

DM54ALS14/DM74ALS14 Hex Inverters with Schmitt Trigger Inputs

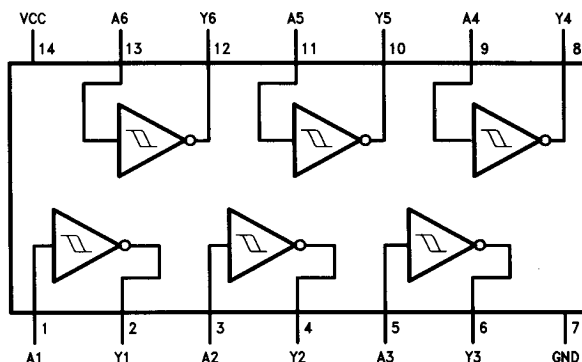
General Description

This device contains six independent gates, each of which performs the logic INVERT function. Each input has hysteresis which increases the noise immunity and transforms a slowly changing input signal to a fast changing, jitter-free output.

Features

- Switching specification at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin-for-pin compatible with Schottky and Low Power Schottky TTL counterparts
- Improved AC performance over low power Schottky counterpart

Connection Diagram



TL/F/8773-1

Order Number DM54ALS14J, DM74ALS14M or DM74ALS14N
See NS Package Number J14A, M14A or N14A

Function Table

$$Y = \bar{A}$$

Input A	Output Y
L	H
H	L

H = High Logic Level

L = Low Logic Level

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Storage Temperature Range	-65°C to +150°C
Operating Free Air Temperature Range	
DM54ALS	-55°C to +125°C
DM74ALS	0°C to +70°C

NOTE: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

Symbol	Parameter		DM54ALS14			DM74ALS14			Units
			Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage		4.5	5	5.5	4.5	5	5.5	V
V _{T+}	Positive-Going Input Threshold Voltage	V _{CC} = Min to Max	1.4		2	1.4		2	V
		V _{CC} = 5V	1.55		1.85	1.55		1.85	
V _{T-}	Negative-Going Input Threshold Voltage	V _{CC} = Min to Max	0.75		1.2	0.75		1.2	V
		V _{CC} = 5V	0.85		1.1	0.85		1.1	
HYS	Input Hysteresis	V _{CC} = Min to Max	0.5			0.5			V
		V _{CC} = 5V	0.6			0.6			
I _{OH}	High Level Output Current				-0.4			-0.4	mA
I _{OL}	Low Level Output Current				4			8	mA
T _A	Operating Free Air Temperature Range		-55		125	0		70	°C

Electrical Characteristics over recommended free air temperature range (unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V _{IC}	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.5	V
V _{OH}	High Level Output Voltage	V _{CC} = 4.5V to 5.5V, I _{OH} = Max	V _{CC} - 2			V
V _{OL}	Low Level Output Voltage	V _{CC} = Min 54/74ALS I _{OL} = 4 mA		0.25	0.4	V
				0.35	0.5	V
I _{T+}	Input Current at Positive-Going Threshold Voltage	V _{CC} = 5V, V _I = V _{T+}			20	μA
I _{T-}	Input Current at Negative-Going Threshold Voltage	V _{CC} = 5V, V _I = V _{T-}			-100	μA
I _I	Input Current at Maximum Input Voltage	V _{CC} = Max, V _I = 7V			100	μA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			20	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.4V			-100	μA
I _O	Output Drive Current	V _{CC} = Max, V _O = 2.25V	-30		-112	mA
I _{CCH}	Supply Current with Outputs High	V _{CC} = Max			12	mA
I _{CCL}	Supply Current with Outputs Low	V _{CC} = Max			12	mA

Switching Characteristics over recommended operating free air temperature range

Symbol	Parameter	Conditions (Note 1)	DM54ALS14		DM74ALS14		Units
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	V _{CC} = 4.5V to 5.5V R _L = 500Ω, C _L = 50 pF	2	13	2	12	ns
t _{PHL}	Propagation Delay Time High to Low Level Output		2	11	2	10	ns

Note 1: See Section 1 for test waveforms and output load.