

KS54AHCT 251
KS74AHCT
1-of-8 Data Selectors/Multiplexers
with 3-State Outputs

T-67-21-51

FEATURES

- Three-State Version of '151
- Three-State Outputs Interface Directly with System Bus
- Performs Parallel-to-Serial Conversion
- Complementary Outputs Provide True and Inverted Data
- 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

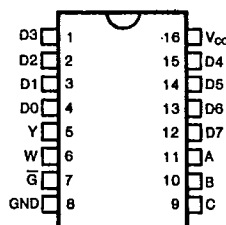
DESCRIPTION

These data selectors/multiplexers contain full binary decoding to select one-of-eight data sources and feature strobe-controlled complementary three-state outputs.

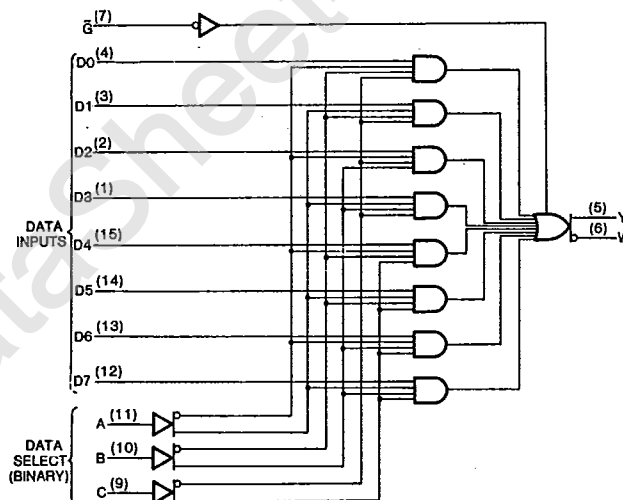
The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state), the low-impedance of the single enabled output will drive the bus line to a high or low logic level. Both outputs are controlled by the strobe ($\bar{G}$). The outputs are disabled when $\bar{G}$ is 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

FUNCTION TABLE

INPUTS				-OUTPUTS	
SELECT	STROBE			Y	W
C B A	$\bar{G}$				
X X X	H			Z	Z
L L L	L			D0	$\bar{D}0$
L L H	L			D1	$\bar{D}1$
L H L	L			D2	$\bar{D}2$
L H H	L			D3	$\bar{D}3$
H L L	L			D4	$\bar{D}4$
H L H	L			D5	$\bar{D}5$
H H L	L			D6	$\bar{D}6$
H H H	L			D7	$\bar{D}7$

LOGIC DIAGRAM


SAMSUNG SEMICONDUCTOR

KS54AHCT 251
KS74AHCT
1-of-8 Data Selectors/Multiplexers
with 3-State Outputs T-67-21-51

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 ($V_{CC}=5V \pm 10\%$ 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



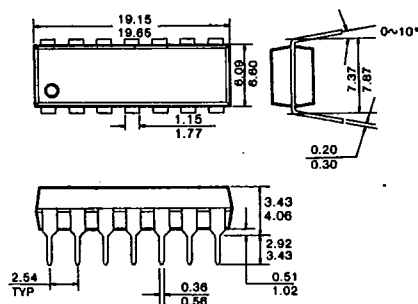
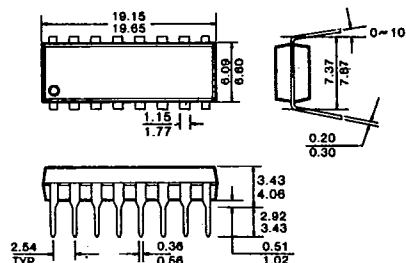
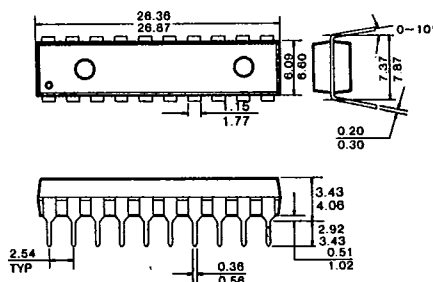
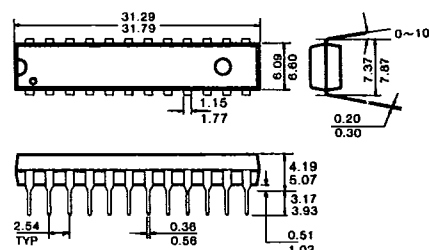
KS54AHCT 251
KS74AHCT**1-of-8 Data Selectors/Multiplexers**
with 3-State Outputs T-67-21-51**AC ELECTRICAL CHARACTERISTICS** (Input $t_r, t_f \leq 2$ ns), AHCT251

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, B or C to Y	t_{PLH}	$C_L = 50\text{pF}$	13		21		25	ns
		$C_L = 150\text{pF}$	16		26		31	
	t_{PHL}	$C_L = 50\text{pF}$	13		21		25	ns
		$C_L = 150\text{pF}$	16		26		31	
Propagation Delay, A, B or C to W	t_{PLH}	$C_L = 50\text{pF}$	15		24		27	ns
		$C_L = 150\text{pF}$	18		29		33	
	t_{PHL}	$C_L = 50\text{pF}$	15		24		27	ns
		$C_L = 150\text{pF}$	18		29		33	
Propagation Delay, Any D to Y	t_{PLH}	$C_L = 50\text{pF}$	9		15		18	ns
		$C_L = 150\text{pF}$	12		20		24	
	t_{PHL}	$C_L = 50\text{pF}$	9		15		18	ns
		$C_L = 150\text{pF}$	12		20		24	
Propagation Delay, Any D to W	t_{PLH}	$C_L = 50\text{pF}$	8		15		18	ns
		$C_L = 150\text{pF}$	11		20		24	
	t_{PHL}	$C_L = 50\text{pF}$	8		15		18	ns
		$C_L = 150\text{pF}$	11		20		24	
Output Enable Time, $\bar{G}$ to Y or W	t_{PZH}	$C_L = 50\text{pF}$	11		18		22	ns
		$C_L = 150\text{pF}$	14		23		28	
	t_{PZL}	$C_L = 50\text{pF}$	11		18		22	ns
		$C_L = 150\text{pF}$	14		23		28	
Output Disable Time, $\bar{G}$ to Y or W	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}							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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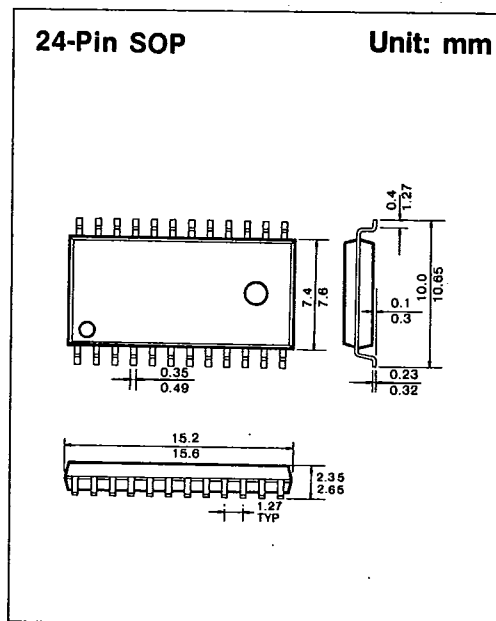
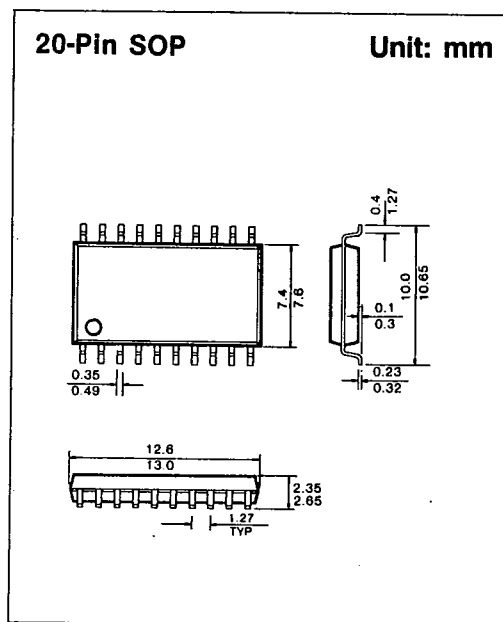
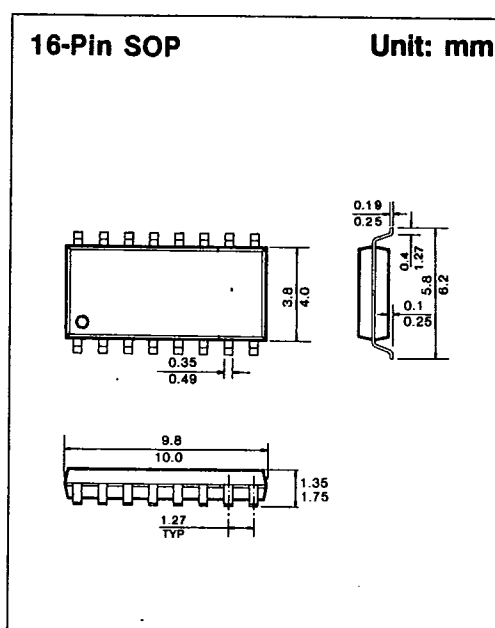
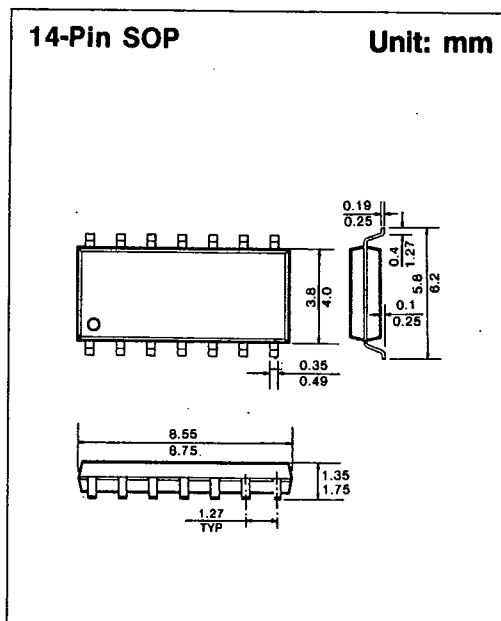
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PACKAGE DIMENSIONS

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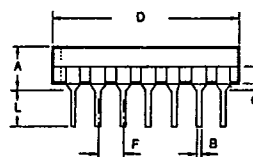
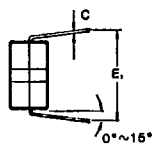
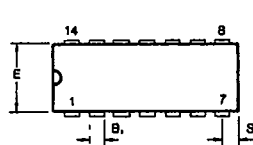
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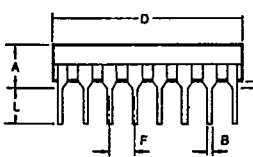
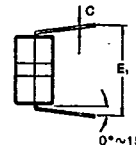
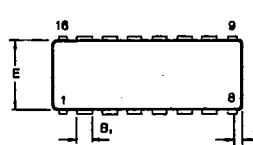
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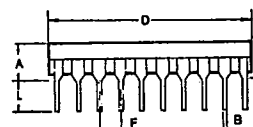
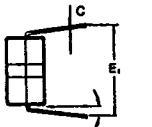
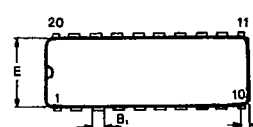
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2. CERAMIC PACKAGES**14-Pin Ceramic DIP Units: mm**

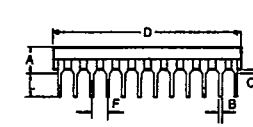
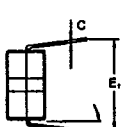
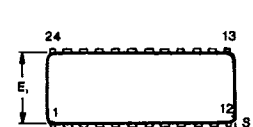
DIM	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B ₁	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	8.10	7.49
E ₁	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

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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1677

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783