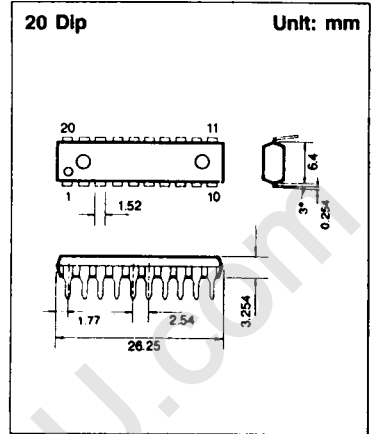


Octal Bus Transceivers

These high-speed octal bus transceivers are designed for asynchronous two-way communication between data buses. A direction control input (DIR) controls the flow direction of data. When DIR is high, data flows from the A inputs to the B outputs. When DIR is low, data flows from B to A. The '643 transfers inverted data from the A bus to the B bus and non-inverted data from the B bus to the A bus. The '640 transfers inverted data in both directions.

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.

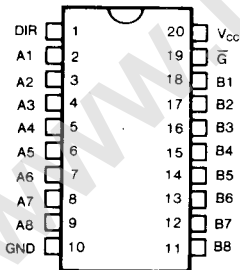
All inputs and outputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and ground.



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 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

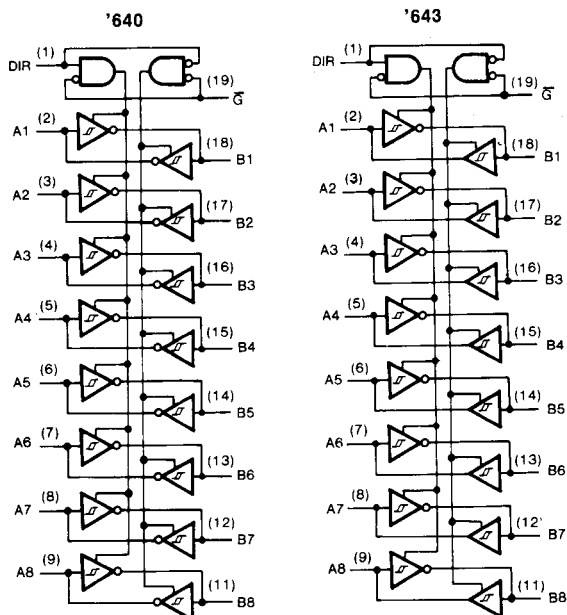
PIN CONFIGURATION



FUNCTION TABLE

Control Inputs		Operation	
G	DIR	'640	'643
L	L	Inverted data transmitted from Bus B to Bus A	Data transmitted from Bus B to Bus A
L	H	Inverted data transmitted from Bus A to Bus B	Inverted data transmitted from Bus A to Bus B
H	X	Buses isolated (High-impedance state)	Buses isolated (High-impedance state)

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	$^\circ C$

* 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/ $^\circ C$ from 65 $^\circ C$ to 85 $^\circ C$
 Ceramic Package (J): -12mW/ $^\circ C$ from 100 $^\circ C$ to 125 $^\circ C$

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 -55	+85 +125	°C °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±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 (all except I/O Pins)	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), AHCT640, AHCT643

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	Guaranteed Limits			
Maximum Propagation Delay, A to B, or B to A	t_{PLH}	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	7 13	11 20	14 25	ns	
	t_{PHL}	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	7 13	11 20	14 25		
Maximum Output Enable Time, \bar{G} or DIR to A or B	t_{PZH}	$R_L = 1\text{k}\Omega$	$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	14 20	23 32	28 39	ns
	t_{PZL}		$C_L = 50\text{pF}$ $C_L = 150\text{pF}$	14 20	23 32	28 39	
Maximum Output Disable Time, \bar{G} or DIR to A or B	t_{PHZ}	$R_L = 1\text{k}\Omega$ $C_L = 50\text{pF}$		10	16	19	ns
	t_{PLZ}			10	16	19	
Maximum Input Capacitance	C_{IN}		5			pF	
Maximum Output Capacitance	C_{OUT}	Output Disabled	10			pF	
Power Dissipation Capacitance* (per stage)	C_{PD}	$\bar{G} = V_{CC}$	5			pF	
		$\bar{G} = \text{GND}$	30				

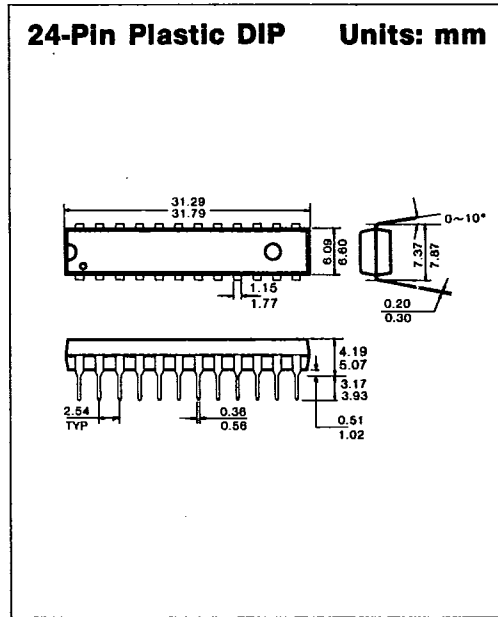
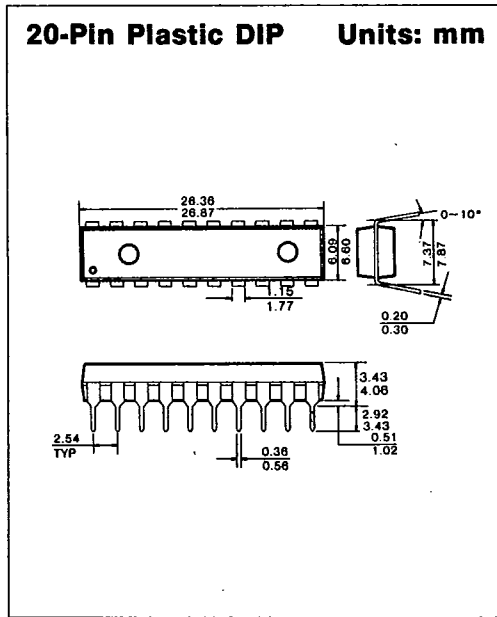
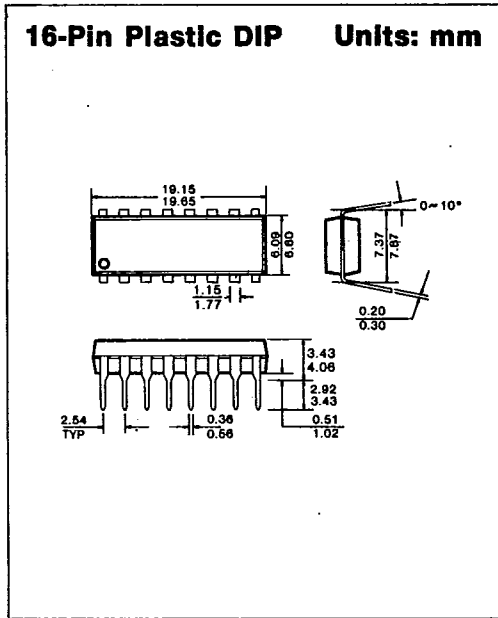
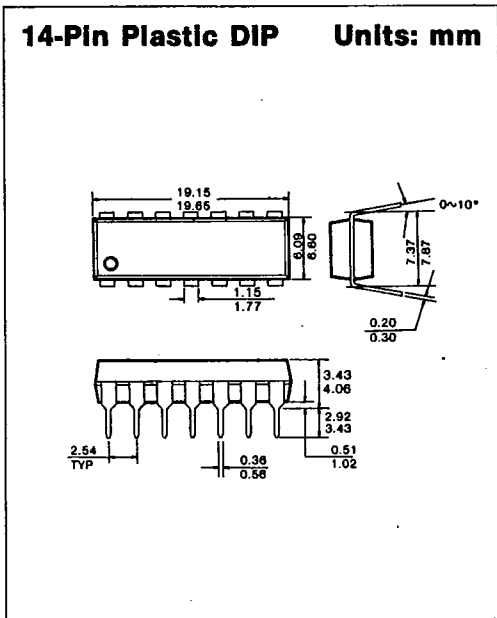
* C_{PD} determines the no-load dynamic power dissipation: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$.

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

PACKAGE DIMENSIONS

T-90-20

1. PLASTIC PACKAGES



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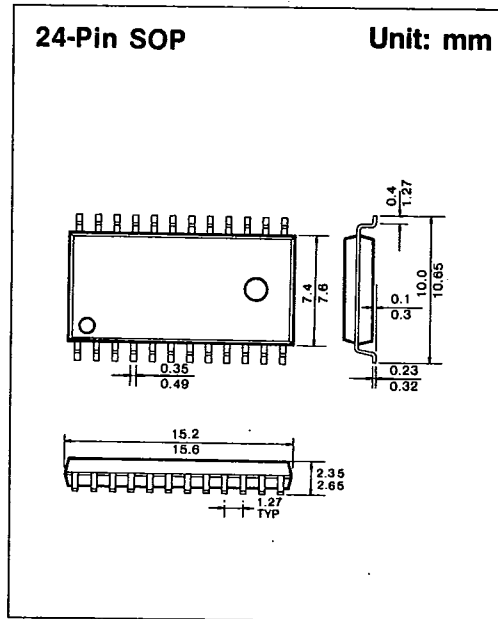
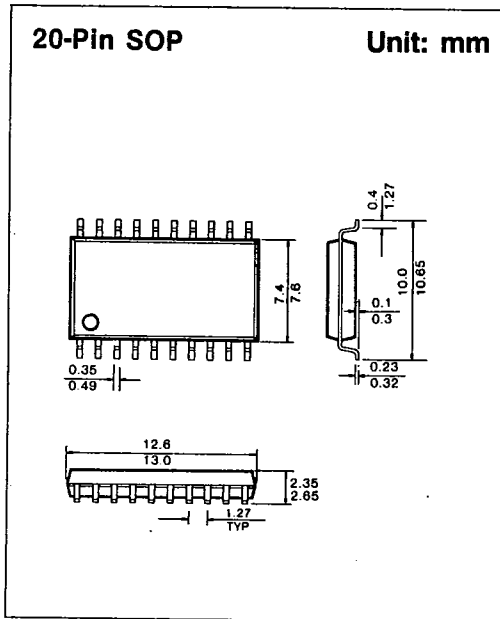
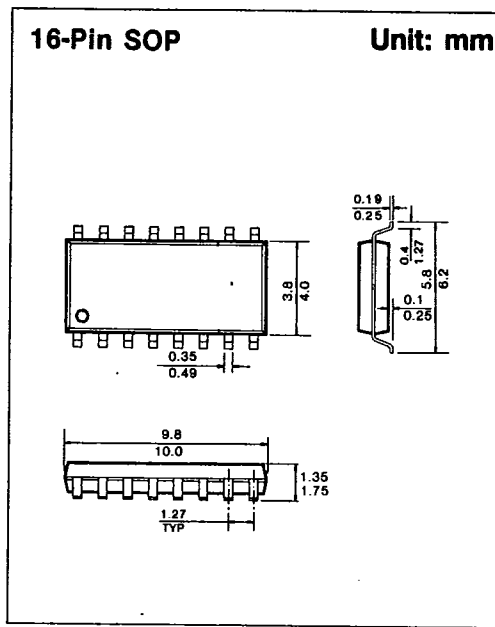
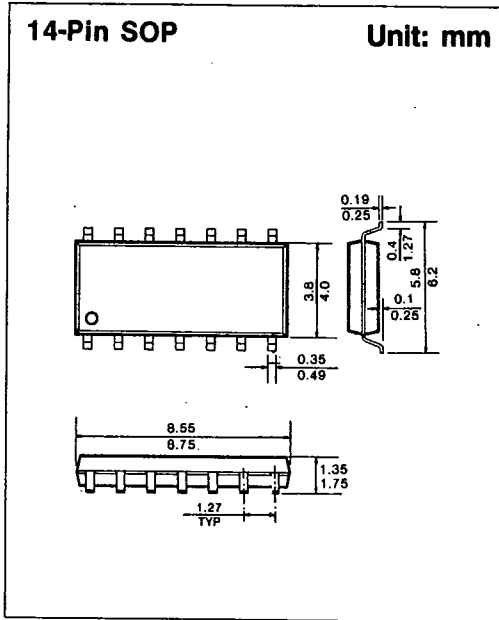
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PACKAGE DIMENSIONS

T-90-20



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
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.58
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	7.88
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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