

TENTATIVE

TC74HCT240P OCTAL BUS BUFFER WITH INVERTED 3-STATE OUTPUTS (TTL INPUT LEVEL)  
TC74HCT241P OCTAL BUS BUFFER WITH NONINVERTED 3-STATE OUTPUTS (TTL INPUT LEVEL)  
TC74HCT244P OCTAL BUS BUFFER WITH NONINVERTED 3-STATE OUTPUTS (TTL INPUT LEVEL)

GENERAL DESCRIPTION

The TC74HCT240, TC74HCT241 and TC74HCT244 are high speed CMOS OCTAL BUS BUFFER'S fabricated with silicon C<sup>2</sup>MOS technology.

These devices may be used as a level converter for interfacing TTL or NMOS to High Speed CMOS. The inputs are compatible with TTL, NMOS and CMOS output voltage levels. They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

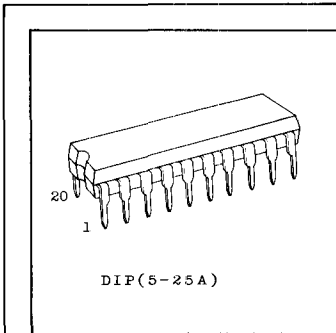
The designer has a choice of selected combinations of inverting and noninverting outputs, symmetrical  $\bar{G}$  (active-low output control) inputs, and complementary G and  $\bar{G}$  inputs. Each control input govern four BUS BUFFERs.

These devices are designated to be used with 3-state memory address drivers, etc.

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

FEATURES:

- High Speed .....  $t_{pd}=20ns(Typ.)$  at  $V_{CC}=5V$
- Low Power Dissipation .....  $I_{CC}=4\mu A(Max.)$  at  $T_a=25^\circ C$
- Compatible with TTL outputs .....  $V_{IH}=2V(Min.)$ ,  
 $V_{IL}=0.8V(Max.)$
- Wide Interfacing ability ..... LSTTL, NMOS, CMOS
- Output Drive Capability ..... 15 LSTTL Loads
- Symmetrical Output Impedance ....  $|I_{OH}|=I_{OL}=6mA(Min.)$
- Balanced Propagation Delays .....  $t_{pLH}\approx t_{pHL}$
- Pin and Function Compatible with 74LS 240/241/244



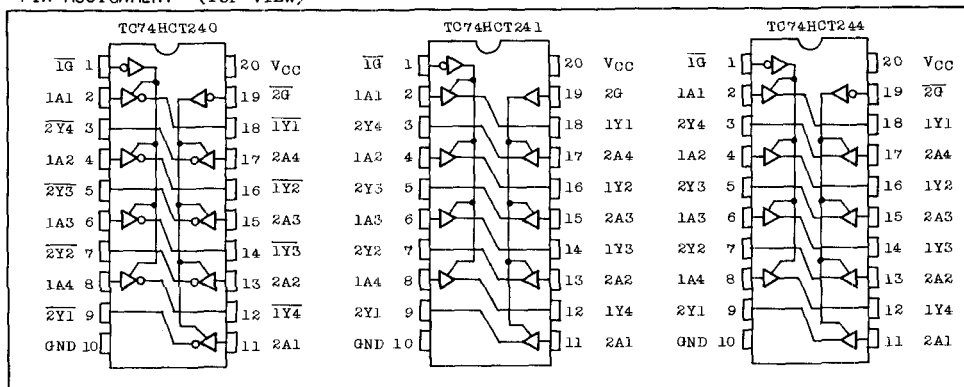
TRUTH TABLE

INPUTS			OUTPUTS	
$\bar{G}$	$g\Delta$	$A_n$	$Y_n$	$\bar{Y}_n \Delta\Delta$
L	H	L	L	H
L	H	H	H	L
H	L	X	Z	Z

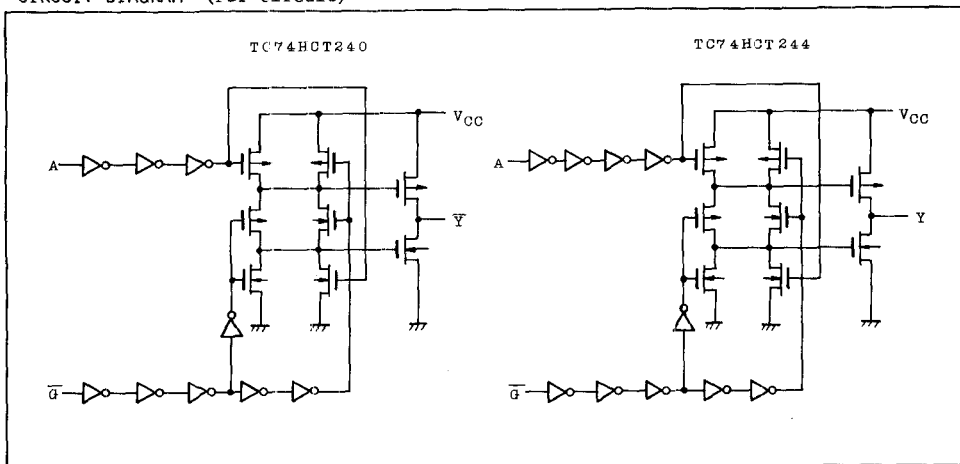
$\Delta$  : TC74HCT241 ONLY  
 $\Delta\Delta$  : TC74HCT240 ONLY  
 X : DON'T CARE  
 Z : HIGH IMPEDANCE

**TC74HCT240P • TC74HCT241P  
TC74HCT244P**

**PIN ASSIGNMENT (TOP VIEW)**



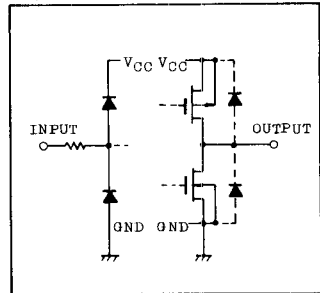
**CIRCUIT DIAGRAM (Per Circuit)**



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	$V_{CC}$	-0.5 ~ 7	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	$I_{OK}$	±20	mA
DC Output Current	$I_{OUT}$	±35	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	±70	mA
Power Dissipation	$P_D$	500*	mW
Storage Temperature	$T_{stg}$	-65 ~ 150	°C
Lead Temperature 10sec	$T_L$	300	°C

INPUT and OUTPUT  
EQUIVALENT CIRCUIT



\* 500mW in the range of  $T_a = -40^{\circ}\text{C} \sim 65^{\circ}\text{C}$  and from  $T_a = 65^{\circ}\text{C}$  up to  $85^{\circ}\text{C}$  derating factor of  $-10\text{mW}/^{\circ}\text{C}$  shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	LIMIT	UNIT
Supply Voltage	$V_{CC}$	4.5 ~ 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	°C
Input Rise and Fall Time	$t_r, t_f$	0 ~ 500	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \sim 85^{\circ}\text{C}$		UNIT		
			$V_{CC}$	MIN.	TYP.	MAX.	MIN.		MAX.	
High-Level Input Voltage	$V_{IH}$		4.5 ~ 5.5	2.0	-	-	2.0	-	V	
			4.5 ~ 5.5	-	-	0.8	-	0.8		
Low-Level Input Voltage	$V_{IL}$		4.5 ~ 5.5	-	-	0.8	-	0.8		
			4.5 ~ 5.5	-	-	0.8	-	0.8		
High-Level Output Voltage	$V_{OH}$	$V_{IN} =$	$I_{OH} = -20\mu\text{A}$	4.5	4.4	4.5	-	4.4		-
		$V_{IH}$ or $V_{IL}$	$I_{OH} = -6\text{mA}$	4.5	4.18	4.31	-	4.13		-
Low-Level Output Voltage	$V_{OL}$	$V_{IN} =$	$I_{OL} = 20\mu\text{A}$	4.5	-	0.0	0.1	-	0.1	
		$V_{IH}$ or $V_{IL}$	$I_{OL} = 6\text{mA}$	4.5	-	0.17	0.32	-	0.37	

**TC74HCT240P·TC74HCT241P**  
**TC74HCT244P**

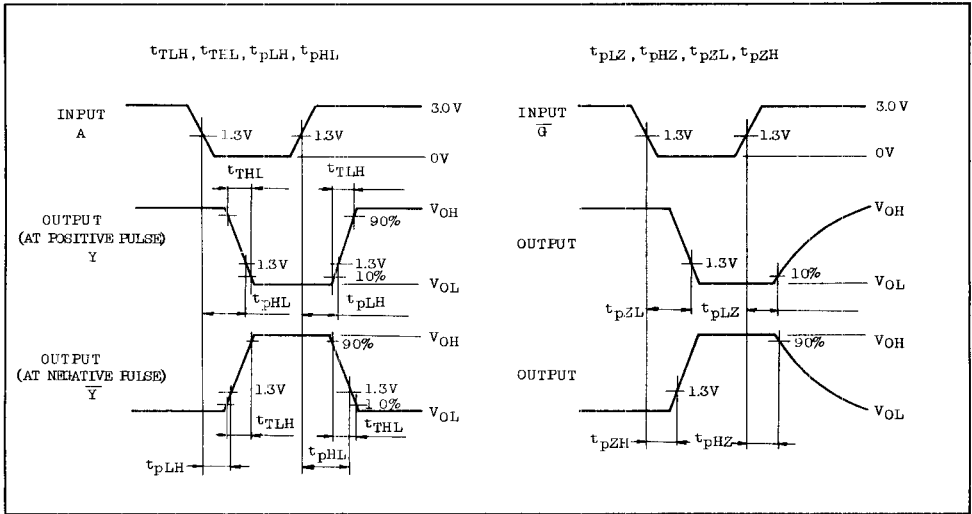
DC ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	SYMBOL	TEST CONDITION	Ta=25°C				Ta=-40~85°C		UNIT
			V <sub>CC</sub>	MIN.	TYP.	MAX.	MIN.	MAX.	
3-State Output Off-State Current	I <sub>OZ</sub>	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub> V <sub>OUT</sub> =V <sub>CC</sub> or GND	5.5	-	-	±0.5	-	±5.0	μA
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND	5.5	-	-	±0.1	-	±1.0	
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> =V <sub>CC</sub> or GND	5.5	-	-	4.0	-	40.0	

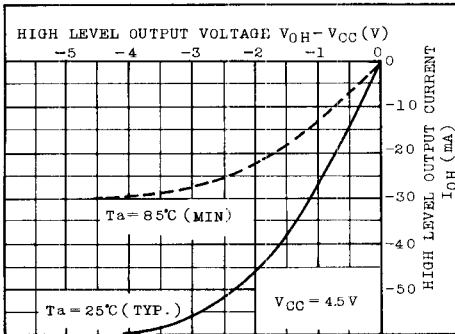
AC ELECTRICAL CHARACTERISTICS (C<sub>L</sub>=50pF, INPUT t<sub>r</sub>=t<sub>f</sub>=6ns)

PARAMETER	SYMBOL	TEST CONDITION	Ta=25°C				Ta=-40~85°C		UNIT
			V <sub>CC</sub>	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t <sub>TLH</sub> t <sub>TLH</sub>		4.5	-	8	12	-	15	ns
Propagation Delay Time (HC240)	t <sub>pLH</sub> t <sub>pHL</sub>		4.5	-	22	35	-	42	
Propagation Delay Time (HC241, HC244)	t <sub>pLH</sub> t <sub>pHL</sub>		4.5	-	23	36	-	44	
Output Enable Time	t <sub>PZL</sub> t <sub>PZH</sub>	R <sub>L</sub> =1kΩ	4.5	-	23	36	-	44	
Output Disable Time	t <sub>PLZ</sub> t <sub>PHZ</sub>	R <sub>L</sub> =1kΩ	4.5	-	30	47	-	57	
Input Capacitance	C <sub>IN</sub>			-	5	10	-	10	pF
Output Capacitance	C <sub>OUT</sub>			-	10	-	-	-	

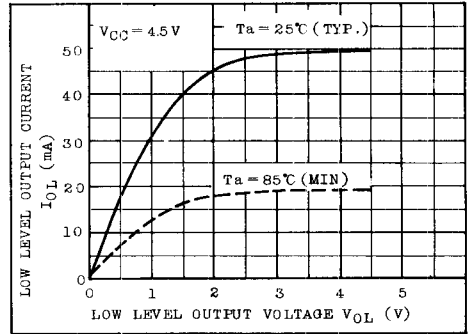
SWITCHING CHARACTERISTICS TEST WAVEFORM



$I_{OH}$  CHARACTERISTICS



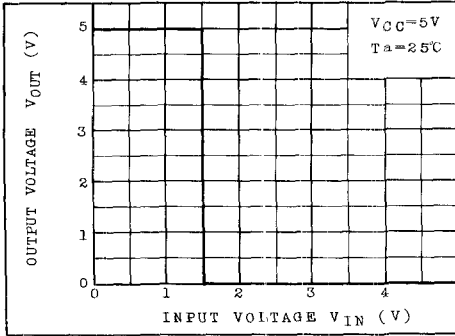
$I_{OL}$  CHARACTERISTICS



**TC74HCT240P - TC74HCT241P**  
**TC74HCT244P**

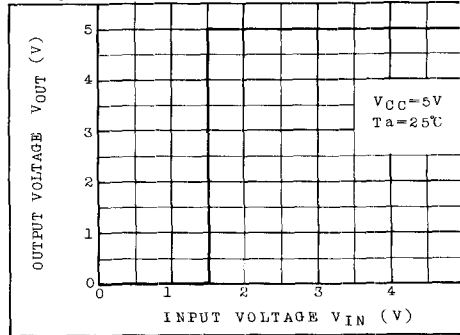
TC74HCT240

$V_{IN} - V_{OUT}$  CHARACTERISTICS (TYP.)

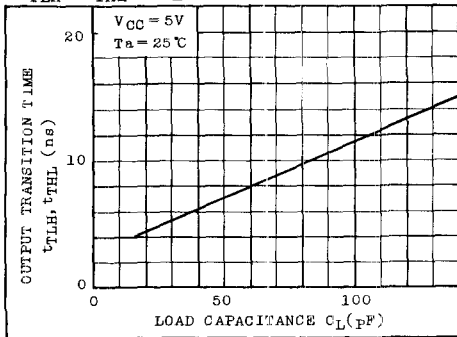


TC74HCT241, TC74HCT244

$V_{IN} - V_{OUT}$  CHARACTERISTICS (TYP.)



$t_{TLH}$ ,  $t_{THL} - C_L$  CHARACTERISTICS (TYP.)



$t_{PLH}$ ,  $t_{PHL} - C_L$  CHARACTERISTICS (TYP.)

