



DM5413/DM7413 Dual 4-Input NAND Gates with Schmitt Trigger Inputs

General Description

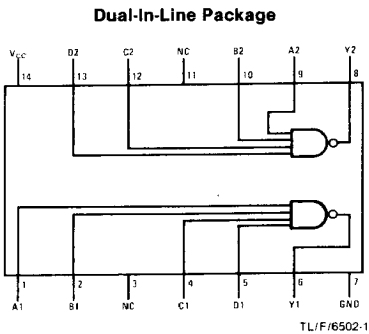
This device contains two independent gates each of which performs the logic NAND function. Each input has hysteresis which increases the noise immunity and transforms a slowly changing input signal to a fast changing, jitter free output.

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Storage Temperature Range	-65°C to 150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not 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.

Connection Diagram



DM5413 (J) DM7413 (N)

Function Table

$$Y = \overline{ABCD}$$

Inputs				Output
A	B	C	D	Y
X	X	X	L	H
X	X	L	X	H
X	L	X	X	H
L	X	X	X	H
H	H	H	H	L

H = High Logic Level

L = Low Logic Level

X = Either Low or High Logic Level

Recommended Operating Conditions

Sym	Parameter	DM5413			DM7413			Units
		Min	Nom	Max	Min	Nom	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)

Sym	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -12 mA			-1.5	V
V _{OH}	High Level Output Voltage	V _{CC} = Min, I _{OH} = Max V _I = V _{T-} Min	2.4	3.4		V
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _I = V _{T+} Max		0.2	0.4	V
I _{T+}	Input Current at Positive-Going Threshold	V _{CC} = 5V, V _I = V _{T+}		-0.65		mA
I _{T-}	Input Current at Negative-Going Threshold	V _{CC} = 5V, V _I = V _{T-}		-0.85		mA
I _I	Input Current @ Max Input Voltage	V _{CC} = Max, V _I = 5.5V			1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.4V			40	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.4V			-1.6	mA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 3)	DM54	-18	-55	mA
			DM74	-18	-55	
I _{CCH}	Supply Current With Outputs High	V _{CC} = Max		14	23	mA
I _{CCL}	Supply Current With Outputs Low	V _{CC} = Max		20	32	mA

Note 1: V_{CC} = 5V.

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°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)

Parameter	Conditions	$C_L = 15 \text{ pF}$ $R_L = 400\Omega$			Units
		Min	Typ	Max	
t_{PLH} Propagation Delay Time Low to High Level Output			18	27	ns
t_{PHL} Propagation Delay Time High to Low Level Output			15	22	ns