

KS54AHCT 245

KS74AHCT

Octal Bus Transceivers with 3-State Outputs

T-52-31

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 ($I_{OL} = 24 \text{ mA}$ @ $V_{OL} = 0.5\text{V}$) 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 $+125^{\circ}\text{C}$
- Package options include plastic "small outline" packages, standard plastic and ceramic 300-mil DIPs

DESCRIPTION

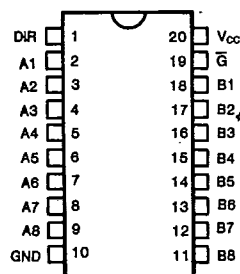
These high-speed octal bus transceivers are designed for synchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

The devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input ($\bar{G}$) can be used to disable the device so that the buses are effectively isolated.

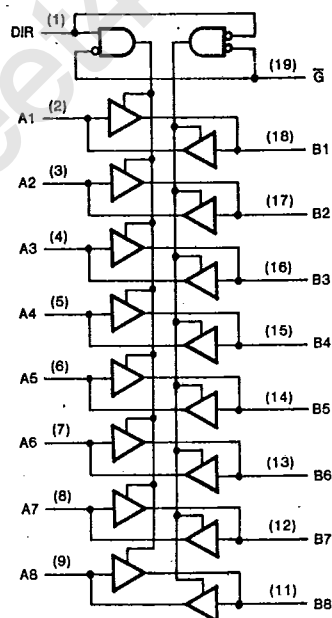
These devices provide speeds and drive capability equivalent to their ALSTTL counterparts and yet maintain CMOS power levels. The input and output voltage levels allow direct interface with TTL, NMOS and CMOS devices without any external components.

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

PIN CONFIGURATION



LOGIC DIAGRAM



FUNCTION TABLE

Inputs		Operation
$\bar{G}$	DIR	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	Isolation



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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 $+150^\circ\text{C}$
 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): $-12\text{mW}/^\circ\text{C}$ from 65°C to 85°C
 Ceramic Package (J): $-12\text{mW}/^\circ\text{C}$ 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 $+85^\circ\text{C}$
 KS54AHCT: -55°C to $+125^\circ\text{C}$

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		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
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



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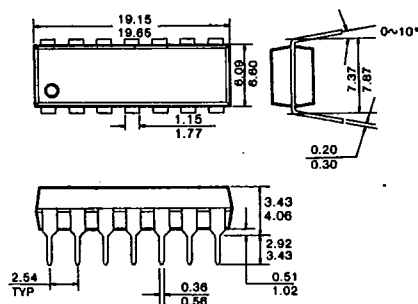
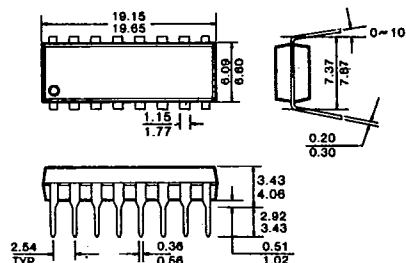
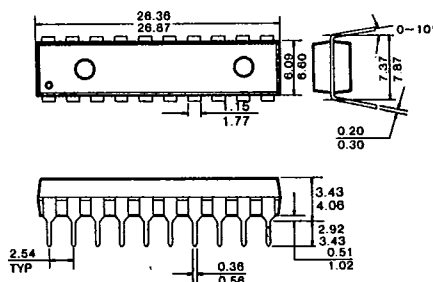
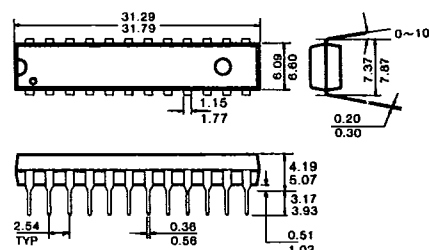
AC ELECTRICAL CHARACTERISTICS (Input t_r , $t_f \leq 2$ ns), AHCT245

Characteristic	Symbol	Conditions†	$T_A = 25^\circ\text{C}$ $V_{CC} = 5.0\text{V}$	KS74AHCT $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ $V_{CC} = 5.0\text{V} \pm 10\%$		KS54AHCT $T_A = -55^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 5.0\text{V} \pm 10\%$		Unit
			Typ	Min	Max	Min	Max	
Propagation Delay, A to B or B to A	t_{PLH}	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	6 9		10 15		14 20	ns
	t_{PHL}	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	6 9		10 15		14 20	
Output Enable Time $\bar{G}$ to A or B	t_{PZH}	$R_L = 1\text{k}\Omega$	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	12 15	20 25		25 31	ns
	t_{PZL}		$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	12 17	20 25		25 31	
Output Disable Time, $\bar{G}$ to A or B	t_{PHZ}	$R_L = 1\text{k}\Omega$	13		18		22	ns
	t_{PLZ}	$C_L = 50\text{pF}$	13		18		22	
Input Capacitance	C_{IN}		5					pF
Output Capacitance	C_{OUT}	Output Disabled	10					pF
Power Dissipation Capacitance*	C_{PD}	$\bar{G} = V_{CC}$ (per stage)	5					pF
		$\bar{G} = \text{GND}$	30					

* 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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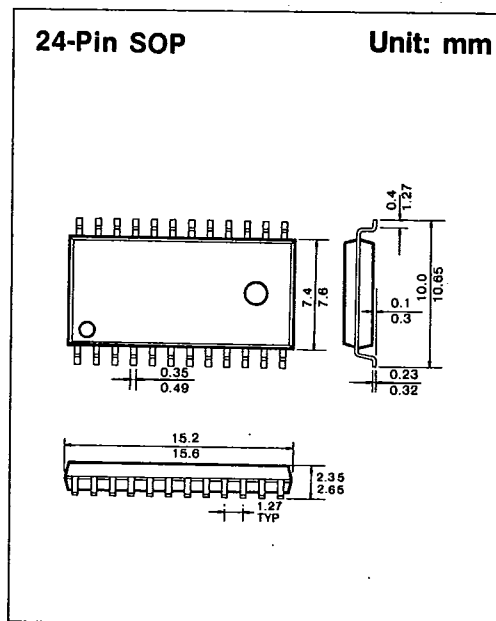
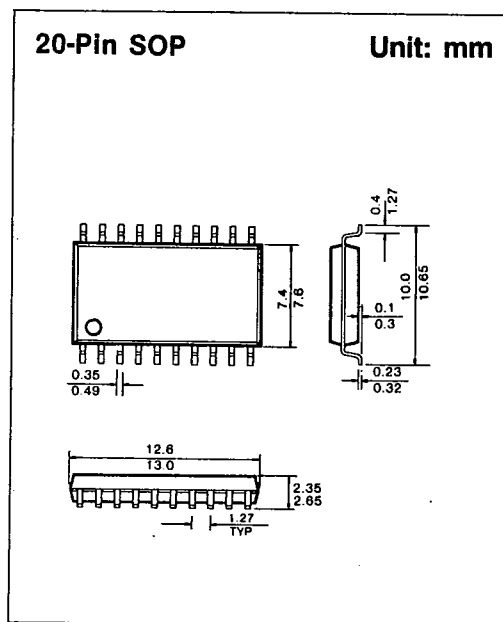
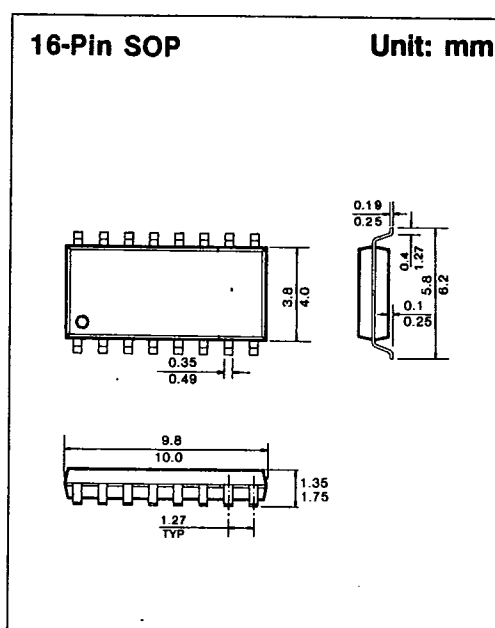
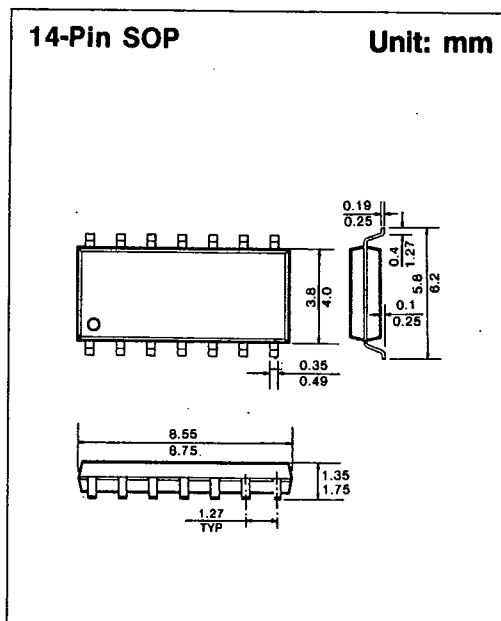
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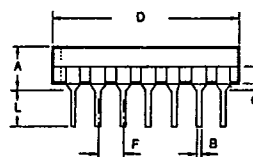
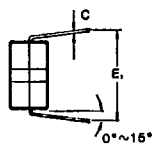
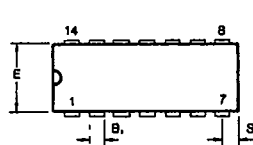
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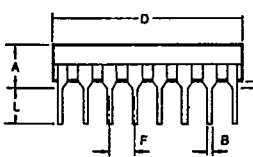
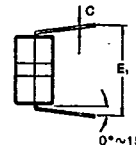
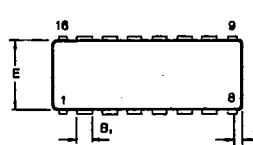


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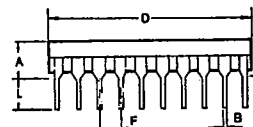
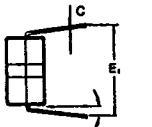
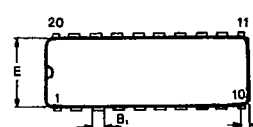
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2. CERAMIC PACKAGES**14-Pin Ceramic DIP Units: mm**

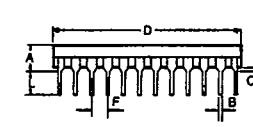
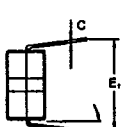
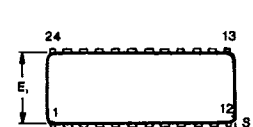
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	8.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

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



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