

KS54HCTLS 04
KS74HCTLS**Hex Inverters****T-43-21****FEATURES**

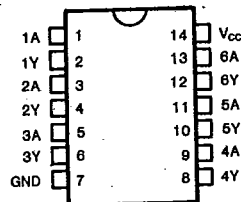
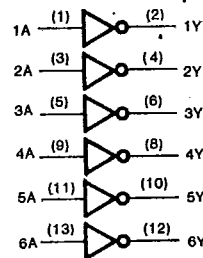
- Function, pin-out, speed and drive compatibility with 54/74LS logic family
- Low power consumption characteristic of CMOS
- High-Drive-Current outputs:
 $I_{OL} = 8 \text{ mA} @ V_{OL} = 0.5 \text{ V}$
- Inputs and outputs interface directly with TTL, NMOS and CMOS devices
- Wide operating voltage range: 4.5V to 5.5V
- Characterized for operation over Industrial and military temperature ranges:
KS74HCTLS: -40°C to $+85^{\circ}\text{C}$
KS54HCTLS: -55°C to $+125^{\circ}\text{C}$
- Package options include plastic "small outline" packages, standard plastic and ceramic 300-mil DIPs

DESCRIPTION

These devices contain six independent inverters. They perform the Boolean function $Y = \bar{A}$.

These devices provide speeds and drive capability equivalent to their LSTTL counterparts and yet maintain CMOS power levels. The input and output voltage levels allow direct interface with TTL, NMOS and CMOS devices without any external components.

All inputs and outputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and ground.

PIN CONFIGURATION**LOGIC DIAGRAM****FUNCTION TABLE**

(Each Inverter)

Input	Output
A	Y
H	L
L	H

**SAMSUNG SEMICONDUCTOR**

KS54HCTLS 04
KS74HCTLS**Hex Inverters****T-43-21****Absolute Maximum Ratings***

Supply Voltage Range V_{CC} -0.5V to +7V
 DC Input Diode Current, I_{IK}
 ($V_I < -0.5V$ or $V_I > V_{CC} + 0.5V$) ± 20 mA
 DC Output Diode Current, I_{OK}
 ($V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$) ± 20 mA
 Continuous Output Current Per Pin, I_O
 ($-0.5V < V_O < V_{CC} + 0.5V$) ± 35 mA
 Continuous Current Through
 V_{CC} or GND pins ± 125 mA
 Storage Temperature Range, T_{stg} ... -65°C to +150°C
 Power Dissipation Per Package, P_d † 500 mW

* Absolute Maximum Ratings are those values beyond which permanent damage to the device may occur. These are stress ratings only and functional operation of the device at or beyond them is not implied. Long exposure to these conditions may affect device reliability.

† Power Dissipation temperature derating:

Plastic Package (N): -12mW/°C from 65°C to 85°C

Ceramic Package (J): -12mW/°C from 100°C to 125°C

Recommended Operating ConditionsSupply Voltage, V_{CC} 4.5V to 5.5VDC Input & Output Voltages*, V_{IN} , V_{OUT} ... 0V to V_{CC}

Operating Temperature

Range KS74HCTLS: -40°C to +85°C

KS54HCTLS: -55°C to +125°C

Input Rise & Fall Times, t_r , t_f Max 500 ns* Unused inputs must always be tied to an appropriate logic voltage level (either V_{CC} or GND)**DC ELECTRICAL CHARACTERISTICS** ($V_{CC}=5V \pm 10\%$ Unless Otherwise Specified)

Characteristic	Symbol	Test Conditions	T _a = 25°C		KS74HCTLS	KS54HCTLS	Unit
					T _a = -40°C to +85°C	T _a = -55°C to +125°C	
			Typ	Guaranteed Limits			
Minimum High-Level Input Voltage	V _{IH}			2.0	2.0	2.0	V
Maximum Low-Level Input Voltage	V _{IL}			0.8	0.8	0.8	V
Minimum High-Level Output Voltage	V _{OH}	V _{IN} =V _{IH} or V _{IL} I _O = -20μA I _O = -4mA	V _{CC} 4.2	V _{CC} - 0.1 3.98	V _{CC} - 0.1 3.84	V _{CC} - 0.1 3.7	V
Maximum Low-Level Output Voltage	V _{OL}	V _{IN} =V _{IH} or V _{IL} I _O = 20μA I _O = 4mA I _O = 8mA	0	0.1 0.26 0.39	0.1 0.33 0.5	0.1 0.4	V
Maximum Input Current	I _{IN}	V _{IN} =V _{CC} or GND		±0.1	±1.0	±1.0	μA
Maximum Quiescent Supply Current	I _{CC}	V _{IN} =V _{CC} or GND I _{OUT} =0μA		2.0	20.0	40.0	μA
Additional Worst Case Supply Current	ΔI _{CC}	per input pin V _I =2.4V other Inputs: at V _{CC} or GND I _{OUT} =0μA		2.7	2.9	3.0	mA

AC ELECTRICAL CHARACTERISTICS (Input t_r , $t_f \leq 6$ ns), HCTLS04

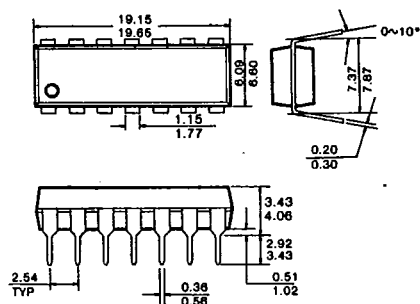
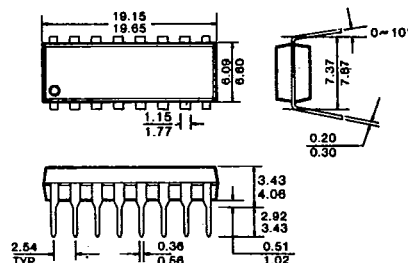
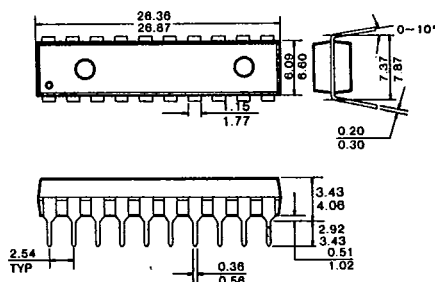
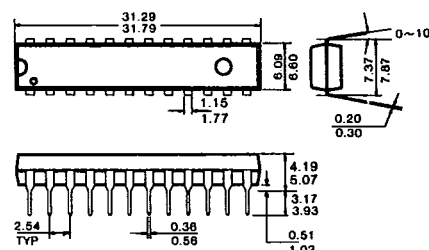
Characteristic	Symbol	Conditions†	T _a = 25°C V _{CC} = 5.0V		KS74HCTLS T _a = -40°C to +85°C V _{CC} = 5.0V ± 10%	KS54 HCTLS T _a = -55°C to +125°C V _{CC} = 5.0V ± 10%	Unit
			Typ	Guaranteed Limits			
Maximum Propagation Delay	t _{PLH}	C _L = 50pF	9	15	18	22	ns
	t _{PHL}		10	15	18	22	
Maximum Input Capacitance	C _{IN}		5				pF
Power Dissipation Capacitance*	C _{PD}	(per gate)	15				pF

* C_{PD} determines the no-load dynamic power dissipation: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$.

† For AC switching test circuits and timing waveforms see section 2.



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PACKAGE DIMENSIONS*T-90-20***1. PLASTIC PACKAGES****14-Pin Plastic DIP Units: mm****16-Pin Plastic DIP Units: mm****20-Pin Plastic DIP Units: mm****24-Pin Plastic DIP Units: mm**

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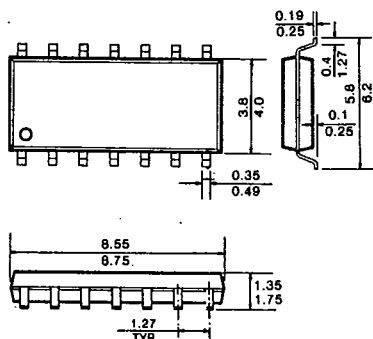
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PACKAGE DIMENSIONS

T-90-20

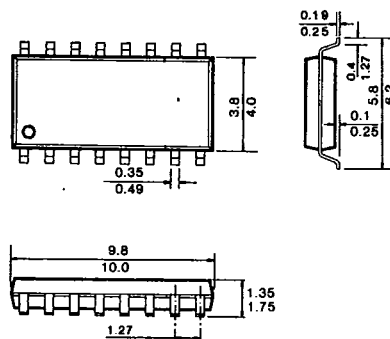
14-Pin SOP

Unit: mm



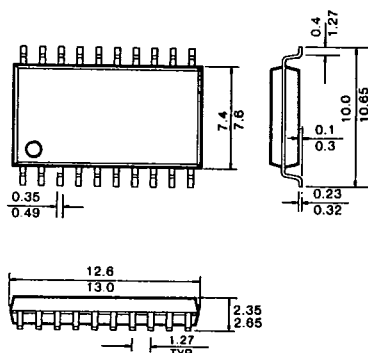
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Unit: mm



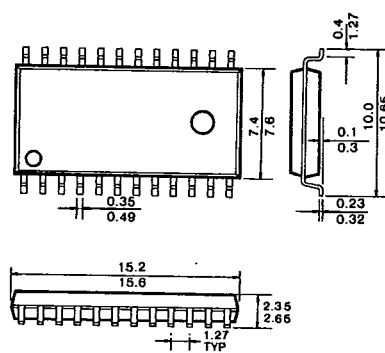
20-Pin SOP

Unit: mm



24-Pin SOP

Unit: mm



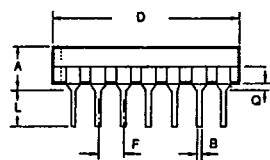
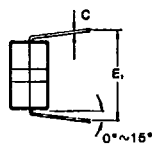
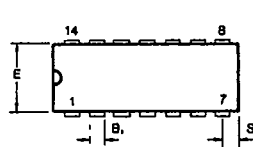
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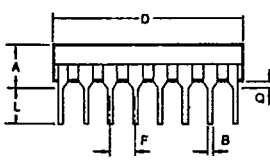
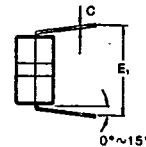
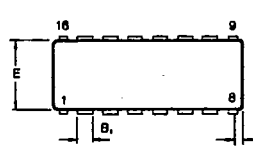
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PACKAGE DIMENSIONS

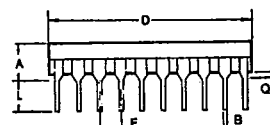
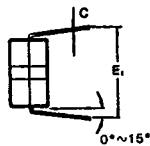
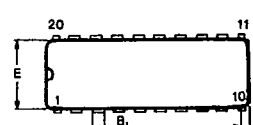
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2. CERAMIC PACKAGES**14-Pin Ceramic DIP Units: mm**

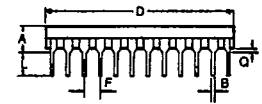
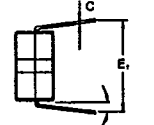
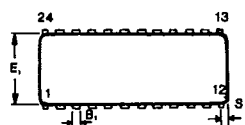
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	6.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

16-Pin Ceramic DIP Units: mm

DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	19.05	19.94
E	6.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	0.51	1.14

20-Pin Ceramic DIP Units: mm

DIM	Millimeters	
	Min	Max
A	4.06	5.08
B	0.38	0.53
B ₁	1.14	1.52
C	0.20	0.38
D	25.78	26.93
E	6.10	6.60
E ₁	7.77	7.95
F	2.54	
L	3.73	4.01
Q	0.38	0.89
S	0.51	1.14

24-Pin Ceramic DIP Units: mm

DIM	Millimeters	
	Min	Max
A	4.06	5.08
B	0.38	0.53
B ₁	1.14	1.52
C	0.20	0.38
D	31.50	32.64
E	7.24	7.75
E ₁	7.77	7.98
F	2.54	
L	3.73	4.01
Q	0.508	1.776
S	1.85	1.93



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