

DM7403 Quad 2-Input NAND Gates with Open-Collector Outputs

General Description

This device contains four independent gates each of which performs the logic NAND function. The open-collector outputs require external pull-up resistors for proper logical operation.

Pull-Up Resistor Equations

$$R_{MAX} = \frac{V_{CC} (Min) - V_{OH}}{N_1 (I_{OH}) + N_2 (I_{IH})}$$

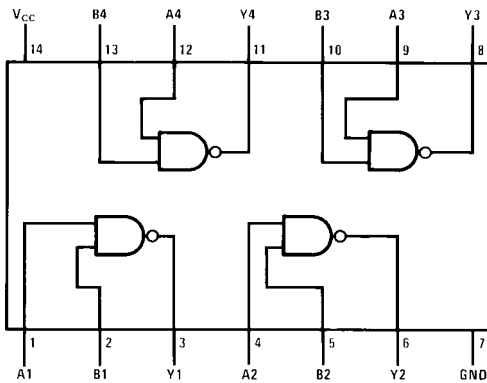
$$R_{MIN} = \frac{V_{CC} (Max) - V_{OL}}{I_{OL} - N_3 (I_{IL})}$$

Where: $N_1 (I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Ordering Code:

Order Number	Package Number	Package Description
DM7403N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Connection Diagram



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 1)

Supply Voltage	7V
Input Voltage	5.5V
Output Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note 1: 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 tables 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	Min	Nom	Max	Units
V _{CC}	Supply Voltage	4.75	5	5.25	V
V _{IH}	HIGH Level Input Voltage	2			V
V _{IL}	LOW Level Input Voltage			0.8	V
V _{OH}	HIGH Level Output Voltage			5.5	V
I _{OL}	LOW Level Output Current			16	mA
T _A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -12 mA			-1.5	V
I _{CEX}	HIGH Level Output Current	V _{CC} = Min, V _O = 5.5V V _{IL} = Max			250	μA
V _{OL}	LOW Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min		0.2	0.4	V
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 _{CCH}	Supply Current with Outputs HIGH	V _{CC} = Max		4	8	mA
I _{CCL}	Supply Current with Outputs LOW	V _{CC} = Max		12	22	mA

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

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

Symbol	Parameter	Conditions	Min	Max	Units
t _{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	C _L = 15 pF R _L = 4 kΩ (t _{PLH})		45	ns
t _{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	R _L = 400Ω (t _{PHL})		15	ns

Physical Dimensions inches (millimeters) unless otherwise noted



N14A (REV F)

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