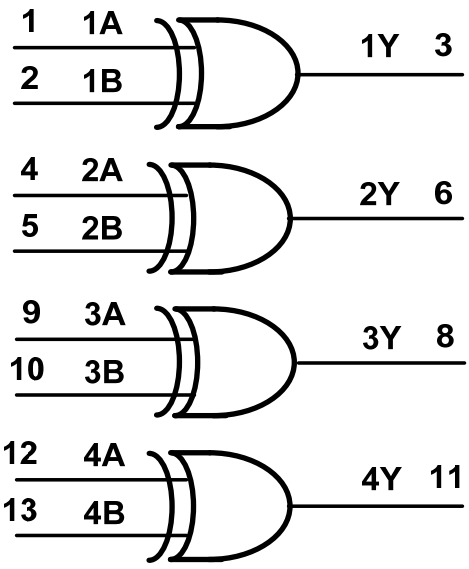
Pin Descriptions

Pin Number	Pin Name	Description
1	1A	Data Input
2	1B	Data Input
3	1Y	Data Output
4	2A	Data Input
5	2B	Data Input
6	2Y	Data Output
7	GND	Ground
8	3Y	Data Output
9	3A	Data Input
10	3B	Data Input
11	4Y	Data Output
12	4A	Data Input
13	4B	Data Input
14	Vcc	Supply Voltage

Logic Diagram



Function Table

Inputs		Output
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

Absolute Maximum Ratings (Note 4)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD CDM	Charged Device Model ESD Protection	1	kV
ESD MM	Machine Model ESD Protection	200	V
V_{CC}	Supply Voltage Range	-0.5 to 7.0	V
V_I	Input Voltage Range note 4	-0.5 to 7.0	V
I_{IK}	Input Clamp Current V_I< 0V	-20	mA
I_{OK}	Output Clamp Current V_O<-0V	-50	mA
I_O	Continuous Output Current - 0.5V < V_O V_{CC} + 0.5V	+/- 25	mA
I_{CC}	Continuous Current Through Vcc	50	mA
I_{GND}	Continuous Current Through GND	-50	mA
T_J	Operating Junction Temperature	-40 to 150	°C
T_{STG}	Storage Temperature	-65 to 150	°C
P_{TOT}	Total Power Dissipation	500	mW

Note: 4. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

Recommended Operating Conditions (Note 5)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	–	2.0	5.5	V
V_I	Input Voltage	–	0	5.5	V
V_O	Output Voltage	–	0	V_{CC}	V
I_{OH}	High-Level Output Current	2.0V	–	-50	mA
		2.3V to 2.7V	–	-2	μA
		3.0V to 3.6V	–	-6	mA
		4.5V to 5.5V	–	-12	mA
I_{OL}	Low-Level Output Current	2.0V	–	50	μA
		2.3V to 2.7V	–	2	mA
		3.0V to 3.6V	–	6	mA
		4.5V to 5.5V	–	12	mA
Δt/ΔV	Input Transition Rise or Fall Rate	2.3V to 2.7V	–	200	ns/V
		3.0V to 3.6V	–	100	
		4.5V to 5.5V	–	20	
T_A	Operating Free-Air Temperature	–	-40	+125	°C

Note: 5. Unused inputs should be held at V_{CC} or Ground.

Electrical Characteristics

Symbol	Parameter	Test Conditions	Vcc	T_A = -40 to +85°C		T_A = -40 to +125°C		Unit
				Min	Max	Min	Max	
V_{IH}	High-Level Input Voltage	–	2.0V	1.5	–	1.5	–	V
		–	2.3V to 2.7V	V_{CC} X 0.7	–	V_{CC} X 0.7	–	
		–	3.0V to 3.6V	V_{CC} X 0.7	–	V_{CC} X 0.7	–	
		–	4.5V to 5.5V	V_{CC} X 0.7	–	V_{CC} X 0.7	–	–
V_{IL}	Low-Level Input Voltage	–	2.0V	–	0.5	–	0.5	V
		–	2.3V to 2.7V	–	V_{CC} X 0.3	–	V_{CC} X 0.3	
		–	3.0V to 3.6V	–	V_{CC} X 0.3	–	V_{CC} X 0.3	
		–	4.5V to 5.5V	–	V_{CC} X 0.3	–	V_{CC} X 0.3	–
V_{OH}	High-Level Output Voltage	I_{OH} = -50μA	2.0V to 5.5V	V_{CC}-0.1	–	V_{CC}-0.1	–	V
		I_{OH} = -2mA	2.3V	2.0	–	2.0	–	
		I_{OH} = -6mA	3.0V	2.48	–	2.48	–	
		I_{OH} = -12mA	4.5V	3.8	–	3.8	–	
V_{OL}	Low-Level Output Voltage	I_{OL} = 50μA	2.0V to 5.5V	–	0.1	–	0.1	V
		I_{OL} = 2mA	2.3V	–	0.4	–	0.4	
		I_{OL} = 6mA	3.0V	–	0.44	–	0.44	
		I_{OL} = 12mA	4.5V	–	0.55	–	0.55	
I_{OFF}	Power Down Leakage Current	V_I or V_O = 0 to 5.5V	0V	–	5	–	5	μA
I_I	Input Current	V_I =GND or 5.5V	0 to 5.5V	–	±1	–	±1	μA
I_{CC}	Supply Current	V_I = GND or V_{CC} I_O = 0	5.5V	–	20	–	20	μA

Switching Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	T_A = +25°C			-40 to +85°C		-40 to +125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
t_{PD}	Propagation Delay A_N to Y_N	Figure 1 C_L=15pF	2.5V ± 0.2V	-	7.9	17.6	1	21	1	22	ns
			3.3V ± 0.3V	-	5.5	11	1	13	1	14	
			5.0V ± 0.5V	-	3.7	6.8	1	8	1	9	
		Figure 1 C_L=50 pF	2.5V ± 0.2V	-	10.5	22.6	1	26.5	1	27.5	ns
			3.3V ± 0.3V	-	7.4	14.5	1	16.5	1	17.5	
			5.0V ± 0.5V	-	5.3	8.8	1	10	1	11	

Operating Characteristics

T_A = +25°C

Parameter		Test Conditions	V_{CC}	TYP	Unit
C_{pd}	Power Dissipation Capacitance per Gate	F = 10MHz C_L = 50pF	3.3V	8.4	pF
			5.0V	8.8	

Noise Characteristics

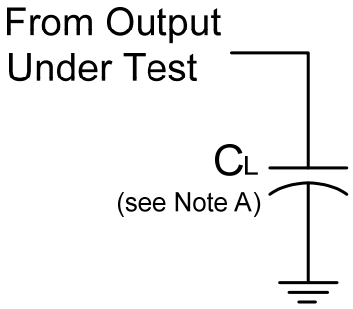
V_{CC} = 3V, C_L = 50pF T_A = +25°C

Symbol	Parameter	Min	Typ.	Max	Unit
$V_{OL(p)}$	Quiet output, maximum dynamic V_{OL}	–	0.2	0.8	V
$V_{OL(V)}$	Quiet output, minimum dynamic V_{OL}	–	-0.1	-0.8	V
$V_{OH(V)}$	Quiet output, minimum dynamic V_{OH}	–	3.1	–	V
$V_{IH(D)}$	High Level dynamic input voltage	2.31	–	–	V
$V_{IL(D)}$	Low Level dynamic input voltage	–	–	0.99	V

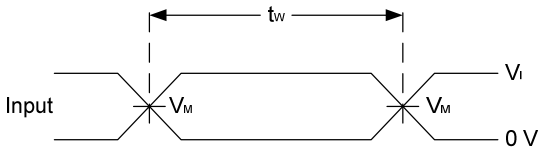
Package Characteristics

Symbol	Parameter	Test Conditions	Vcc	Min	Typ.	Max	Unit
C_i	Input Capacitance	V_i = V_{CC} – or GND	2.0 to 5.5V	–	3.3	10	pF

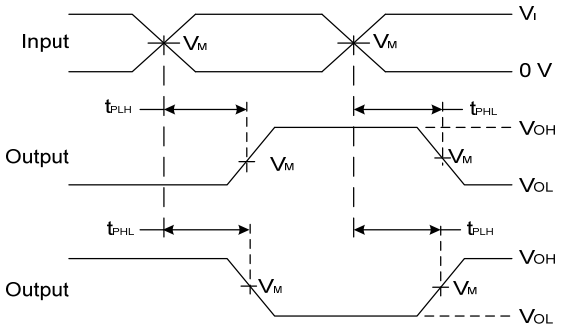
Parameter Measurement Information



V_{CC}	Inputs		V_M	C_L
	V_I	t_r/t_f		
2.0V to 5.5V	V_{CC}	<3ns	$V_{CC}/2$	15pF or 50pF



Voltage Waveform
Pulse Duration

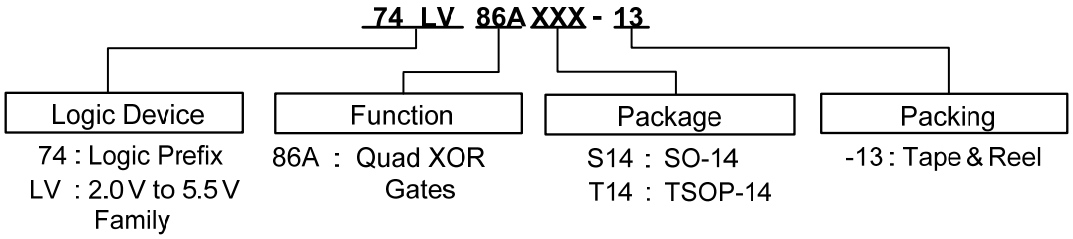


Voltage Waveform
Propagation Delay Times
Inverting and Non Inverting Outputs

Notes: A . Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 10MHz
C. Inputs are measured separately one transition per measurement
D. t_{PLH} and t_{PHL} are the same as t_{PD}

Figure 1. Load Circuit and Voltage Waveforms

Ordering Information

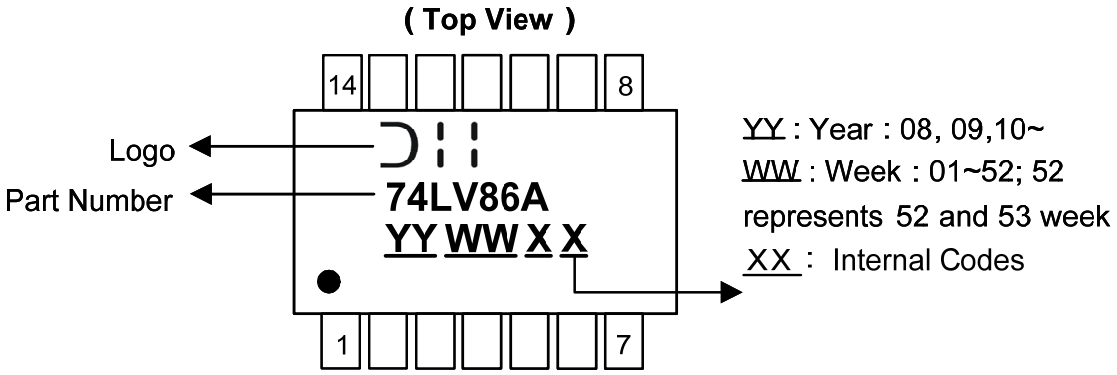


Device	Package Code	Packaging (Note 6)	13" Tape and Reel	
			Quantity	Part Number Suffix
74LV86AS14-13	S14	SO-14	2500/Tape & Reel	-13
74LV86AT14-13	T14	TSSOP-14	2500/Tape & Reel	-13

Note: 6. The taping orientation and tape details can be found at http://www.diodes.com/datasheets/ap02007.pdf

Marking Information

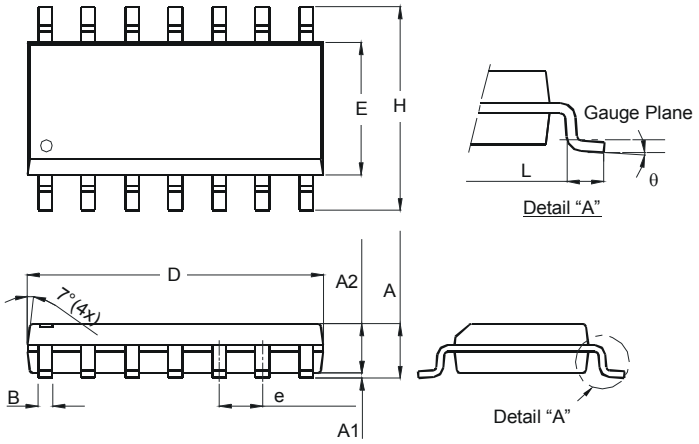
(1) SO14, TSSOP14



Part Number	Package
74LV86AS14	SO-14
74LV86AT14	TSSOP-14

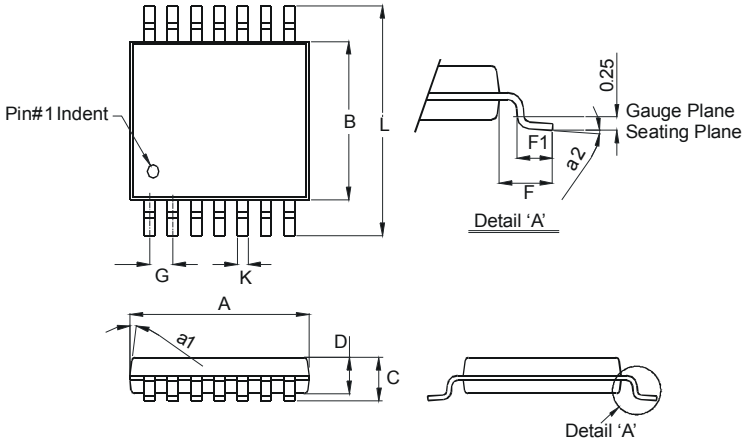
Package Outline Dimensions (All Dimensions in mm)

Package Type: SO-14



SO-14		
Dim	**Min**	**Max**
A	1.47	1.73
A1	0.10	0.25
A2	1.45 Typ	
B	0.33	0.51
D	8.53	8.74
E	3.80	3.99
e	1.27 Typ	
H	5.80	6.20
L	0.38	1.27
θ	0°	8°
All Dimensions in mm		

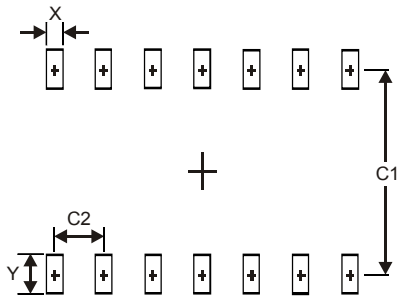
Package Type: TSSOP-14



TSSOP-14		
Dim	**Min**	**Max**
a1	7° (4X)	
a2	0°	8°
A	4.9	5.10
B	4.30	4.50
C	—	1.2
D	0.8	1.05
F	1.00 Typ	
F1	0.45	0.75
G	0.65 Typ	
K	0.19	0.30
L	6.40 Typ	
All Dimensions in mm		

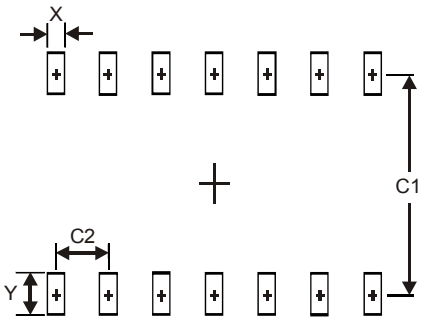
Suggested Pad Layout

Package Type: SO-14



Dimensions	Value (in mm)
X	0.60
Y	1.50
C1	5.4
C2	1.27

Package Type: TSSOP-14



Dimensions	Value (in mm)
X	0.45
Y	1.45
C1	5.9
C2	0.65

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