

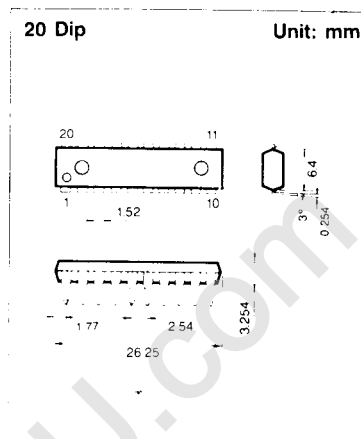
Octal Buffers and Line Drivers with 3-States Outputs

The '540 and '541 are general purpose high-speed octal line drivers/buffers with 3-state outputs. The inputs and outputs are located on opposite sides of the 20-pin package, thus improving circuit board density. The '540 provides inverted data and the '541 provides true data at the outputs.

The three-state control gate is a 2-input NOR such that if either $\bar{G}1$ or $\bar{G}2$ is high, all eight outputs are in the high impedance state.

These devices provide speeds and drive capability equivalent to their ALSTTL 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.

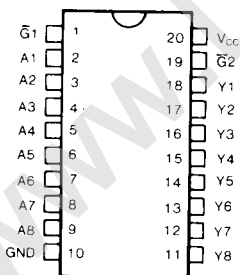
All inputs and outputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and ground.



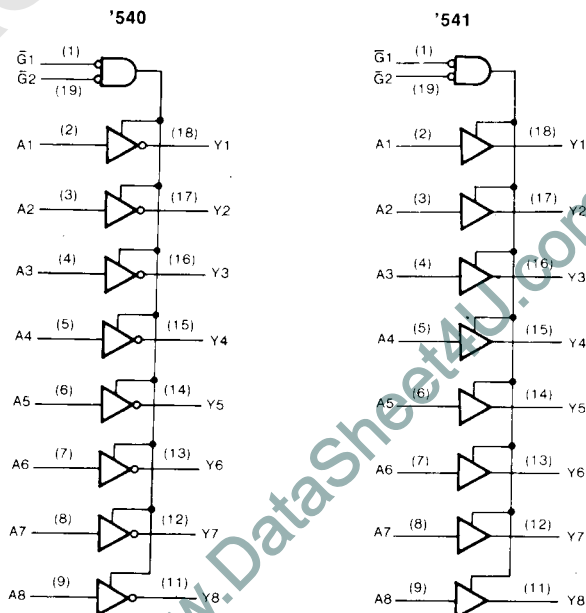
FEATURES

- Function, pin-out, speed and drive compatibility with 54/74ALS logic family
- Low power consumption characteristic of CMOS
- 3-State outputs with high drive current ($I_{OL} = 24 \text{ mA}$ @ $V_{OL} = 0.5V$) for direct bus interface
- 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:
KS74AHCT: -40°C to $+85^{\circ}\text{C}$
KS54AHCT: -55°C to $+125^{\circ}\text{C}$

PIN CONFIGURATION



LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS*

Characteristic	Symbol	Ratings	Unit
Supply Voltage Range	V_{CC}	-0.5 to +7.0	V
DC Input Diode Current ($V_I < -0.5V$ or $V_I > V_{CC} + 0.5V$)	I_{IK}	± 20	mA
DC Output Diode Current ($V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$)	I_{OK}	± 20	mA
Continuous Output Current Per Pin ($-0.5V < V_O < V_{CC} + 0.5V$)	I_O	± 70	mA
Continuous Current Through V_{CC} or GND pins		± 250	mA
Power Dissipation Per Package	$P_d^\dagger$	500	mW
Storage Temperature Range	T_{stg}	-65 to +150	°C

* 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 CONDITIONS

Characteristic	Symbol	Value			Unit
		Min	Typ	Max	
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
DC Input & Output Voltages*	V_{IN}, V_{OUT}	0		V_{CC}	V
Operating Temperature Range KS74AHCT KS54AHCT	T_A	-40		+85	°C
		-55		+125	°C
Input Rise & Fall Times	t_r, t_f			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		KS74AHCT	KS54AHCT	Unit
			Typ	Guaranteed Limits		T _A = -40°C to +85°C	
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 = -6mA	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 = 12mA I _O = 24mA	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 3-State Leakage Current	I _{OZ}	Output Enable = V _{IH} V _{OUT} = V _{CC} or GND		±0.5	±5.0	±10.0	μA
Maximum Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND I _{OUT} = 0μA		8.0	80.0	160.0	μA



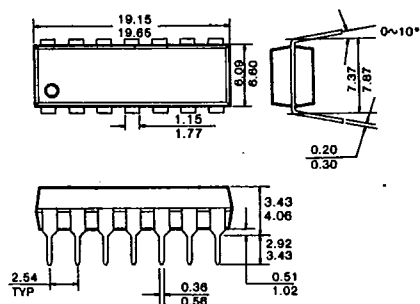
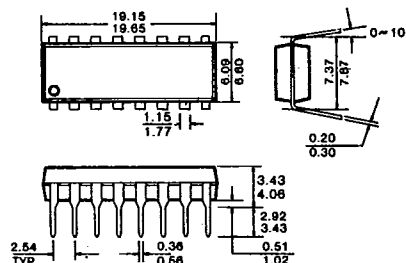
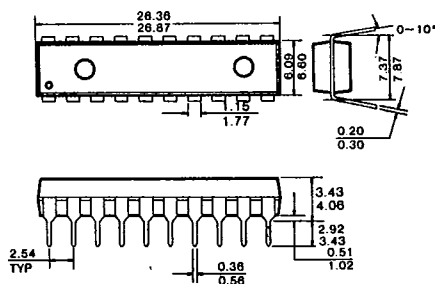
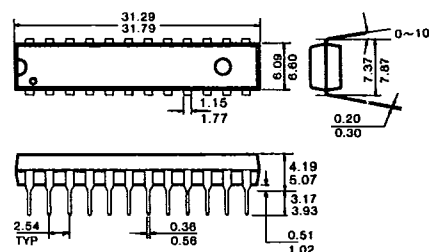
AC ELECTRICAL CHARACTERISTICS (Input $t_r, t_f \leq 2$ ns), AHCT540/541

Characteristic	Symbol	Conditions†		T _A = 25°C V _{CC} = 5.0V	KS74AHCT T _A = - 40°C to + 85°C V _{CC} = 5.0V ± 10%	KS54AHCT T _A = - 55°C to + 125°C V _{CC} = 5.0V ± 10%	Unit
				Typ	Guaranteed Limits		
Maximum Propagation Delay, Delay, A to Y	t _{PLH}	C _L = 50pF C _L = 150pF		6 12	10 19	12 23	ns
	t _{PHL}	C _L = 50pF C _L = 150pF		6 12	10 19	12 23	
Maximum Output Enable Time, $\bar{G}$ to Y	t _{PZH}	R _L = 1kΩ	C _L = 50pF C _L = 150pF	11 17	18 27	22 33	ns
	t _{PZL}		C _L = 50pF C _L = 50pF	11 17	18 27	22 33	
Maximum Output Disable Time, $\bar{G}$ to Y	t _{PHZ}	R _L = 1kΩ		9	14	17	ns
	t _{PLZ}	C _L = 50pF		9	14	17	
Maximum Input Capacitance	C _{IN}			5			pF
Maximum Output Capacitance	C _{OUT}	Output Disabled		10			pF
Power Dissipation Capacitance* (per stage)	C _{PD}	$\bar{G}$ = V _{CC} $\bar{G}$ = GND		5 30			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.



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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**SAMSUNG SEMICONDUCTOR**

1675

A-04

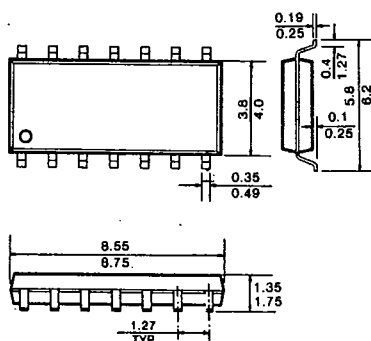
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PACKAGE DIMENSIONS

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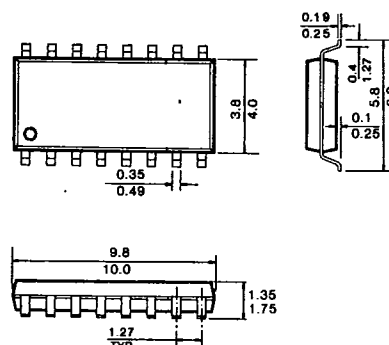
14-Pin SOP

Unit: mm



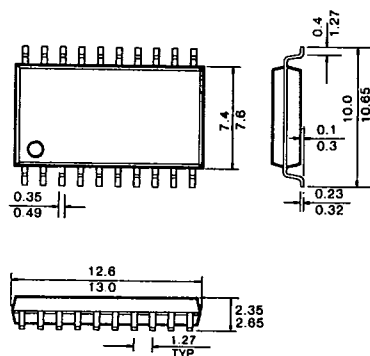
16-Pin SOP

Unit: mm



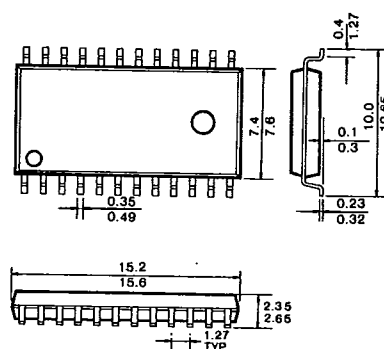
20-Pin SOP

Unit: mm



24-Pin SOP

Unit: mm



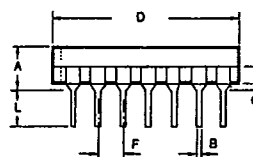
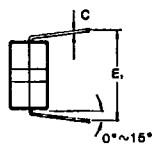
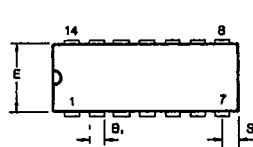
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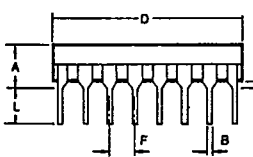
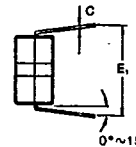
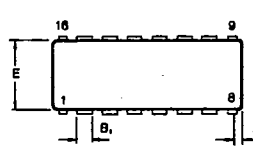
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PACKAGE DIMENSIONS

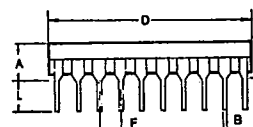
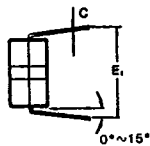
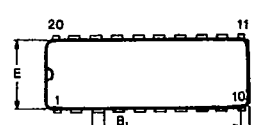
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2. CERAMIC PACKAGES**14-Pin Ceramic DIP Units: mm**

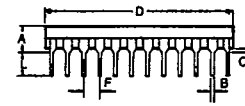
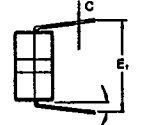
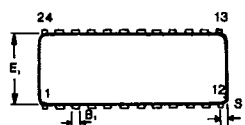
Dim	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	8.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

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	8.10	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	8.10	8.60
E ₁	7.77	7.98
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	32.84
E	7.24	7.75
E ₁	7.77	7.98
F	2.54	
L	3.73	4.01
Q	0.508	1.778
S	1.85	1.93



SAMSUNG SEMICONDUCTOR

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