



3.3V CMOS HEX SCHMITT-TRIGGER INVERTER

IDT74ALVC14

FEATURES:

- 0.5 MICRON CMOS Technology
- ESD > 2000V per MIL-STD-883, Method 3015; > 200V using machine model (C = 200pF, R = 0)
- Vcc = 3.3V ± 0.3V, Normal Range
- Vcc = 2.7V to 3.6V, Extended Range
- Vcc = 2.5V ± 0.2V
- CMOS power levels (0.4µ W typ. static)
- Rail-to-Rail output swing for increased noise margin
- Available in SOIC, SSOP, and TSSOP packages

DRIVE FEATURES:

- High Output Drivers: ±24mA
- Suitable for Heavy Loads

DESCRIPTION:

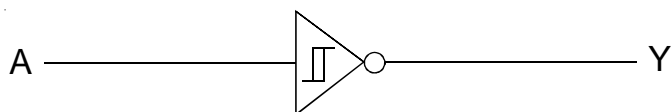
This hex Schmitt-trigger inverter is built using advanced dual metal CMOS technology. The ALVC14 contains six independent inverters, and performs the Boolean function $Y = \bar{A}$.

The ALVC14 has been designed with a ±24mA output driver. This driver is capable of driving a moderate to heavy load while maintaining speed performance.

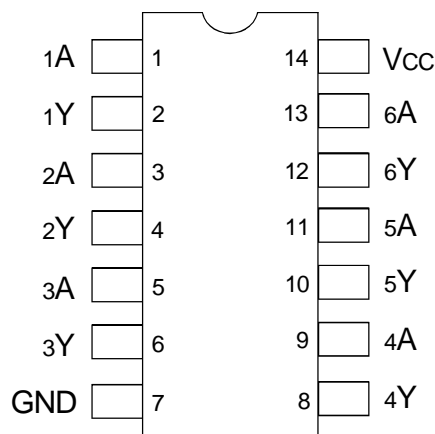
APPLICATIONS:

- 3.3V high speed systems
- 3.3V and lower voltage computing systems

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SOIC/ SSOP/ TSSOP
TOP VIEW

PIN DESCRIPTION

Pin Names	Description
x A	Data Inputs
x Y	Data Outputs

FUNCTION TABLE (EACH GATE)⁽¹⁾

Input	Output
x A	x Y
H	L
L	H

NOTE:

1. H = HIGH Voltage Level
L = LOW Voltage Level

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Description	Max	Unit
V _{TERM} ⁽²⁾	Terminal Voltage with Respect to GND	-0.5 to +4.6	V
V _{TERM} ⁽³⁾	Terminal Voltage with Respect to GND	-0.5 to V _{CC} +0.5	V
T _{STG}	Storage Temperature	-65 to +150	°C
I _{OUT}	DC Output Current	-50 to +50	mA
I _{IK}	Continuous Clamp Current, V _i < 0 or V _i > V _{CC}	±50	mA
I _{OK}	Continuous Clamp Current, V _o < 0	-50	mA
I _{CC} I _{SS}	Continuous Current through each V _{CC} or GND	±100	mA

NOTES:

1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. V_{CC} terminals.
3. All terminals except V_{CC}.

CAPACITANCE (T_A = +25°C, F = 1.0MHz)

Symbol	Parameter ⁽¹⁾	Conditions	Typ.	Max.	Unit
C _{IN}	Input Capacitance	V _{IN} = 0V	5	7	pF
C _{OUT}	Output Capacitance	V _{OUT} = 0V	7	9	pF
C _{I/O}	I/O Port Capacitance	V _{IN} = 0V	7	9	pF

NOTE:

1. As applicable to the device type.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Condition: T_A = -40°C to +85°C

Symbol	Parameter	Test Conditions		Min.	Typ. ⁽¹⁾	Max.	Unit
I _{IH}	Input HIGH Current	V _{CC} = 3.6V	V _i = V _{CC}	—	—	±5	μA
I _{IL}	Input LOW Current	V _{CC} = 3.6V	V _i = GND	—	—	±5	μA
V _{IK}	Clamp Diode Voltage	V _{CC} = 2.3V, I _{IIN} = -18mA		—	-0.7	-1.2	V
I _{CC} I _{CC}	Quiescent Power Supply Current	V _{CC} = 3.6V V _{IN} = GND or V _{CC}		—	0.1	20	μA
ΔI _{CC}	Quiescent Power Supply Current Variation	One input at V _{CC} - 0.6V, other inputs at V _{CC} or GND		—	—	750	μA

NOTE:

1. Typical values are at V_{CC} = 3.3V, +25°C ambient.

OUTPUT DRIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Max.	Unit
V _{OH}	Output HIGH Voltage	V _{CC} = 2.3V to 3.6V	I _{OH} = - 0.1mA	V _{CC} - 0.2	—	V
		V _{CC} = 2.3V	I _{OH} = - 6mA	2	—	
		V _{CC} = 2.3V	I _{OH} = - 12mA	1.7	—	
		V _{CC} = 2.7V		2.2	—	
		V _{CC} = 3V		2.4	—	
		V _{CC} = 3V	I _{OH} = - 24mA	2	—	
V _{OL}	Output LOW Voltage	V _{CC} = 2.3V to 3.6V	I _{OL} = 0.1mA	—	0.2	V
		V _{CC} = 2.3V	I _{OL} = 6mA	—	0.4	
			I _{OL} = 12mA	—	0.7	
		V _{CC} = 2.7V	I _{OL} = 12mA	—	0.4	
		V _{CC} = 3V	I _{OL} = 24mA	—	0.55	

NOTE:
1. V_{IH} and V_{IL} must be within the min. or max. range shown in the DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE table for the appropriate V_{CC} range.
T_A = - 40°C to + 85°C.

OPERATING CHARACTERISTICS, T_A = 25°C

Symbol	Parameter	Test Conditions	V _{CC} = 2.5V ± 0.2V	V _{CC} = 3.3V ± 0.3V	Unit
			Typical	Typical	
CPD	Power Dissipation Capacitance per Inverter	C _L = 0pF, f = 10MHz	27	31	pF

SWITCHING CHARACTERISTICS⁽¹⁾

Symbol	Parameter	V _{CC} = 2.5V ± 0.2V		V _{CC} = 2.7V		V _{CC} = 3.3V ± 0.3V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
t _{PLH}	Propagation Delay	1	6	1	5.5	1	4.5	ns
t _{PHL}	xA to xY							

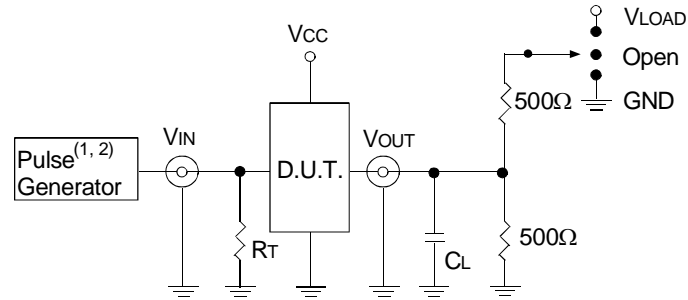
NOTE:
1. See TEST CIRCUITS AND WAVEFORMS. T_A = - 40°C to + 85°C.

HYSTERESIS CHARACTERISTICS

Parameter	Test Conditions	V _{CC}	Min.	Typ.	Max.	Unit
V _{T+} Positive-going threshold	Input Voltage, from V _{IL} to V _{IH} , in a linear ramp observing the output transition.	2.7V	0.8		2	V
		3V	0.8		2	
		3.6V	0.8		2	
V _{T-} Negative-going threshold	Input Voltage, from V _{IH} to V _{IL} , in a linear ramp observing the output transition.	2.7V	0.4		1.4	V
		3V	0.6		1.5	
		3.6V	0.8		1.8	
ΔV _T Hysteresis (V _{T+} - V _{T-})	ΔV _T min = V _{T+} min - V _{T-} max ΔV _T max = V _{T+} max - V _{T-} min	2.7V	0.3		1.1	V
		3V	0.3		1.2	
		3.6V	0.3		1.2	

TEST CIRCUITS AND WAVEFORMS
TEST CONDITIONS

Symbol	V _{CC} ⁽¹⁾ =3.3V±0.3V	V _{CC} ⁽¹⁾ =2.7V	V _{CC} ⁽²⁾ =2.5V±0.2V	Unit
V _{LOAD}	6	6	2 x V _{CC}	V
V _{IH}	2.7	2.7	V _{CC}	V
V _T	1.5	1.5	V _{CC} / 2	V
V _{LZ}	300	300	150	mV
V _{HZ}	300	300	150	mV
C _L	50	50	30	pF



Test Circuit for All Outputs

DEFINITIONS:

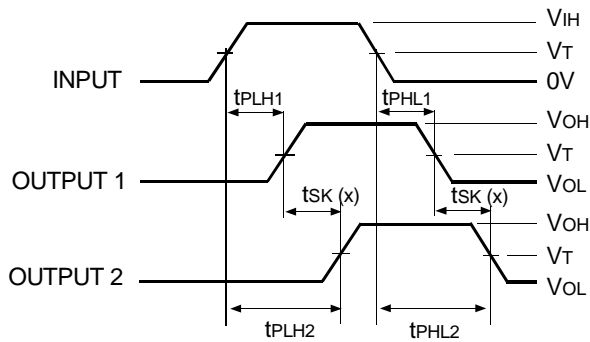
C_L = Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to Z_{out} of the Pulse Generator.

NOTES:

1. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_r ≤ 2.5ns; t_f ≤ 2.5ns.
2. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_r ≤ 2ns; t_f ≤ 2ns.

SWITCH POSITION

Test	Switch
Open Drain Disable Low Enable Low	V _{LOAD}
Disable High Enable High	GND
All Other Tests	Open



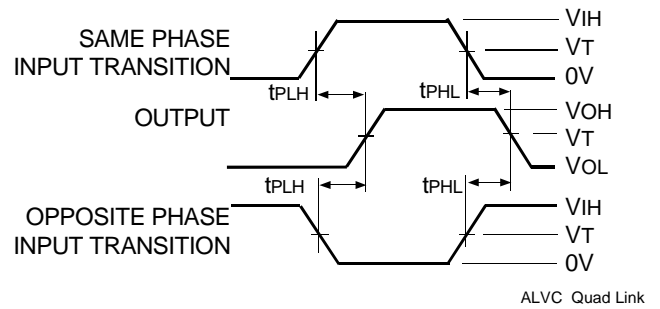
$$t_{SK}(x) = |t_{PLH2} - t_{PLH1}| \text{ or } |t_{PHL2} - t_{PHL1}|$$

ALVC Quad Link

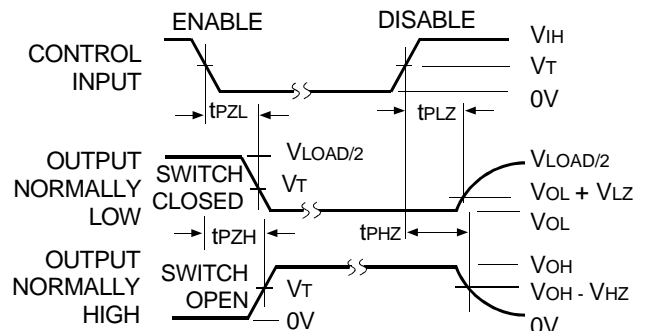
Output Skew - t_{SK}(x)

NOTES:

1. For t_{SK}(o) OUTPUT1 and OUTPUT2 are any two outputs.
2. For t_{SK}(b) OUTPUT1 and OUTPUT2 are in the same bank.



Propagation Delay

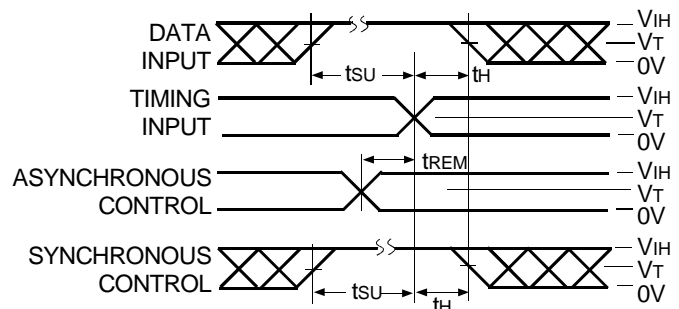


ALVC Quad Link

NOTE:

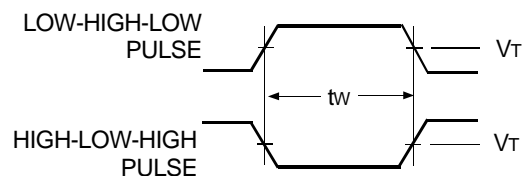
1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.

Enable and Disable Times



ALVC Quad Link

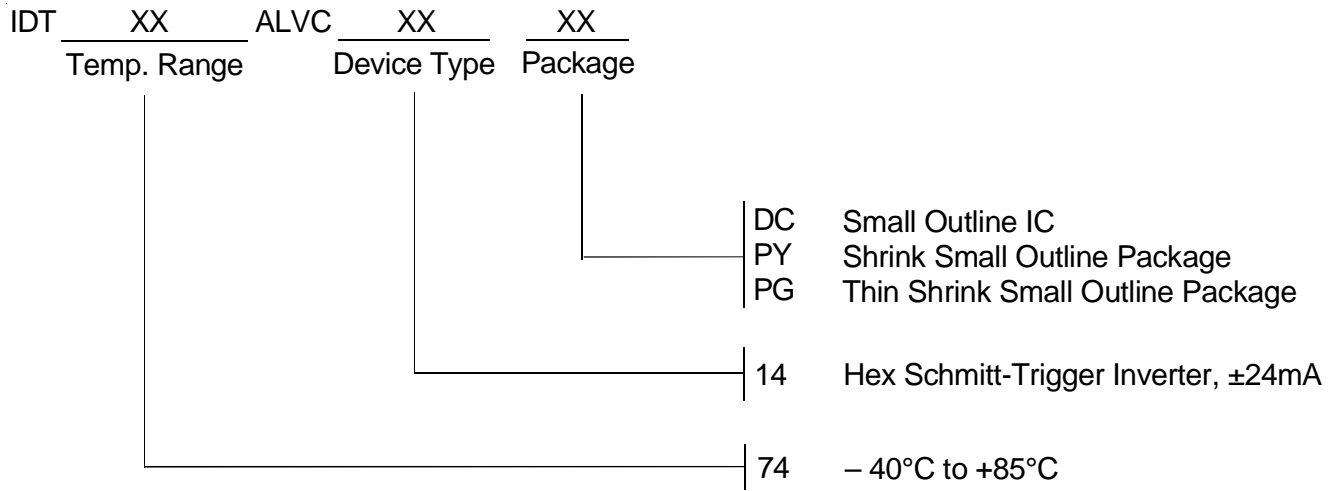
Set-up, Hold, and Release Times



ALVC Quad Link

Pulse Width

ORDERING INFORMATION



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