

SN54HC154, SN74HC154 4-LINE TO 16-LINE DECODERS/DEMULPLEXERS

D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

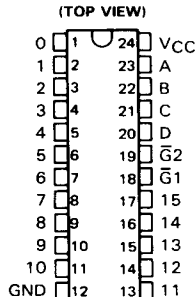
- Decodes 4 Binary-Coded Inputs into One of 16 Mutually Exclusive Outputs
- Performs the Demultiplexing Function by Distributing Data From One Input to Any One of 16 Outputs
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

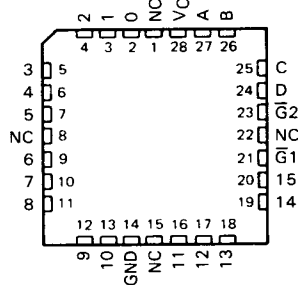
Each of these monolithic, 4-line to 16-line decoders decodes four binary-coded inputs into one of sixteen mutually exclusive outputs when both the strobe inputs, $\overline{G1}$ and $\overline{G2}$, are low. The demultiplexing function is performed by using the 4 input lines to address the output line, 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.

The SN54HC154 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC154 is characterized for operation from -40°C to 85°C .

SN54HC154 . . . JT PACKAGE
SN74HC154 . . . DW OR NT PACKAGE



SN54HC154 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

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HC MOS Devices

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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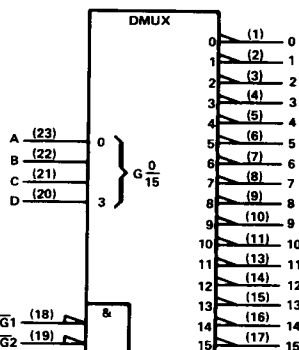
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HCMOS Devices

Pin diagram of the 74VHC04 hex inverters. The chip has 16 pins. Pins 1, 2, 4, and 8 are inputs labeled A, B, C, and D respectively, with corresponding bubble symbols. Pins 10, 11, 13, and 14 are inputs labeled G1, G2, and EN. Pin 15 is the output labeled X/Y. Pin 16 is the output labeled B. The chip is labeled 'X/Y' and 'B'.



FUNCTION TABLE

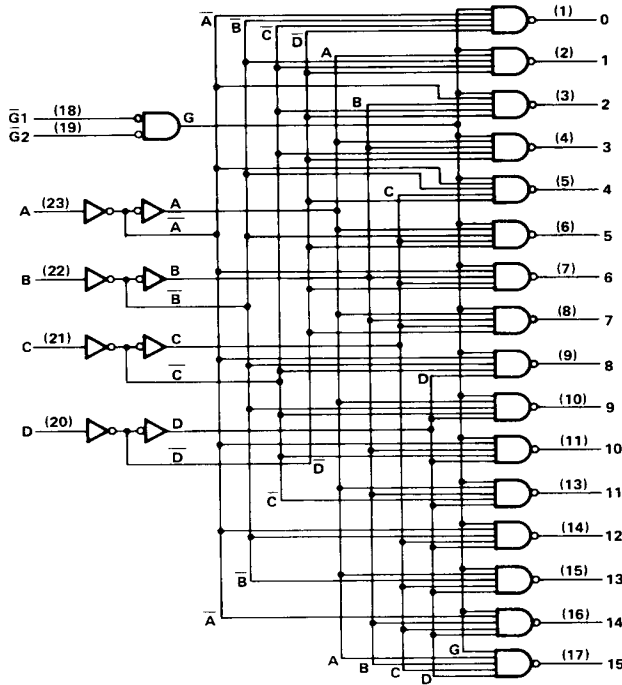
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logic diagram (positive logic)



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HC MOS Devices

Pin numbers shown on logic notation are for DW, JT, or NT packages.

absolute maximum ratings over operating free-air temperature range†

Supply voltage, V_{CC}	 -0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	 ± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	 ± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	 ± 25 mA
Continuous current through V_{CC} or GND pins	 ± 50 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or JT package	 300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: DW or NT package	 260°C
Storage temperature range	 -65°C to 150°C

†Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

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SN54HC154, SN74HC154

4-LINE TO 16-LINE DECODERS/DEMULTIPLEXERS

recommended operating conditions

			SN54HC154			SN74HC154			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage		2	5	6	2	5	6	V
V _{IH}	High-level input voltage	V _{CC} = 2 V	1.5			1.5			V
		V _{CC} = 4.5 V	3.15			3.15			
		V _{CC} = 6 V	4.2			4.2			
V _{IL}	Low-level input voltage	V _{CC} = 2 V	0	0.3		0	0.3		V
		V _{CC} = 4.5 V	0	0.9		0	0.9		
		V _{CC} = 6 V	0	1.2		0	1.2		
V _I	Input voltage		0	V _{CC}		0	V _{CC}		V
V _O	Output voltage		0	V _{CC}		0	V _{CC}		V
t _t	Input transition (rise and fall) times	V _{CC} = 2 V	0	1000		0	1000		ns
		V _{CC} = 4.5 V	0	500		0	500		
		V _{CC} = 6 V	0	400		0	400		
T _A	Operating free-air temperature		-55	125		-40	85		°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN54HC154		SN74HC154		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL} , I _{OH} = -20 µA	2 V	1.9	1.998		1.9		1.9		V
		4.5 V	4.4	4.499		4.4		4.4		
		6 V	5.9	5.999		5.9		5.9		
	V _I = V _{IH} or V _{IL} , I _{OH} = -4 mA	4.5 V	3.98	4.30		3.7		3.84		
V _{OL}	V _I = V _{IH} or V _{IL} , I _{OH} = -5.2 mA	6 V	5.48	5.80		5.2		5.34		V
	V _I = V _{IH} or V _{IL} , I _{OL} = 20 µA	2 V	0.002	0.1		0.1		0.1		
		4.5 V	0.001	0.1		0.1		0.1		
		6 V	0.001	0.1		0.1		0.1		
	V _I = V _{IH} or V _{IL} , I _{OL} = 4 mA	4.5 V	0.17	0.26		0.4		0.33		
I _I	V _I = V _{CC} or 0	6 V	±0.1	±100		±1000		±1000		nA
	V _I = V _{CC} or 0, I _O = 0	6 V		8		160		80		µA
C _i		2 to 6 V	3	10		10		10		pF

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC154		SN74HC154		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, C, or D	Any	2 V		72	180		270		225	ns
			4.5 V		24	36		54		45	
			6 V		20	31		46		38	
t _{pd}	G ₁ or G ₂	Any	2 V		72	180		270		225	ns
			4.5 V		24	36		54		45	
			6 V		20	31		46		38	
t _t		Any	2 V		28	75		110		95	ns
			4.5 V		8	15		22		19	
			6 V		6	13		19		16	

C _{pd}	Power dissipation capacitance	No load, T _A = 25°C	96 pF typ
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NOTE 1: Load circuit and voltage waveforms are shown in Section 1.