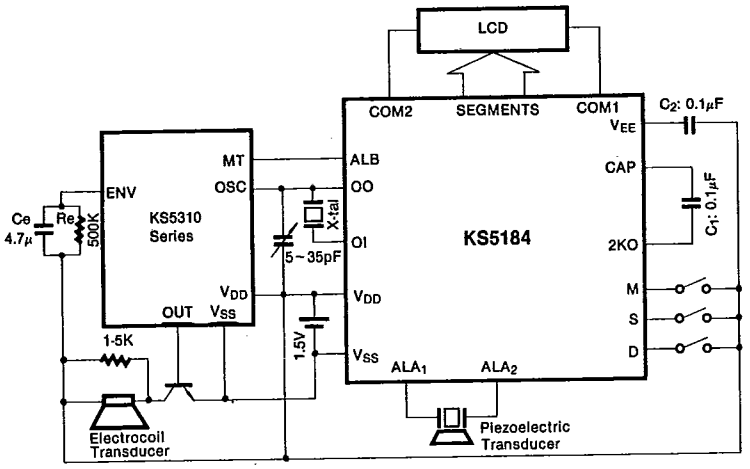
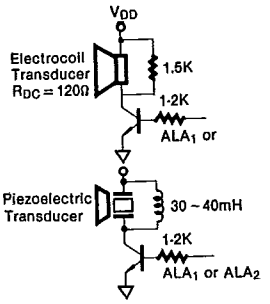


Fig. 3

KS5184 CMOS DIGITAL INTEGRATED CIRCUIT

APPLICATION CIRCUIT



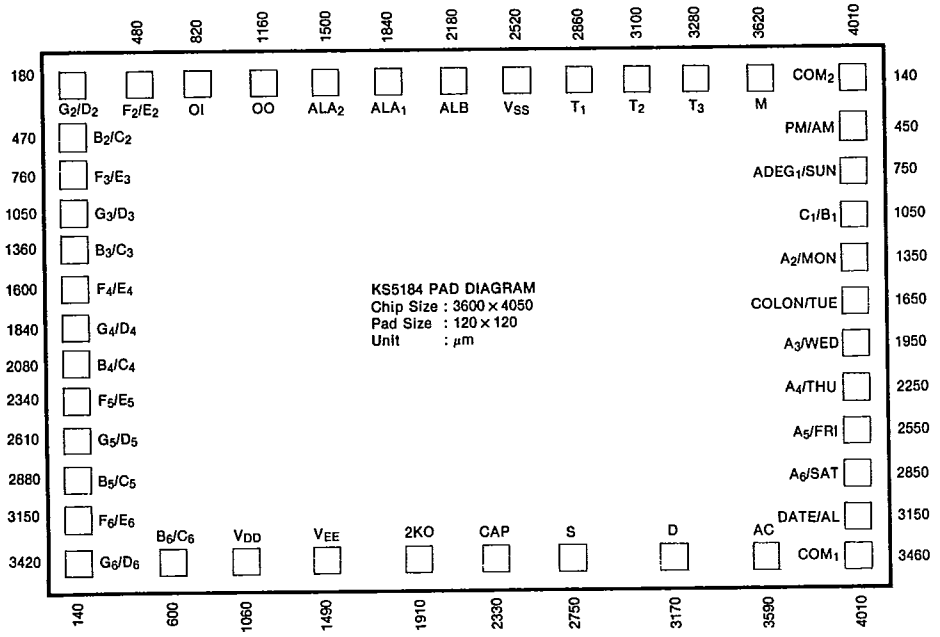


* Quartz Crystal Parameter
Fp = 32,768Hz
CL = 12.5pF
C1 = 4 fF
CO = 2.5pF
Rs = 35KΩ
Q = 35,000

Re and Ce are necessary only when employing envelope circuit with KS5310 Series. Otherwise, ENV pad must be connected to V_{SS}.

Fig. 4

PAD DIAGRAM

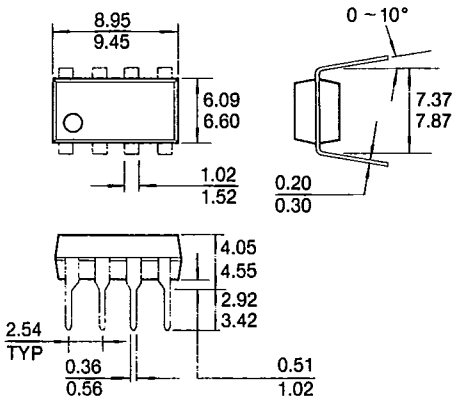


PACKAGE DIMENSIONS

T-90-20

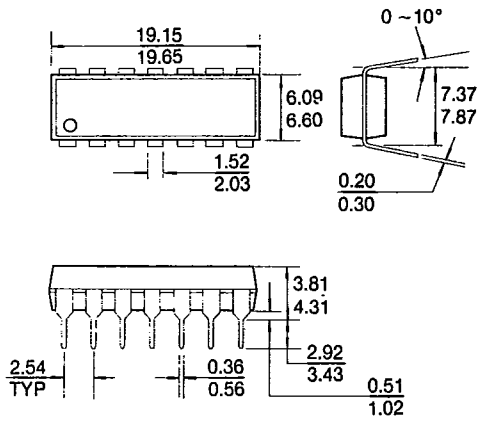
8 DIP

Unit: mm



14 DIP

Unit: mm



16 DIP

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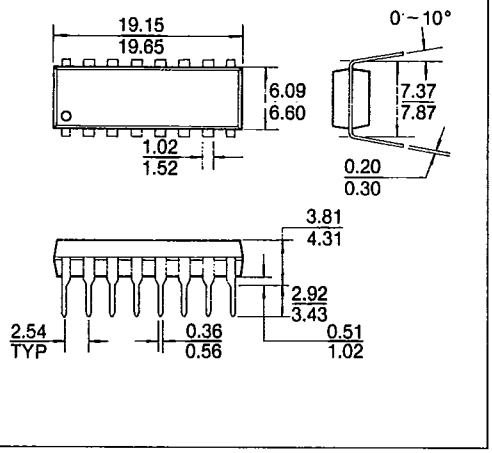
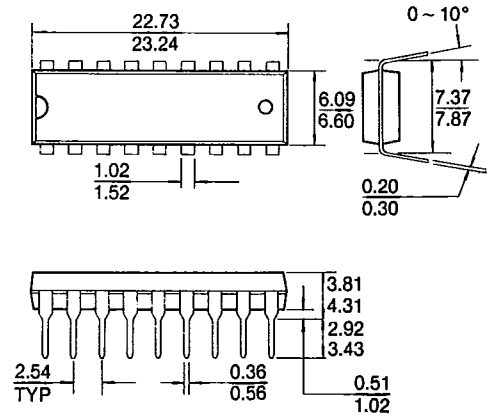


18 DIP

Unit: mm



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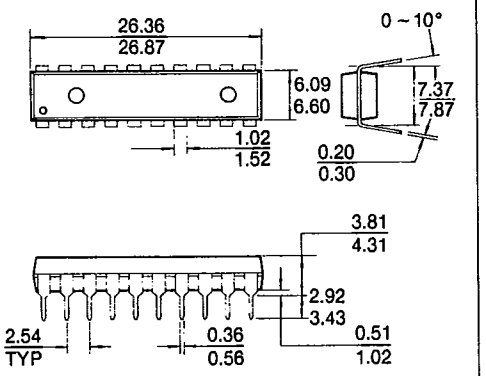
PACKAGE DIMENSIONS

T-90-20

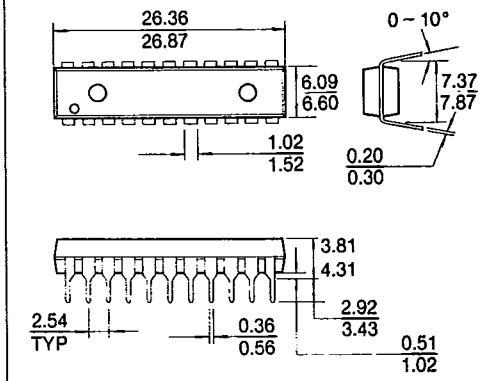
20 DIP

Unit: mm



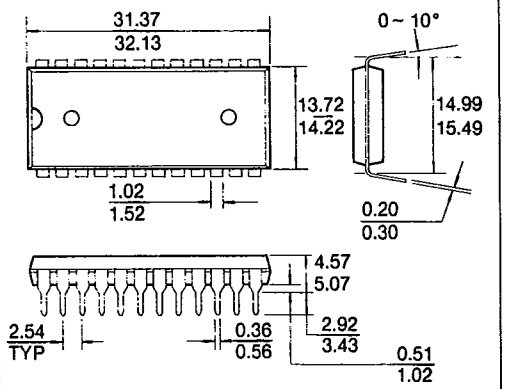
22 DIP

Unit: mm



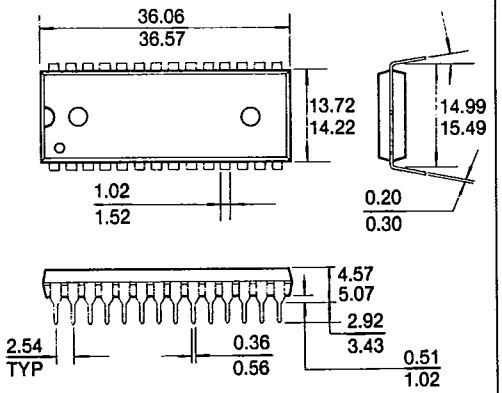
24 DIP

Unit: mm



28 DIP

Unit: mm

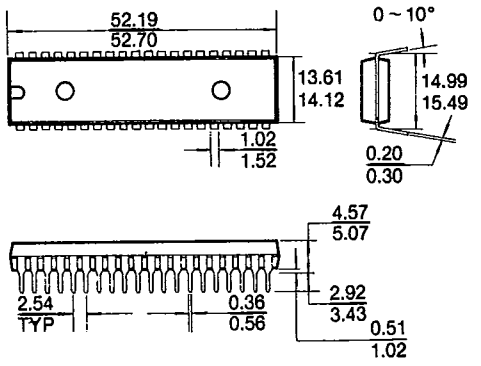


PACKAGE DIMENSIONS

T-90-20

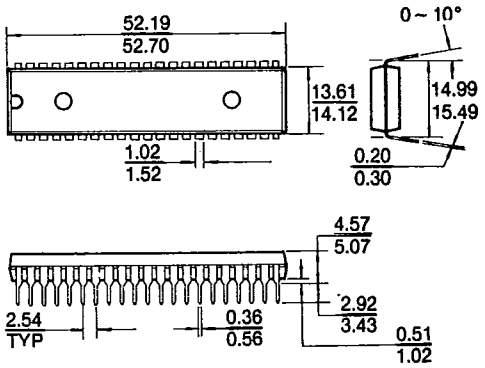
40 DIP

Unit: mm



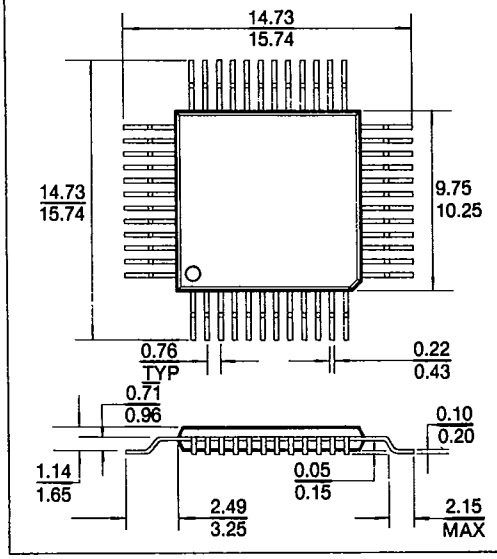
42 DIP

Unit: mm



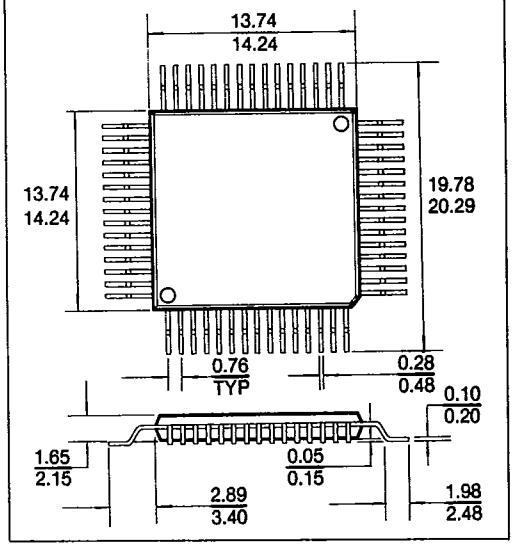
48 FQP

Unit: mm



60 FQP

Unit: mm



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PACKAGE DIMENSIONS

T-90-20

60 FQP **Unit: mm**