



## U74AHC158

CMOS IC

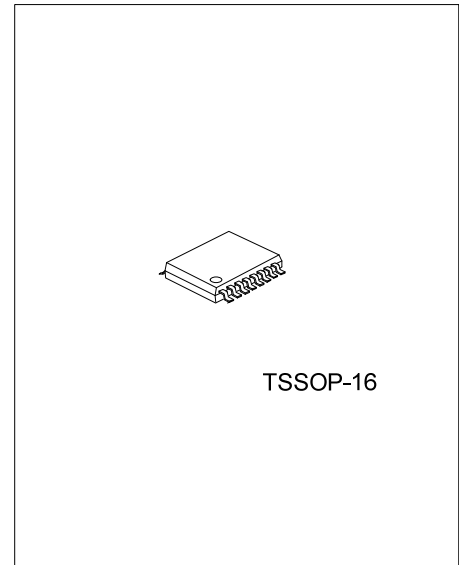
### QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

#### DESCRIPTION

The **U74AHC158** is a quadruple 2-line to 1-line data selector/multiplexer. When  $\bar{G}$  is high, all outputs are high. When  $\bar{G}$  is low, a 4-bit word is selected from one of with two sources and is routed to the four outputs. The device provides inverted data.

#### FEATURES

- \* Wide supply voltage range from 2V to 5.5V
- \* Max  $t_{pd}$  of 4.1ns from A or B to Y at 5V,  $C_L=15pF$
- \* Low power consumption,  $I_{CC} = 4 \mu A$  (Max.) at 5.5V
- \*  $\pm 8$  mA output driver at 5V

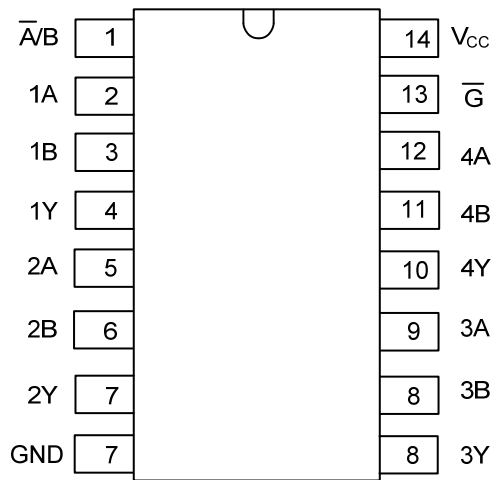


#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC158L-P16-R	U74AHC158G-P16-R	TSSOP-16	Tape Reel
U74AHC158L-P16-T	U74AHC158G-P16-T	TSSOP-16	Tube

<p>U74AHC158L-P16-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) P16: TSSOP-16 (3) G: Halogen Free, L: Lead Free</p>
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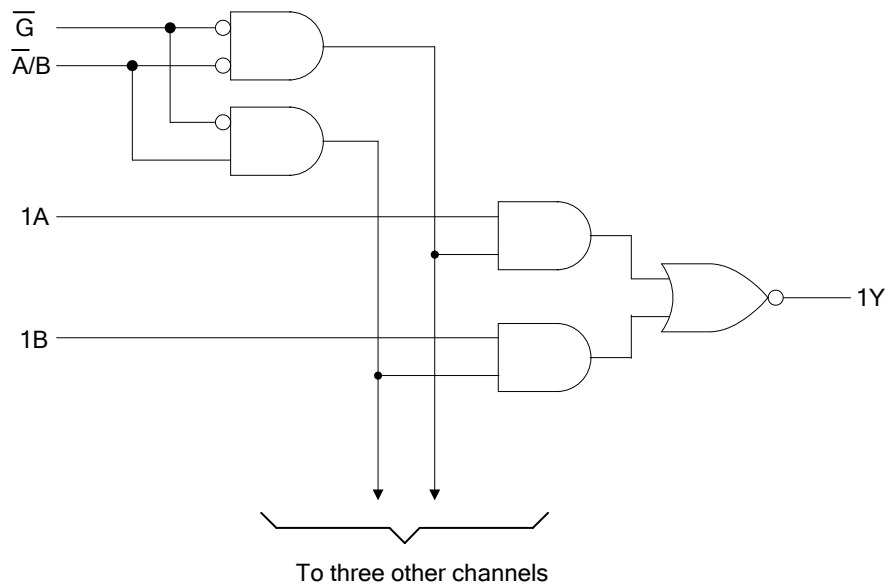
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUTS				OUTPUTS
$\bar{G}$	$\bar{A}/B$	A	B	Y
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



■ ABSOLUTE MAXIMUM RATING( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7	V
Input Voltage Range	$V_{IN}$	-0.5~7	V
Output Voltage Range	$V_{OUT}$	-0.5~ $V_{CC} + 0.5$	V
Input Clamp Current ( $V_{IN} < 0$ )	$I_{IK}$	-20	mA
Output Clamp Current ( $V_{OUT} < 0$ , or $V_{OUT} > V_{CC}$ )	$I_{OK}$	$\pm 20$	mA
Output Current	$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 50$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

Note: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	108	$^\circ\text{C}/\text{W}$

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2		5.5	V
High-Level Input Voltage	$V_{IH}$	$V_{CC} = 2\text{V}$	1.5			V
		$V_{CC} = 3\text{V}$	2.1			
		$V_{CC} = 5.5\text{V}$	3.85			
Low-Level Input Voltage	$V_{IL}$	$V_{CC} = 2\text{V}$			0.5	V
		$V_{CC} = 3\text{V}$			0.9	
		$V_{CC} = 5.5\text{V}$			1.65	
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
High-level Output Current	$I_{OH}$	$V_{CC} = 2\text{V}$			-50	$\mu\text{A}$
		$V_{CC} = 3.3 \pm 0.3\text{V}$			-4	mA
		$V_{CC} = 5 \pm 0.5\text{V}$			-8	
Low-level Output Current	$I_{OL}$	$V_{CC} = 2\text{V}$			50	$\mu\text{A}$
		$V_{CC} = 3.3 \pm 0.3\text{V}$			4	mA
		$V_{CC} = 5 \pm 0.5\text{V}$			8	
Input Transition Rise or Fall Rate	$\Delta t/\Delta V$	$V_{CC} = 3.3 \pm 0.3\text{V}$			100	ns/V
		$V_{CC} = 5 \pm 0.5\text{V}$			20	
Operating Temperature	$T_A$		-40		85	$^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -50 μA, V <sub>CC</sub> = 2V	1.9	2		V
		I <sub>OH</sub> = -50 μA, V <sub>CC</sub> = 3V	2.9	3		
		I <sub>OH</sub> = -50 μA, V <sub>CC</sub> = 4.5V	4.4	4.5		
		I <sub>OH</sub> = -4 mA, V <sub>CC</sub> = 3V	2.58			
		I <sub>OH</sub> = -8 mA, V <sub>CC</sub> = 4.5V	3.94			
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OH</sub> = 50 μA, V <sub>CC</sub> = 2V			0.1	V
		I <sub>OH</sub> = 50 μA, V <sub>CC</sub> = 3V			0.1	
		I <sub>OH</sub> = 50 μA, V <sub>CC</sub> = 4.5V			0.1	
		I <sub>OH</sub> = 4 mA, V <sub>CC</sub> = 3V			0.36	
		I <sub>OH</sub> = 8 mA, V <sub>CC</sub> = 4.5V			0.36	
Input Leakage Current (A or B inputs)	I <sub>I(LEAK)</sub>	V <sub>IN</sub> = 5.5V or GND, V <sub>CC</sub> = 0 to 5.5V			±0.1	μA
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>OUT</sub> = 0, V <sub>CC</sub> = 5.5V			4	μA
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> =5V		2	10	pF

■ SWITCHING CHARACTERISTICS

(V<sub>CC</sub> = 3.3V ± 0.3V, T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A or B to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		6.2	9.7	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		8.7	13.2	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		6.2	9.7	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		8.7	13.2	
Propagation delay from input $\bar{A}/\bar{B}$ to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		8.4	13.2	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		10.9	16.7	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		8.4	13.2	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		10.9	16.7	
Propagation delay from input $\bar{G}$ to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		8.7	13.6	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		11.2	17.1	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		8.7	13.6	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		11.2	17.1	

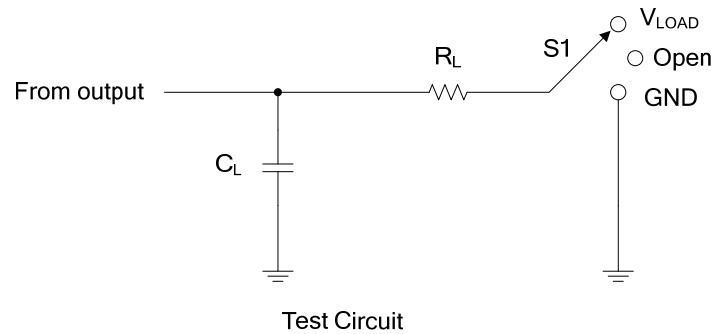
(V<sub>CC</sub> = 5V ± 0.5V, T<sub>A</sub> =25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A or B to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		4.1	6.4	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.6	8.4	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		4.1	6.4	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		5.6	8.4	
Propagation delay from input $\bar{A}/\bar{B}$ to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.3	8.1	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		6.8	10.1	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.3	8.1	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		6.8	10.1	
Propagation delay from input $\bar{G}$ to output Y, t <sub>pd</sub>	t <sub>PLH</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.6	8.6	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		7.1	10.6	
	t <sub>PHL</sub>	C <sub>L</sub> =15pF, R <sub>L</sub> =1kΩ		5.6	8.6	ns
		C <sub>L</sub> =50pF, R <sub>L</sub> =1kΩ		7.1	10.6	

■ OPERATING CHARACTERISTICS (T<sub>A</sub> =25°C)

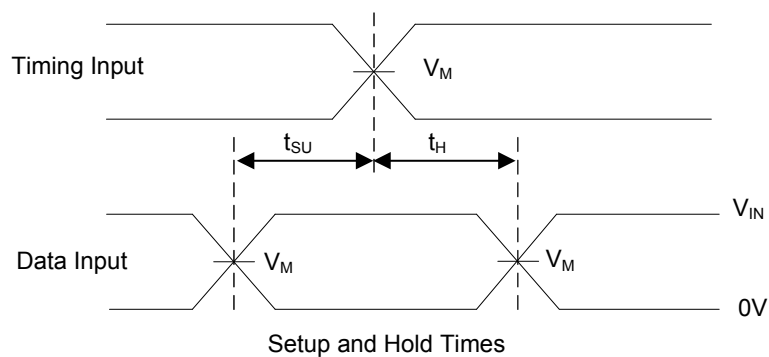
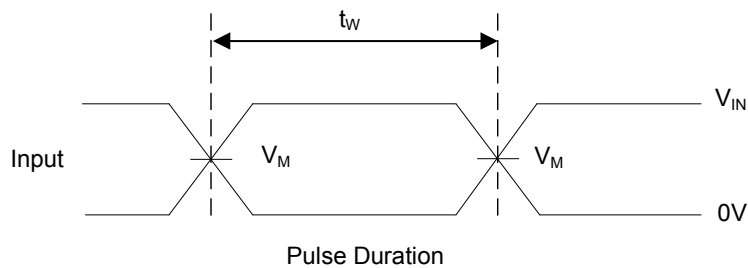
PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power dissipation capacitance	C <sub>PD</sub>	V <sub>CC</sub> = 5V, f=1MHz, No load	11	pF

## ■ TEST CIRCUIT AND WAVEFORMS

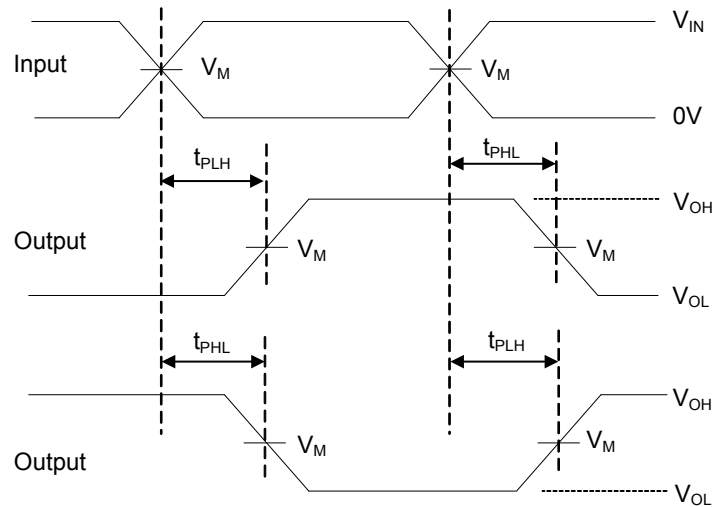


TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

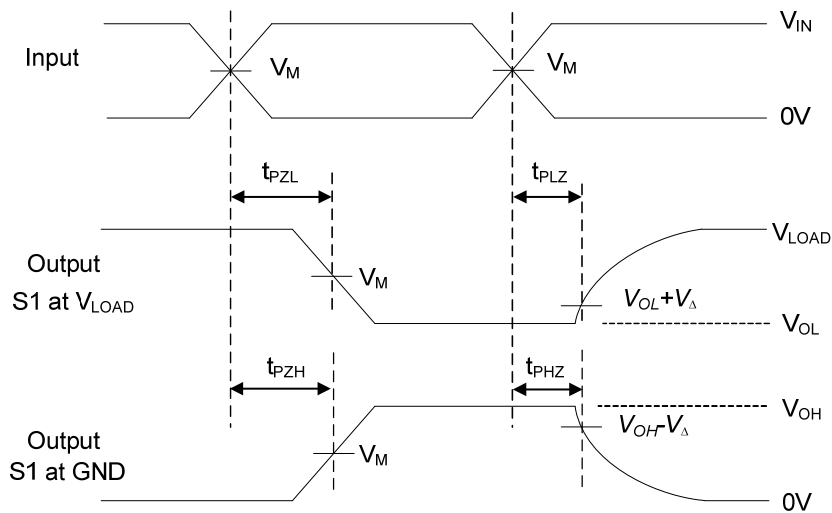
$V_{CC}$	Input		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_{IN}$	$t_R, t_F$					
$3.3V \pm 0.3V$	$V_{CC}$	$\leq 3ns$	$V_{CC}/2$	$V_{CC}$	15pF	1k $\Omega$	0.3V
					50pF		
$5V \pm 0.5V$	$V_{CC}$	$\leq 3ns$	$V_{CC}/2$	$V_{CC}$	15pF	1k $\Omega$	0.5V
					50pF		



## ■ TEST CIRCUIT AND WAVEFORMS(Cont.)



Voltage Waveforms Propagation Delay Times



Voltage Waveforms Enable and Disable Times

Notes: 1.  $C_L$  includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR  $\leq 1\text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_R \leq 3\text{ns}$ ,  $t_F \leq 3\text{ns}$ .

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