

SN54HC157, SN54HC158, SN74HC157, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

D2684, DECEMBER 1982—REVISED SEPTEMBER 1987

- 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

These monolithic data selectors/multiplexers contain inverters and drivers to supply full data selection to the four output gates. A separate strobe input (\bar{G}) is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'HC157 presents true data whereas the 'HC158 presents inverted data.

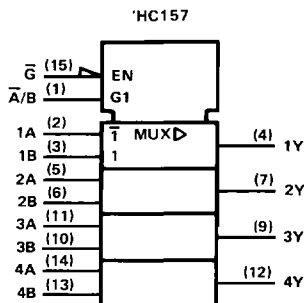
The SN54HC157 and SN54HC158 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC157 and SN74HC158 are characterized for operation from -40°C to 85°C .

FUNCTION TABLE

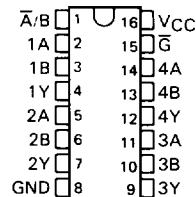
STROBE \bar{G}	SELECT \bar{A}/\bar{B}	DATA		OUTPUT Y	
		A	B	'HC157	'HC158
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

H = high level, L = low level, X = irrelevant

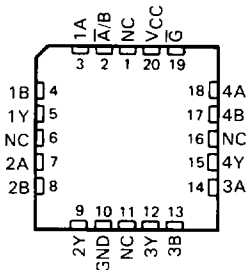
logic symbols[‡]



SN54HC157, SN54HC158 . . . J PACKAGE
SN74HC157, SN74HC158 . . . D/DW[†] OR N PACKAGE
(TOP VIEW)



SN54HC157, SN54HC158 . . . FK PACKAGE
(TOP VIEW)



NC—No internal connection

[†]Contact the factory for D or DW availability.

[‡]These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for D/DW, J, and N packages.

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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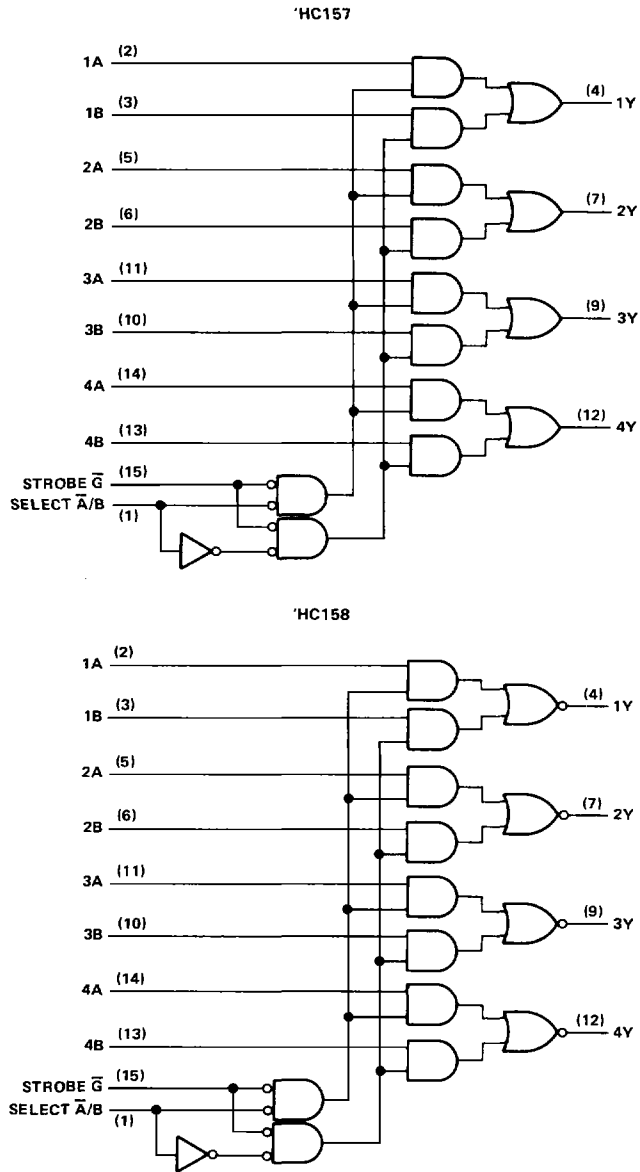
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SN54HC157, SN54HC158, SN74HC157, SN74HC158
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

logic diagrams (positive logic)

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Pin numbers shown are for D/DW, J, and N packages.

SN54HC157, SN54HC158, SN74HC157, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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})	± 35 mA
Continuous current through V_{CC} or GND pins	± 70 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: FK or J package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: D/DW or N 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.

recommended operating conditions

		SN54HC157			SN74HC157			UNIT
		SN54HC158			SN74HC158			
		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		V	
		$V_{CC} = 4.5$ V		0	0.9			
		$V_{CC} = 6$ V		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		ns	
		$V_{CC} = 4.5$ V		0	500			
		$V_{CC} = 6$ V		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}	$T_A = 25^\circ\text{C}$			SN54HC157		SN74HC157		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_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 20$ μA	2 V	0.002	0.1		0.1		0.1	V	
		4.5 V	0.001	0.1		0.1		0.1		
		6 V	0.001	0.1		0.1		0.1		
V_{OL}	$V_I = V_{IH}$ or V_{IL} , $I_{OL} = 6$ mA	4.5 V	0.17	0.26		0.4		0.33	V	
		6 V	0.15	0.26		0.4		0.33		
		6 V	0.15	0.26		0.4		0.33		
I_I	$V_I = V_{CC}$ or 0	6 V	± 0.1	± 100		± 1000		± 1000	nA	
I_{CC}	$V_I = V_{CC}$ or 0, $I_O = 0$	6 V		8		160		80	μA	
C_i		2 to 6 V	3	10		10		10	pF	

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**SN54HC157, SN54HC158, SN74HC157, SN74HC158
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS**

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			SN54HC157 SN54HC158		SN74HC157 SN74HC158		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	2 V		63	125		190		160	ns
			4.5 V		13	25		38		32	
			6 V		11	21		32		27	
t _{pd}	\bar{A}/B	Y	2 V		67	125		190		160	ns
			4.5 V		18	25		38		31	
			6 V		14	21		32		27	
t _{pd}	\bar{C}	Y	2 V		59	115		170		145	ns
			4.5 V		16	23		34		29	
			6 V		13	20		29		25	
t _t		Y	2 V		28	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	

C _{pd}	Power dissipation capacitance	No load, T _A = 25°C	40 pF typ
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switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 150$ pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC157 SN54HC158		SN74HC157 SN74HC158		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	2 V		81	190		290		235	ns
			4.5 V		23	38		58		47	
			6 V		18	33		49		41	
t _{pd}	\bar{A}/B	Y	2 V		81	210		320		260	ns
			4.5 V		23	42		64		52	
			6 V		18	36		54		45	
t _{pd}	\bar{C}	Y	2 V		91	190		290		235	ns
			4.5 V		24	38		58		47	
			6 V		18	33		49		41	
t _t		Y	2 V		45	210		315		265	ns
			4.5 V		17	42		63		53	
			6 V		13	36		53		45	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

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