

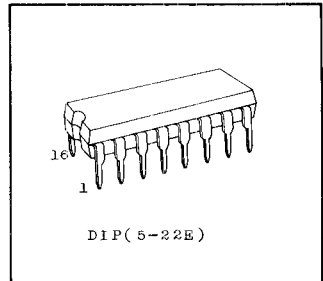
TC74HC155P DUAL 2-TO-4 LINE DECODER/3-TO-8 LINE DECODER

GENERAL DESCRIPTION

The TC74HC155 is a high speed CMOS 2-TO-4 LINE DECODER fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. It features dual 1-TO-4 line demultiplexers with individual strobe inputs (1G and 2G), individual data inputs (1C and 2C) and common binary address inputs (A and B). When both decoders are enabled by the strobes, the inverted output of 1C data and non-inverted output of 2C data will be brought to the selected output pins of each sections. A 1-TO-8 line demultiplexer will be also easily built up by providing a data signal to both 1C and 2C inputs; the output order from significance bit is 1Y3, 1Y2, 1Y1, 1Y0, 2Y3, 2Y2, 2Y1, 2Y0 (BOTTOM). This device can be used as a 2-to-4 line decoder or a 3-to-8 line decoder when 1C is held high and 2C is held low. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

- High Speed $t_{pd}=18ns(Typ.)$ at $V_{CC}=5V$
- Low Power Dissipation $I_{CC}=4\mu A(Max.)$ at $T_a=25^\circ C$
- High Noise Immunity $V_{NIH}=V_{NIL}=28\% V_{CC}(Min.)$
- Output Drive Capability 10 LSTTL Loads
- Symmetrical Output Impedance $|I_{OH}|=I_{OL}=4mA(Min.)$
- Balanced Propagation Delays $t_{pLH}\doteq t_{pHL}$
- Wide Operating Voltage Range $V_{CC}(Opr.)=2V\sim 6V$
- Pin and Function Compatible with 74LS155

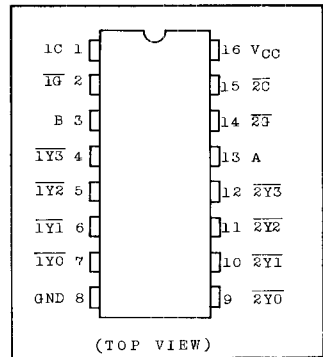


ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 7$	V
DC Input Voltage	V_{IN}	$-0.5 \sim V_{CC}+0.5$	V
DC Output Voltage	V_{OUT}	$-0.5 \sim V_{CC}+0.5$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
DC Output Current	I_{OUT}	± 25	mA
DC V_{CC} /Ground Current	I_{CC}	± 50	mA
Power Dissipation	P_D	500*	mW
Storage Temperature	T_{stg}	$-65 \sim 150$	$^\circ C$
Lead Temperature 10sec	T_L	300	$^\circ C$

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

PIN ASSIGNMENT



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TRUTH TABLE

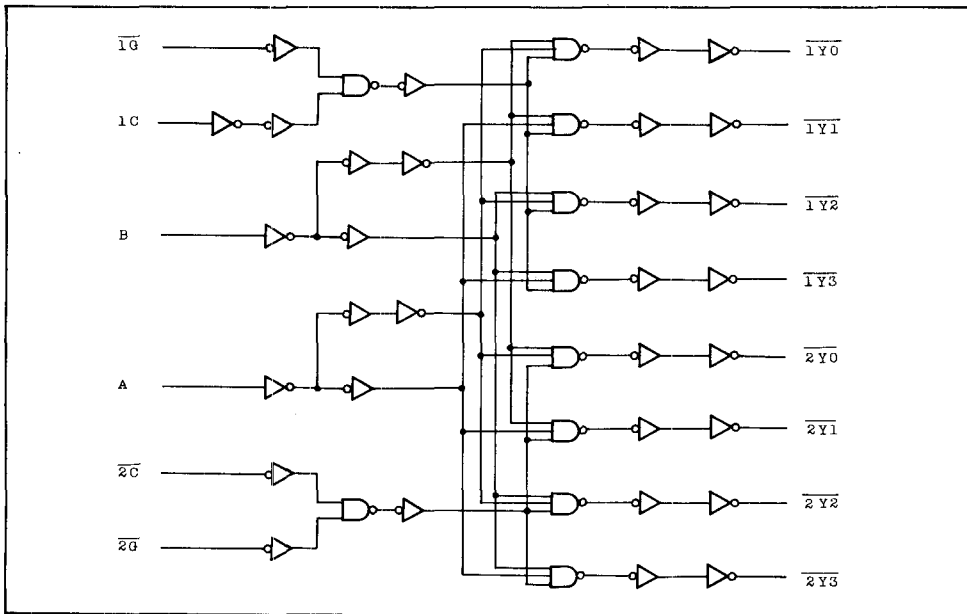
INPUTS				OUTPUTS			
B	A	$\overline{1G}$	1C	$\overline{1Y0}$	$\overline{1Y1}$	$\overline{1Y2}$	$\overline{1Y3}$
X	X	H	X	H	H	H	H
L	L	L	H	L	H	H	H
L	H	L	H	H	L	H	H
H	L	L	H	H	H	L	H
H	H	L	H	H	H	H	L
X	X	X	L	H	H	H	H

X : DON'T CARE

INPUTS				OUTPUTS			
B	A	$\overline{2G}$	2C	$\overline{2Y0}$	$\overline{2Y1}$	$\overline{2Y2}$	$\overline{2Y3}$
X	X	H	X	H	H	H	H
L	L	L	L	L	H	H	H
L	H	L	L	H	L	H	H
H	L	L	L	H	H	L	H
H	H	L	L	H	H	H	L
X	X	X	H	H	H	H	H

X : DON'T CARE

LOGIC DIAGRAM

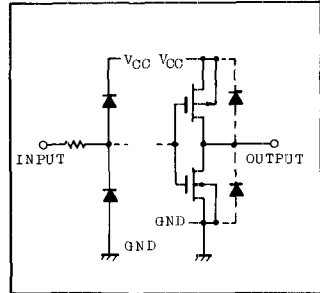


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RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	LIMIT	UNIT
Supply Voltage	V _{CC}	2 ~ 6	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 ~ 1000 (V _{CC} =2.0V) 0 ~ 500 (V _{CC} =4.5V) 0 ~ 400 (V _{CC} =6.0V)	ns

INPUT and OUTPUT EQUIVALENT CIRCUIT



DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	T _a =25°C				T _a =-40~85°C		UNIT	
			V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.		
High-Level Input Voltage	V _{IH}		2.0	1.5	-	-	1.5	-	V	
			4.5	3.15	-	-	3.15	-		
			6.0	4.2	-	-	4.2	-		
Low-Level Input Voltage	V _{IL}		2.0	-	-	0.5	-	0.5	V	
			4.5	-	-	1.35	-	1.35		
			6.0	-	-	1.8	-	1.8		
High-Level Output Voltage	V _{OH}	V _{IN} =V _{IH} or V _{IL}	I _{OH} =-20μA	2.0	1.9	2.0	-	1.9	-	V
				4.5	4.4	4.5	-	4.4	-	
				6.0	5.9	6.0	-	5.9	-	
				4.5	4.18	4.31	-	4.13	-	
Low-Level Output Voltage	V _{OL}	V _{IN} =V _{IH} or V _{IL}	I _{OL} =20μA	2.0	-	0.0	0.1	-	0.1	V
				4.5	-	0.0	0.1	-	0.1	
				6.0	-	0.0	0.1	-	0.1	
				4.5	-	0.17	0.32	-	0.37	
Input Leakage Current	I _{IN}	V _{IN} =V _{CC} or GND	6.0	-	-	±0.1	-	±1.0	μA	
			4.0	-	-	4.0	-	40.0		
Quiescent Supply Current	I _{CC}	V _{IN} =V _{CC} or GND	6.0	-	-	4.0	-	40.0	μA	

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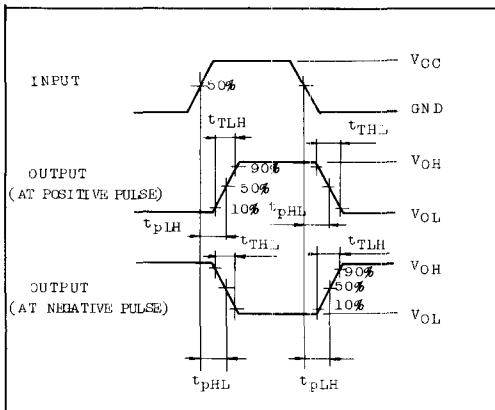
AC ELECTRICAL CHARACTERISTICS ($C_L=50\text{pF}$, INPUT $t_r=t_f=6\text{ns}$)

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.	
Output Transition Time	t_{TLH}		2.0	-	36	75	-	90	ns
	t_{THL}		4.5	-	9	15	-	18	
			6.0	-	8	13	-	16	
Propagation Delay Time	t_{pLH}		2.0	-	88	175	-	210	
	t_{pHL}		4.5	-	22	35	-	42	
			6.0	-	19	30	-	36	
Input Capacitance	C_{IN}		-	5	10	-	10	pF	
Power Dissipation Capacitance	$C_{PD}(1)$		-	65	-	-	-		

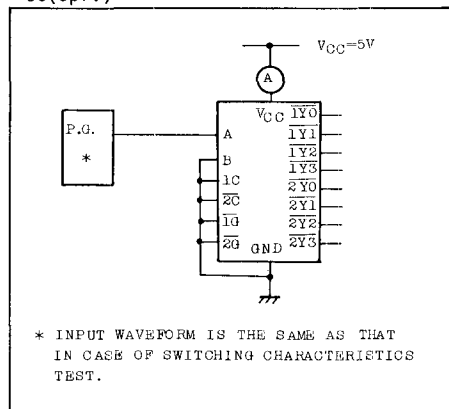
Note (1) C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit). Average operating current can be obtained by the equation hereunder.

$$I_{CC(opr.)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

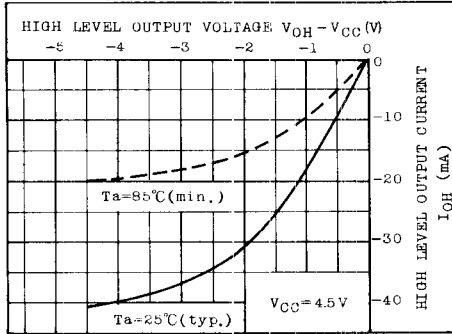
SWITCHING CHARACTERISTICS TEST WAVEFORM



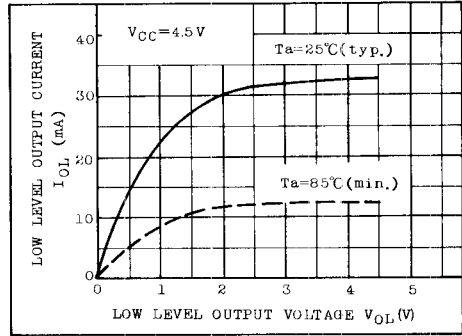
$I_{CC(opr.)}$ TEST WAVEFORM



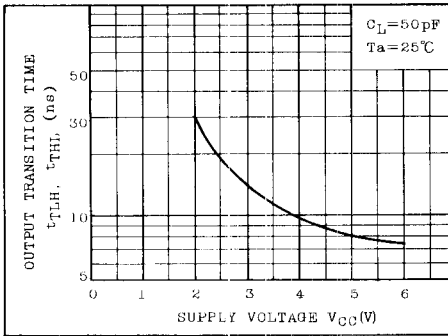
I_{OH} CHARACTERISTICS



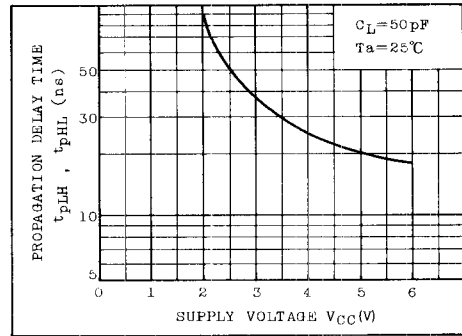
I_{OL} CHARACTERISTICS



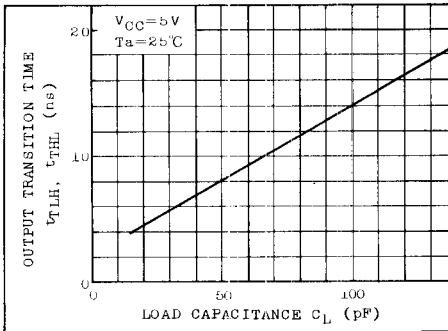
t_{TLH}, t_{THL} - V_{CC} CHARACTERISTICS (TYP.)



t_{PLH}, t_{PHL} - V_{CC} CHARACTERISTICS (TYP.)



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



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

