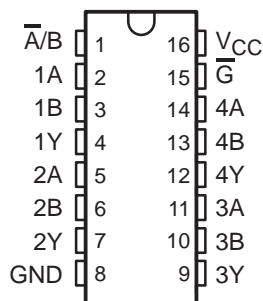


# SN54HC158, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

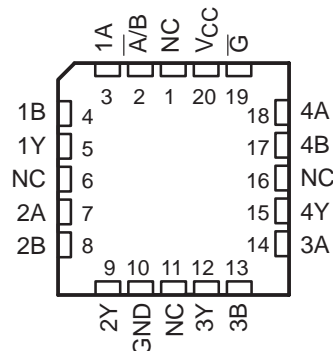
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- Wide Operating Voltage Range of 2 V to 6 V
- Outputs Can Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80- $\mu$ A Max  $I_{CC}$
- Typical  $t_{pd} = 11$  ns
- $\pm 6$ -mA Output Drive at 5 V
- Low Input Current of 1  $\mu$ A Max

SN54HC158 . . . J OR W PACKAGE  
SN74HC158 . . . D, N, NS, OR PW PACKAGE  
(TOP VIEW)



SN54HC158 . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

## description/ordering information

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

## ORDERING INFORMATION

$T_A$	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	PDIP – N	Tube of 25	SN74HC158N	SN74HC158N
	SOIC – D	Tube of 40	SN74HC158D	HC158
		Reel of 2500	SN74HC158DR	
		Reel of 250	SN74HC158DT	
	SOP – NS	Reel of 2000	SN74HC158NSR	HC158
–55°C to 125°C	TSSOP – PW	Tube of 90	SN74HC158PW	HC158
		Reel of 2000	SN74HC158PWR	
		Reel of 250	SN74HC158PWT	
	CDIP – J	Tube of 25	SNJ54HC158J	SNJ54HC158J
	CFP – W	Tube of 150	SNJ54HC158W	SNJ54HC158W
	LCCC – FK	Tube of 55	SNJ54HC158FK	SNJ54HC158FK

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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**TEXAS  
INSTRUMENTS**

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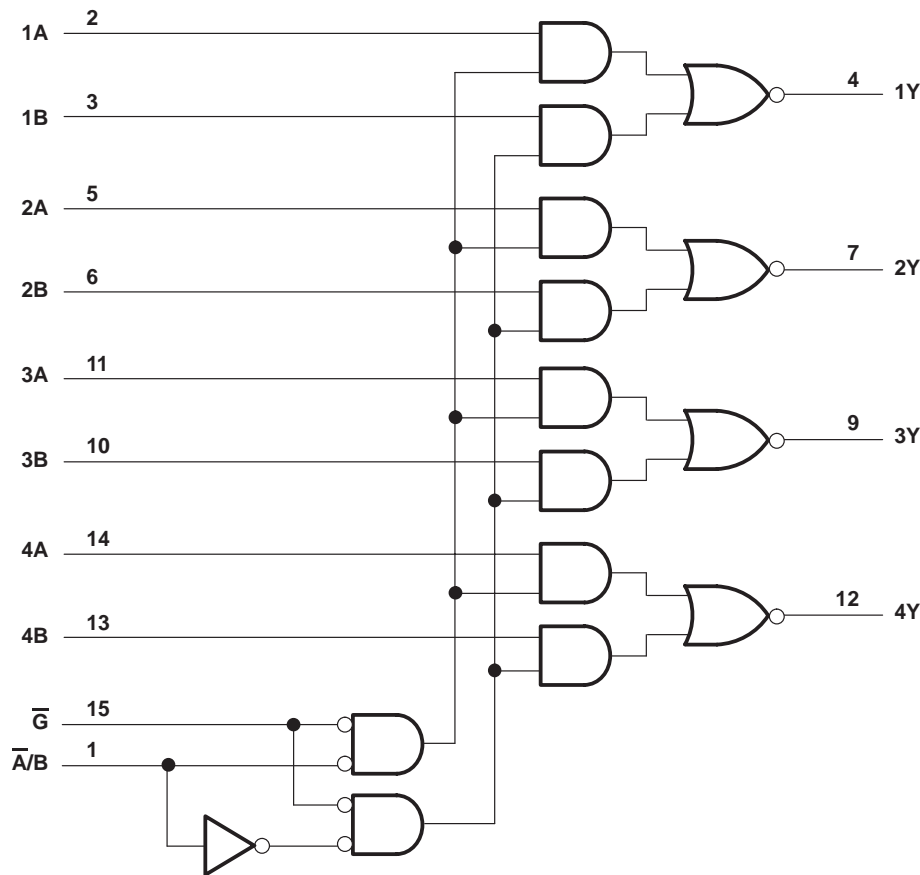
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SN54HC158, SN74HC158  
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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FUNCTION TABLE				
INPUTS				OUTPUT Y
$\overline{G}$	SELECT $\overline{A/B}$	DATA		
		A	B	
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

logic diagram (positive logic)



Pin numbers shown are for the D, J, N, NS, PW, and W packages.

# SN54HC158, SN74HC158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$	–0.5 V to 7 V
Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ ) (see Note 1)	±20 mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) (see Note 1)	±20 mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ )	±35 mA
Continuous current through $V_{CC}$ or GND	±70 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): D package	73°C/W
N package	67°C/W
NS package	64°C/W
PW package	108°C/W
Storage temperature range, $T_{stg}$	–65°C to 150°C

<sup>†</sup> 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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. The package thermal impedance is calculated in accordance with JESD 51-7.

### recommended operating conditions (see Note 3)

			SN54HC158			SN74HC158			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage		2	5	6	2	5	6	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 2 V	1.5			1.5			V
		V <sub>CC</sub> = 4.5 V	3.15			3.15			
		V <sub>CC</sub> = 6 V	4.2			4.2			
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 2 V	0.5			0.5			V
		V <sub>CC</sub> = 4.5 V	1.35			1.35			
		V <sub>CC</sub> = 6 V	1.8			1.8			
V <sub>I</sub>	Input voltage		0		V <sub>CC</sub>	0		V <sub>CC</sub>	V
V <sub>O</sub>	Output voltage		0		V <sub>CC</sub>	0		V <sub>CC</sub>	V
Δt/Δv	Input transition rise/fall time	V <sub>CC</sub> = 2 V	1000			1000			ns
		V <sub>CC</sub> = 4.5 V	500			500			
		V <sub>CC</sub> = 6 V	400			400			
T <sub>A</sub>	Operating free-air temperature		−55		125	−40		85	°C

NOTE 3: All unused inputs of the device must be held at  $V_{CC}$  or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

# SN54HC158, SN74HC158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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

PARAMETER	TEST CONDITIONS		V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC158		SN74HC158		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -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		
		I <sub>OH</sub> = -6 mA	4.5 V	3.98	4.3		3.7		3.84		
		I <sub>OH</sub> = -7.8 mA	6 V	5.48	5.8		5.2		5.34		
V <sub>OL</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 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	
		I <sub>OL</sub> = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
		I <sub>OL</sub> = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0		6 V		±0.1	±100		±1000		±1000	nA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0, I <sub>O</sub> = 0		6 V			8		160		80	µA
C <sub>i</sub>			2 V to 6 V		3	10		10		10	pF

switching characteristics over recommended operating free-air temperature range, C<sub>L</sub> = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC158		SN74HC158		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A or B	Y	2 V		63	125		190		160	ns
			4.5 V		13	25		38		32	
			6 V		11	21		32		27	
	$\bar{A}/\bar{B}$	Y	2 V		67	125		190		160	
			4.5 V		18	25		38		31	
			6 V		14	21		32		27	
	$\bar{G}$	Y	2 V		59	115		170		145	
			4.5 V		16	23		34		29	
			6 V		13	20		29		25	
t <sub>t</sub>		Y	2 V		28	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	

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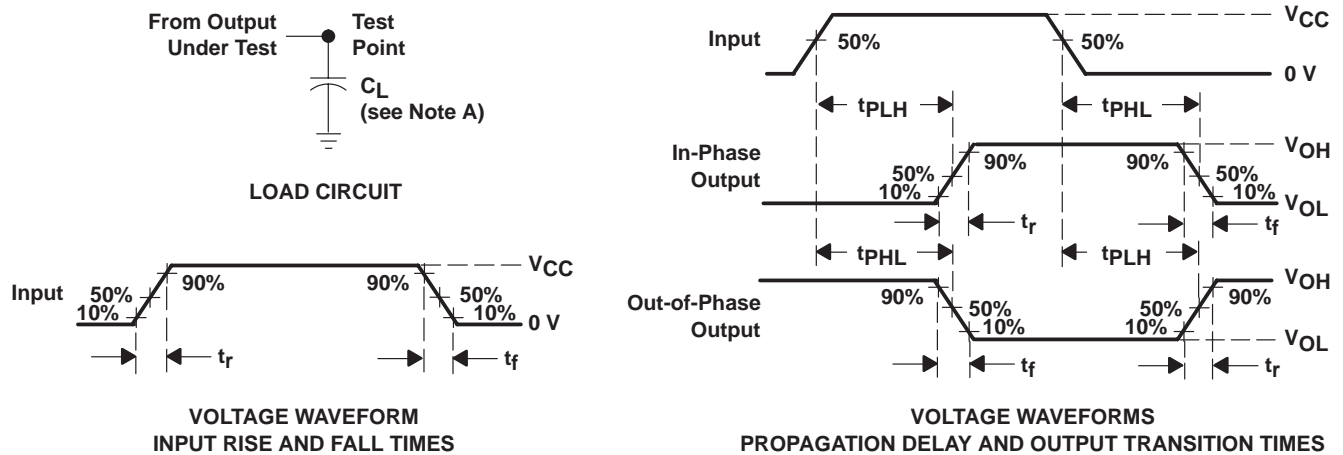
switching characteristics over recommended operating free-air temperature range,  $C_L = 150$  pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HC158		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	
	$\bar{A}/\bar{B}$	Y	2 V		81	210		320		260	
			4.5 V		23	42		64		52	
			6 V		18	36		54		45	
	$\bar{G}$	Y	2 V		91	190		290		235	
			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	

operating characteristics,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$ Power dissipation capacitance	No load	40	pF

## PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A.  $C_L$  includes probe and test-fixture capacitance.
  - B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1$  MHz,  $Z_O = 50 \Omega$ ,  $t_r = 6$  ns,  $t_f = 6$  ns.
  - C. The outputs are measured one at a time with one input transition per measurement.
  - D.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

Figure 1. Load Circuit and Voltage Waveforms

## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



PINS **	14	16	18	20
DIM				
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.

## D (R-PDSO-G16)

## PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-012 variation AC.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



## PW (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-153

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