

KS54AHCT 658/659

KS74AHCT

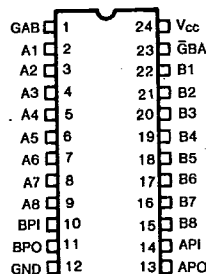
Octal Bus Transceivers with Parity T-52-31

Preliminary Specifications

FEATURES

- Bus Transceivers with Inverting Outputs ('658) or True Outputs ('659)
- Generates a Parity Bit for A Bus and B Bus
- Easily Cascadable
- Internal Active Pull-Ups and Pull-Downs
- 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

PIN CONFIGURATION



DESCRIPTION

These octal bus transceivers are designed for asynchronous, bidirectional communication between data buses. The devices transmit data from the A Bus to the B Bus, or from the B Bus to the A Bus, depending on the levels at the direction control inputs, GAB and GBA. These devices also generate parity outputs, APO and BPO, which reflect the number of high levels at the A Bus and B Bus, respectively, taking into account the parity inputs API and BPI.

The bidirectional I/O ports feature active circuits on the input stage that, when the output shared by that pin is disabled, will maintain the input in the last state taken by the output. This state will be maintained until changed by activity on the bus. The advantage of this arrangement is that when all outputs on the bus are disabled, the inputs will be prevented from floating, resulting in minimum power dissipation and minimum susceptibility to noise. This eliminates any need for external pull-up or pull-down resistors. The parity inputs API and BPI have similar circuits.

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.

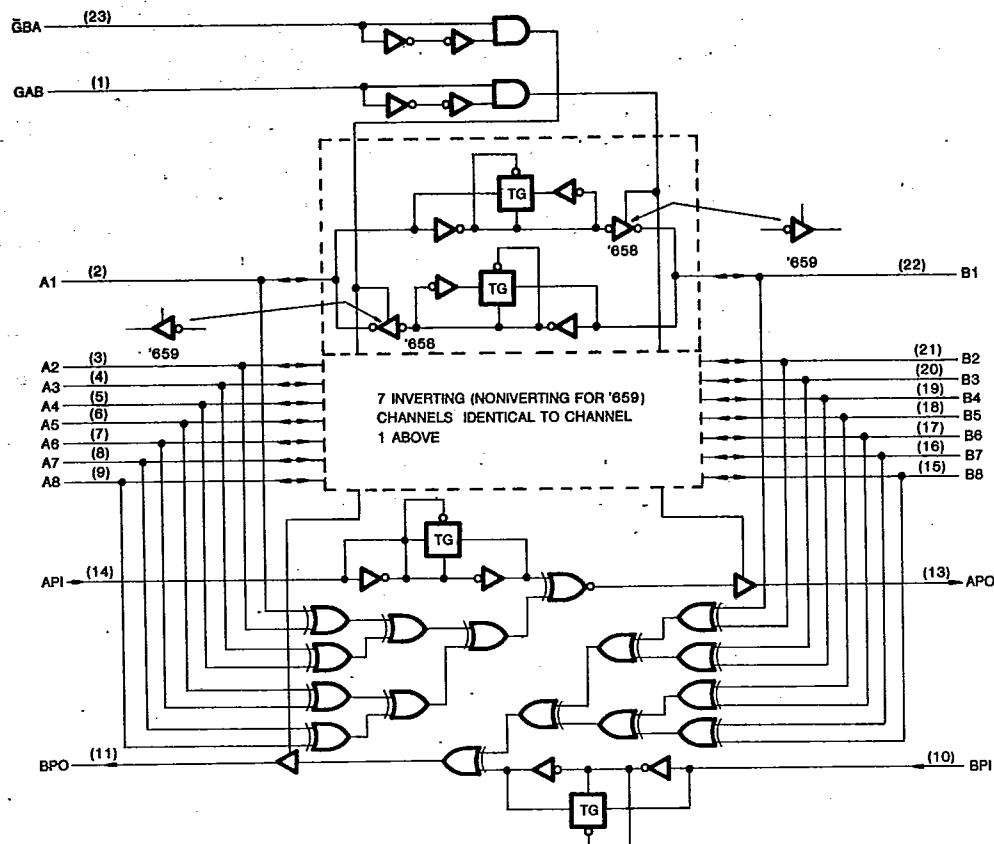
All inputs and outputs are protected from damage due to static discharge by internal diode clamps to V_{cc} and ground.

FUNCTION TABLE

CONTROL INPUTS		NUMBER OF HIGH INPUTS ON A BUS AND API	NUMBER OF HIGH INPUTS ON B BUS AND BPI	OUTPUTS		OPERATION	
GBA	GAB			APO	BPO	'658	'659
L	L	X	0, 2, 4, 6, 8	Z	H	$\bar{B}$ Data to A Bus	B Data to A Bus
		X	1, 3, 5, 7, 9	Z	L		
H	H	0, 2, 4, 6, 8	X	H	Z	$\bar{A}$ Data to B Bus	A Data to B Bus
		1, 3, 5, 7, 9	X	L	Z		
H	L	X	X	Z	Z	Isolation	Isolation
L	H	X	0, 2, 4, 6, 8		H	$\bar{B}$ Data to A Bus, $\bar{A}$ Data to B Bus	B Data to A Bus, A Data to B Bus
		X	1, 3, 5, 7, 9		L		
		0, 2, 4, 6, 8	X	H			
		1, 3, 5, 7, 9	X	L			



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KS54AHCT 658/659
KS74AHCT
Octal Bus Transceivers
with Parity
LOGIC DIAGRAM

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)


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DC ELECTRICAL CHARACTERISTICS ($V_{CC}=5V \pm 10\%$ Unless Otherwise Specified)

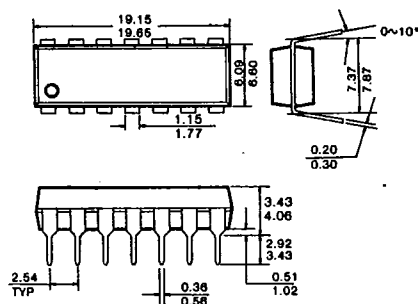
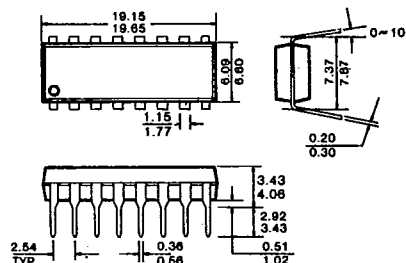
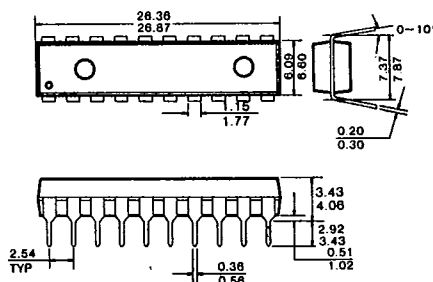
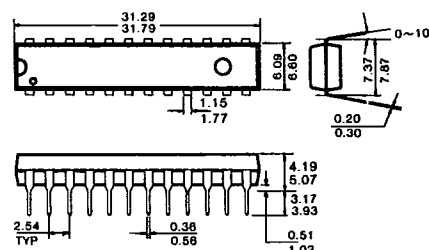
Characteristic	Symbol	Test Conditions	T _a = 25°C		KS74AHCT	KS54AHCT	Unit
					T _a = -40°C to +85°C	T _a = -55°C to +125°C	
			Typ	Guaranteed Limits			
Minimum High-Level Input Voltage	V _{IH}			2.0	2.0	2.0	V
Maximum Low-Level Input Voltage	V _{IL}			0.8	0.8	0.8	V
Minimum High-Level Output Voltage	V _{OH}	V _{IN} =V _{IH} or V _{IL} I _O =-20μA I _O =-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

AC ELECTRICAL CHARACTERISTICS (Input $t_r, t_f \leq 2$ ns, AHCT658, AHCT659)

AC ELECTRICAL CHARACTERISTICS (Input t_r , $t_f \leq 2$ ns), AHCT1658, AHCT1659									
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 or B to B or A	t_{PLH}	$C_L = 50\text{pF}$		11		18		22	ns
		$C_L = 150\text{pF}$		14		23		28	
	t_{PHL}	$C_L = 50\text{pF}$		11		18		22	ns
		$C_L = 150\text{pF}$		14		23		28	
Propagation Delay, A or B to APO or BPO	t_{PLH}	$C_L = 50\text{pF}$		16		27		32	ns
		$C_L = 150\text{pF}$		19		32		38	
	t_{PHL}	$C_L = 50\text{pF}$		16		27		32	ns
		$C_L = 150\text{pF}$		19		32		38	
Propagation Delay, API or BPI to APO or BPO	t_{PLH}	$C_L = 50\text{pF}$		11		18		22	ns
		$C_L = 150\text{pF}$		14		23		28	
	t_{PHL}	$C_L = 50\text{pF}$		11		18		22	ns
		$C_L = 150\text{pF}$		14		23		28	
Enable Time, GAB or GBA to APO or BPO	t_{PZH}	$R_L = 1\text{k}\Omega$	$C_L = 50\text{pF}$	16		27		32	ns
			$C_L = 150\text{pF}$	19		32		38	
	t_{PZL}	$C_L = 50\text{pF}$	16		27		32	ns	
			$C_L = 150\text{pF}$	19		32			38
Disable Time, GAB or GBA to APO or BPO	t_{PLZ}	$R_L = 1\text{k}\Omega$		16		27		32	ns
	t_{PHZ}	$C_L = 50\text{pF}$		16		27		32	pF
Input Capacitance	C_{IN}			5					pF
Output Capacitance	C_{OUT}								pF
Power Dissipation Capacitance*	C_{PD}								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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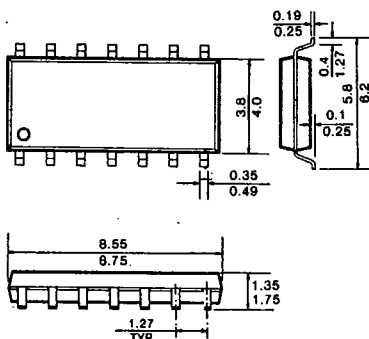
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PACKAGE DIMENSIONS

T-90-20

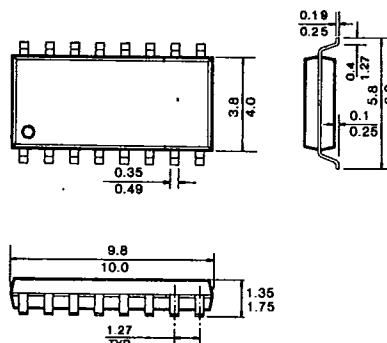
14-Pin SOP

Unit: mm



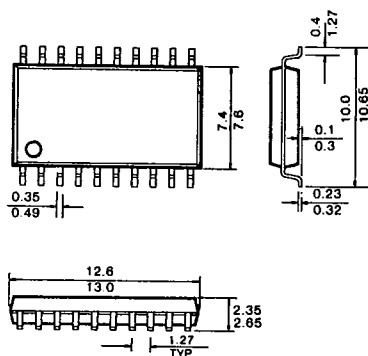
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Unit: mm



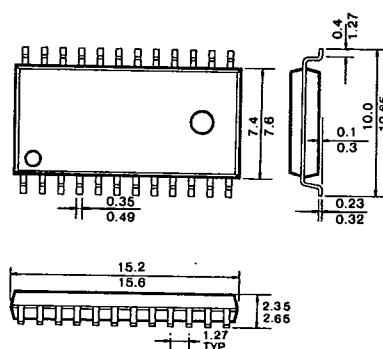
20-Pin SOP

Unit: mm



24-Pin SOP

Unit: mm



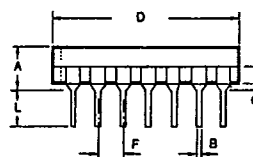
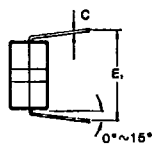
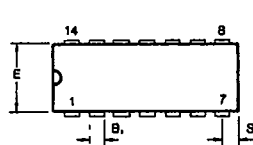
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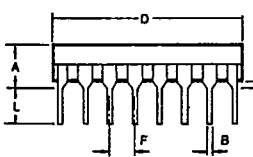
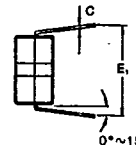
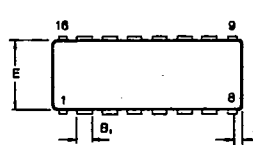
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PACKAGE DIMENSIONS

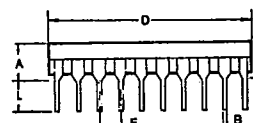
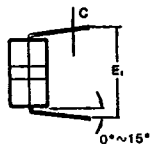
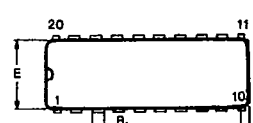
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2. CERAMIC PACKAGES**14-Pin Ceramic DIP Units: mm**

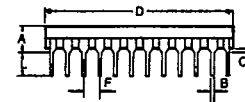
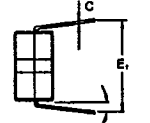
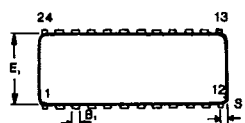
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	8.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

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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