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NTE74HC153
Integrated Circuit
TTL – High Speed CMOS,
Dual 4–Line–to–1–Line Data Selector/ Multiplexer

Description:

The NTE74HC153 is a high speed CMOS dual multiplexer in a 16–Lead DIP type package fabricated with silicon–gate C^2MOS technology. Along with high noise immunity and low power dissipation of standard CMOS integrated circuits, it possesses the ability to drive 15 LS–TTL loads. Each data input (1C0 – 1C3, 2C0 – 2C3) of the NTE74HC153 is selected by the two address inputs A and B. Separate strobe inputs ($1\overline{G}$, $2\overline{G}$) are provided for each of the two four–line selectors. The strobe input ($\overline{G}$) can be used to inhibit the data output; the output of the NTE74HC153 is fixed in the low level, while the strobe input is held low.

The 74HC logic family is functionally, as well as pinout compatible, with the standard 74LS logic family. All inputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and GND.

Features:

- Wide Operating Supply Voltage Range: 2V to 6V
- Outputs Can Drive up to 15 LS–TTL Loads
- Low Power Consumption: 80μA (max)
- Typical Propagation Delay: 9ns
- Low Input Current: 1μA (max)
- Permit Multiplexing from n Lines to One Line
- Perform Parallel–to–Serial Conversion
- Strobe (Enable) Line Provided for cascading (N Lines to n Lines)

Absolute Maximum Ratings: (Note 1, Note 2)

Supply Voltage Range, V_{CC} . . . . . –0.5 to +7.0V
Clamp Diode Current (Note 3), I_{IK}, I_{OK} . . . . . ±20mA
DC Output Current (Per Pin), I_{OUT} . . . . . ±35mA
DC V_{CC} or GND Current (Per Pin), I_{CC} . . . . . ±70mA
Storage Temperature Range, T_{stg} . . . . . –65°C to +150°C
Thermal Impedance, Junction–to–Ambient, R_{thJA} . . . . . 73°C/W

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. Th input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended Operating Conditions: (Note 4)

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	2.0	5.0	6.0	V
DC Input or Output Voltage	V_{IN}, V_{OUT}	0	–	V_{CC}	V
Operating Temperature Range	T_A	–40	–	+85	°C
High–Level Input Voltage V_{CC} = 2.0V	V_{IH}	1.5	–	–	V
V_{CC} = 4.5V		3.15	–	–	V
V_{CC} = 6.0V		4.2	–	–	V
Low–Level Input Voltage V_{CC} = 2.0V	V_{IH}	–	–	0.5	V
V_{CC} = 4.5V		–	–	1.35	V
V_{CC} = 6.0V		–	–	1.8	V

Note 4. All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

Electrical Characteristics:

Parameter	Symbol	Test Conditions	V_{CC}	T_A = +25°C			T_A = –40° to +85°C		Unit
				Min	Typ	Max	Min	Max	
High Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}, I_{OH} = –20μA	2.0	1.9	1.998	–	1.9	–	V
			4.5	4.4	4.499	–	4.4	–	V
			6.0	5.9	5.999	–	5.9	–	V
		V_{IN} = V_{IH} or V_{IL}, I_{OH} = –6mA	4.5	3.98	4.3	–	3.84	–	V
		V_{IN} = V_{IH} or V_{IL}, I_{OH} = –7.8mA	6.0	5.48	5.8	–	5.34	–	V
Low Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}, I_{OL} = 20μA	2.0	–	0.002	0.1	–	0.1	V
			4.5	–	0.001	0.1	–	0.1	V
			6.0		0.001	0.1	–	0.1	V
		V_{IN} = V_{IH} or V_{IL}, I_{OL} = 6mA	4.5	–	0.17	0.26	–	0.33	V
		V_{IN} = V_{IH} or V_{IL}, I_{OL} = 7.8mA	6.0	–	0.15	0.26	–	0.33	V
Input Current	I_{IN}	V_{IN} = V_{CC} or GND	6.0	–	±0.1	±100	±1.0	±1000	nA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND, I_{OUT} = 0μA	6.0	–	–	8	–	80	μA
Input Capacitance	C_I			–	3	10	–	10	pF

Switching Characteristics: (t_r = t_f = 6ns, Note 5)

Parameter	Symbol	Test Conditions	V_{CC}	T_A = +25°C			T_A = –40° to +85°C		Unit
				Min	Typ	Max	Min	Max	
Propagation Delay Time A or B to Y	t_{pd}	C_L = 50pF	2.0	–	90	150	–	190	ns
			4.5	–	21	30	–	38	ns
			6.0	–	17	26	–	32	ns
		C_L = 150pF	2.0	–	105	235	–	295	ns
			4.5	–	27	47	–	59	ns
			6.0	–	21	41	–	51	ns

Switching Characteristics (Cont'd): ($t_r = t_f = 6ns$, Note 5)

Parameter	Symbol	Test Conditions	V_{CC}	$T_A = +25°C$			$T_A = -40°$ to $+85°C$		Unit
				Min	Typ	Max	Min	Max	
Propagation Delay Time Data (Any C) to Y	t_{pd}	$C_L = 50pF$	2.0	–	73	126	–	158	ns
			4.5	–	17	28	–	35	ns
			6.0	–	14	23	–	29	ns
		$C_L = 150pF$	2.0	–	93	220	–	274	ns
			4.5	–	23	44	–	55	ns
			6.0	–	19	38	–	48	ns
Propagation Delay Time $\overline{G}$ to Y	t_{pd}	$C_L = 50pF$	2.0	–	38	95	–	125	ns
			4.5	–	11	19	–	24	ns
			6.0	–	9	16	–	20	ns
		$C_L = 150pF$	2.0	–	60	185	–	230	ns
			4.5	–	17	37	–	46	ns
			6.0	–	14	32	–	40	ns
Output Rise and Fall Time	t_t	$C_L = 50pF$	2.0	–	20	60	–	75	ns
			4.5	–	8	12	–	15	ns
			6.0	–	6	10	–	13	ns
		$C_L = 150pF$	2.0	–	45	210	–	265	ns
			4.5	–	17	42	–	53	ns
			6.0	–	13	36	–	45	ns
Power Dissipation Capacitance, Per Multiplexer	C_{PD}	No Load	–	–	40	–	–	–	pF

Note 5. t_{PLH} and t_{PHL} are the same as t_{pd}.

Truth Table:

Inputs							Output
Select *		Data					
A	B	C0	C1	C2	C3	$\overline{G}$	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

* Select inputs A and B are common to both sections.

Pin Connection Diagram