Jameco Part Number 63765NSC

National Semiconductor

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MM54HCT05/MM74HCT05 Hex Inverter (Open Drain)

General Description

The MM54HCT05/MM74HCT05 are logic functions fabricated by using advanced silicon-gate CMOS technology, which provides the inherent benefits of CMOS—low quiescent power and wide power supply range. These devices are also input and output characteristic and pinout compatible with standard DM54LS/DM74LS logic families. The MM54HCT05/MM74HCT05 open drain Hex Inverter requires the addition of an external resistor to perform a wire-NOR function.

All inputs are protected from static discharge damage by internal diodes to V_{CC} and ground.

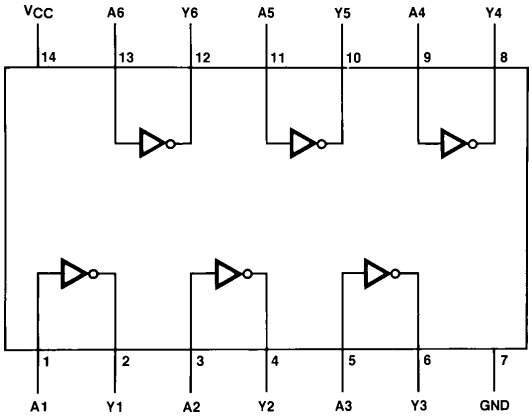
MM54HCT/MM74HCT devices are intended to interface between TTL and NMOS components and standard CMOS devices. These parts are also plug-in replacements for LS-TTL devices and can be used to reduce power consumption in existing designs.

Features

- Open drain for wire-NOR function
- LS-TTL pinout and threshold compatible
- Fanout of 10 LS-TTL loads
- Typical propagation delays:
  t_{PLH} (with 1 kΩ resistor) 10 ns
  t_{PHL} (with 1 kΩ resistor) 8 ns

Connection Diagram

Dual-In-Line Package

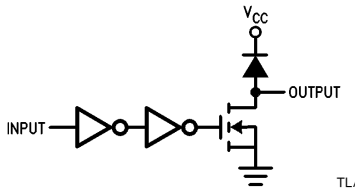


TL/F/5358–1

Top View

Order Number MM54HCT05 or MM74HCT05

Logic Diagram



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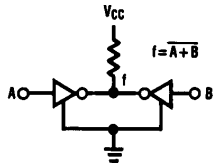
Typical Application



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Note: Can be extended to more than 2 inputs.

RRD-B30M105/Printed in U. S. A.

Absolute Maximum Ratings (Notes 1 & 2)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage (V_{CC})	−0.5 to +7.0V
DC Input Voltage (V_{IN})	−1.5 to V_{CC} +1.5V
DC Output Voltage (V_{OUT})	−0.5 to V_{CC} +0.5V
Clamp Diode Current (I_{IK}, I_{OK})	±20 mA
DC Output Current, per pin (I_{OUT})	±25 mA
DC V_{CC} or GND Current, per pin (I_{CC})	±50 mA
Storage Temperature Range (T_{STG})	−65°C to +150°C
Power Dissipation (P_D)	
(Note 3)	600 mW
S.O. Package only	500 mW
Lead Temperature (T_L)	
(Soldering 10 seconds)	260°C

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})	4.5	5.5	V
DC Input or Output Voltage (V_{IN}, V_{OUT})	0	V_{CC}	V
Operating Temp. Range (T_A)			
MM74HCT	−40	+85	°C
MM54HCT	−55	+125	°C
Input Rise or Fall Times (t_r, t_f)		500	ns

DC Electrical Characteristics (V_{CC} = 5V ±10%, unless otherwise specified)

Symbol	Parameter	Conditions	T_A = 25°C	74HCT T_A = −40 to 85°C	54HCT T_A = −55 to 125°C	Units
			Typ	Guaranteed Limits		
V_{IH}	Minimum High Level Input Voltage			2.0	2.0	2.0	V
V_{IL}	Maximum Low Level Input Voltage			0.8	0.8	0.8	V
V_{OL}	Maximum Low Level Voltage	V_{IN} = V_{IH}					
		$\|I_{OUT}\|$ = 20 μA	0	0.1	0.1	0.1	V
		$\|I_{OUT}\|$ = 4.0 mA, V_{CC} = 4.5V	0.2	0.26	0.33	0.4	V
		$\|I_{OUT}\|$ = 4.8 mA, V_{CC} = 5.5V	0.2	0.26	0.33	0.4	V
I_{IN}	Maximum Input Current	V_{IN} = V_{CC} or GND, V_{IH} or V_{IL}		±0.1	±1.0	±1.0	μA
I_{LKG}	Minimum High Level Output Leakage Current	V_{IN} = V_{IH} or VIL, V_{OUT} = V_{CC}		0.5	5.0	10	μA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} = V_{CC} or GND I_{OUT} = 0μA		2.0	20	40	μA
		V_{IN} = 2.4V or 0.5V (Note 4)		0.3	0.4	0.5	mA

Note 1: Absolute Maximum Ratings are those values beyond which damage to the device may occur.

Note 2: Unless otherwise specified all voltages are referenced to ground.

Note 3: Power Dissipation temperature derating — plastic "N" package: −12 mW/°C from 65°C to 85°C; ceramic "J" package: −12 mW/°C from 100°C to 125°C.

Note 4: This is measured per input with all other inputs held at V_{CC} or ground.

AC Electrical Characteristics $V_{CC} = 5V$, $T_A = 25°C$, $C_L = 15$ pF, $t_r = t_f = 6$ ns unless otherwise noted.

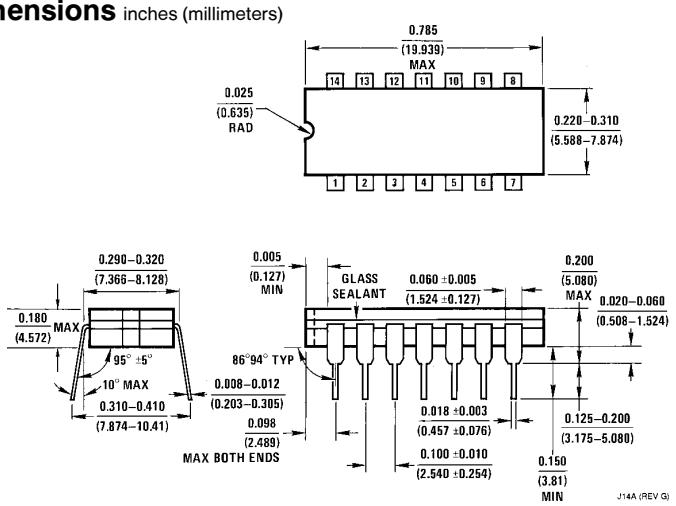
Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
t_{PZL}	Maximum Propagation Delay	$R_L = 1\ k\Omega$	8	15	ns
t_{PLZ}	Maximum Propagation Delay	$R_L = 1\ k\Omega$	9	16	ns

AC Electrical Characteristics $V_{CC} = 5V \pm 10\%$, $C_L = 50$ pF, $t_r = t_f = 6$ ns unless otherwise specified

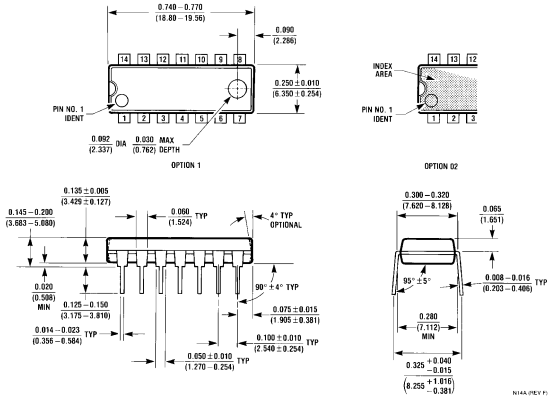
Symbol	Parameter	Conditions	$T_A = 25°C$		74HCT $T_A = -40$ to $85°C$	54HCT $T_A = -55$ to $125°C$	Units
			Typ	Guaranteed Limits			
t_{PZL}	Maximum Propagation Delay	$R_L = 1\ k\Omega$	10	22	28	33	ns
t_{PLZ}	Maximum Propagation Delay	$R_L = 1\ k\Omega$	12	20	25	30	ns
t_{THL}	Maximum Output Fall Time		10	15	19	22	ns
C_{PD}	Power Dissipation Capacitance (Note 5)	(per gate) $R_L = \infty$		20			pF
C_{IN}	Maximum Input Capacitance			5	10	10	pF

Note 5: C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD}\ V_{CC}^2\ f + I_{CC}\ V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD}\ V_{CC}\ f + I_{CC}$.

Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)
Order Number MM54HCT05J
See NS Package J14A



Molded Dual-In-Line Package (N)
Order Number MM74HCT05J, N
See NS Package N14A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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