TC74HC352AP/AF
TC74HC353AP/AF

TC74HC352 Dual 4-Channel Multiplexer

TC74HC353 Dual 4-Channel Multiplexer with 3-State Output

The TC74HC352A and TC74HC353A are high speed CMOS DUAL 4-CHANNEL MULTIPLEXERs fabricated with silicon gate C^2MOS technology.

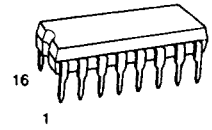
It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

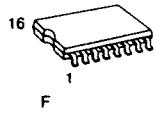
The TC74HC352A is an inverted output version of the TC74HC153 (normal outputs), and the TC74HC353A is an inverted output version of TC74HC253 (3-state outputs).

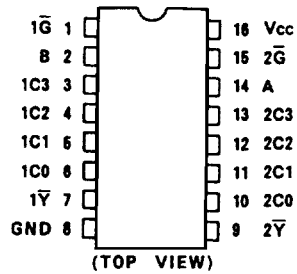
Input data (1C0 ~ 1C2, 2C0 ~ 2C3) are selected by the two address inputs A and B.

Separate strobe inputs ($1\overline{G}$, 2G) are provided for each of the two four-line sections. They can be used to inhibit the data outputs: The output of HC352A is set low, and the HC353A output set is to the high impedance state, when the strobe input is held low.

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



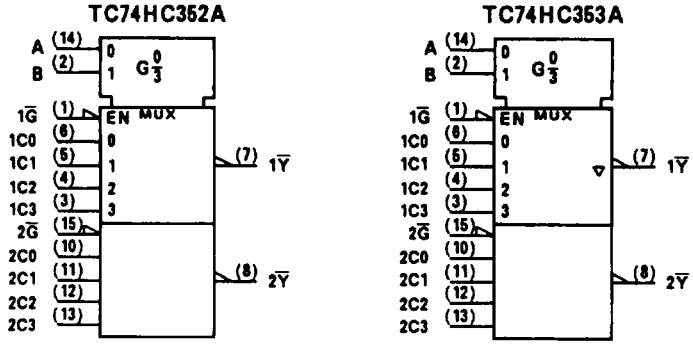




Pin Assignment

Features

- High Speed: t_{pd} = 12ns(Typ.) at V_{CC} = 5V
- Low Power Dissipation: I_{CC} = 4μA(Max.) at Ta = 25°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: $t_{pLH} = t_{pHL}$
- Wide Operating Voltage Range: V_{CC}(opr) = 2V ~ 6V
- Pin and Function Compatible with 74LS352, 74LS353

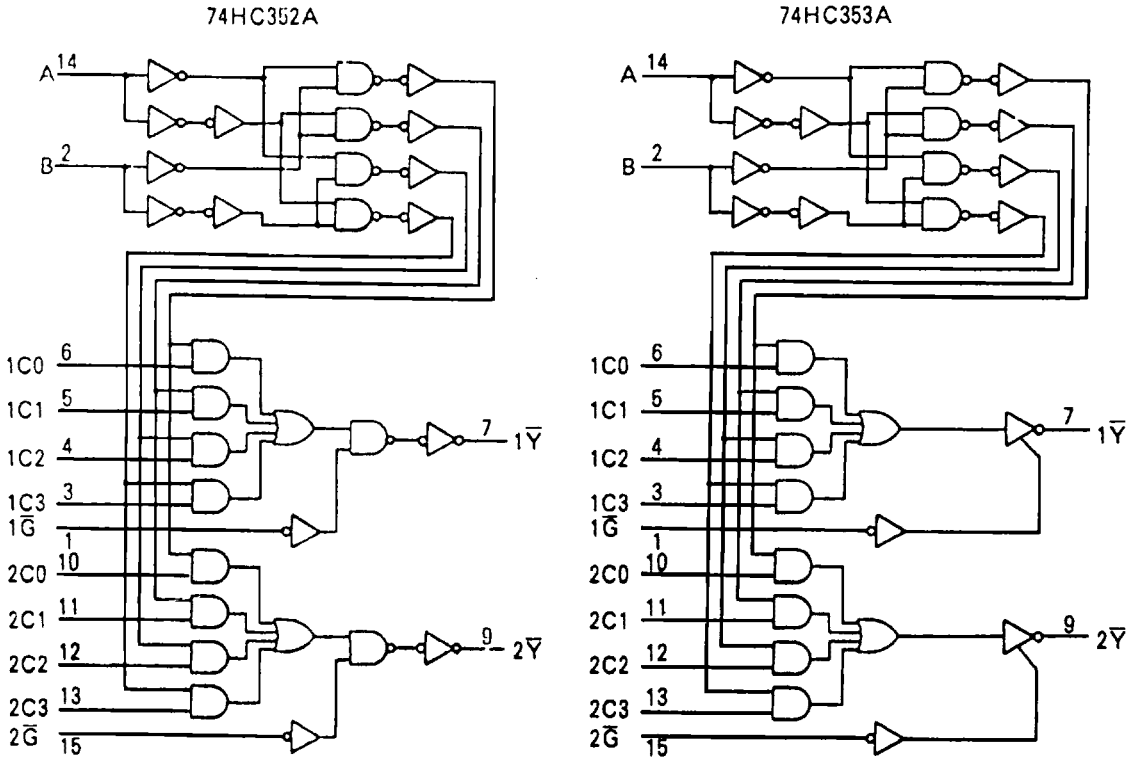


IEC Logic Symbol

Truth Table

Select Input		Data Inputs				Strobe	Output $\overline{Y}$	
B	A	C0	C1	C2	C3	$\overline{G}$	HC352A	HC353A
X	X	X	X	X	X	H	H	Z
L	L	L	X	X	X	L	H	H
L	L	H	X	X	X	L	L	L
L	H	X	L	X	X	L	H	H
L	H	X	L	X	X	L	L	L
H	L	X	X	L	X	L	H	H
H	L	X	X	L	X	L	L	L
H	H	X	X	X	L	L	H	H
H	H	X	X	X	H	L	L	L

X: Don't Care
Z: High Performance



Logic Diagram

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage Range	V_{CC}	-0.5 ~ 7	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}	±20	mA
DC Output Current	I_{OUT}	±25	mA
DC V_{CC}/Ground Current	I_{CC}	±50	mA
Power Dissipation	P_D	500(DIP)*/180(SOIC)	mW
Storage Temperature	T_{stg}	-65 ~ 150	°C
Lead Temperature 10sec	T_L	300	°C

*500mW in the range of Ta = -40°C ~ 65°C. From Ta = 65°C to 85°C a derating factor of -10mW/°C shall be applied until 300mW.

Recommended Operating Conditions

Parameter	Symbol	Value	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

DC Electrical Characteristics

Parameter	Symbol	Test Condition		V_{CC}	Ta = 25°C Min.	Ta = 25°C Typ.	Ta = 25°C Max.	Ta = -40 ~ 85°C Min.	Ta = -40 ~ 85°C Max.	Unit
High-Level Input Voltage	V_{IH}	–		2.0 4.5 6.0	1.5 3.15 4.2	– – –	– – –	1.5 3.15 4.2	– – –	V
Low-Level Input Voltage	V_{IL}	–		2.0 4.5 6.0	– – –	– – –	0.5 1.35 1.8	– – –	0.5 1.35 1.8	V
High-Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -20μA	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	– – –	1.9 4.4 5.9	– – –	V
			I_{OH} = -4 mA I_{OH} = -5.2mA	4.5 6.0	4.18 5.68	4.31 5.80	– –	4.13 5.63	– –	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20μA	2.0 4.5 6.0	– – –	0.0 0.0 0.0	0.1 0.1 0.1	– – –	0.1 0.1 0.1	V
			I_{OL} = 4 mA I_{OL} = 5.2mA	4.5 6.0	– –	0.17 0.18	0.26 0.26	– –	0.33 0.33	
3-State Output Off-State Current	I_{OZ}*	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		6.0	–	–	±0.5	–	±5.0	μA
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		6.0	–	–	±0.1	–	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		6.0	–	–	4.0	–	40.0	

* for TC74HC353A only

AC Electrical Characteristics (C_L = 15pF, V_{CC} = 5V, Ta = 25°C)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Transition Time	t_{TLH} t_{THL}	–	–	4	8	ns
Propagation Delay Time (Cn-$\overline{Y}$)	t_{pLH} t_{pHL}	–	–	12	19	
Propagation Delay Time (A, B-$\overline{Y}$)	t_{pLH} t_{pHL}	–	–	18	29	
Propagation Delay Time ($\overline{G}$-$\overline{Y}$)*	t_{pLH} t_{pHL}	–	–	9	16	
Propagation Delay Time ($\overline{G}$-$\overline{Y}$)**	t_{pLZ} t_{pHZ}	–	–	9	16	

AC Electrical Characteristics (C_L = 50pF, Input t_r = t_f = 6ns)

Parameter	Symbol	Test Condition		Ta = 25°C			Ta = -40 ~ 85°C		Unit
			V_{CC}	Min.	Typ.	Max.	Min.	Max.	
Output Transition Time	t_{TLH} t_{THL}	–	2.0 4.5 6.0	– – –	30 8 7	75 15 13	– – –	95 19 16	ns
Propagation Delay Time (Cn-$\overline{Y}$)	t_{pLH} t_{pHL}	–	2.0 4.5 6.0	– – –	48 15 12	115 23 20	– – –	145 29 25	
Propagation Delay Time (A, B-$\overline{Y}$)	t_{pLH} t_{pHL}	–	2.0 4.5 6.0	– – –	72 22 18	170 34 29	– – –	215 43 37	
Propagation Delay Time ($\overline{G}$-$\overline{Y}$)*	t_{pLH} t_{pHL}	–	2.0 4.5 6.0	– – –	36 12 9	95 19 16	– – –	120 24 20	
3-State Output Enable Time ($\overline{G}$-$\overline{Y}$)**	t_{pZL} t_{pZH}	–	2.0 4.5 6.0	– – –	36 12 9	100 20 17	– – –	125 25 21	
3-State Output Disable Time ($\overline{G}$-$\overline{Y}$)**	t_{pLZ} t_{pHZ}	–	2.0 4.5 6.0	– – –	22 13 11	115 23 20	– – –	145 29 25	
Input Capacitance	C_{IN}	–		–	5	10	–	10	pF
Power Dissipation Capacitance	C_{PD}(1)	TC74HC352A		–	63	–	–	–	
		TC74HC353A		–	62	–	–	–	

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:

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

* for TC74HC352A only
**for TC74HC353A only