KS54AHCT / KS74AHCT 125/126

Quad 3-State Buffers

FEATURES

- Function, pin-out, speed and drive compatibility with 54/74ALS logic family
- Low power consumption characteristic of CMOS
- 3-State outputs with drive current (I_{OL} = 24 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°C
  KS54AHCT: −55°C to +125°C
- Package options include plastic "small outline" packages, standard plastic and ceramic 300-mil DIPs

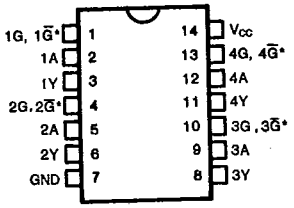
DESCRIPTION

These bus buffers feature four independent line drivers with 3-state outputs. The output enable functions for the '125 buffers are active-low, while those for '126 are active high.

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.

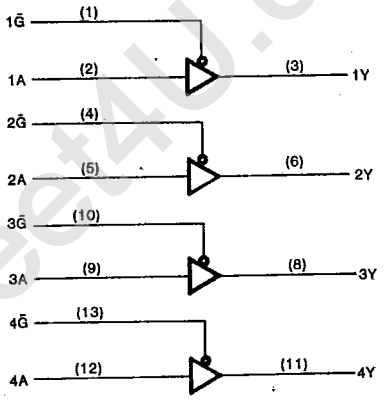
PIN CONFIGURATION



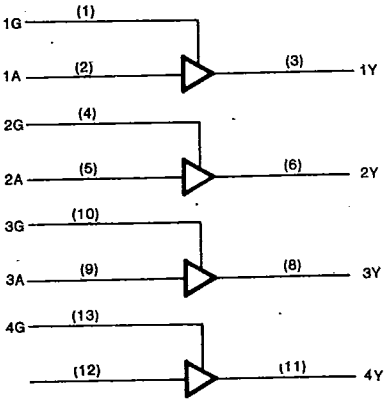
*$\overline{G}$ for '125: G for '126

LOGIC DIAGRAMS

'125



'126



FUNCTION TABLES

'125

Inputs		Output
A	$\overline{G}$	Y
H	L	H
L	L	L
X	H	Z

'126

Inputs		Output
A	G	Y
H	H	H
L	H	L
X	L	Z

KS54AHCT KS74AHCT 125/126 Quad 3-State Buffers

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
($-0.5V < V_O < V_{CC} + 0.5V$) ..... ±70 mA
Continuous Current Through
V_{CC} or GND pins ..... ±250 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 Conditions

Supply Voltage, V_{CC} ..... 4.5V to 5.5V
DC Input & Output Voltages*, V_{IN}, V_{OUT} .. 0V to V_{CC}
Operating Temperature
Range KS74AHCT: −40°C to +85°C
KS54AHCT: −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±10% Unless Otherwise Specified)

Characteristic	Symbol	Test Conditions	T_a=25°C	KS74AHCT T_a=−40°C to +85°C	KS54AHCT T_a=−55°C to +125°C	Unit
			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} $I_O=-20\mu A$ $I_O=-6mA$	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} $I_O=20\mu A$ $I_O=12mA$ $I_O=24mA$	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 $I_{OUT}=0\mu A$		8.0	80.0	160.0	μA
Additional Worst Case Supply Current	ΔI_{CC}	per input pin $V_I=2.4V$ other inputs: at V_{CC} or GND $I_{OUT}=0\mu A$		2.7	2.9	3.0	mA

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AC ELECTRICAL CHARACTERISTICS (Input t_r, t_f≤2 ns), AHCT125, AHCT126

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	Min	Max	Min	Max	
Propagation Delay, A to Y	t_{PLH}	C_L=50pF C_L=150pF		6 9		10 15		12 18	ns
	t_{PHL}	C_L=50pF C_L=150pF		6 9		10 15		12 18	
Output Enable Time Enable to Y	t_{PZH}	R_L=1kΩ	C_L=50pF C_L=150pF	11 14		18 23		22 28	ns
	t_{PZL}		C_L=50pF C_L=150pF	11 14		18 23		22 28	
Output Disable Time, Enable to Y	t_{PHZ}	R_L=1kΩ C_L=50pF		13		18		22	ns
	t_{PLZ}			13		18		22	
Input Capacitance	C_{IN}			5					pF
Output Capacitance	C_{OUT}	Output disabled		10					pF
Power Dissipation Capacitance* (per stage)	C_{PD}	G or $\overline{G}$=V_{CC} G or $\overline{G}$=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.

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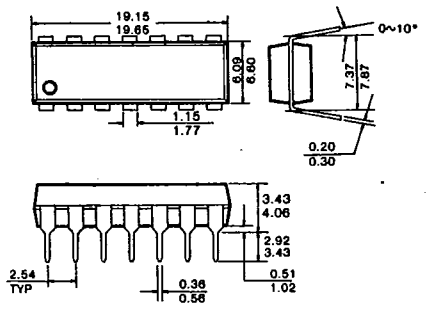
PACKAGE DIMENSIONS

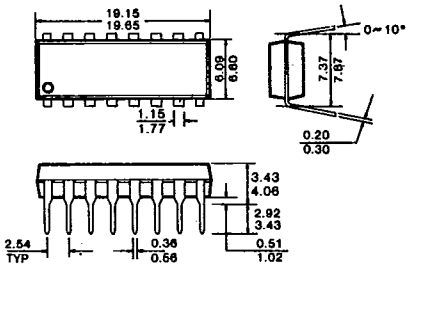
T-90-20

1. PLASTIC PACKAGES

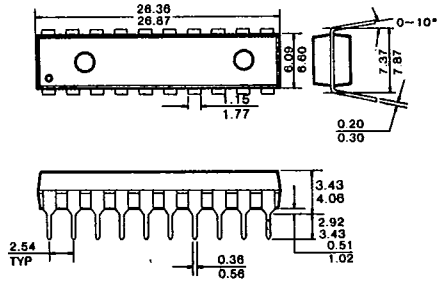
14-Pin Plastic DIP **Units: mm**



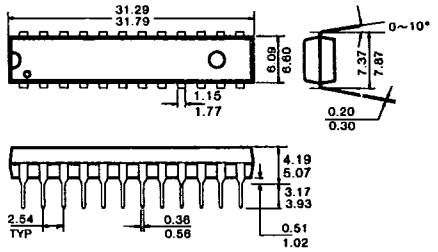
16-Pin Plastic DIP **Units: mm**



20-Pin Plastic DIP **Units: mm**



24-Pin Plastic DIP **Units: mm**



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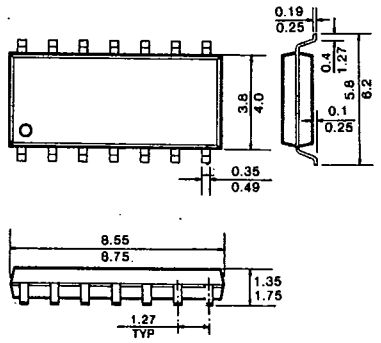
PACKAGE DIMENSIONS

T-90-20

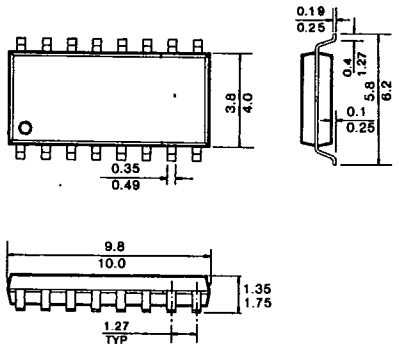
14-Pin SOP

Unit: mm



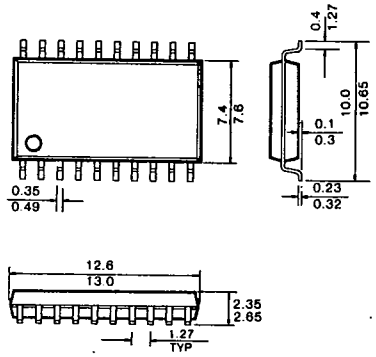
16-Pin SOP

Unit: mm



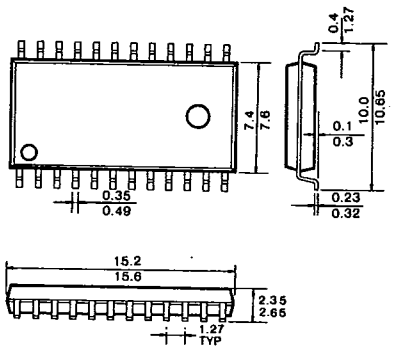
20-Pin SOP

Unit: mm



24-Pin SOP

Unit: mm

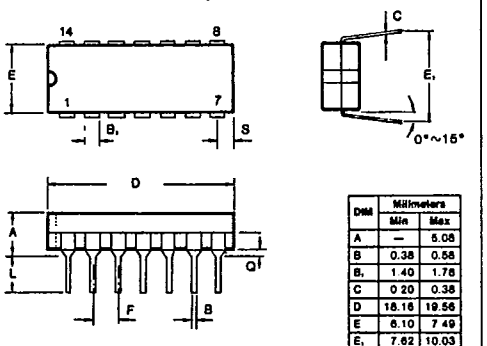


PACKAGE DIMENSIONS

T-90-20

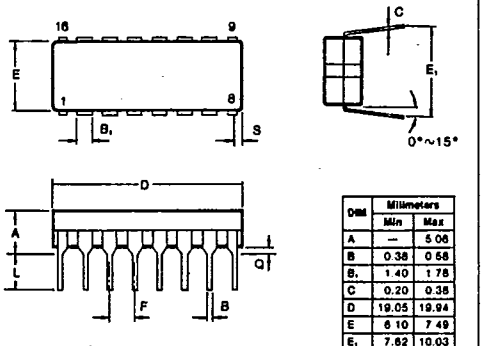
2. CERAMIC PACKAGES

14-Pin Ceramic DIP Units: mm



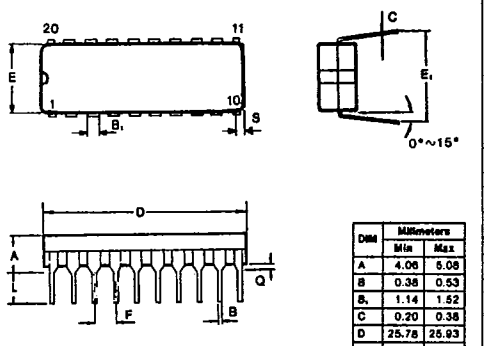
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B1	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	6.10	7.49
E1	7.62	10.03
F	2.54	
L	3.16	4.19
Q	0.51	1.02
S	1.91	2.29

16-Pin Ceramic DIP Units: mm



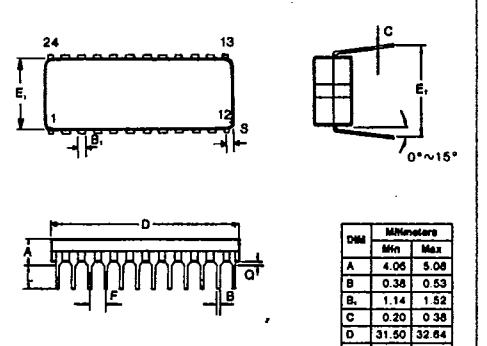
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B1	1.40	1.78
C	0.20	0.38
D	19.05	19.94
E	6.10	7.49
E1	7.62	10.03
F	2.54	
L	3.16	4.19
Q	0.51	1.02
S	0.51	1.14

20-Pin Ceramic DIP Units: mm



DIM	Millimeters	
	Min	Max
A	4.06	5.08
B	0.38	0.53
B1	1.14	1.52
C	0.20	0.38
D	25.78	25.93
E	6.10	6.60
E1	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
B1	1.14	1.52
C	0.20	0.38
D	31.50	32.64
E	7.24	7.75
E1	7.77	7.98
F	2.54	
L	3.73	4.01
Q	0.508	1.778
S	1.65	1.93

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