

March 1998

FAIRCHILD
SEMICONDUCTOR™

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.

Where: $N_1 (I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor

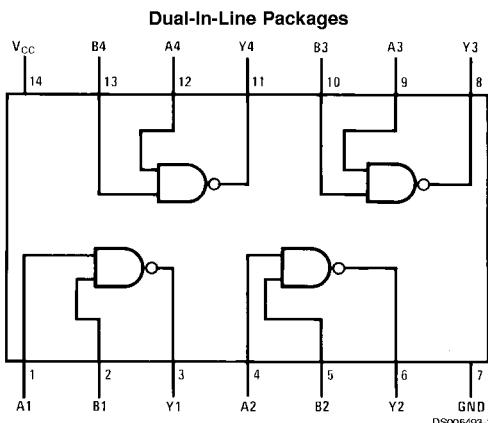
$N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor

$N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Pull-Up Resistor Equations

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

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

Connection Diagram

Order Number DM5403J or DM7403N
See 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 1)

Supply Voltage	7V	Operating Free Air Temperature Range	DM54 DM74 Storage Temperature Range	-55°C to +125°C 0°C to +70°C -65°C to +150°C
Input Voltage	5.5V			
Output Voltage	7V			

Recommended Operating Conditions

Symbol	Parameter	DM5403			DM7403			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
V_{OH}	High Level Output Voltage			5.5			5.5	V
I_{OL}	Low Level Output Current			16			16	mA
T_A	Free Air Operating Temperature	-55		125	0		70	°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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

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	$V_{CC} = \text{Min}$, $I_I = -12 \text{ mA}$			-1.5	V
I_{CEX}	High Level Output Current	$V_{CC} = \text{Min}$, $V_O = 5.5V$ $V_{IL} = \text{Max}$			250	μA
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}$, $I_{OL} = \text{Max}$ $V_{IH} = \text{Min}$		0.2	0.4	V
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	$V_{CC} = \text{Max}$, $V_I = 0.4V$			-1.6	mA
I_{CCH}	Supply Current with Outputs High	$V_{CC} = \text{Max}$		4	8	mA
I_{CCL}	Supply Current with Outputs Low	$V_{CC} = \text{Max}$		12	22	mA

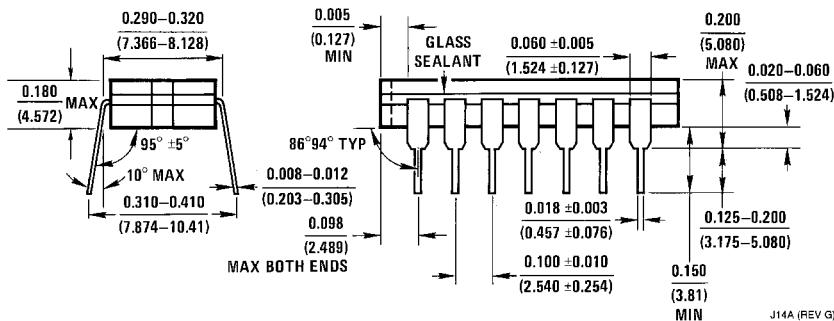
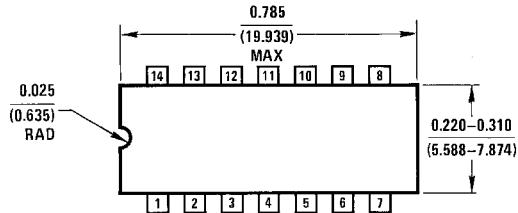
Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25^\circ\text{C}$

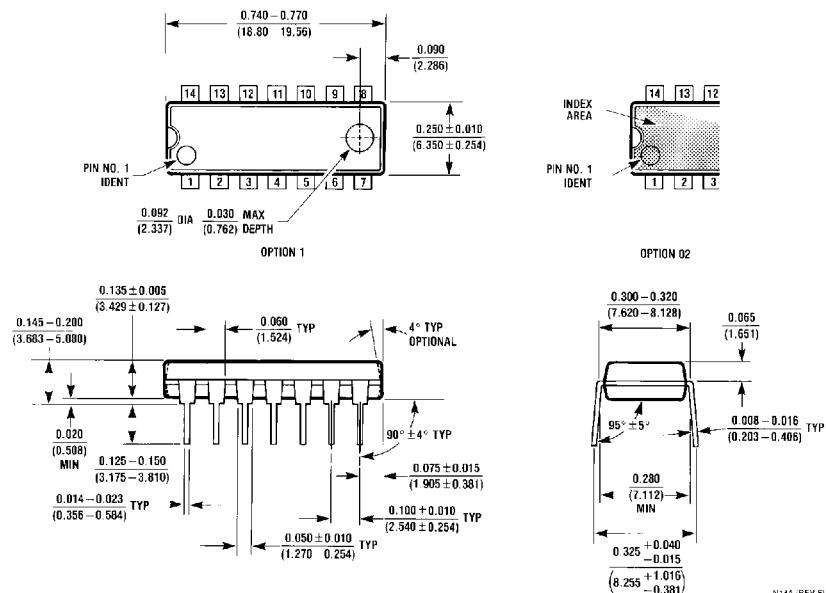
Symbol	Parameter	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 15 \text{ pF}$ $R_L = 4 \text{ k}\Omega$ (t_{PLH}) $R_L = 400\Omega$ (t_{PHL})		45	ns
t_{PHL}	Propagation Delay Time High to Low Level Output			15	ns

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

Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Ceramic Dual-In-Line Package (J)
Order Number DM5403J
Package Number J14A



14-Lead Molded Dual-In-Line Package (N)
Order Number DM7403N
Package Number N14A