

DM54L05/DM74L05 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

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

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

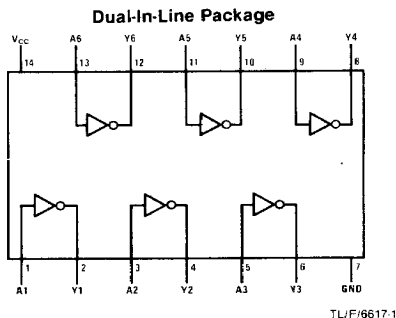
Where: $N_1 (I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Absolute Maximum Ratings (Note 1)

Supply Voltage	8V
Input Voltage	5.5V
Output Voltage	8V
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



DM54L05 (J) DM74L05 (N)

Function Table

$$Y = \bar{A}$$

Input A	Output Y
L	H
H	L

H = High Logic Level
L = Low Logic Level

Recommended Operating Conditions

Sym	Parameter	DM54L05			DM74L05			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			0.6			0.6	V
V _{OH}	High Level Output Voltage			5.5			5.5	V
I _{OL}	Low Level Output Current			2			3.6	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 1)	Max	Units
I _{CEX}	High Level Output Current	V _{CC} = Min, V _O = 5.5V V _{IL} = Max			50	μA
V _{OL}	Low Level Output Voltage	V _{CC} = Min I _{OL} = Max V _{IH} = Min	DM54	0.15	0.3	V
			DM74	0.2	0.4	
I _I	Input Current @ Max Input Voltage	V _{CC} = Max, V _I = 5.5V			0.1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.4V			10	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.3V			- 0.18	mA
I _{CCH}	Supply Current With Outputs High	V _{CC} = Max		0.66	1.2	mA
I _{CCL}	Supply Current With Outputs Low	V _{CC} = Max		1.74	3.06	mA

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

Parameter	Conditions	R _L = 4 kΩ C _L = 50 pF			Units
		Min	Typ	Max	
t _{PLH} Propagation Delay Time Low to High Level Output			60	90	ns
t _{PHL} Propagation Delay Time High to Low Level Output			33	60	ns

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.