UNISONIC TECHNOLOGIES CO., LTD

U74AHC157

CMOS IC

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

TSSOP-16

■ DESCRIPTION

The **U74AHC157** is a quadruple 2-line to 1-line data selector/multiplexer. When $\overline{G}$ is high all outputs are low. When $\overline{G}$ is low a 4-bit word is selected from one of two sources and is routed to the four outputs. The device provides true 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 μA (MAX) at 5.5V
* ±8 mA output driver at 5V

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC157L-P16-R	U74AHC157G-P16-R	TSSOP-16	Tape Reel
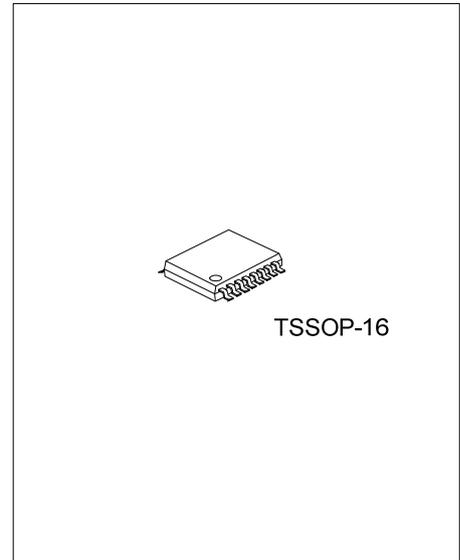
U74AHC157G-P16-R	
(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) P16: TSSOP-16
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

UTC □□□□ → Date Code
U74AHC157□ L: Lead Free
→ G: Halogen Free
→ Lot Code

U74AHC157

CMOS IC

■ **PIN CONFIGURATION**

Left	Pin		Pin	Right
$\overline{A}$/B	1		14	V_{CC}
1A	2		13	$\overline{G}$
1B	3		12	4A
1Y	4		11	4B
2A	5		10	4Y
2B	6		9	3A
2Y	7		8	3B
GND	7		8	3Y
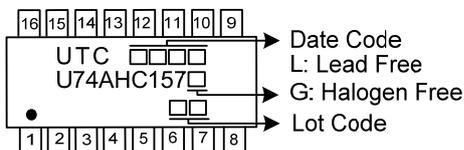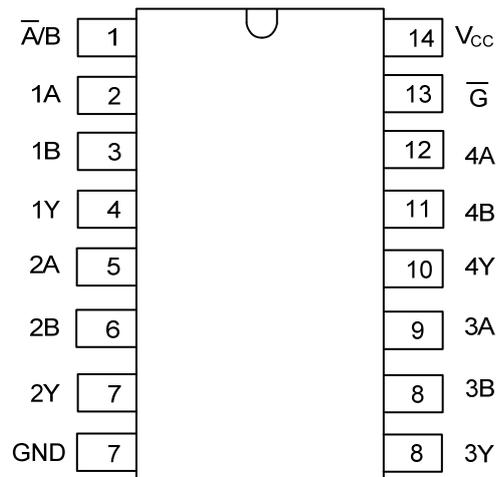
■ **FUNCTION TABLE**

INPUTS				OUTPUTS
$\overline{G}$	$\overline{A}$ / *B*	A	B	Y
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

■ **LOGIC DIAGRAM**

To three other channels

U74AHC157 *CMOS IC*
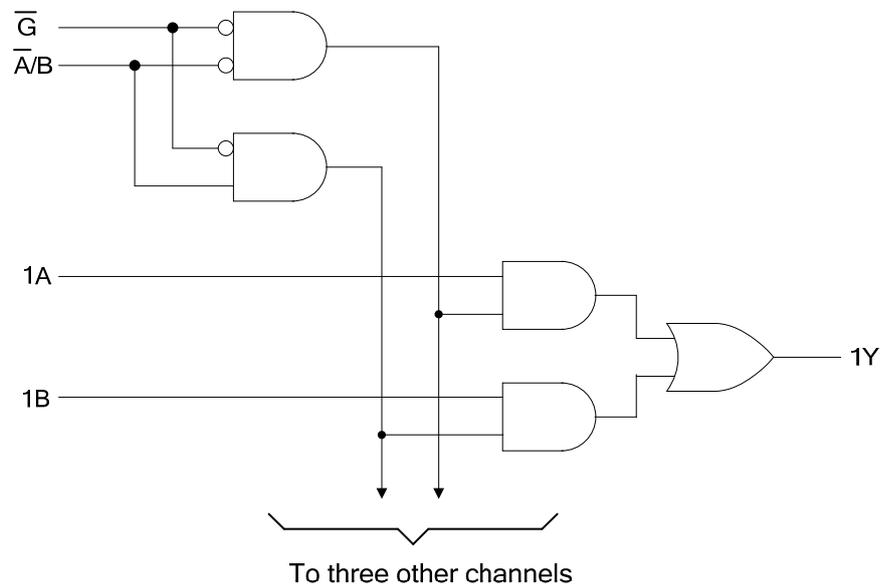
■ **ABSOLUTE MAXIMUM RATING** (Unless otherwise specified)

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}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ +150	°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.

■ **RECOMMENDED OPERATING COMDITIONS** (Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		5.5	V
High-Level Input Voltage	V_{IH}	V_{CC} = 2V	1.5			V
		V_{CC} = 3V	2.1			
		V_{CC} = 5.5V	3.85			
Low-Level Input Voltage	V_{IL}	V_{CC} = 2V			0.5	V
		V_{CC} = 3V			0.9	
		V_{CC} = 5.5V			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} = 2V			-50	µA
		V_{CC} = 3.3±0.3V			-4	mA
		V_{CC} = 5±0.5V			-8	
Low-level Output Current	I_{OL}	V_{CC} = 2V			50	µA
		V_{CC} = 3.3±0.3V			4	mA
		V_{CC} = 5±0.5V			8	
Input Transition Rise or Fall Rate	Δt/Δv	V_{CC} = 3.3±0.3V			100	ns/V
		V_{CC} = 5±0.5V			20	
Operating Temperature	T_A		-40		+125	°C

■ **ELECTRICAL CHARACTERISTICS** (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	V_{CC}=2V, I_{OH}=-50µA	1.9	2		V
		V_{CC}=3V, I_{OH}=-50µA	2.9	3		
		V_{CC}=4.5V, I_{OH}=-50µA	4.4	4.5		
		V_{CC}=3V, I_{OH}=-4mA	2.58			
		V_{CC}=4.5V, I_{OH}=-8mA	3.94			
Low-Level Output Voltage	V_{OL}	V_{CC}=2V, I_{OL}=50µA			0.1	V
		V_{CC}=3V, I_{OL}=50µA			0.1	
		V_{CC}=4.5V, I_{OL}=50µA			0.1	
		V_{CC}=3V, I_{OL}=4mA			0.36	
		V_{CC}=4.5V, I_{OL}=8mA			0.36	
Input Leakage Current (A or B inputs)	$I_{I(LEAK)}$	V_{IN}=5.5V or GND, V_{CC}=0to5.5V			±0.1	µA
Quiescent Supply Current	I_{CC}	V_{IN}=V_{CC} or GND, I_{OUT}=0, V_{CC}=5.5V			4	µA
Input Capacitance	C_{IN}	V_{IN}=V_{CC} or GND, V_{CC}=5V		2	10	pF

■ **SWITCHING CHARACTERISTICS** (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{CC} = 3.3V ± 0.3V						
Propagation delay from input A or B to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		6.2	9.7	ns
		C_L=50pF, R_L=1kΩ		8.7	13.2	
	t_{PHL}	C_L=15pF, R_L=1kΩ		6.2	9.7	ns
		C_L=50pF, R_L=1kΩ		8.7	13.2	
Propagation delay from input $\overline{A}$ / B to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		8.4	13.2	Ns
		C_L=50pF, R_L=1kΩ		10.9	16.7	
	t_{PHL}	C_L=15pF, R_L=1kΩ		8.4	13.2	Ns
		C_L=50pF, R_L=1kΩ		10.9	16.7	
Propagation delay from input $\overline{G}$ to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		8.7	13.6	Ns
		C_L=50pF, R_L=1kΩ		11.2	17.1	
	t_{PHL}	C_L=15pF, R_L=1kΩ		8.7	13.6	Ns
		C_L=50pF, R_L=1kΩ		11.2	17.1	
V_{CC} = 5V ± 0.5V						
Propagation delay from input A or B to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		4.1	6.4	ns
		C_L=50pF, R_L=1kΩ		5.6	8.4	
	t_{PHL}	C_L=15pF, R_L=1kΩ		4.1	6.4	ns
		C_L=50pF, R_L=1kΩ		5.6	8.4	
Propagation delay from input $\overline{A}$ / B to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		5.3	8.1	ns
		C_L=50pF, R_L=1kΩ		6.8	10.1	
	t_{PHL}	C_L=15pF, R_L=1kΩ		5.3	8.1	ns
		C_L=50pF, R_L=1kΩ		6.8	10.1	
Propagation delay from input $\overline{G}$ to output Y, t_{PD}	t_{PLH}	C_L=15pF, R_L=1kΩ		5.6	8.6	ns
		C_L=50pF, R_L=1kΩ		7.1	10.6	
	t_{PHL}	C_L=15pF, R_L=1kΩ		5.6	8.6	ns
		C_L=50pF, R_L=1kΩ		7.1	10.6	

■ **OPERATING CHARACTERISTICS** (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power dissipation capacitance	C_{PD}	V_{CC} = 5V, f=1MHz, No load	11			pF

■ **TEST CIRCUIT AND WAVEFORMS**
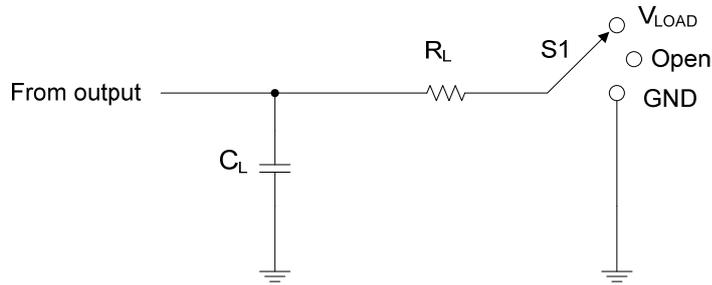
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Test Circuit

V_{CC}	Input		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_{IN}	t_R, t_F					
3.3V±0.3V	V_{CC}	≤3ns	V_{CC}/2	V_{CC}	15pF	1kΩ	0.3V
					50pF		
5V±0.5V	V_{CC}	≤3ns	V_{CC}/2	V_{CC}	15pF	1kΩ	0.5V
					50pF		
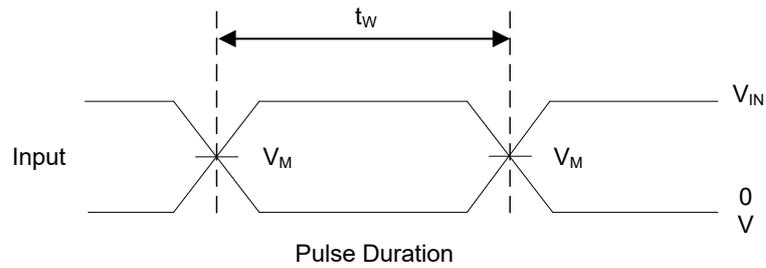
Pulse Duration
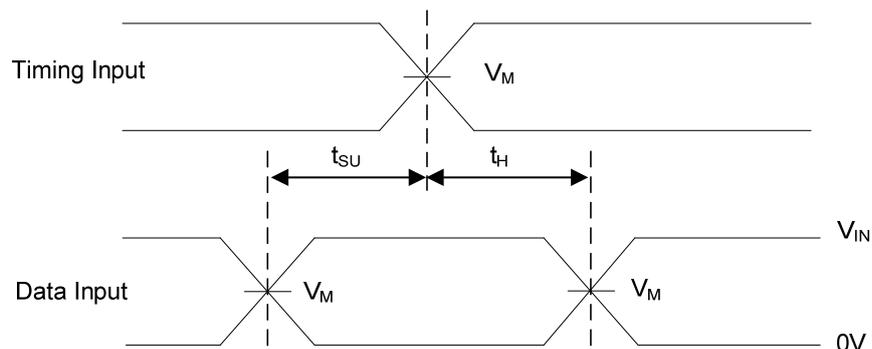
Setup and Hold Times

■ **TEST CIRCUIT AND WAVEFORMS (Cont.)**
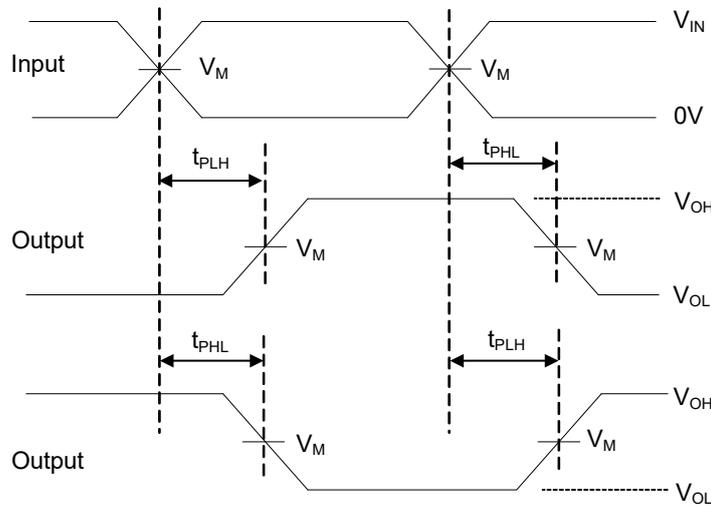
Voltage Waveforms Propagation Delay Times
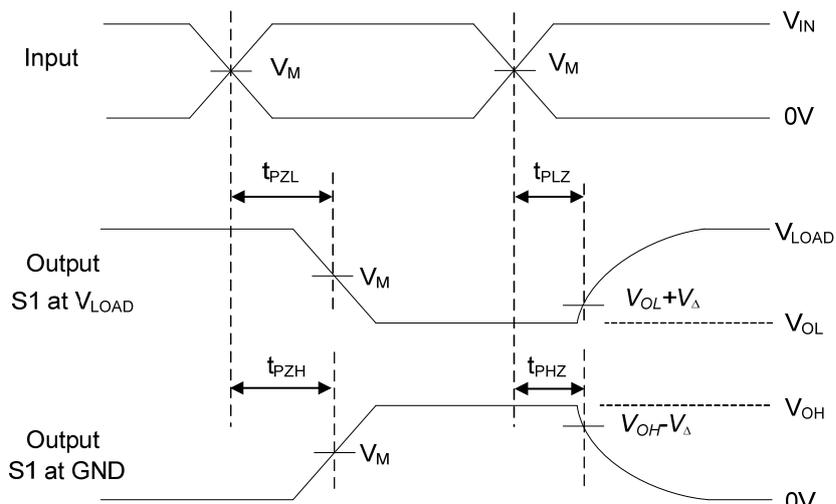
Voltage Waveforms Enble and Disable Times

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, Z_O = 50Ω.