

T-49-15-02

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  $\pm 30$  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** ( $T_a = 25^\circ\text{C}$ )

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	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ +125	$^\circ\text{C}$

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



SAMSUNG SEMICONDUCTOR

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**KS5184**

**C-MOS DIGITAL INTEGRATED CIRCUIT**

**ELECTRICAL CHARACTERISTICS** ( $T_a = 25^\circ\text{C}$ ,  $V_{DD} = 0\text{V}$ ,  $V_{SS} = -1.5\text{V}$ ; 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	$\mu\text{A}$
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	$\mu\text{A}$
Oscillator Start Voltage	$ V_{OSC} $	Within 5 Sec			1.45	V
Oscillator Stop Voltage	$ V_{OSP} $				1.15	V
Alarm Drive Current	$I_{ala}$	$V_{sat} = 0.5\text{V}$ (Both Direction)	0.5	2.0		mA
	$I_{alb}$	$V_{sat} = 0.5\text{V}$	10	20		$\mu\text{A}$
Oscillator Frequency	$F_{OSC}$			32,768		Hz
DC-DC Conversion Frequency	$F_{CON}$	$C1 = C2 = 0.1\mu\text{F}$		2,048		Hz
LCD Frequency	$F_d$			32		Hz
Oscillator Input Capacitor	$C_{in}$			25		pF
Time Stability	$T_{stab}$	$\Delta V_{DD} = 0.5\text{V}$ ( $C_{out} = 25\text{pF}$ )			1	ppm
Switch Debouncing Time	$T_{deb}$				62.5	mSEC

**LCD FORMAT**

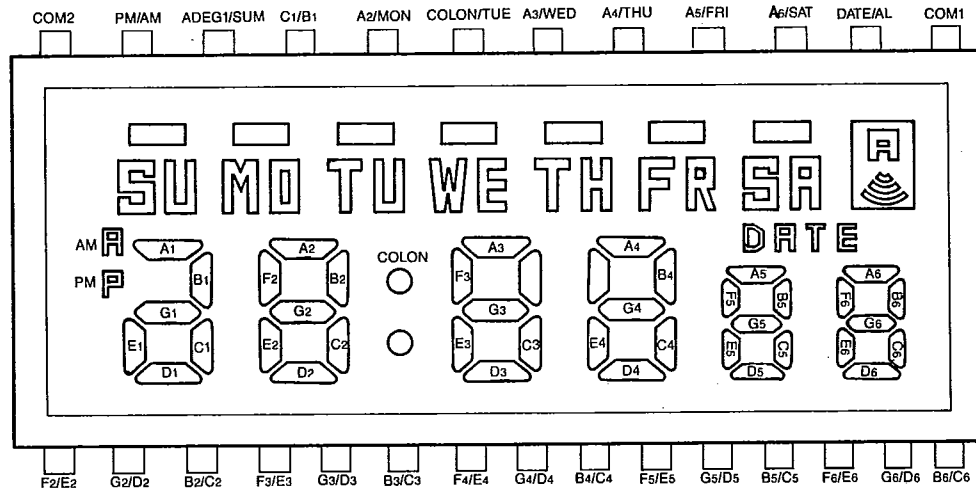


Fig. 1

**KS5184**

**CMOS DIGITAL INTEGRATED CIRCUIT**

**SETTING SEQUENCY AND SWITCH OPERATION**

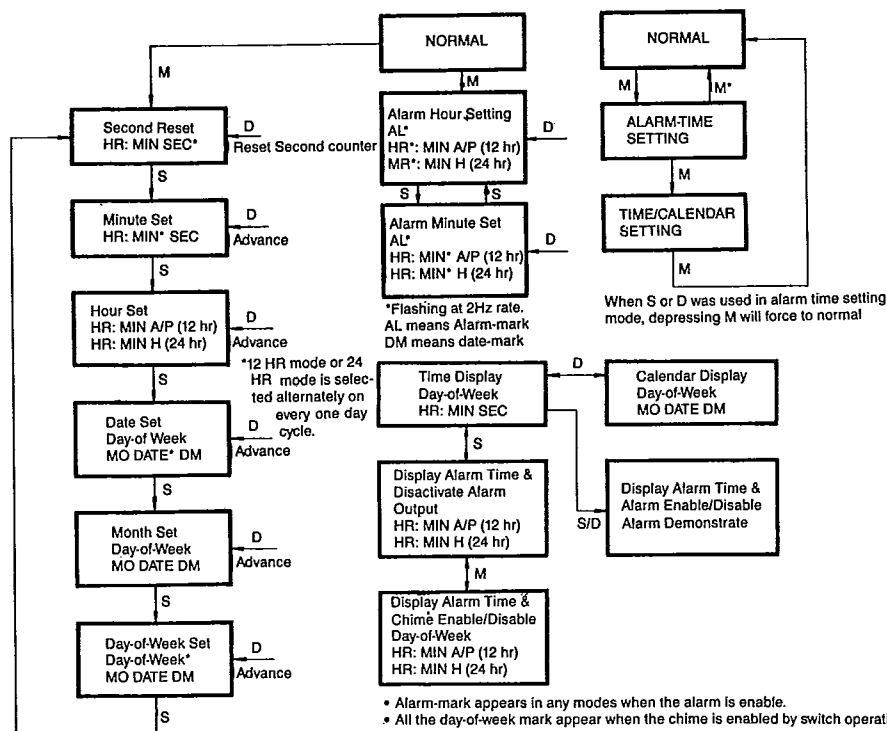


Fig. 2

**ALARM OUTPUT WAVEFORMS**

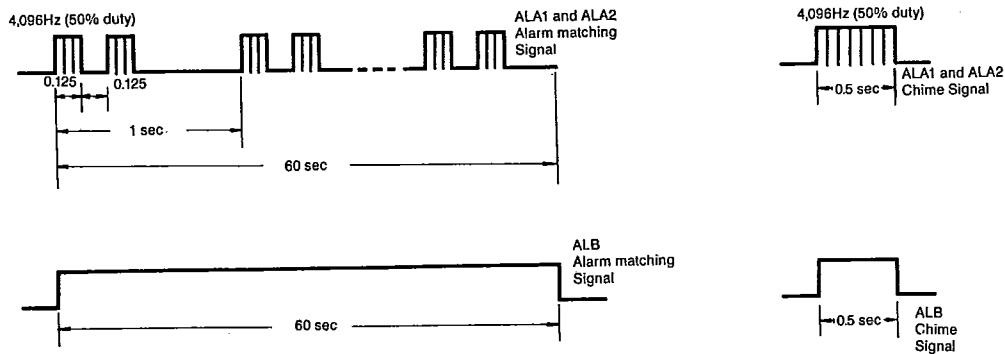


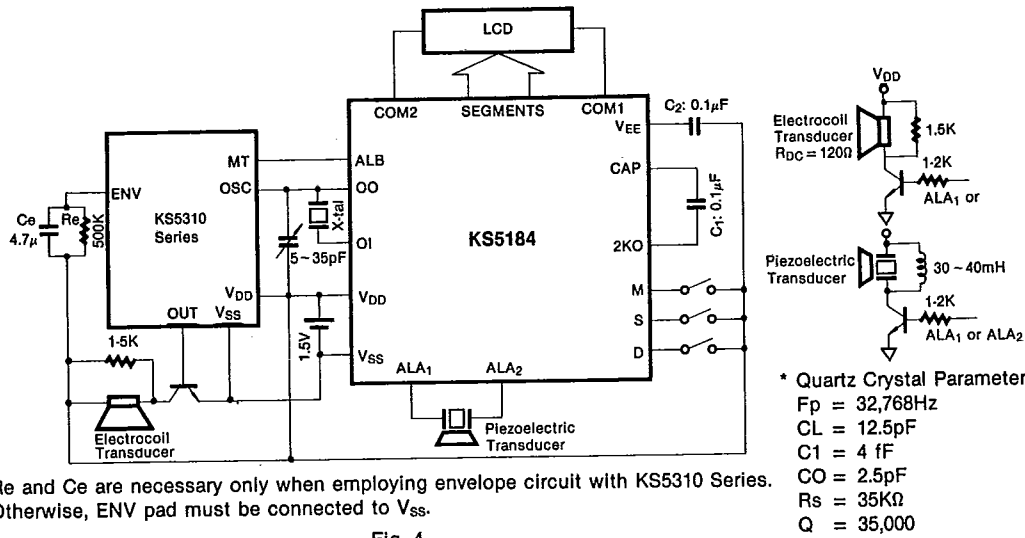
Fig. 3

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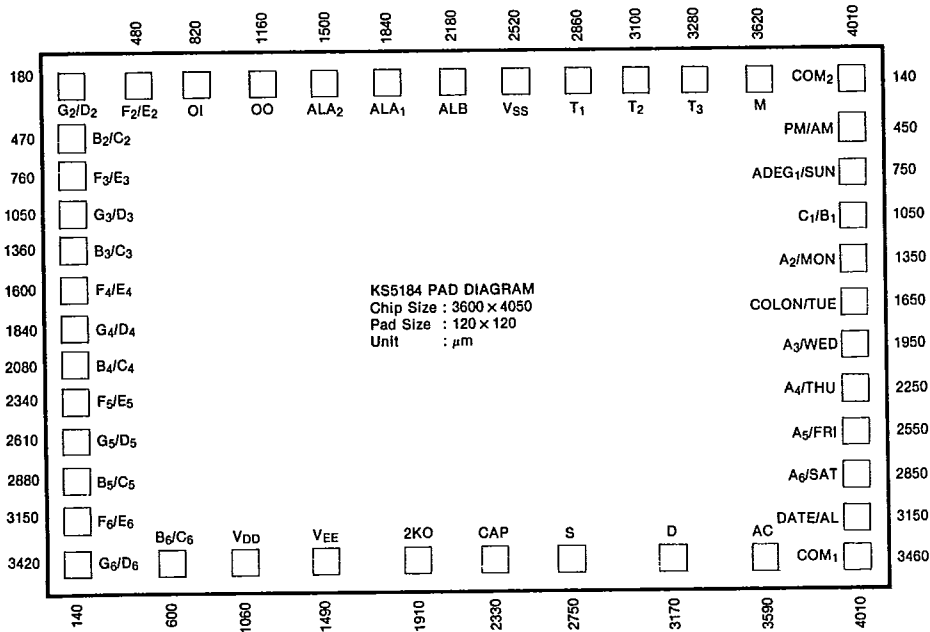
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**CMOS DIGITAL INTEGRATED CIRCUIT**

**APPLICATION CIRCUIT**

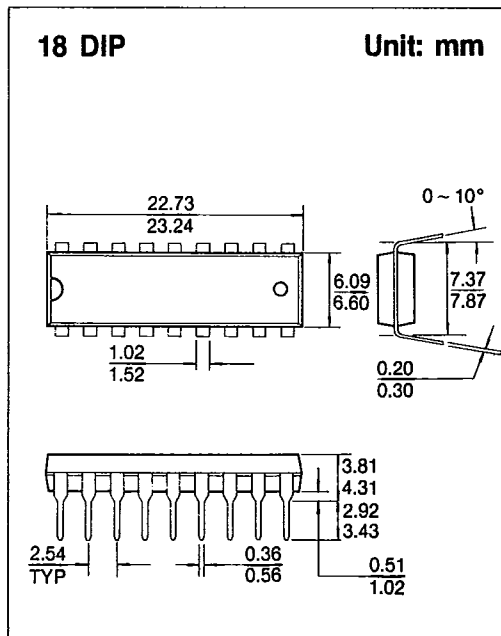
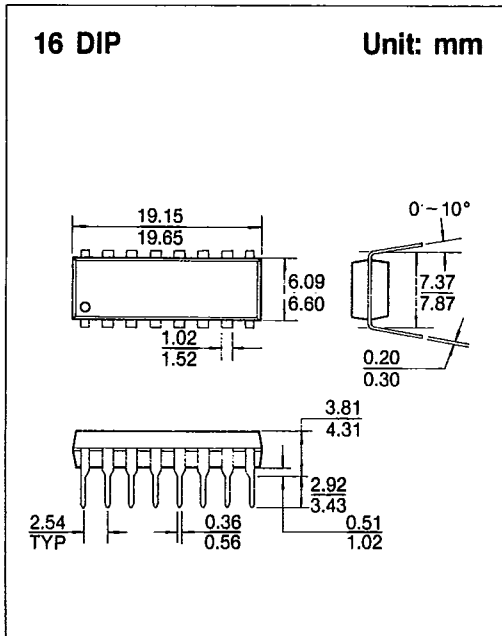
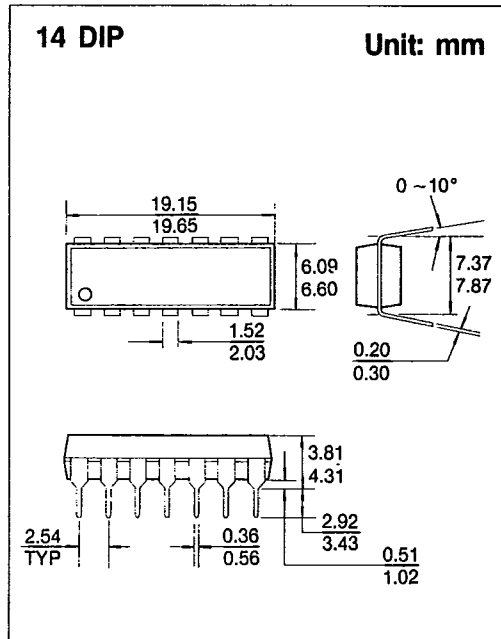
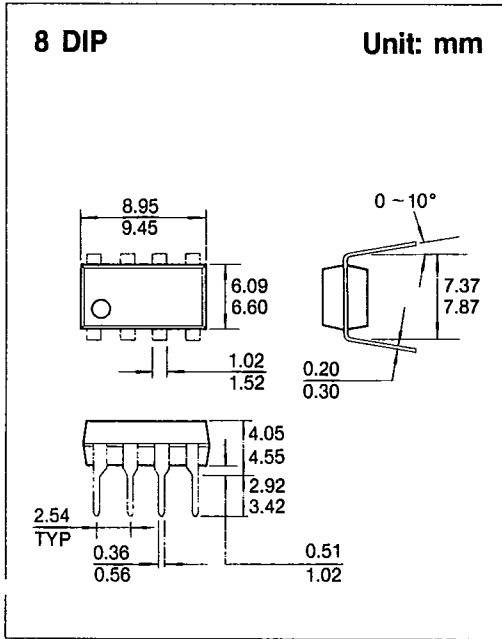


**PAD DIAGRAM**



**PACKAGE DIMENSIONS**

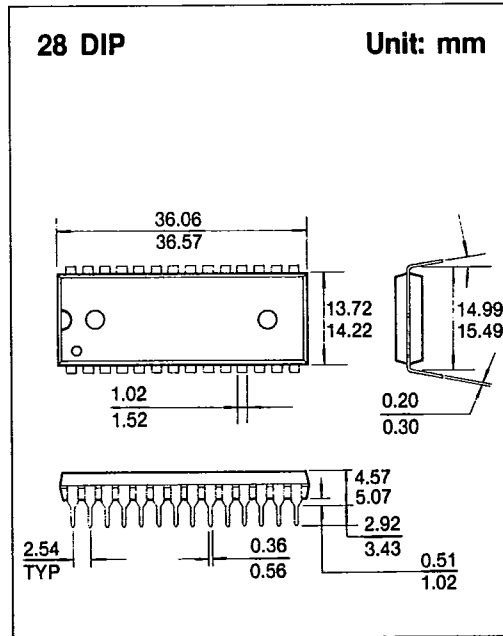
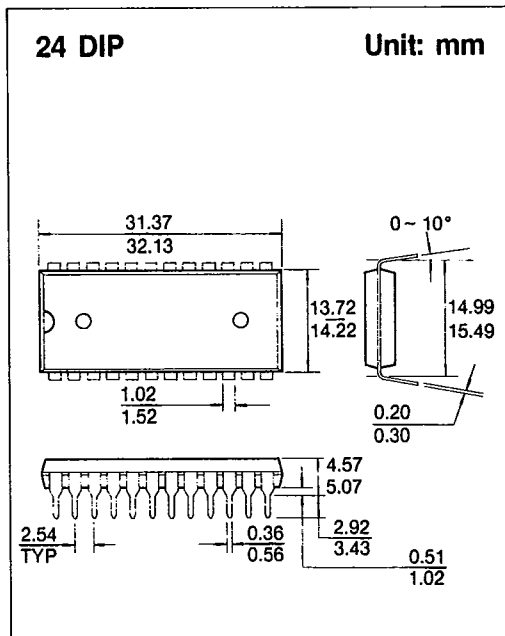
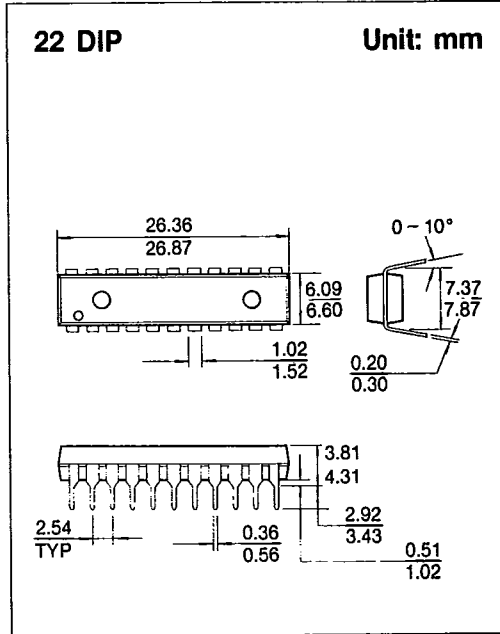
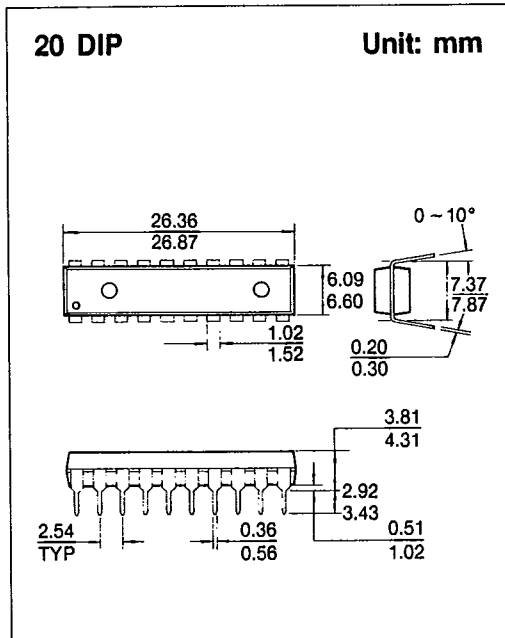
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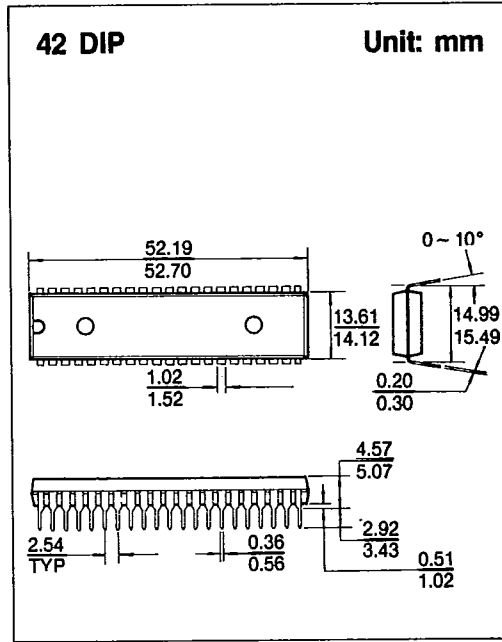
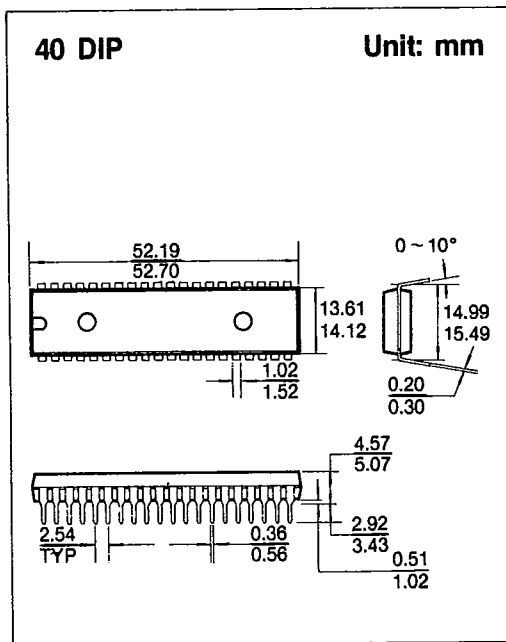
**PACKAGE DIMENSIONS**

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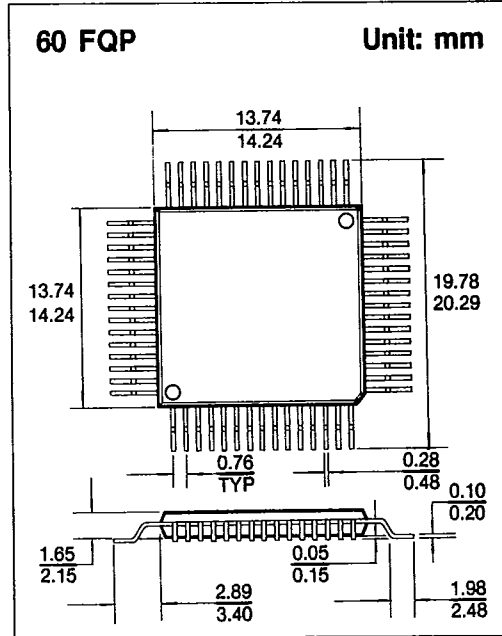
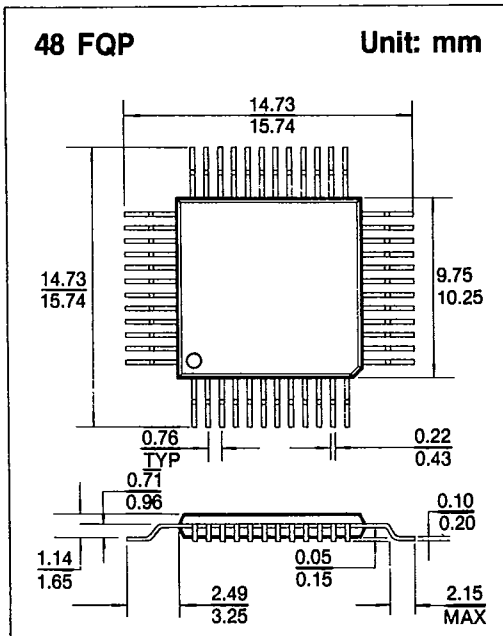


**PACKAGE DIMENSIONS**

*T-90-20*



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**PACKAGE DIMENSIONS**

*T-90-20*

