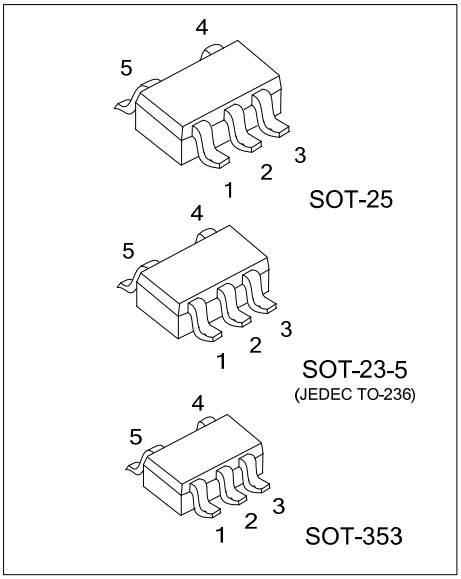
U74LVC1G17

CMOS IC

SINGLE SCHMITT-TRIGGER BUFFER



■ DESCRIPTION

The UTC **U74LVC1G17** is a single Schmitt-trigger buffer, it provides the function Y=A.

The device have different input threshold levels for positive-going (V_{T+}) and negative-going(V_{T-}) signals because of the Schmitt-trigger action in the input.

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

■ FEATURES

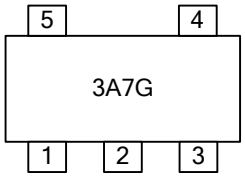
* Operation Voltage Range: 1.6V ~ 5.5V
* Low Power Current: I_{CC}=10μA (Max.)
* ±24mA Output Drive (V_{CC}=3.0V)
* Power Down Protection

■ ORDERING INFORMATION

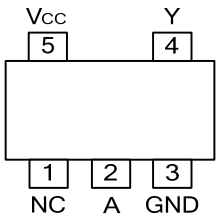
Ordering Number	Package	Packing
U74LVC1G17G-AE5-R	SOT-23-5	Tape Reel
U74LVC1G17G-AF5-R	SOT-25	Tape Reel
U74LVC1G17G-AL5-R	SOT-353	Tape Reel

U74LVC1G17G-AF5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (3) G: Halogen Free and Lead Free

■ MARKING



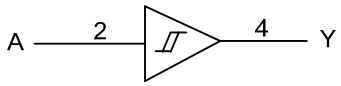
■ PIN CONFIGURATION



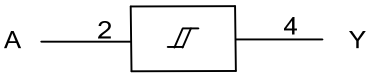
■ FUNCTION TABLE (each gate)

INPUT	OUTPUT
A	Y
L	L
H	H

■ LOGIC DIAGRAM (positive logic)



Logic symbol



IEC logic symbol

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified) (Note 2)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5~6.5	V
Input Voltage	V_{IN}		-0.5~6.5	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5~V_{CC}+0.5	V
		Output in the power-off state	-0.5~6.5	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}		±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0	-50	mA
Storage Temperature Range	T_{STG}		-65 ~+150	°C

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

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	θ_{JA}	280	°C/W
	SOT-25		230	
	SOT-353		350	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=1.8V±0.15V V_{CC}=2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V			10	ns/V
		V_{CC}=5V±0.5V			5	ns/V
Operating Temperature	T_A		-40		125	°C

■ STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Positive-going Input Threshold Voltage	V_{T+}	V_{CC}=1.65V	0.76		1.16	V
		V_{CC}=2.3V	1.08		1.56	
		V_{CC}=3.0V	1.48		1.92	
		V_{CC}=4.5V	2.16		2.74	
		V_{CC}=5.5V	2.61		3.33	
Negative-going Input Threshold Voltage	V_{T-}	V_{CC}=1.65V	0.35		0.62	V
		V_{CC}=2.3V	0.56		0.88	
		V_{CC}=3.0V	0.84		1.2	
		V_{CC}=4.5V	1.41		1.97	
		V_{CC}=5.5V	1.87		2.4	
Hysteresis Voltage (V_{T+}-V_{T-})	$\triangle V_T$	V_{CC}=1.65V	0.36		0.64	
		V_{CC}=2.3V	0.45		0.78	
		V_{CC}=3.0V	0.51		0.87	
		V_{CC}=4.5V	0.58		1.04	
		V_{CC}=5.5V	0.69		1.11	

■ STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V~5.5V, I_{OH}=-100μA		V_{CC}-0.1			V
		V_{CC}= 1.65V, I_{OH}=-4mA		1.2			
		V_{CC}= 2.3V, I_{OH}=-8mA		1.9			
		V_{CC}= 3.0V	I_{OH}=-16mA	2.4			
			I_{OH}=-24mA	2.3			
		V_{CC}= 4.5V, I_{OH}=-32mA		3.8			
Low-Level Output Voltage	V_{OL}	V_{CC}= 1.65V~5.5V, I_{OL}=100μA				0.1	V
		V_{CC}= 1.65V, I_{OL}=4mA				0.45	
		V_{CC}= 2.3V, I_{OL}=8mA				0.3	
		V_{CC}= 3.0V	I_{OL}=16mA			0.4	
			I_{OL}=24mA			0.55	
		V_{CC}= 4.5V, I_{OL}=32mA				0.55	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}= 0~5.5V, V_{IN}=V_{CC} or GND				±5	μA
Power OFF Leakage Current	I_{OFF}	V_{CC}= 0V, V_{IN} or V_{CC}=5.5V				±10	μA
Quiescent Supply Current	I_Q	V_{CC}= 1.65V~5.5V, V_{IN}=V_{CC} or GND I_{OUT}=0				10	μA
Additional Quiescent Supply Current	ΔI_Q	V_{CC}= 3V~5.5V, One input at V_{CC}-0.6V, other inputs at V_{CC} or GND				500	μA
Input Capacitance	C_{IN}	V_{CC}= 3.3V, V_{IN}=V_{CC} or GND			4.5		pF

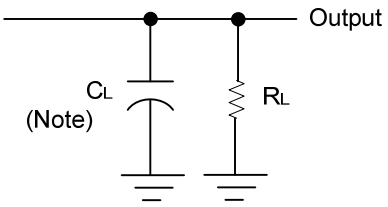
■ DYNAMIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output (Y)	t_{PLH} / t_{PHL}	C_L=15pF	V_{CC}=1.8±0.15V	2.8		9.9	ns
			V_{CC}=2.5±0.2V	1.6		5.5	ns
			V_{CC}=3.3±0.3V	1.5		4.6	ns
			V_{CC}=5±0.5V	0.9		4.4	ns
		C_L=30 or 50pF	V_{CC}=1.8±0.15V	3.8		11	ns
			V_{CC}=2.5±0.2V	2		6.5	ns
			V_{CC}=3.3±0.3V	1.8		5.5	ns
			V_{CC}=5±0.5V	1.2		5	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V		20		pF
		V_{CC}=2.5V		21		pF
		V_{CC}=3.3V		22		pF
		V_{CC}=5V		25		pF

■ TEST CIRCUIT AND WAVEFORMS



Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R, t_F	V_M	C_L	R_L
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	15pF	1MΩ
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1KΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	50pF	500Ω