

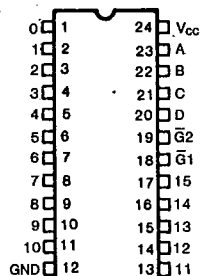
KS54AHCT  
KS74AHCT154  
4-Line to 16-Line Decoders/Demultiplexers

T-67-21-55

## FEATURES

- Decodes 4 Binary-Coded Inputs into One of 16 Mutually Exclusive Outputs
- Performs the Demultiplexing Function by Distributing Data From One Input to Any One of 16 Outputs
- Function, pin-out, speed and drive compatibility with 54/74ALS logic family
- Low power consumption characteristic of CMOS
- High-Drive-Current outputs:  
 $I_{OL} = 8 \text{ mA}$  @  $V_{OL} = 0.5 \text{ V}$
- 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:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
KS54AHCT:  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Package options include plastic "small outline" packages, standard plastic and ceramic 300-mil DIPs

## PIN CONFIGURATION



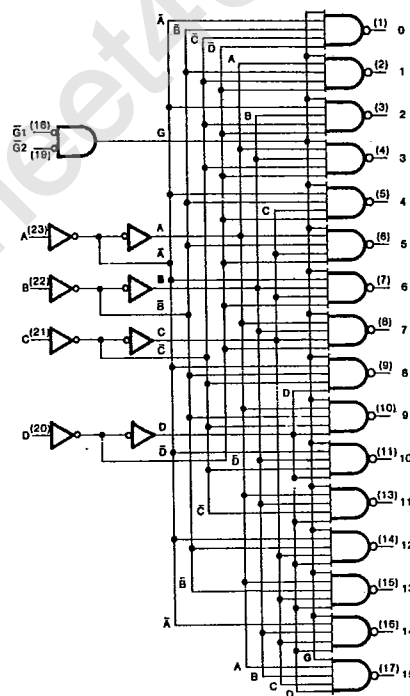
## DESCRIPTION

These monolithic, 4-line to 16-line decoders decode four binary-coded inputs into one of sixteen mutually exclusive outputs when both the strobe inputs,  $\bar{G}_1$  and  $\bar{G}_2$ , are low. The demultiplexing function is performed by using the 4 input lines to address the output line, passing data from one of the strobe inputs with the other strobe input low. When either strobe input is high, all outputs are high. These demultiplexers are ideally suited for implementing high-performance memory decoders.

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.

## LOGIC DIAGRAM



SAMSUNG SEMICONDUCTOR

### 4-Line to 16-Line Decoders/Demultiplexers

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[illegible]

\* Unused inputs must always be tied to an appropriate logic voltage level (either  $V_{CC}$  or GND)



KS54AHCT  
KS74AHCT

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4-Line to 16-Line Decoders/Demultiplexers

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

Characteristic	Symbol	Test Conditions	T <sub>a</sub> = 25°C		KS74AHCT	KS54AHCT		Unit
				Typ	T <sub>a</sub> = -40°C to +85°C	T <sub>a</sub> = -55°C to +125°C		
Minimum High-Level Input Voltage	V <sub>IH</sub>			2.0	2.0	2.0	V	
Maximum Low-Level Input Voltage	V <sub>IL</sub>			0.8	0.8	0.8	V	
Minimum High-Level Output Voltage	V <sub>OH</sub>	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> I <sub>O</sub> =-20μA I <sub>O</sub> =-8mA	V <sub>CC</sub> 4.2	V <sub>CC</sub> -0.1 3.98	V <sub>CC</sub> -0.1 3.84	V <sub>CC</sub> -0.1 3.7	V	
Maximum Low-Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> I <sub>O</sub> =20μA I <sub>O</sub> =4mA I <sub>O</sub> =8mA	0	0.1 0.26 0.39	0.1 0.33 0.5	0.1 0.4	V	
Maximum Input Current	I <sub>IN</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND		±0.1	±1.0	±1.0	μA	
Maximum Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND I <sub>OUT</sub> =0μA		8.0	80.0	160.0	μA	
Additional Worst Case Supply Current	ΔI <sub>CC</sub>	per input pin V <sub>I</sub> =2.4V other Inputs: at V <sub>CC</sub> or GND I <sub>OUT</sub> =0μA		2.7	2.9	3.0	mA	

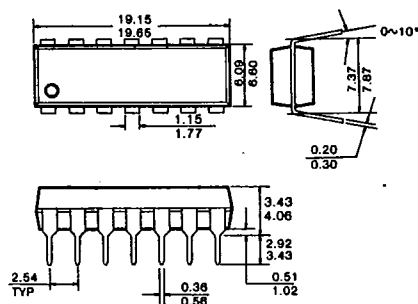
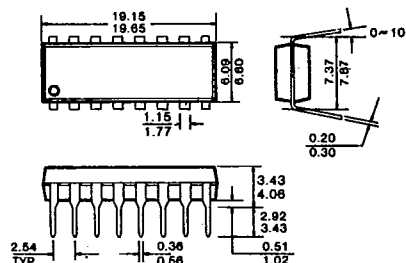
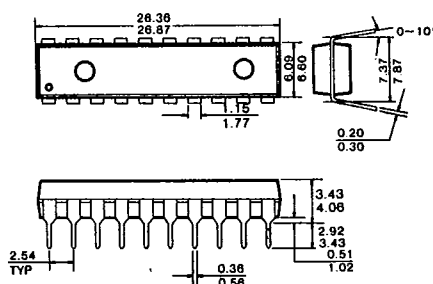
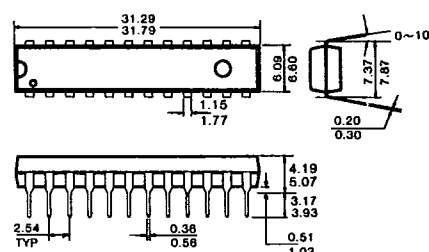
AC ELECTRICAL CHARACTERISTICS (Input  $t_r, t_f \leq 2$  ns), AHCT154

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, C, D to Any Output	$t_{PLH}$	$C_L = 50\text{pF}$	12		20		24	ns
	$t_{PHL}$		12		20		24	
Propagation Delay, G1 or G2 to Any Output	$t_{PLH}$		12		20		24	ns
	$t_{PHL}$		12		20		24	
Input Capacitance	$C_{IN}$		5					pF
Power Dissipation Capacitance*	$C_{PD}$		50					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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**SAMSUNG SEMICONDUCTOR**

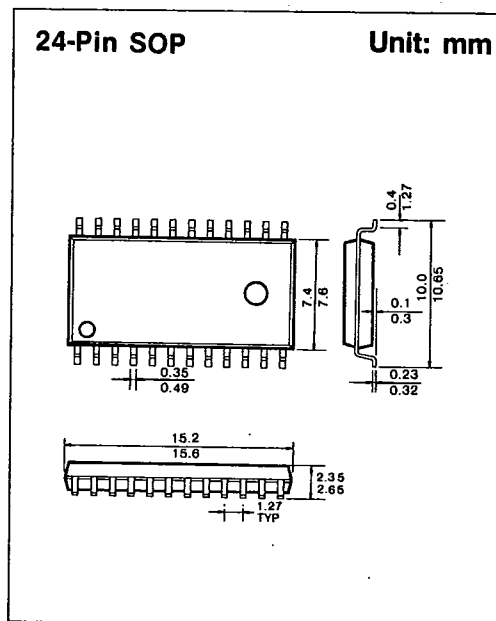
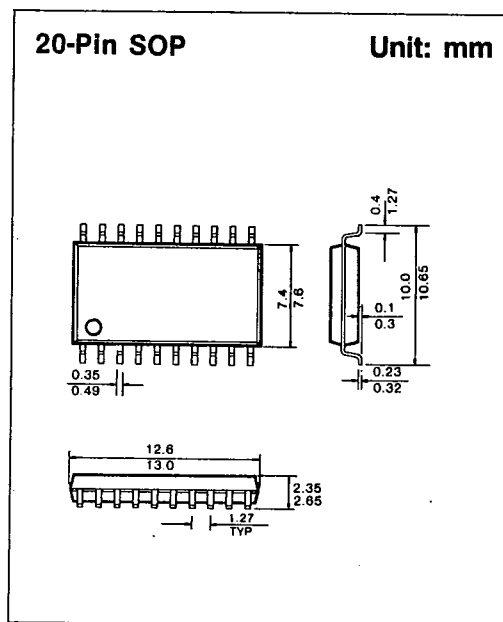
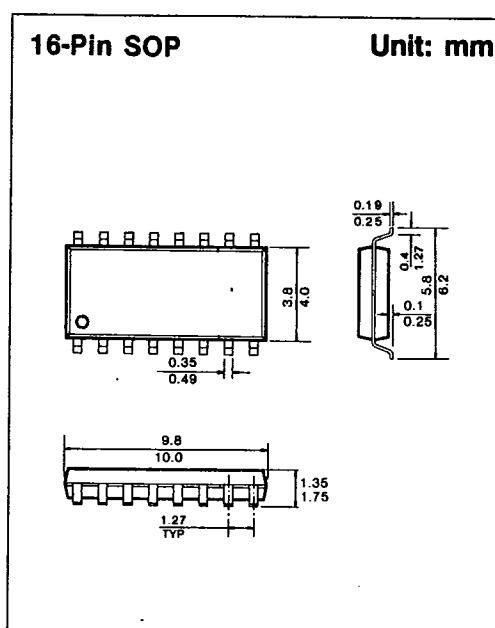
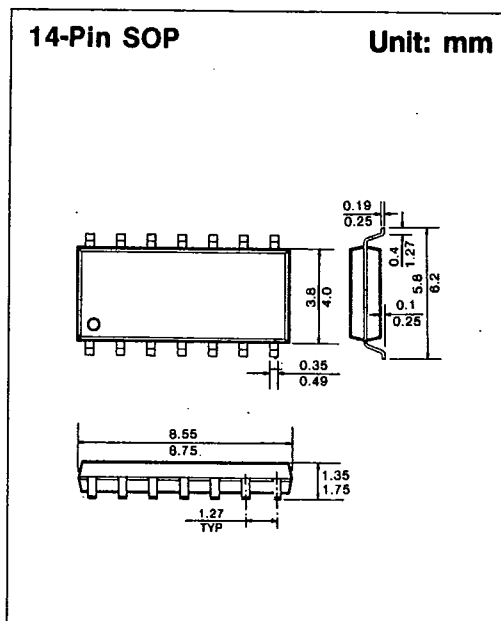
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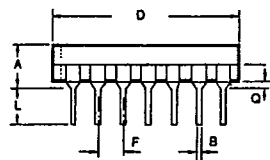
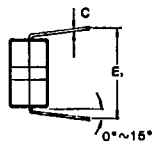
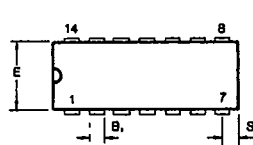
**PACKAGE DIMENSIONS**

*T-90-20*

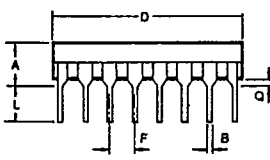
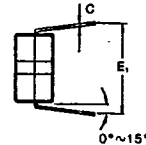
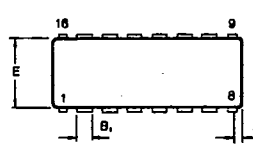


**PACKAGE DIMENSIONS**

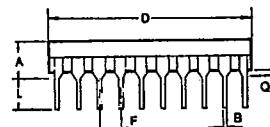
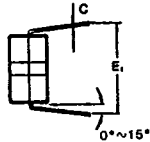
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**2. CERAMIC PACKAGES****14-Pin Ceramic DIP Units: mm**

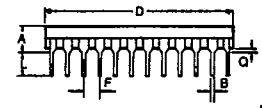
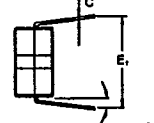
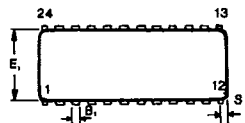
Dim	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B <sub>1</sub>	1.40	1.78
C	0.20	0.38
D	18.16	19.56
E	8.10	7.49
E <sub>1</sub>	7.62	10.03
F	2.54	
L	3.18	4.19
Q	0.51	1.02
S	1.91	2.29

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

Dim	Millimeters	
	Min	Max
A	—	5.08
B	0.38	0.58
B <sub>1</sub>	1.40	1.78
C	0.20	0.38
D	19.05	19.94
E	8.10	7.49
E <sub>1</sub>	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 <sub>1</sub>	1.14	1.52
C	0.20	0.38
D	25.78	26.93
E	8.10	8.60
E <sub>1</sub>	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 <sub>1</sub>	1.14	1.52
C	0.20	0.38
D	31.50	32.84
E	7.24	7.75
E <sub>1</sub>	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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