TC74ACT151P/F/FN 8-CHANNEL MULTIPLEXER
TC74ACT251P/F/FN 8-CHANNEL MULTIPLEXER (3-STATE)

The TC74ACT151 and the TC74ACT251 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.

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.

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 (ACT151) and 3-state output (ACT251).

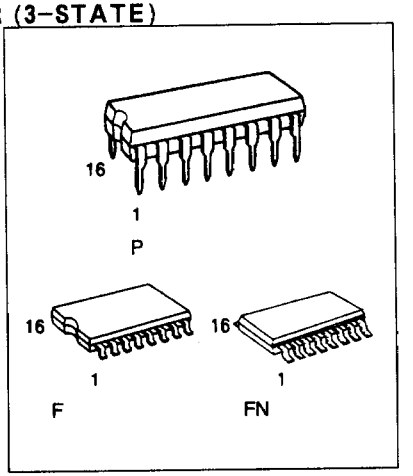
The $\overline{STROBE}$ input provides two output conditions ; a low level on the $\overline{STROBE}$ input transferrs the selected data to the outputs. A high level on the $\overline{STROBE}$ input of ACT151 sets the Y output low and the W output high without regard to the data or select input conditions.

When the $\overline{STROBE}$ input of ACT251 is held high, both outputs are in the high-impedance state.

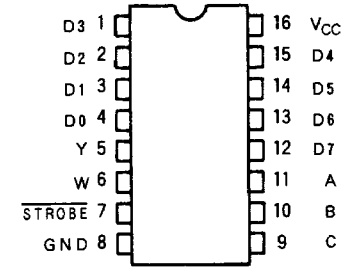
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

- High Speed ..... t_{pd}=7.1ns(typ.) at V_{CC}=5V
- Low Power Dissipation ..... I_{CC}=8μA(Max.) at Ta=25℃
- Compatible with TTL outputs..... V_{IL} =0.8V (Max.)
  V_{IH} =2.0V (Min.)
- Symmetrical Output Impedance ··· $|I_{OH}|=I_{OL}$=24mA(Min.)
  Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays ..... $t_{pLH} \fallingdotseq t_{pHL}$
- Pin and Function Compatible with 74F151/251

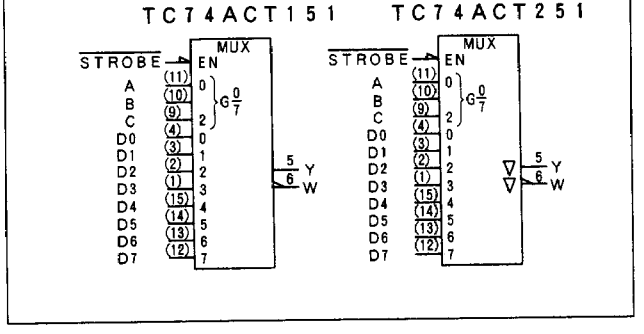


PIN ASSIGNMENT



(TOP VIEW)

IEC LOGIC SYMBOL



TRUTH TABLE

INPUTS				OUTPUTS			
SELECT			$\overline{STROBE}$	ACT151		ACT251	
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

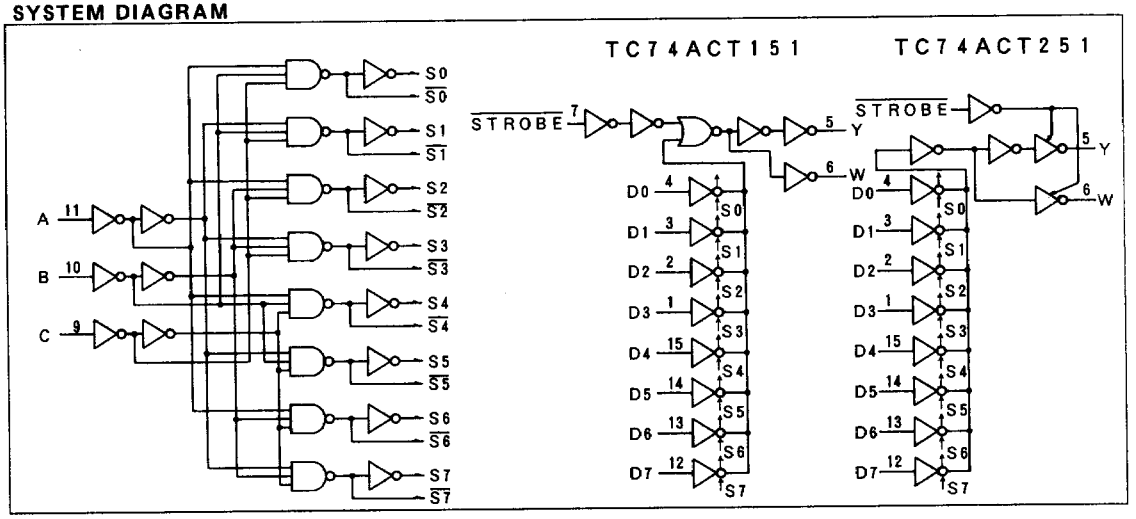
PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	4.5~5.5	V
Input Voltage	V_{IN}	0 ~ V_{CC}	V
Output Voltage	V_{OUT}	0 ~ V_{CC}	V
Operating Temperature	T_{opr}	−40 ~ 85	℃
Input Rise and Fall Time	dt/dv	0 ~ 10	ns/v

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V_{CC}	Ta=25℃			Ta=−40~85℃		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High−Level Input Voltage	V_{IH}			4.5 ~ 5.5	2.0	−	−	2.0	−	V
Low−Level Input Voltage	V_{IL}			4.5 ~ 5.5	−	−	0.8	−	0.8	V
High−Level Output Voltage	V_{OH}	V_{IN}= V_{IH} or V_{IL}	I_{OH}=−50μA	4.5	4.4	4.5	−	4.4	−	V
			I_{OH}=−24mA	4.5	3.94	−	−	3.80	−	
			I_{OH}=−75mA*1	5.5	−	−	−	3.85	−	
Low−Level Output Voltage	V_{OL}	V_{IN}= V_{IH} or V_{IL}	I_{OL}=50μA	4.5	−	0.0	0.1	−	0.1	V
			I_{OL}=24mA	4.5	−	−	0.36	−	0.44	
			I_{OL}=75mA*1	5.5	−	−	−	−	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	μA
Input Leakage Current	I_{IN}	V_{IN} =V_{CC} or GND		5.5	−	−	±0.1	−	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} =V_{CC} or GND		5.5	−	−	8.0	−	80.0	
	ΔI_{CC}	PER INPUT:V_{IN} =3.4V OTHER INPUT:V_{CC} or GND		5.5	−	−	1.35	−	1.5	mA

• 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 TC74ACT251 only

SYSTEM DIAGRAM



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

PARAMETER	SYMBOL	TEST CONDITION		Ta=25℃			Ta=−40 ~85℃		UNIT
			V_{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time (D−Y.W) *	t_{pLH} t_{pHL}		5.0±0.5	−	7.5	11.8	1.0	13.5	ns
Propagation Delay Time (A,B,C−Y.W)*	t_{pLH} t_{pHL}		5.0±0.5	−	9.5	15.8	1.0	18.0	
Propagation Delay Time (D−Y.W) * *	t_{pLH} t_{pHL}		5.0±0.5	−	7.8	12.3	1.0	14.0	
Propagation Delay Time (A,B,C−Y.W) * *	t_{pLH} t_{pHL}		5.0±0.5	−	9.9	16.2	1.0	18.5	
Propagation Delay Time ($\overline{ST}$−Y.W) *	t_{pLH} t_{pHL}		5.0±0.5	−	6.3	10.1	1.0	11.5	
Output Enable Time **	t_{pZL} t_{pZH}		5.0±0.5		5.4	9.6	1.0	11.0	
Output Disable Time **	t_{pLZ} t_{pHZ}		5.0±0.5		5.9	8.8	1.0	10.0	
Input Capacitance	C_{IN}			−	5	10	−	10	pF
Output Capacitance **	C_{OUT}			−	10	−	−	−	
Power Dissipation Capacitance	C_{PD}	TC74ACT151		−	66	−	−	−	
		TC74ACT251		−	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 TC74ACT151 only

** for TC74ACT251 only