

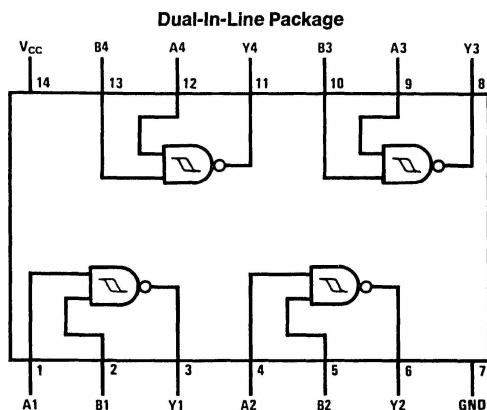


DM54132/DM74132 Quad 2-Input NAND Gates with Schmitt Trigger Inputs

General Description

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

Connection Diagram



TL/F/6542-1

Order Number DM54132J or DM74132N
See NS Package Number J14A or N14A

Function Table

$$Y = \overline{AB}$$

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

H = High Logic Level

L = Low Logic Level

Absolute Maximum Ratings (Note)

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

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	
DM54	–55°C to +125°C
DM74	0°C to +70°C
Storage Temperature Range	–65°C to +150°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	DM54132			DM74132			Units
		Min	Typ	Max	Min	Typ	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{T+}	Positive-Going Input Threshold Voltage (Note 1)	1.5	1.7	2	1.5	1.7	2	V
V_{T-}	Negative-Going Input Threshold Voltage (Note 1)	0.6	0.9	1.1	0.6	0.9	1.1	V
HYS	Input Hysteresis (Note 1)	0.4	0.8		0.4	0.8		V
I_{OH}	High Level Output Current			–0.8			–0.8	mA
I_{OL}	Low Level Output Current			16			16	mA
T_A	Free Air Operating Temperature	–55		125	0		70	°C

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

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = \text{Min}, I_I = -12 \text{ mA}$			–1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = \text{Min}, I_{OH} = \text{Max}$	DM54	2.4	3.4	V
		$V_I = V_{T-} \text{ Min}$	DM74	2.4	3.4	
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}, I_{OL} = \text{Max}$ $V_I = V_{T+} \text{ Max}$		0.2	0.4	V
I_{T+}	Input Current at Positive-Going Threshold	$V_{CC} = 5V, V_I = V_{T+}$		–0.43		mA
I_{T-}	Input Current at Negative-Going Threshold	$V_{CC} = 5V, V_I = V_{T-}$		–0.56		mA
I_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}, V_I = 5.5V$			1	mA
I_{IH}	High Level Input Current	$V_{CC} = \text{Max}, V_I = 2.4V$			40	μA
I_{IL}	Low Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4V$		–0.8	–1.2	mA
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	DM54	–18	–55	mA
			DM74	–18	–55	
I_{CCH}	Supply Current with Outputs High	$V_{CC} = \text{Max}$		15	24	mA
I_{CCL}	Supply Current with Outputs Low	$V_{CC} = \text{Max}$		26	40	mA

Note 1: $V_{CC} = 5V$.

Note 2: All typicals are at $V_{CC} = 5V, T_A = 25^\circ\text{C}$.

Note 3: Not more than one output should be shorted at a time.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	$R_L = 400\Omega$ $C_L = 15\text{ pF}$		Units
		Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output		22	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		22	ns