



U74AUP1T157

CMOS IC

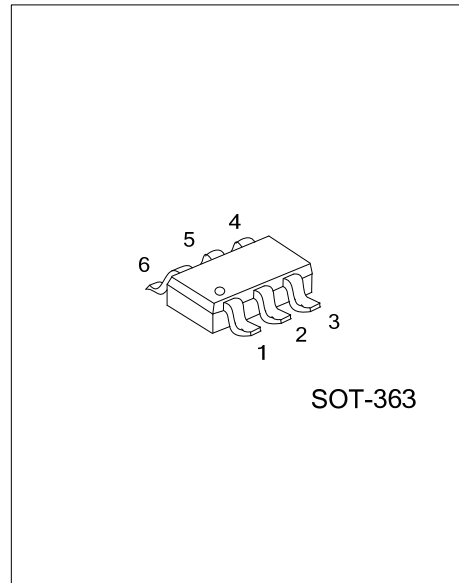
SINGLE 2-INPUT SCHMITT-TRIGGER BUFFER MULTIPLEXER (NONINVERTED)

DESCRIPTION

The **U74AUP1T157** is a single 2-input multiplexer. The data select input(c) determines the two data input A or B which of them is connect to the output with the true and complementary data.

This device has power-down protective circuit, preventing device destruction when it is powered down.

The wide V_{CC} range of 2.3V to 3.6V allows the possibility of switching output level to connect to external controllers or processors. All input levels that accept 1.8V LVCMOS signals, while operating from either a single 3.3V or 2.5V V_{CC} supply.



SOT-363

FEATURES

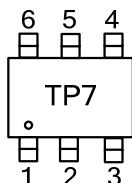
- * Single-Supply Voltage Translator
- * I_{OFF} supports partial-power-down mode
- * Low power dissipation
- * Output Level Up to Supply V_{CC} CMOS Level
 - 1.8V to 3.3V (at $V_{CC} = 3.3V$)
 - 2.5V to 3.3V (at $V_{CC} = 3.3V$)
 - 1.8V to 2.5V (at $V_{CC} = 2.5V$)
 - 3.3V to 2.5V (at $V_{CC} = 2.5V$)

ORDERING INFORMATION

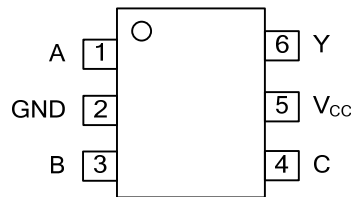
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUP1T157L-AL6-R	U74AUP1T157G-AL6-R	SOT-363	Tape Reel

<p>U74AUP1T157G-AL6-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AL6: SOT-363</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



PIN CONFIGURATION



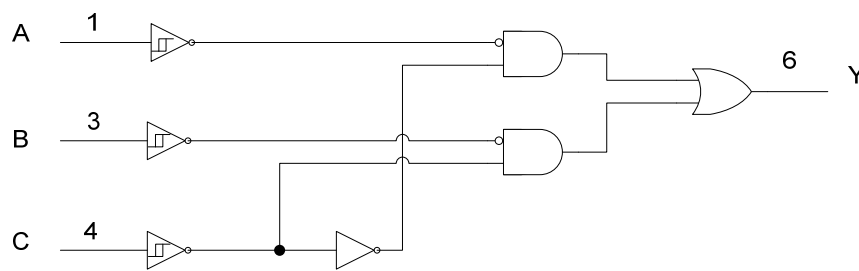
FUNCTION TABLE

INPUT			OUTPUT
A	B	C	Y
X	L	L	L
X	H	L	H
L	X	H	L
H	X	H	H

Notes: 1. H: High voltage level; L: Low voltage level.

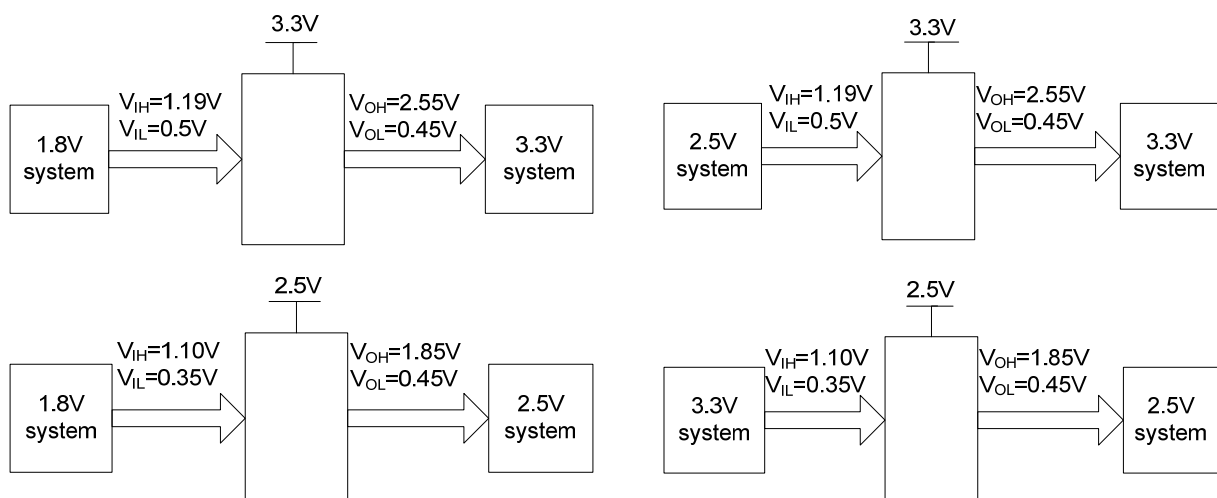
2. Supply V_{CC} =2.3V to 2.7V

LOGIC DIAGRAM (positive logic)



Logic symbol

TYPICAL DESIGN EXAMPLES



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	V
Output Voltage	V_{OUT}	Output in the power-off state	-0.5 ~ +4.6	V
		Output in the high or low state	-0.5 ~ $V_{CC}+0.5$	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0V \sim V_{CC}$	±20	mA
Input Clamp Current	I_{IK}	$V_{IN}<0V$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT}>V_{CC}$ or $V_{OUT}<0V$	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Note: 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 CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	2.3		3.6	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Positive-Going Input Threshold Voltage	V_{T+}	$V_{CC}=2.5V \pm 0.2V$	0.6		1.1	V	
		$V_{CC}=3.0V \pm 0.3V$	0.75		1.16	V	
Negative-Going Input Threshold Voltage	V_{T-}	$V_{CC}=2.5V \pm 0.2V$	0.35		0.6	V	
		$V_{CC}=3.0V \pm 0.3V$	0.5		0.85	V	
Hysteresis Voltage ($V_{T+}-V_{T-}$)	ΔV_T	$V_{CC}=2.5V \pm 0.2V$	0.23		0.6	V	
		$V_{CC}=3.0V \pm 0.3V$	0.25		0.56	V	
High-Level Output Voltage	V_{OH}	$V_{CC}=2.3 \sim 3.6V, I_{OH}=-20\mu A$	$V_{CC}-0.1$			V	
		$V_{CC}=2.3V$	$I_{OH}=-2.3mA$	2.05			V
			$I_{OH}=-3.1mA$	1.9			V
		$V_{CC}=3.0V$	$I_{OH}=-2.7mA$	2.72			V
$I_{OH}=-4mA$	2.6				V		
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.3 \sim 3.6V, I_{OL}=20\mu A$			0.1	V	
		$V_{CC}=2.3V$	$I_{OL}=2.3mA$			0.31	V
			$I_{OL}=3.1mA$			0.44	V
		$V_{CC}=3.0V$	$I_{OL}=2.7mA$			0.31	V
$I_{OL}=4mA$				0.44	V		
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0 \sim 3.6V, V_{IN}=3.6V$ or GND			0.1	μA	
Power OFF Leakage Current	I_{off}	$V_{CC}=0V, V_{IN}$ or $V_{OUT}=3.6V$			0.1	μA	
Additional Power OFF Leakage Current	ΔI_{off}	$V_{CC}=0 \sim 0.2V, V_{IN}$ or $V_{OUT}=3.6V$			0.2	μA	
Quiescent Supply Current	I_{CC}	$V_{CC}=2.3 \sim 3.6V, V_{IN}=3.6V$ or GND, $I_{OUT}=0A$			0.5	μA	
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	$V_{CC}=2.3 \sim 2.7V$, One input at 0.3V or 1.1V, Other inputs at 0 or V_{CC} , $I_{OUT}=0A$			4	μA	
		$V_{CC}=3 \sim 3.6V$, One input at 0.45V or 1.2V, Other inputs at 0 or V_{CC} , $I_{OUT}=0A$			12	μA	
Input Capacitance	C_I	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND		1.5		pF	
Output Capacitance	C_O	$V_{CC}=3.3V, V_{OUT}=V_{CC}$ or GND		3.0		pF	

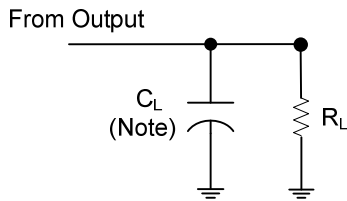
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A, B or C) to output(Y)	t _{PD}	C _L =5pF R _L =1MΩ	V _{CC} =2.5V±0.2V, V _{IN} =1.8V±0.15V	1.8	2.3	2.9	ns
			V _{CC} =2.5V±0.2V V _{IN} =2.5V±0.2V	1.8	2.3	3.1	ns
			V _{CC} =2.5V±0.2V V _{IN} =3.3V±0.3V	2.0	2.7	3.5	ns
			V _{CC} =3.3V±0.3V V _{IN} =1.8V±0.15V	1.6	2.0	2.5	ns
			V _{CC} =3.3V±0.2V V _{IN} =2.5V±0.2V	1.6	1.9	2.4	ns
			V _{CC} =3.3V±0.2V V _{IN} =3.3V±0.3V	1.6	2.1	2.7	ns
		C _L =10pF R _L =1MΩ	V _{CC} =2.5V±0.2V, V _{IN} =1.8V±0.15V	2.3	2.8	3.4	ns
			V _{CC} =2.5V±0.2V V _{IN} =2.5V±0.2V	2.2	2.8	3.5	ns
			V _{CC} =2.5V±0.2V V _{IN} =3.3V±0.3V	2.4	3.1	3.9	ns
			V _{CC} =3.3V±0.3V V _{IN} =1.8V±0.15V	2.0	2.4	2.9	ns
			V _{CC} =3.3V±0.2V V _{IN} =2.5V±0.2V	2.0	2.3	2.7	ns
			V _{CC} =3.3V±0.2V V _{IN} =3.3V±0.3V	2.0	2.4	3.0	ns
		C _L =15pF R _L =1MΩ	V _{CC} =2.5V±0.2V, V _{IN} =1.8V±0.15V	2.6	3.1	3.8	ns
			V _{CC} =2.5V±0.2V V _{IN} =2.5V±0.2V	2.6	3.2	5.2	ns
			V _{CC} =2.5V±0.2V V _{IN} =3.3V±0.3V	2.8	3.5	4.3	ns
			V _{CC} =3.3V±0.3V V _{IN} =1.8V±0.15V	2.3	2.8	3.3	ns
			V _{CC} =3.3V±0.2V V _{IN} =2.5V±0.2V	2.3	2.7	3.1	ns
			V _{CC} =3.3V±0.2V V _{IN} =3.3V±0.3V	2.3	2.7	3.3	ns
		C _L =30pF R _L =1MΩ	V _{CC} =2.5V±0.2V, V _{IN} =1.8V±0.15V	3.8	4.4	5.1	ns
			V _{CC} =2.5V±0.2V V _{IN} =2.5V±0.2V	3.7	4.4	5.2	ns
			V _{CC} =2.5V±0.2V V _{IN} =3.3V±0.3V	4.0	4.7	5.5	ns
			V _{CC} =3.3V±0.3V V _{IN} =1.8V±0.15V	3.4	3.9	4.4	ns
			V _{CC} =3.3V±0.2V V _{IN} =2.5V±0.2V	3.4	3.8	4.2	ns
			V _{CC} =3.3V±0.2V V _{IN} =3.3V±0.3V	3.4	2.8	4.4	ns

■ OPERATING CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

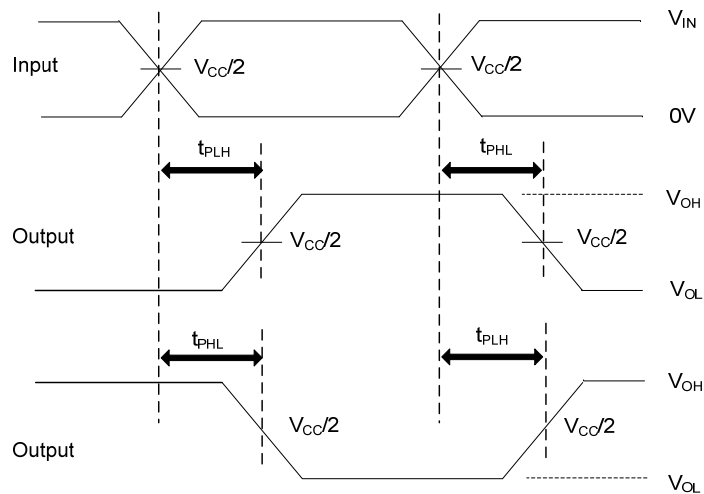
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$V_{CC}=2.5\pm 0.2\text{V}$, $f=10\text{MHz}$		4.0		pF
		$V_{CC}=3.3\pm 0.3\text{V}$, $f=10\text{MHz}$		5.0		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

V_{CC}	V_M	C_L	R_L	V_{Δ}
0.8V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}
1.2V \pm 0.1V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}
1.5V \pm 0.1V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}
1.8V \pm 0.15V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}
2.5V \pm 0.2V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}
3.3V \pm 0.3V	$V_{CC}/2$	5,10,15,30pF	1M Ω	V_{CC}



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR \leq 10MHz, $Z_O = 50\Omega$.

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