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NTE74HCT240 & NTE74HCT244

Integrated Circuit

TTL – High Speed CMOS,

Octal Buffer/Line Driver/Receiver

with 3–State Outputs

Description:

The NTE74HCT240 (Inverting Outputs) and NTE74HCT244 (Non–Inverting Outputs) are 3–STATE buffers in a 20–Lead DIP type package that utilize advanced silicon–gate CMOS technology and are general purpose high speed buffers. They possess high drive current outputs which enable high speed operation even when driving large bus capacitances. These circuits achieve speeds comparable to low power Schottky devices, while retaining the low power consumption of CMOS. Both devices are TTL input compatible and have a fanout of 15 LS–TTL equivalent inputs. Each device has two active low enables (1G and 2G), and each enable independently controls 4 buffers.

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

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

Features:

- TTL Input Compatible
- Typical Propagation Delay: 14ns
- 3–STATE Outputs for Connection to System Buses
- Low Quiescent Current: 80 μ A
- High Output Drive Current: 6mA (min)

Absolute Maximum Ratings: (Note 1, Note 2)

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}	± 35 mA
DC V_{CC} or GND Current (Per Pin), I_{CC}	± 70 mA
Power Dissipation (Note 3), P_D	600mW
Storage Temperature Range, T_{stg}	–65°C to +150°C
Lead Temperature (During Soldering, 10sec), T_L	+260°C

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 GND.

Note 3. Power Dissipation temperature derating: 12mW/°C from +65°C to +85°C.

Recommended Operating Conditions:

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.5	–	5.5	V
DC Input or Output Voltage	V_{IN}, V_{OUT}	0	–	V_{CC}	V
Operating Temperature Range	T_A	–40	–	+85	°C
Input Rise or Fall Times	t_r, t_f	–	–	500	ns

DC Electrical Characteristics: ($V_{CC} = 5V \pm 10\%$ unless otherwise specified)

Parameter	Symbol	Test Conditions		T _A = +25°C		T _A = −40° to +85°C	Unit
				Typ	Guaranteed Limits		
Minimum High Level Input Voltage	V _{IH}			–	2.0	2.0	V
Maximum Low Level Input Voltage	V _{IL}			–	0.8	0.8	V
Minimum High Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OUT} = 20μA	V _{CC}	V _{CC} ^{−0.1}	V _{CC} ^{−0.1}	V
			I _{OUT} = 6.0mA, V _{CC} = 4.5V	4.2	3.98	3.84	V
			I _{OUT} = 7.2mA, V _{CC} = 5.5V	5.7	4.98	4.84	V
Maximum Low Level Output Voltage	V _{OL}	V _{IN} = V _{IH}	I _{OUT} = 20μA	0	0.1	0.1	V
			I _{OUT} = 6.0mA, V _{CC} = 4.5V	0.2	0.26	0.33	V
			I _{OUT} = 7.2mA, V _{CC} = 5.5V	0.2	0.26	0.33	V
Maximum Input Current	I _{IN}	V _{IN} = V _{CC} or GND, V _{IH} or V _{IL}		–	±0.05	±0.5	μA
Maximum 3–STATE Output Leakage Current	I _{OZ}	V _{OUT} = V _{CC} or GND, $\overline{G}$ = V _{IH} , G = V _{IL}		–	±0.25	±2.5	μA
Maximum Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND, I _{OUT} = 0μA		–	4.0	40	μA
		V _{IN} = 2.4V or 0.5V, Note 4		0.6	1.0	1.3	mA

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

AC Electrical Characteristics: ($V_{CC} = 5V$, $t_r = t_f = 6\text{ns}$, $T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Typ	Guaranteed Limits	Unit
Maximum Output Propagation Delay	t_{PHL}, t_{PLH}	$C_L = 45\text{pF}$	14	18	ns
Maximum Output Enable Time	t_{PZL}, t_{PZH}	$C_L = 45\text{pF}$, $R_L = 1\text{k}\Omega$	20	30	ns
Maximum Output Disable Time	t_{PLZ}, t_{PHZ}	$C_L = 5\text{pF}$, $R_L = 1\text{k}\Omega$	16	25	ns

AC Electrical Characteristics: ($V_{CC} = 5V \pm 10\%$, $t_r = t_f = 6\text{ns}$ unless otherwise specified)

Parameter	Symbol	Test Conditions		T _A = +25°C		T _A = -40° to +85°C	Unit
				Typ	Guaranteed Limits		
Maximum Output Propagation Delay	t _{PHL} , t _{PLH}	C _L = 50pF		14	20	25	ns
		C _L = 150pF		20	28	35	ns
Maximum Output Enable Time	t _{PZH} , t _{PZL}	R _L = 1kΩ	C _L = 50pF	21	30	38	ns
			C _L = 150pF	26	42	53	ns
Maximum Output Disable Time	t _{PHZ} , t _{PLZ}	R _L = 1kΩ, C _L = 50pF		16	25	32	ns
Maximum Output Rise and Fall Time	t _{THL} , t _{TLH}	C _L = 50pF		6	12	15	ns
Maximum Input Capacitance	C _{IN}			10	15	15	pF
Maximum Output Capacitance	C _{OUT}			15	20	20	pF
Power Dissipation Capacitance (Per Buffer, Note 5)	C _{PD}	G̅ = V _{CC} , G = GND		5	–	–	pF
		G̅ = GND, G = V _{CC}		90	–	–	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, $I_S = C_{PD} V_{CC} f + I_{CC}$.

Truth Tables:

NTE74HCT240:

$1\overline{G}$	1A	1Y	$2\overline{G}$	2A	2Y
L	L	H	L	L	H
L	H	L	L	H	L
H	L	Z	H	L	Z
H	H	Z	H	H	Z

H = HIGH Level

L = LOW Level

Z = High Impedance

NTE74HCT244:

$1\overline{G}$	1A	1Y	$2\overline{G}$	2A	2Y
L	L	L	L	L	L
L	H	H	L	H	H
H	L	Z	H	L	Z
H	H	Z	H	H	Z

H = HIGH Level

L = LOW Level

Z = High Impedance

Pin Connection Diagram



