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FAIRCHILD SEMICONDUCTOR™

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DM7405
Hex Inverters with Open-Collector Outputs

General Description

This device contains six independent gates each of which performs the logic INVERT 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

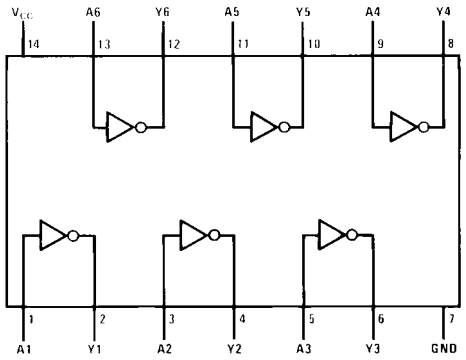
N_2 (I_{IH}) = total maximum input high current for all inputs tied to pull-up resistor

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
DM7405N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Connection Diagram



Function Table

$$Y = \overline{A}$$

Input	Output
A	Y
L	H
H	L

H = HIGH Logic Level
L = LOW Logic Level

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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		6	12	mA
I_{CCL}	Supply Current with Outputs LOW	V_{CC} = Max		18	33	mA

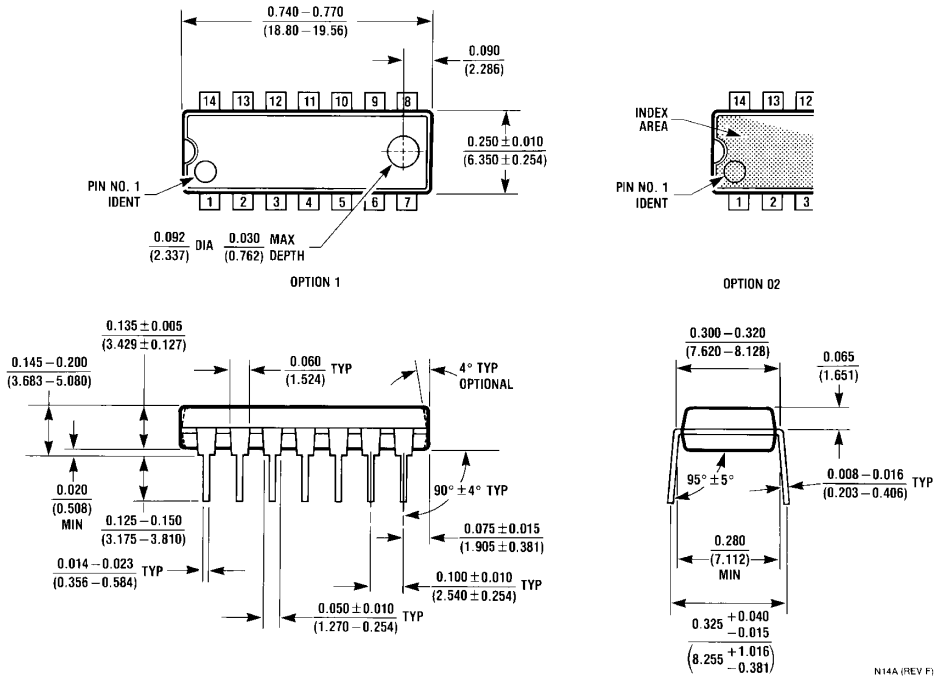
Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

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})		55	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



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

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