TC74AC151P/F/FN 8-CHANNEL MULTIPLEXER
TC74AC251P/F/FN 8-CHANNEL MULTIPLEXER (3-STATE)

The TC74AC151 and the TC74AC251 are advanced high speed CMOS 8-CHANNEL MULTIPLEXER fabricated with silicon gate and double-layer metal wiring C^2MOS technology.

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

One of eight date input signals (D0-D7) is selected by decoding of the three-bit address input (A, B, C). The selected data appears on two outputs : non-inverting (Y) and inverting (W).

The designer has a choice of complementary output (AC151) and 3-state output (AC251).

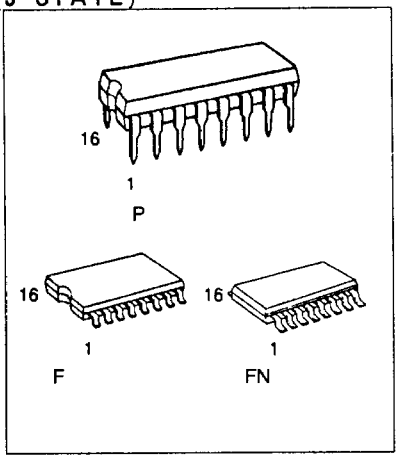
The $\overline{\text{STROBE}}$ input provides two output conditions ; a low level on the $\overline{\text{STROBE}}$ input transferrs the selected data to the outputs. A high level on the $\overline{\text{STROBE}}$ input of AC151 sets the Y output low and the W output high without regard to the data or select input conditions.

When the $\overline{\text{STROBE}}$ input of AC251 is held high, both outputs are in the high-impedance state.

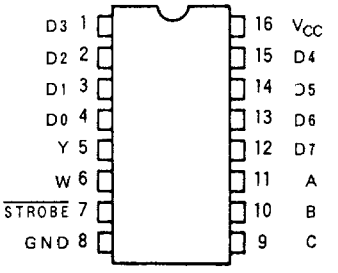
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

- High Speed ····· t_{pd}=5.3ns(typ.)at V_{CC}=5V
- Low Power Dissipation ····· I_{CC}=8μA(Max.)at Ta=25℃
- High Noise Immunity ····· $V_{NIH}=V_{NIL}$ 28% V_{CC} (Min.)
- Symmetrical Output Impedance··· $|I_{OH}|=I_{OL}$=24mA(Min.) Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays ····· $t_{pLH} \fallingdotseq t_{pHL}$
- Wide Operating Voltage Range ··· V_{CC} (opr)=2V~5.5V
- Pin and Function Compatible with 74F 151/251

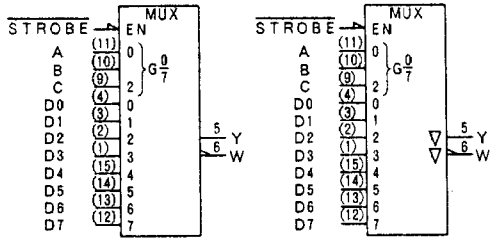


PIN ASSIGNMENT



(TOP VIEW)

IEC LOGIC SYMBOL



TRUTH TABLE

INPUTS				OUTPUTS			
SELECT			$\overline{\text{STROBE}}$	AC151		AC251	
C	B	A		Y	W	Y	W
X	X	X	H	L	H	Z	Z
L	L	L	L	D0	$\overline{D0}$	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$	D7	$\overline{D7}$

Z:High Impedance
X:Don't care

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	−0.5 ~7.0	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}	±100	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

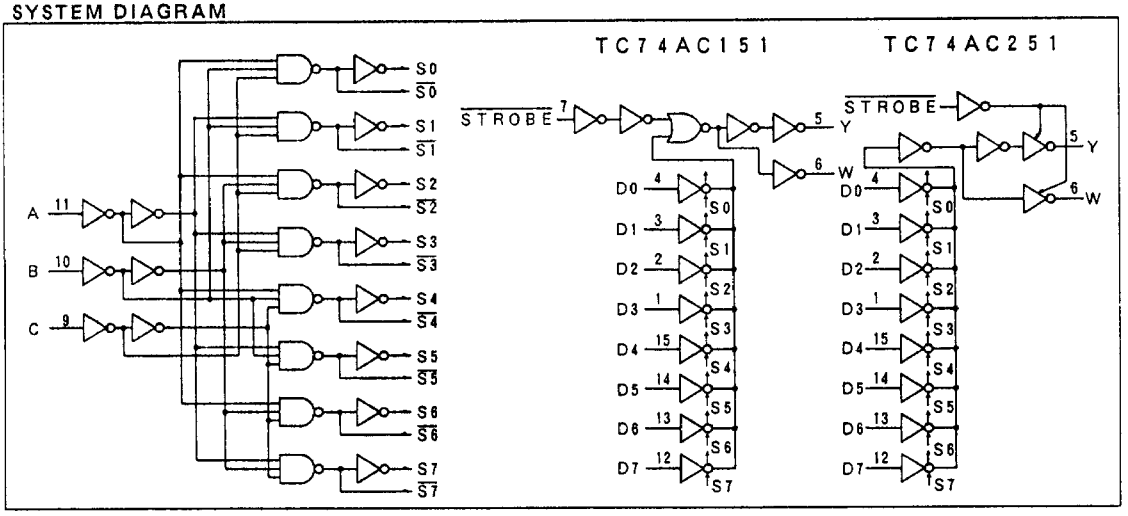
DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V_{CC}	Ta=25℃ MIN.	Ta=25℃ TYP.	Ta=25℃ MAX.	Ta=−40~85℃ MIN.	Ta=−40~85℃ MAX.	UNIT
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
High−Level Output Voltage	V_{OH}	V_{IN}= V_{IH} or V_{IL}	I_{OH}=−50μA	2.0 3.0 4.5	1.9 2.9 4.4	2.0 3.0 4.5	− − −	1.9 2.9 4.4	− − −	V
			I_{OH}=−4mA I_{OH}=−24mA I_{OH}=−75mA*1	3.0 4.5 5.5	2.58 3.94 −	− − −	− − −	2.48 3.80 3.85	− − −	
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*1	3.0 4.5 5.5	− − −	− − −	0.36 0.36 −	− − −	0.44 0.44 1.65	
3−State Output *2 Off−State Current	I_{OZ}	V_{IN}=V_{IH} or V_{IL} V_{OUT}=V_{CC} or GND		5.5	−	−	±0.5	−	±5.0	V
Input Leakage Current	I_{IN}	V_{IN} =V_{CC} or GND		5.5	−	−	±0.1	−	±1.0	μA
Quiescent Supply Current	I_{CC}	V_{IN} =V_{CC} or GND		5.5	−	−	8.0	−	80.0	

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

* 2 :for TC74AC251 only.

SYSTEM DIAGRAM



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

PARAMETER	SYMBOL	TEST CONDITION	V_{CC}	Ta=25℃ MIN.	Ta=25℃ TYP.	Ta=25℃ MAX.	Ta=−40 ~85℃ MIN.	Ta=−40 ~85℃ MAX.	UNIT
Propagation Delay Time (D-Y.W)	t_{pLH}		3.3±0.3	−	10.7	19.3	1.0	22.0	ns
	t_{pHL}		5.0±0.5	−	6.6	10.5	1.0	12.0	
Propagation Delay Time (A, B, C-Y.W)	t_{pLH}		3.3±0.3	−	13.3	23.7	1.0	27.0	
	t_{pHL}		5.0±0.5	−	8.2	13.0	1.0	14.8	
Propagation Delay Time ($\overline{ST}$-Y.W) *	t_{pLH}		3.3±0.3	−	8.6	15.3	1.0	18.0	
	t_{pHL}		5.0±0.5	−	5.6	9.6	1.0	11.0	
Output Enable Time	t_{pZL}		3.3±0.3	−	6.4	13.2	1.0	15.0	
**	t_{pZH}		5.0±0.5	−	4.4	7.9	1.0	9.0	
Output Disable Time	t_{pLZ}		3.3±0.3	−	5.9	11.4	1.0	13.0	
**	t_{pHZ}		5.0±0.5	−	5.0	8.8	1.0	10.0	
Input Capacitance	C_{IN}			−	5	10	−	10	pF
Output Capacitance **	C_{OUT}			−	10	−	−	−	
Power Dissipation Capacitance	C_{PD} (1)	TC74AC151		−	68	−	−	−	
		TC74AC251		−	72	−	−	−	

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:

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

(2) * for TC74AC151 only
** for TC74AC251 only