HEX INVERTER(OPEN DRAIN)

The TC74AC05 is an advanced high speed CMOS INVERTER fabricated with silicon gate and double-layer metal wiring C^{2}MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

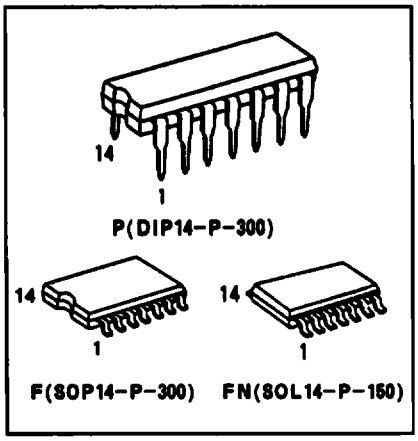
Pin configurathion and function are the same as the TC 74AC04, but the TC74AC05 has high performance MOS N-channel transistor(OPEN-DRAIN) outputs.

This device can, therfore, with a suitable pull-up rsistors, be used in wired-OR, LED drive and other applications.

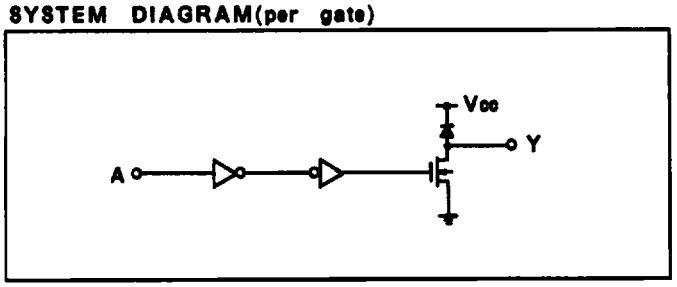
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

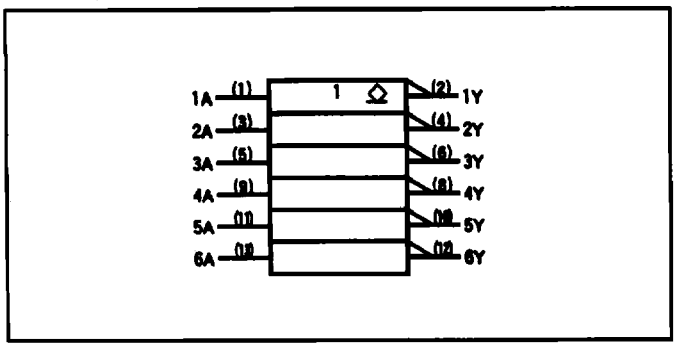
- High Speed ..... t_{pz}=3.4ns (typ.) at V_{CC}=5V
- Low Power Dissipation ..... I_{CC}=4 μA(Max.) at Ta=25℃
- High Noise Immunity ..... $V_{NIH}=V_{NIL}$=28% V_{CC}(Min.)
- Symmetrical Output Impedance ··· I_{OL}=24mA(Min.)
  Capability of driving 50Ω transmission lines.
- Wide Operating Voltage Range ··· V_{CC}(opr)=2V~5.5V
- Open Drain Structure.
- Pin and Function Compatible with 74F05



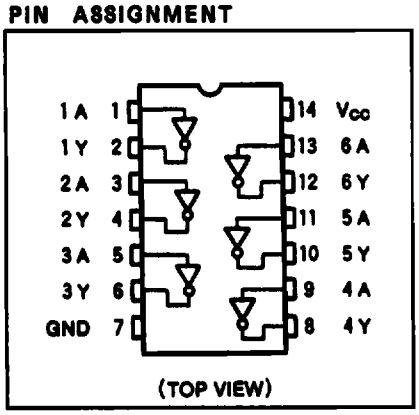
SYSTEM DIAGRAM(per gate)



IEC LOGIC SYMBOL



PIN ASSIGNMENT



TRUTH TABLE

A	Y
L	Z
H	L

Z:High Impedance

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	−0.5 ~6.0	V
DC Input Voltage	V_{IN}	−0.5 ~V_{CC}+0.5	V
DC Output Voltage	V_{OUT}	−0.5 ~V_{CC}+0.5	V
Input Diode Current	I_{IK}	±20	mA
Output Diode Current	I_{OK}	±50	mA
DC Output Current	I_{OUT}	+50	mA
DC V_{CC}/Ground Current	I_{CC}	±150	mA
Power Dissipation	P_D	500(DIP)*/180(SOP)	mW
Storage Temperature	T_{stg}	−65 ~150	℃
Lead Temperature 10sec	T_L	300	℃

*500mW in the range of Ta= −40℃~ 65℃. From Ta=65℃ to 85℃ a derating factor of −10mW/℃ should be applied up to 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2.0~5.5	V
Input Voltage	V_{IN}	0 ~ V_{CC}	V
Output Voltage	V_{OUT}	0 ~ V_{CC}	V
Operating Temperature	T_{opr}	−40 ~ 85	℃
Input Rise and Fall Time	dt/dv	0 ~100(V_{CC} = 3.3±0.3V) 0 ~ 20(V_{CC} = 5±0.5V)	ns/v

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V_{CC}	Ta=25℃			Ta=−40~85℃		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High−Level Input Voltage	V_{IH}			2.0 3.0 5.5	1.50 2.10 3.85	− − −	− − −	1.50 2.10 3.85	− − −	V
Low−Level Input Voltage	V_{IL}			2.0 3.0 5.5	− − −	− − −	0.50 0.90 1.65	− − −	0.50 0.90 1.65	V
Low−Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL}=50μA	2.0 3.0 4.5	− − −	0.0 0.0 0.0	0.1 0.1 0.1	− − −	0.1 0.1 0.1	V
			I_{OL}=12mA I_{OL}=24mA I_{OL}=75mA*	3.0 4.5 5.5	− − −	− − −	0.36 0.36 −	− − −	0.44 0.44 1.65	
3−State Output Off−State Current	I_{OZ}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		5.5	−	−	±0.5	−	±5.0	μA
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		5.5	−	−	±0.1	−	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	−	−	4.0	−	40.0	

* :This spec indicates the capability of driving 50Ω transmission lines.
One output should be tested at a time for a 10ms maximum duration.

AC ELECTRICAL CHARACTERISTICS(C_L=50pF, R_L=500Ω, Input $t_r=t_f$=3ns)

PARAMETER	SYMBOL	TEST CONDITION		Ta=25℃			Ta=−40 ~85℃		UNIT
			V_{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t_{pLZ}		3.3±0.3	−	4.1	7.0	1.0	8.0	ns
			5.0±0.5	−	3.5	5.3	1.0	6.0	
Propagation Delay Time	t_{pZL}		3.3±0.3	−	5.9	9.1	1.0	10.4	
			5.0±0.5	−	4.1	6.6	1.0	7.5	
Input Capacitance	C_{IN}			−	5	10	−	10	pF
Output Capacitance	C_{OUT}			−	10	−	−	−	
Power Dissipation Capacitance	C_{PD}(1)			−	8	−	−	−	

Note(1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation:

$$I_{CC(opr)}=C_{PD} \cdot V_{CC} \cdot f_{IN}+I_{CC}/6(\text{per Gate})$$